

CHEMICAL HERITAGE FOUNDATION

JERRY McAFEE

Transcript of an Interview
Conducted by

James J. Bohning

in

Fox Chapel, Pennsylvania

on

26 July 1993

(With Subsequent Corrections and Additions)

THE CHEMICAL HERITAGE FOUNDATION
Oral History Program

RELEASE FORM

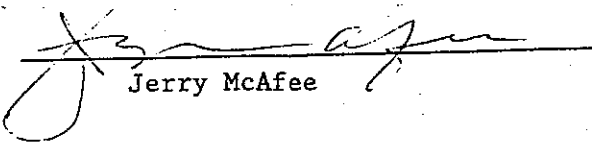
This document contains my understanding and agreement with the Chemical Heritage Foundation with respect to my participation in a tape-recorded interview conducted by James J. Bohning on 26 July 1993.

I have read the transcript supplied by the Chemical Heritage Foundation and returned it with my corrections and emendations.

1. The tapes and corrected transcript (collectively called the "Work") will be maintained by the Chemical Heritage Foundation and made available in accordance with general policies for research and other scholarly purposes.
2. I hereby grant, assign, and transfer to the Chemical Heritage Foundation all right, title, and interest in the Work, including the literary rights and the copyright, except that I shall retain the right to copy, use and publish the Work in part or in full until my death.
3. The manuscript may be read and the tape(s) heard by scholars approved by the Chemical Heritage Foundation subject to the restrictions listed below. The scholar pledges not to quote from, cite, or reproduce by any means this material except with the written permission of the Chemical Heritage Foundation.
4. I wish to place the following conditions that I have checked below upon the use of this interview. I understand that the Chemical Heritage Foundation will enforce my wishes until the time of my death, when any restrictions will be removed.
 - a. No restrictions for access.
 - b. My permission required to quote, cite, or reproduce.
 - c. My permission required for access to the entire document and all tapes.

This constitutes our entire and complete understanding.

(Signature)


Jerry McAfee

(Date)

March 29, 1994

This interview has been designated as **Free Access**.

One may view, quote from, cite, or reproduce the oral history with the permission of CHF.

Please note: Users citing this interview for purposes of publication are obliged under the terms of the Chemical Heritage Foundation Oral History Program to credit CHF using the format below:

Jerry McAfee, interview by James J. Bohning at Fox Chapel, Pennsylvania, 26 July 1993 (Philadelphia: Chemical Heritage Foundation, Oral History Transcript # 0114).



Chemical Heritage Foundation
Oral History Program
315 Chestnut Street
Philadelphia, Pennsylvania 19106



The Chemical Heritage Foundation (CHF) serves the community of the chemical and molecular sciences, and the wider public, by treasuring the past, educating the present, and inspiring the future. CHF maintains a world-class collection of materials that document the history and heritage of the chemical and molecular sciences, technologies, and industries; encourages research in CHF collections; and carries out a program of outreach and interpretation in order to advance an understanding of the role of the chemical and molecular sciences, technologies, and industries in shaping society.

JERRY MCAFEE

1916 Born in Port Arthur Texas on 3 November

Education

1937 B.S., chemical engineering, University of Texas
1940 Sc.D., chemical engineering, Massachusetts Institute
of Technology

Professional Experience

Universal Oil Products Company
1940-1943 Research chemical engineer
1943-1945 Operating Engineer
1945-1950 Technical Specialist, Gulf Oil Corporation, Port
Arthur, Texas
Gulf Research and Development Company, Hamarville,
Pennsylvania
1950-1951 Director, chemistry division
1951-1954 Assistant director of research
1954-1955 Vice president and associate director of
research
Gulf Oil Corporation
1955-1960 Vice president, engineering (refinery department)
1960-1964 Vice president and executive technical advisor
1962-1964 Director of planning and economics
1964-1967 Senior vice president, Gulf Eastern Company,
London
1967-1969 Executive vice president, British American Oil
Company, Ltd., Toronto
1969-1975 President and CEO, Gulf Oil Canada, Ltd., Toronto
1975-1981 Chairman of the Board and CEO, Gulf Oil
Corporation, Pittsburgh

