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Interviewee: Ward, E. G. “Skip”
Interview Date: October 17, 1998

OFFSHORE ENERGY CENTER

ORAL HISTORY PROJECT

Interviewee: E.G. "Skip" Ward

Date: October 17, 1998

Place: Houston, Texas

Interviewer: Dr. Joseph Pratt

Side 1

JP: This is an interview with Mr. E.G. "Skip" Ward. The date is October 17, 1998. The interviewer is Joe Pratt. Mr. Ward, I want to start by asking you to briefly describe your experience in the industry, your education and background, and how you came to be in oil.

EGW: I completed my graduate work at the University of Houston, with every intention of going into aerospace work for NASA. My timing was a little suspect in that as I graduated, the space race crunched. My wife had worked for Shell in graduate school so that was my entry into Shell, if you will. So, I started Shell with a Ph.D. in mechanical engineering, and an interest in things like fluid dynamics and hydrodynamics. I was lucky enough to have gotten to become a shade tree oceanographer, if you will, early in my career.

In those days, I think the entire offshore group in Shell Research consisted of about four people, and I became kind of the oceanographer/meteorologist by default. I don't know . . . do you want more than that?

JP: When you say, "in those days," about what year was this?

EGW: I started with Shell Development in 1968, the research laboratory for Shell Oil Company.

JP: Shell Development became a very big part of the evolution of offshore technology. Perhaps you could tell us a bit about the history of Shell Development and how its role in offshore research grew over time.

EGW: Shell always fashioned themselves as a company that got into plays based on developing a technological edge, so it was a great place to be a researcher. One of their big divisions was offshore. And so, they became a very active player in trying to develop the technology and the descriptions of the environment in many, many offshore areas in those days. We saw lease sales from the Gulf of Mexico, from the Gulf of Alaska, and all up and down the east coast of the United states. And so, it was quite a frontier of technology, it was quite a frontier of the oil industry trying to move into places where they had never been. It was a very exciting place to be, not only from the standpoint of people that were interested in technology, but just interested in doing something on the business side that had never been done before.

JP: You came to lead Shell Development? Am I correct on

that?

EGW: I started out as, like I say, kind of a shade tree oceanographer. Over the years I got to where I was the manager of the offshore engineering and research department, which grew to some 30-40 people by the late 1980s.

JP: You had an incredible collection of talent at Shell. Was that all in one place or was it distributed throughout the company?

EGW: It was distributed throughout the company, and we really enjoyed working with some of the other giants on the engineering side; Pat Dunn, Bruce Collip, Carl Wickizer and many, many people like that on the engineering side. They were very strong supporters of the need for technology, and very unwavering in their support of the development of new technology, which was the role that we played.

JP: Why do you think Shell became so prominent in this area for so long, which is unusual for a company?

EGW: Well, I think that Shell Oil Company, being basically a

domestic oil company, did not have many overseas opportunities. That was the venue of Royal Dutch Shell. And so, if Shell were to succeed in a big way in the United States, the offshore had to be considered a very big part of the growth opportunity for Shell. I think that there were a lot of people in Shell that had this vision of technological excellence and a desire to get into a place where technology was the key to success. I think that kind of person naturally went into the offshore in those days.

JP: Were there landmarks within Shell that were particularly obvious to you; things that people talked about when you arrived or things that happened while you were there that really marked Shell's forward motion in this area?

EGW: Right. When I joined Shell, Shell had either just installed or soon installed South Pass 62 platforms in about 325 feet of water. Those were the landmarks of deep water activity in the Gulf of Mexico at that time. As we progressed, we began to try to understand what happened in Hurricane Camille. You mentioned that. That was quite a benchmark event, and I think it prompted the industry to take a critical look at finding out more about what happened during hurricanes, particularly the

wind wave and current loads on platforms so that we could know how to better design them.

Even in those days people were looking ahead to ever deeper waters, and I think the landmarks that you have to put in, that were important to Shell and the industry as well, were the installation of the "Cognac" platform in a little over 1000 feet of water; then the installation of the "Bullwinkle" platform in a little over 1300 feet of water. And more recently, the industry and Shell has gone away from these bound and founded platforms. They are now using floating structures such as tension leg platforms. Shell installed their first, not the first in the world but the deepest at that time in the Gulf of Mexico, and that was the Ogder tension leg platform. It soon followed by Mars, by the Van Pal tension leg platform, and then just this past summer, the Ursa tension leg platform was being installed in about 4000 feet of water.

JP: Let's get back to Hurricane Camille, which is more or less where you came onto the scene.

EGW: That is about when I came on.

JP: Camille is the most devastating hurricane to hit the Gulf Coast in our lifetime, and it came up through the offshore alley, more or less, at least on the eastern edge, if I am remembering right. So, you enter Shell and enter this .

EGW: I hope I didn't bring Camille with me!

JP: We are not trying to make you responsible for Camille but you enter Shell just at a time where things are really exciting and the scientists are presented with the most challenging hurricane in memory.

EGW: There was another piece of the challenge, another thing Camille presented: right before I joined Shell, Shell had led an offshore measurement program. It was done by such people as Maurice Patterson with Shell and Bob Hamilton who was then with Baylor, who went on to form his own company. They had instrumented six platforms across the Gulf of Mexico, in the South Pass area almost over to the Louisiana/Texas border. And these platforms were typically in the then deepest water, so they went out to a little over 300 feet. And fortunately, many of the instrumentation-made measurements worked through that storm. It was a really marvelous achievement for them.

And so, we were presented not only with the challenge of Camille but also an awful lot of data with which to try to quantify and better understand the hurricane.

The biggest waves that were measured during Camille were in a little bit bigger than 70 feet. And with those kinds of measurements in hand, and the oceanographers that worked within the industry, the oceanographers and meteorologists that were part of the academic scene could get together and begin to really develop a much better understanding of this design event.

JP: It would be useful for the record to talk about the state of knowledge as you found it when you entered the industry, and then how it evolved after Camille. Then, particularly, to move into the idea of hindcasting and how that developed, including your role in it.

EGW: O.K. Hindcasting is the practice of trying to predict what has happened in the past. It is a lot easier than forecasting because you know what the outcome is to start with. The fundamental idea in hindcasting was that there have been records of things like barometric pressure and wind observations and whatnot that have been kept religiously by mariners for years and years. And so,

when you look back to try to use history as a means of predicting future extremes, you have to go back and work with the data that is there and that leads to the set up of the basis for hindcasting. In hindcasting, what you try to do is with science and data is predict what happened in Camille, for example. Then you use those analytical models with whatever historical data might exist back in time over the last 100 years, if you can find it. And use that as a basis to set up a situation where you have data over 100 years and not just over one storm. In the process of doing this, you can perform statistics on this hindcast database and use that as a strong basis of an indicator of what will happen in the future. Is that clear?

JP: Sure. And what was your major role in this process? How did you spend your time?

EGW: We tried to bring some then modern ideas in terms of meteorology and oceanography, working principally with Pearson and Cardone at New York University, to compile quite a complete and complex model of hurricane-generated winds and waves. That way, we could get very, very active predictions of what happened in Camille. Then we could use that as a basis for studying a lot of other

historical storms, and use that as a basis for developing design criteria.

JP: Did you find much help when you started, information that was useful about the other storms' wave heights, or are you extrapolating that from other measurements of the weather?

EGW: The measurement program that I mentioned lasted until the early 1970s. So, Camille happened in 1968 . . . I think we measured five or six storms during that program. Camille was certainly the worst. As we started developing the technology and the science to try to better predict hurricane winds and waves, there were other measurements that were made in other places. There were some measurements made along the east coast of the United States. There were some measurements made offshore California. And although those weren't hurricanes, the technology that was being developed was fundamental enough to describe any storm situation. And that is how we got a pretty well-validated piece of science.

This whole idea of hindcasting had actually started during the invasion of North Africa in World War II,

where some real pioneers were given the task of trying to predict the weather for landing craft and for landing on beaches. Based on that general idea, several layers of several generations of technology were developed. When we started in the late 1960s after Camille, there had been some more primitive, I'd say, models that had been developed and this whole idea of hindcasting was beginning to gain acceptance as a basis for establishing design criteria. I think that what we brought to it were the measurements that were there, a lot of very fundamental understanding, and a much more fundamental approach in terms of the science of oceanography and meteorology.

JP: As hindcasting developed, did it change our fundamental knowledge of what hurricanes produced?

EGW: Yes it did. In fact, the industry had an exciting time coming to a consensus. I guess before Camille and before a kind of a consensus building program that I will talk about in a second, there were variations in the 100-year design wave height, which is taken as a marker of severity, between maybe 55 and 92 feet, I can remember that kind of a range.