Honors

1958 Distinguished Engineering Graduate, The University
of Texas
1963 Certificate of Appreciation, American Petroleum
Institute, Division of Refining
1967 Member, National Academy of Engineering
1969 Founders Award, American Institute of Chemical
Engineers
1971 Fellow, American Institute of Chemical Engineers
1981 Distinguished Service Award, Texas Mid-Continent
Oil & Gas Association
1984 Gold Medal for Distinguished Achievement, American
Petroleum Institute

ABSTRACT

Jerry McAfee begins this interview by discussing his parents and his childhood in Port Arthur, Texas. McAfee became interested in chemical engineering at an early age because of the influence of his father who worked for Texaco and Gulf. McAfee studied chemical engineering at the University of Texas and the Massachusetts Institute of Technology. He worked for five years as a research and operating engineer for Universal Oil Products Company before accepting a position as technical specialist with Gulf Oil Corporation in Port Arthur. His career with Gulf brought him to Pennsylvania, London and Toronto. He served as Chairman of the Board and CEO of Gulf for six years before retiring in 1981. McAfee concludes this interview by reflecting on his forty-year career in chemical engineering.

INTERVIEWER

James J. Bohning, Assistant Director for Oral History at the Chemical Heritage Foundation, holds the B.S., M.S., and Ph.D. degrees in chemistry. He was a member of the chemistry faculty at Wilkes University from 1959 until 1990, where he served as chair of the Chemistry Department for sixteen years, and chair of the Earth and Environmental Sciences Department for three years. He was Chair of the Division of the History of Chemistry of the American Chemical Society in 1986, and has been associated with the development and management of the Foundations's oral history program since 1985.

TABLE OF CONTENTS

- 1 Parents and Family Background
Father works for the Texas Company and Gulf in Port Arthur, Texas. Father develops aluminum chloride process. Mother studies liberal arts.
- 6 Childhood and Early Education
Two oil refineries are biggest employer in Port Arthur. Effect of the Depression. Wants to become chemical engineer like father. Attends Port Arthur public schools.
- 8 University of Texas
Chemical Engineering Department. Laboratory facilities.
- 11 Massachusetts Institute of Technology
Receives Tau Beta Phi Fellowship. Studies chemical engineering with Warren Kendall Lewis. Thesis on nickel catalyst under Harold Walker.
- 15 Universal Oil Products Company
Marriage to Geraldine Smith. Development of catalytic cracking process. Cooperation between industry and government. Organizes group to design better catalytic cracking unit. Designs McAfee gauge.
- 26 Gulf Oil Company
Five years as technical specialist at Port Arthur refinery. Works on pilot plant for HDS process. Moves to Hamarville, Pennsylvania to become director of Gulf Research and Development Company. Pittsburgh management course. Becomes vice president of engineering in refining department. Reorganization of Gulf under W. K. Whiteford. Petroleum Research Fund.
- 41 London
Becomes Gulf representative on Kuwait Oil Board of Directors. Visits Iran every year. The Organization of Petroleum Exporting Countries.
- 45 Canada
Controversy over imported crude. Takes trip to the Arctic. Gulf uranium ventures. Syncrude Project. Reasons for excluding Canada from global reorganization. Canada Board of Directors.

58	Chairman of the Board	Selection process. Writes "Statement of Business Principles." Changes name of Chairman's Council. Extricates company from uranium business. Price controls.
66	Reflections on Career	
73	Notes	
75	Index	

INTERVIEWEE: Jerry McAfee
INTERVIEWER: James J. Bohning
LOCATION: Fox Chapel, Pennsylvania
DATE: 26 July 1993

BOHNING: One of the chemical engineers whom I've interviewed is Hoyt Hottel.

MCAFEE: As a first year graduate student, I was just starting out, scared to death and confused. One night he invited me to go over to some club that he belonged to on Beacon street, that specialized in cheese fondue. Mostly it was a gab session with some very interesting people. He took me along as a colleague. He made me feel like I was somebody. We ate fondue and talked like we knew what we were talking about. I will never, ever forget that experience. It was a wonderful introduction to MIT and its humanistic aspects, when you get down under the surface. And especially Hoyt Hottel. He is quite a remarkable man.