The measurement program I mentioned had been a joint industry funded program, and I think that there were eight strong participants in that program that were visionary enough to fund us. This was also one of the early, if not the first, consensus building joint industry programs, which has been a way in which the industry over the years has been able to cost share in the development of commonly needed data or technology. It has also been very useful in building a consensus by the industry, kind of a technical consensus.

Following the measurement program, we started a program to develop this hindcast model and then another one later on to use this hindcast model to come up with a hindcast database. That hindcast database became the basis for design criteria development in the Gulf of Mexico. And in this joint industry project, there was an awful lot of consensus building, if you will -- people readily shared information, all pitched in to bringing data to the table.

JP: Who were the most prominent companies and people in that consensus building method?

EGW: There was Shell, Exxon, Amoco, Chevron. There was the

CAGC group. Texaco.

JP: Was the API involved yet or was that a different set of companies?

EGW: No, the API was a different entity, and it wasn't a part of this. All this work found its way into all of the API practices.

JP: And on that issue, how did this work affect design?

EGW: I think it brought a lot more certainty to the design. Certainly, we did away with the variation between 55 and 92 feet in terms of design wave height that I mentioned earlier. I think it increased . . . certainly, the oil companies faith in criteria and it definitely made more fundamentally sound investments, if you will, with less uncertainty. I think it had a large measure in affecting the government's view of what the industry did.

On the industry's part, there was quite an interest in getting a lot of this into recommended practices and trying to use this to help educate, if you will, with the regulatory environment. Because at about that time the MMS had just been handed the mandate to provide this

regulatory environment. It was very difficult for them because most of the knowledge about the offshore industry was in the offshore industry. And so, we worked quite closely together, and our outlet, I think, for this cooperative work really was the recommended practices that were developed by API. So, much of this work got published in order to get an open, almost a peer or academic type of review to help with its acceptability. And there was a lot of interface with the government to try to help them understand what we were doing and the strength of the basis on which we thought we were doing it.

JP: When you say a consensus developed, around what did it develop? What were the statistics that seemed .

EGW: Well, I think that everybody honed in on the notion that the design wave height was about 70 feet which, coincidentally, was about the maximum measured in Camille. And I think that the process, and not only the tools that were developed for hindcasting, the third program in the series -- first measurements, then the hindcasting methods and oceanography and meteorology, and then the third phase was that these same companies stayed, who were the major offshore operators at the

time, stayed together and developed the extreme wave statistics and extreme wind statistics, for the Gulf of Mex ico. That then pretty much became the basis for everyone's criteria.

And so, I think everybody ended up having about the same view on extremes of wind waves and currents due to hurricanes in the Gulf of Mexico. Those same tools and the same methodology, and even many of the same players, if you will, went on out of the Gulf of Mexico then, and used that same information to develop criteria all over the world.

JP: Are there more extreme conditions in hurricanes that you planned for in other parts of the world?

EGW: The North Sea has a more severe, extreme environment, and certainly a more extreme, everyday environment as well.

JP: And the design criteria there is higher than 70 feet for the extraordinary incident?

EGW: Right.

JP: In terms of before and after Camille and before and after

hindcasting, has the performance been dramatically better in terms of the durability of the platforms and the problems associated with hurricanes?

EGW: That is really a very, very difficult question to assess. It is one that the industry has spent a lot of time trying to assess. It is in their interest to know if they over-designed and spending way too much money or if they are under-designed and at more business risk than they thought? The fact is that hurricanes are such an infrequent event, and while they are large in magnitude, those extreme conditions are really at a sight. So not many platforms have been tested. When you bring some science and engineering, but basically, are trying to develop an engineered practice based on experience, that is one of the difficulties that you face. We certainly think, at this point, that we are at the right place level-wise, but there have not been a lot of losses. As a matter of fact, I am not sure there have been any losses since camille of a large magnitude.

JP: And Camille is ideal for a young man entering the industry because it is the most powerful and it goes through platform?

EGW: Right.

JP: And you had instrumentation that survived it. That is pretty amazing.

EGW: Yes, it really is.

JP: That is a pretty amazing start for a new science.

EGW: You bet. Betsy, actually, a few years earlier, was a more devastating storm to the patch because it went through what was then a larger accumulation of platforms. Hilda did the same, and they both there were platforms lost in both of those storms as well. There were platforms lost in Camille. Shell lost two in Camille. But those were two due to a different phenomenon than getting knocked over by waves. Those two platforms were lost due to soil or mud slides that were generated by the large waves.