BOHNING: During the first session, after we had gone about three hours, I suggested that he might want to take a break. He looked at me and said, "You've just got me started. Put another tape in!"

MCAFEE: I'll bet that tape was just as good as the others.

BOHNING: Absolutely. He is an incredible man.

MCAFEE: It would be helpful to me to know how to respond to your questions, if you would give me a little background about the project, the audience that your writing and speaking for, and what you want to do with this.

BOHNING: First of all, we are trying to create an archival repository that can be used by scholars. We are interested not just in the technical aspects, but in personal aspects, starting with parents and family background. We will transcribe this and edit the transcript. You will also have a chance to edit it, and you will have control over who will have access to the final document.

I don't have a very specific agenda. We try to put an autobiography together. What you just said about Hoyt Hottel is exactly what I am looking for, the human side of science as it were, which we too often tend to forget about. I feel very strongly about that.

MCAFEE: I'm glad to hear you say that, because I do too. It's the people, when you come right down to it, in this profession as in any profession.

BOHNING: With that, why don't we get started. Dr. McAfee, I know you were born on the third of November in 1916 in Port Arthur, Texas. I also know your father worked for Gulf at that time. Could you tell me some more about your parents and your family background?

MCAFEE: Sure. In fact, this could take all day, if you really want to go into it. [laughter] I was very fortunate in being born into a wonderful family, both father and mother, and sister and brother, in Port Arthur, as you point out. My Dad [Almer McDuffie McAfee] was in the oil business for almost forty years. He got out of Columbia University with a doctor's degree in chemistry, with a major in industrial chemistry, which was the nearest thing there was to chemical engineering at the time.

BOHNING: When would he have graduated from Columbia?

MCAFEE: I believe it was 1911. Immediately after getting out of Columbia he went to work for The Texas Company, as it was then called, in Bayonne, New Jersey. Shortly after that he transferred into the Port Arthur refinery of The Texas Company, as their principal scientist, their number-one technical guy. During the couple of years that he was there, he began work on what later turned out to be his best work—aluminum chloride as a catalyst, as it applied to the oil industry.

After a couple of years, he came to cross-purposes with his boss. (I don't know what the details are; I never did know and I really don't want to know.) They parted company and Dad went across the street, more or less, to the Gulf refinery, which was also located in Port Arthur. It was their principal refinery. Like Texaco's, it had been built primarily to process Spindletop crude. It was, for that day, a big refinery, as was Texaco's. So for the period of my boyhood, it was a two-company town; Texaco on the one side, Gulf on the other, and never the twain shall meet. There was a lot of competition, a lot of friendly rivalry.

With Gulf, Dad went on and developed the aluminum chloride process—the "alchlor" process, as they came to call it—which in essence had three prongs. First, they found that aluminum chloride, basically the old Friedel-Crafts reagent, could act on petroleum hydrocarbons in such a way as to crack them. At that time, thermal cracking was just beginning to come in and catalytic cracking was unknown. Most gasoline was made by straight-run distillation, and, of course, was very low octane and varied depending on the crude oil source.

They found that by treating a furnace-oil distillation-range fraction with about five percent aluminum chloride, heating it up in a pot and stirring it for a couple of days, and then distilling off the products, they produced a higher yield of gasoline, which they found just by pragmatic trial-and-error ran well in the cars of the day; it didn't knock. So they said, "What a great thing. We'll call this no-knocks gasoline." That was the mainstay of Gulf's retail business for years and years. "No-Nox" gasoline.

(I'll just go on with this part of the story and then come back to the development part.) In it's heyday, which was about 1929, I remember there being a string of about twenty thousand-barrel pot stills along the highway in the Port Arthur refinery. Each of them had a fire under it and a stirrer from the top. They would pump in a thousand barrels, more or less, of furnace oil, and dump in five percent, more or less, of aluminum chloride, and sit there and keep the fire going and stir the pot for forty-eight hours; all the time boiling over the lighter fractions, and getting no-knocks gasoline and some lighter products that were wasted.

At the end of two days, they would have a pot full of coke, and they would turn off the fire, cool down the still, and open the hatch. After it cooled, they would send in some laborers to pick out the coke by hand and throw it out the front. I remember that was a sight to see: the laborers in there throwing the coke out through the hatch. It made great piles of coke, but it also made great barrels of gasoline and great piles of money for Gulf. [laughter] So it was a very attractive piece of business for Gulf. In fact, it built Gulf's business at that time.

Now, to go back to the development.

BOHNING: Before you do, I'm curious about the large amounts of aluminum chloride they were using. Where were they getting it from?

MCAFEE: That's what I'm coming to. From a scientific standpoint, it was very elegant; it worked just dandy! As long as you had some aluminum chloride on the shelf, you just reached

down and dumped some in; there was no problem. But at the time, aluminum chloride cost a dollar-and-a-half a pound. At a dollar-and-a-half a pound and five percent of the oil, the economics were obviously just completely out of shape. So they set to work to find a way to make a usable, technical grade of aluminum chloride more cheaply.

To make a long story a little bit shorter, they developed a process for the direct chlorination of bauxite, using chlorine and oxygen directly. Somehow, it worked, and made a technical grade of aluminum chloride, about ninety-six or ninety-seven percent aluminum chloride, which was quite satisfactory for their purpose. And the cost of it was something like a nickel a pound, instead of a dollar-and-a-half a pound. This put it in the economically feasible range at that time.

Frankly, the development of the aluminum chloride producing process, the manufacture of aluminum chloride itself, was at least as important as the application of aluminum chloride as the catalyst. Although the catalyst part was significant in itself, particularly the fact that it was the first catalytic cracking process. It is not always recognized, but it was true, and it predated the others by a long time. Quality-wise, the no-knocks gasoline was superior to the thermally-cracked gasoline which came along later in larger volumes and lower costs.

It was a good product for its day. Just to compete the third prong of the alchlor development or McAfee process or processes, if you will: In the late 1920s, I guess it was, while the alchlor gasoline, "No-Nox" process was still in its heyday, they looked for other ways to extend the reagent catalytic properties of aluminum chloride. They applied it to lubricating oil, and found that, sure enough, it was a good refining agent. It was by a somewhat similar process, treating lubricating oil fractions at not as high a temperature and for not as long, but under different circumstances, that they found they produced a very high quality motor oil, which became "Gulf Pride," "The world's finest motor oil," it says here. That really was the beginning of Gulf's dominance, for many years, in the lubricating oil business.

After these developments, Dad was regarded highly in the company and in the industry, and in chemical and chemical engineering circles. Professionally, I think he was recognized as being one of the guys of his day. He stayed on, however, in the Port Arthur refinery, by election. They wanted him to move to Pittsburgh and take charge of their research. He said, "I like it here. I'm a Texan by birth and I'm going to stay right here and raise my family." Which he did. I'm glad he did, because it all worked out pretty well.

He stayed on then as superintendent at the alchlor plant and technical expert or whatever, and made quite a good career of it.

In his later years, he became very active in civic affairs and devoted a lot of time to the school board, as did my mother later on, and to the ration board during the war and Rotary Club and all these good things. He was a good citizen, one of the stalwart's of the city.

Mother (Marguerite Calfee) was also a Texan. She was born and raised in Waxahachie, Texas, which is not far from Corsicana, which is where my father was born and raised. They'd known each other at the University of Texas. Then she went to Bryn Mawr and got a master's degree there. She and dad courted when he was at Columbia and she was at Bryn Mawr, and finally they got married and moved to Port Arthur.

BOHNING: What was her area of study?

MCAFEE: It's general literature. Liberal arts. There was no scientific background.

BOHNING: It's somewhat unusual, in a way, that at that time your father was getting a Ph.D. in chemistry in 1911 and your mother was doing master's work at Bryn Mawr. There must have been a drive somewhere for the academic aspects.