JP: And that was in the Mississippi Delta?

EGW: Yes, that was in

JP: With a whole other set of scientific problems.

EGW: That is correct.

JP: On how to stick them down in the mud.

EGW: Right.

JP: When was that? I have heard that story all my life, about Shell losing a platform and never finding it. Is that a true story?

EGW: I think they found everything they lost. But right after Camille one of my good friends, Maurice Patterson, went out in a helicopter to begin to retrieve his data tapes, or the data tapes from this measurement program. And they went over to look in the South Pass Block 70 area and he said, "Well, one of these platforms is not here!"

JP: That's the story!

EGW: And that was the one with the mud slide.

JP: A missing one that was later found!

EGW: Which was quite a significant loss because it was in 300 feet of water. It was a deep water platform at the time.

JP: So, for an interested novice in this, the 70 foot wave design will generally mean that the platform will be built 70 feet above the normal wave?

EGW: No, the wave crest is typically two-thirds of the height. So in a 70 foot wave it might reach up, perhaps, 45 feet. And so generally, you design for the maximum height. You figure out what the crest elevation is in that and, like I say, it is about two-third above, one-third below, and then you add some allowance on there for a storm surge which generally happens during a hurricane. Then you add some kind of an allowance for uncertainty. And so, you end up with decks that are often about 55 feet above the water level in the Gulf of Mexico.

JP: What other design measures can be taken to deal with the hindsight forecast, other than deck height?

EGW: The wave heights control the fundamental push by the ocean on the platform. That basically tells how fast the water moves. If you stand in the surf on the beach and a wave comes by, you can feel the push against you. The amount of that push is principally driven by the height of the waves that you experience. Andso, the wave heights basically control the base sheer in the

overturning moment that the platform has to withstand as a wave comes by. Other things that are important in the design, but to a lesser extent, are winds. We measured winds in Camille, I can't remember, it was in excess of 100 knots. But they become a force that has to be dealt with in the design of platforms.

During Camille, in that measurement system, was before our ability to measure currents in offshore situations in any practical sense. And so, kind of the same story was repeated with currents, but this was done five to ten years later, as the technology was developed to allow us to really measure currents during storms. That is kind of the third force in function that tends to try to push platforms over.

JP: As the technology of platforms changes after 1969, does it change the questions asked of hindcasting? I am thinking particularly in the moving away from fixed platforms.

EGW: No. Basically, the platform designer still has to understand the forces of nature. They still have to deal with wind, waves, and currents as they contribute loads on the platforms and apply loads on the platforms. There

are a number of other factors that need to be considered other than just the basic amount of push on the platform by the ocean. This gets into the dynamics of the platforms and how they respond. A floating platform will move around in kind of a watch circle that is a little bit less than 10% of the water depth. So, a tension leg platform in 3000 feet will move around in a watch circle of a couple of hundred feet during a storm.

JP: So, that consideration wouldn't affect your work? They would still need to know . . .

EGW: They would still need to know fundamentally what the oceanography was, yes. But they just go on to ask even more difficult questions that are driven by that oceanography.

JP: I want to ask some more speculative questions about the creative process, about how this goes forward in the sharing of information and the experience that leads to better and better technology, better and better science.

EGW: I was thinking about the word "pioneer" over the last couple of days, and I think that there are several things that came to my mind: one was a frontier. I think we

were certainly working in a frontier area. It was a frontier technologically, and the oil industry was trying to do something that had never been done before. I think that brought quite a camaraderie amongst people that were working in the area that went across company lines, and led to a very concerted effort by a number of people from different walks of life.

In the early days of this oceanography, there was certainly strong input from the oil companies that I mentioned and their people. There was a strong input from academia, where we went out and got involved in this process to help develop and apply this technology. So, there was quite a spirit of camaraderie, a lot of sharing of fundamental technical information and ideas and things like that. That area of cooperation, I think, also spilled very heavily over into the American petroleum institutes, businesses writing recommended practices, and trying to present a picture of trying to be very self-regulating and take care of their business in a very thoughtful and sound way, and then influence the government to develop that same belief.

When some of these joint industry programs would come to an end and before others would start, there was almost a

sense of loss in that you had been working with this group of people from all different companies for a couple of years on a project, and then you would get to the end and the project would be over. There was quite a sense of loss in terms of continued technical association. It was a very heady environment of trying to develop things.

I think the industry also had, and maybe this goes back to the pioneering remark also, a lot of self-reliance. We were doing things that hadn't been done before in places .

[PAUSE]

. . . In doing that, it made me think back because now, here we are, we are going to try to raise eight million bucks .

JP: This is the A&M . . .

EGW: Yes, for the A&M . . . the state of Texas built the first one, and it is not clear how much the state of Texas wants to participate in the expansion. It was kind of reasonable. And so, here we are trying to launch this in times when crude is twelve bucks a barrel! I am also

submitting an application for an outstanding organization to OTC about the Offshore Technology Research Center. And it has made me look back at the history in the late 1980s when that was formed, in the last half of the 1980s, actually. During that time with Shell I was firing people once a year. So it kind of makes me wonder about . . . this industry is always tough times.

JP: I taught at A&M until 1986.

EGW: Oh, did you?

JP: I was teaching history. I had a course called The History of the American Petroleum Industry that would fill up with great ease, was such a fun course. And mainly, when I came to U of H, that course shrunk out of existence because the Petroleum Engineering program just stopped.

EGW: The Petroleum Engineering program is big up there now. We are working very closely with Chuck Bowman who is ex-VP of exploration of the department.

JP: Yes, because they have been cyclical historically, all those programs, but that was the most fun I ever had

teaching. These guys would come in not knowing anything about the history of the oil industry, but knowing all this other stuff that I didn't know. I'd get 50 of them at a time. Every time I offered the course, they started telling each other about it. They would go back and do class research projects and go to Austin and do research on old west Texas oil fields and the Railroad Commission records and stuff. And anything I could tell them about the history of the company, the API, the general history, they would just lap up because they knew it would help them, as far as a practical history. I have been doing it ever since in this offshore material. It is so interesting anyway. You know, that is kind of the litmus test when you are a researcher: is it exciting to do? So, I think if we can find a way to put these technological strings together coherently, it would really serve a good educational purpose broadly, but it certainly would be a fun book to write.

EGW: One of the things we are doing right now is we have been awarded the National Science Foundation grant to put together, what we are calling a Summer Institute. our vision is to get people that are new graduates or have gone to work within the industry, and are not more than one or two years into the industry. And in that, take

them from A to Z on a project, and let them go through concept selection, and take it on through and focus on right decisions and wrong decisions about the economics of a project and what you can do. Then we will get into the technological aspects of deep water platforms. And we will spend through next summer developing course materials. We will offer it for the first time in the summer of 2000.

JP: I would love to get involved in that. I am getting good at this. I do it a lot.

EGW: Well, one of the things that we envision is maybe six major technical blocks, but we want to salt and season that with some people that can come in and talk on the economics, who can talk about government regulations. So we'll see some shorter . . . more just information giving to provide these fellows with a break.

JP: I would love to do that.

EGW: That will be great!

JP: I didn't bring any cards getting up here this morning, but I will keep in touch with you. It is fun to talk

about. The more you talk about it, the more you understand it, I think.

EGW: Well, I would also think that from not only our purposes of trying to encourage people to come in but also in petroleum engineering, I am sure there are some seminar opportunities that you would be interested in. Are you still at U of H?

JP: Yes. I came down to a Chair and I am one-half management professor and one-half history professor. And it has worked out great. I love U of H, but we are not very good in these areas and we ought to be. We are not very good in energy, period, and A&M is.

EGW: My degree is from U of H.

JP: We should be and we are not. I can't make that happen. A&M has a lot better grasp of the importance of this, and it is a lot more privileged school, too.

EGW: There have been a lot of resources from government.

JP: Right, which is no secret. You've got to hire people and give them things to play with and almost always, if you

choose right, that will bring back the money you use to buy them, and bring in the equipment. But at U of H, we are a lot less able to do that than A&M. We are less pampered! This Shell book, we still have to think about the ideas that a Shell history in the Gulf of Mexico will allow us to talk about in management and technology, and not just about how a group made choices. And it is the best group, so I think it could be sort of a breakthrough book. All of you all are so young and involved, the people that did this. We keep interviewing people at Shell who look . . . I'm 50 but they appear younger than me. They are probably 60 but they have the good energy that keeps them young! And they are not in the company anymore. It is a strange system. But I guess people do the kind of things that you are doing: they go off and consult and are still involved. They are just not working at Shell.