MCAFEE: There was, and I don't know what it was, Jim. Dad was the ninth or tenth of eleven children in his family. His father was a storekeeper in Corsicana. I think he just somehow had that inner drive that made him go. He was going to do something with his life, and by golly, he saw it through. He was a tenacious guy. He was a short fellow; his stature was 5'2" at most, something like that, and slight of build. Just a wiry little guy, but he had a lot of energy.

Mother came from a (I hesitate to use the word high-class; that's not a good word these days) more elegant family background. They had more stature in the Waxahachie community than his father had in the Corsicana community. It was more or less assured that she would go to the university.

She went to the University of Texas and Bryn Mawr, and then actually came back to the University of Texas as the assistant registrar for a period. She had an interesting outlook on life and a broader outlook than Dad's outlook, which was basically technical. She added a breadth to our family which was needed and which was very much appreciated.

She too, was extremely active in civic work, in church work, and all the good things that came along. After Dad served I guess, ten years or more as chairman of the school board in Port

Arthur, then she ran for the office and served another ten years. So they had something to do with the Port Arthur school system for quite a few years. When Dad retired in 1953, they moved up to a little country place in Woodville, Texas, which is about sixty or seventy-five miles north of Port Arthur in the piney woods.

As his hobby during the years, Dad had gone to that part of the country to do fox hunting. He and some cronies had some fox hounds, and most Saturday nights they would go up and turn the dogs loose and listen to the hounds chase the fox until the wee hours of the morning. He took me along a time or two. I really never got into fox hunting at that time, because the joy of it, apparently, was to sit there and listen to those dogs chase that darn fox. The trick was to pick out who's your dog, and is he leading this guy's dog. "Old Bay has got him down now. Boy, he's got his trail, and he's going to go this way and that way." It's an esoteric sport, which I never got into. [laughter]

So that was pretty much the family background.

BOHNING: What was it like growing up in Port Arthur?

MCAFEE: It was interesting, particularly in the fact, as I mentioned, that it was a two-company town. Everything, and I mean everything, revolved around one or the other of the refineries. What went on in those refineries was what went on in the town. The grocery stores, the banks, the drug stores, and everything else were there to serve the people who worked in the refineries. They were the big employers, and that was what it was all about.

The domination of the city politics and all the civic activities was a direct result of that situation, and either you were on the Texaco side (or The Texas Company, as it was then) or you were on the Gulf side. As I mentioned, the two didn't get along too well together, sometimes. But, in spite of that, there was relatively a good deal of middle-class money available. The wages were relatively high and people were working steadily. They very soundly saw fit to spend a lot of their money on the good things, like a good school system.

For a long time, Port Arthur enjoyed the reputation of the best school system in the State of Texas. They were one of the first Texas schools to go to a 12-grade system, for example. We were recognized as being one of the outstanding schools, in many respects. Nevertheless, it was pretty much a small-town atmosphere, and while you didn't know everybody, you knew a great many, and you pretty well confined yourself to Port Arthur and its activities.

Beaumont, which was about twenty miles north, was another old town. But it was larger and more sophisticated and richer. Frankly, the Beaumont people were regarded by the Port Arthur people as "damn yankees." [laughter] It was that far north. It was unheard of for somebody to live in Beaumont and work in Port Arthur, although now it's done all the time.

But Port Arthur was a good town to grow up in, in that it was a real town. There were people of a broad spectrum of affluence; everything was relative. Nobody had much money, [laughter] but some had a little more than others. You were exposed in the public schools—and that's all there was—to everybody who was there. So yes, it was a good town to have been brought up in.

BOHNING: Did the Depression have much of an effect?

MCAFEE: Very much. It had a tremendously depressing effect on the refineries, of course, and it was a tough time. Now, I was extremely fortunate. Even though I lived through the Depression years, I was practically unscathed by it. Dad's job was one of the better ones in the refinery, and we were able to really get through the Depression without any serious crimp. I had to feel a little guilty at the time, because I was able to be one of the lucky ones to get a summer job at the refinery. There were frequently many jobs, but during the Depression not quite so many, for high school and college kids to come in and work over the summer vacation period as relief workers and whatnot.