EGW: Yes, most of them I know are still actively involved. Pat, I think, has become pretty much a cattle rancher.

JP: Yes, I went out to his ranch to interview him.

. you were talking about collegiality and sharing. Are there lessons you want to talk about for the future,

things you have learned that might be useful to people looking at this years from now?

EGW: I will just start over for this, if you don't mind. One of the things that has been a real privilege to work in this area is that there were a number of companies facing common problems, and the approach that we all took to this was a very cooperative approach. People from various companies and even from academia would be together working on the same project to develop technology, and there was a lot of technical sharing that took place in that area.

I think the other thing that united the people as they worked together on these were the fact that it tended to be a frontier area. We were out trying to do things that nobody knew how to do and that nobody had tried to do. And so, that also led to quite a bond. Being out there on our own facing some pretty formidable technological challenges, we also had to be quite resourceful. We would go worldwide looking for people and techniques to try to figure out how to do things and make things work. And I guess another part of this kind of pioneering aspect of it is that it brought people together and made them pretty self-reliant in that we had a job to do, it

was an important job to do. This technology was very much needed, and we were the ones responsible for making it work.

In this era, I think a lot of good science and technology was developed to help solve engineering problems. A lot of that science and technology is still active in the world today. It is still the basis. As people go off to west Africa and go down to offshore Brazil and the Far East, a lot of these same techniques and a lot of the same science is still being applied to the study. And a lot of that is a direct growth out of what happened in the Gulf of Mexico. The comradeship or the collegiality that continues to exist in this area stems from the fact that everybody involved in this business is kind of thrilled by the idea that their job is charted as describing nature. In particular, describe the extremes of nature, whether it is hurricane generated waves, winds and currents, the big currents that you were talking about a minute ago, or whether it is the ice in the Beaufort sea. These are all tremendous challenges, and I think they have drawn a lot of people around the world to work together and try to solve these problems that we have in common.

The way that this collegiality has impacted, I think, the industry has been that it has brought everybody to a relative consensus. As you think about it, people should have a common view of what the extremes are offshore when everybody tries to go out and do their own thing in a business sense. It ought to have about the same technological basis, or somebody is going to do something out there that will basically get the whole industry in trouble. I think we all remember back to the Santa Barbara Channel days, and I think that was a lesson that the industry really took to heart and said, we have to not only develop criteria and compete with each other in the business arena, but we have to make sure that nobody really messes up this whole offshore play for everyone. So, I think that led to a lot of the commonality and the joint industry approaches to a lot of fundamental technical issues that really don't provide a technological advantage in the terms of knowing all the answers or being able to get it out necessarily the cheapest, but it is just kind of the underpinning of the sound way to manage you business and do your business.

That same spirit, I think, led over into the early days of the American Petroleum Institute, and that, I have always seen, as industries attempt to be basically self-

regulated. It was the idea that the industry was going to put together recommended practices. Generally, this was done as an ad hoc volunteer effort by members working within the industry. That became the underpinning that said to the public and to other members of the industry and everyone, that this is the minimum that we should do, that is safe in practice. There is still plenty of room for people to excel by being a bit smarter or making a bit different kind of an investment, but don't do any less than this, I guess, is a way to look at it.

That same concern, I think, also led the industry to take quite an initiative in trying to work with the government in the early days of the MMS' involvement, when they got their congressional mandate to regulate the offshore industry. We collectively spent a lot of time working with people in the agencies in Washington, and I think have developed a marvelous working relationship between regulator and industry being regulated that exists to this day. It is a very cooperative feeling or a very cooperative arrangement in that information is passed back and forth; also, perspectives and points of views and responsibility is passed back and forth. I think it brings out the very best that can be in an industry that has to be regulated. I would say that . . . I don't like

to say it . . . an industry that has to be regulated, and an industry that is regulated by the governmental agencies.

JP: Also, we are looking all over the world for models of less intrusive government and more self-regulated models, and it is hard to find a better example than the offshore industry, particularly since Santa Barbara woke people up.

EGW: Yes.

JP: But you came right on the cusp of several big changes.

EGW: In a big way.

JP: Thank you.

EGW: Well, I hope I didn't ramble.

JP: Oh, that is a good word. There will be no rambling today, at an hour at a time, we cannot ramble. I am going to get back to you on a couple of levels.

THE END

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