I will always regard that as one of my blessings, that I was able to do that, because it got me acquainted with what it takes to make a living fairly early on. The first summer I worked at the Gulf refinery, I worked for thirty-five cents an hour. My job, along with two or three other high school boys who were hired for the same purpose, was to go out behind what was then the experimental lab. There were hundreds of fifty-gallon drums of samples of oil and chemicals and whatnot stored back there. With the mushy ground that Port Arthur is built on, they were gradually seeping into the muck more and more. Our job was to go out and move those drums and spread crushed brick from an old furnace or whatever underneath where the drum was and move the drum back, so it wouldn't sink in the mud! I'm telling you, that was a pretty good introduction to the fact that I didn't want to be a laborer. [laughter]

In other summers, I was lucky enough to get into a laboratory job in one or two of the laboratories, and finally a little pseudo-engineering job, making flow sheets in the engineering department. So I got a bit of a flavor of the refinery through that exposure.

Even before that, I will regard it as a blessing that my Dad was good enough to frequently take me out to the laboratory at the plant on a Saturday and let me fiddle around in the lab, while he did whatever he did. One of the chemists there was good enough to show me how to blow glass. I had a fascinating time, blowing glass in my own clumsy way. That exposure, together with exposure to Dad and what he was doing and how he was wrapped up in it--and it was absolutely his life--made me be one of the lucky ones who never went through any period of doubt as to what it was I wanted to do with my life.

I wanted to be a chemical engineer before I knew what the words meant. I wanted to be like my Dad, because that was such a satisfying life that he seemed to be living. He seemed to be doing such exciting things. Somehow the fire was lit under me fairly early in life. It never went out. My enthusiasm for the profession has continued every since.

[END OF TAPE, SIDE 1]

MCAFEE: To get on with my educational background, I went through the public schools in Port Arthur. I did pretty well, grade-wise, and I participated in all the activities except sports. I was never inclined to and I was never smart enough or able enough to play very well. I was a member of the debate team and did a good deal of public speaking in school. There were Latin contests and that sort of thing, mostly scholastic.

I went to the University of Texas in 1933.

BOHNING: Was it preordained that you would go there, since both of your parents had gone there? [laughter]

MCAFEE: Oh, yes. There was no other place to go. I mean, you went to the university, the university, with a capital "T." That was all there was to it. I went to The University in 1933, in chemical engineering. I got along pretty well there and enjoyed that period very much indeed. I was fortunate enough in my senior year to be awarded a Tau Beta Phi Fellowship, which let me go wherever I wanted to go. Of course, I wanted to go to MIT.

So that got me started on the road to MIT. It didn't pay all that much; but the fact that I was able to qualify for it and able to make the grade, as far as getting into MIT is concerned, was a big boost to my morale. I was glad to have that chance.

BOHNING: Tell me something about the chemical engineering department at UT. Your father had gone there as a chemistry

major, is that correct?

MCAFEE: That's right.

BOHNING: I see you were taking a lot of chemistry at the same time. What was the chemical engineering department like?

MCAFEE: Embryonic. The nearest thing to a chemical engineering professor of standing that the department enjoyed at the time was Dr. E. P. [Eugene Paul] Schoch, who was a pretty well known physical chemist in his own right. He taught physical chemistry. That's what I took from him, and that's what my Dad had taken from him. My father was a great admirer of Dr. Schoch in his younger days and was close to him personally over the years. As a matter of fact, Dad was chairman of the school board when I graduated, and he invited Dr. Schoch to come down and give the commencement address to our high school class.

His chemical engineering interest, however, was concentrated on, in fact almost limited to, water treatment. He felt that water treatment was the end-and-all of being, and that to be a good water treatment plant operator was a nice form of life. Had I been exposed only to Dr. Schoch's chemical engineering, I might have a somewhat different view of the chemical engineering profession.

Later on, he got interested in making various products from natural gas, by an electronic discharge method of some sort. I never understood it, and I'm not sure he did. But it worked, more or less, but not real well, certainly not commercially. But that was a later phase of his career.

I was lucky enough that I was in the first class of a man who they brought into the department as the first real chemical engineering professor. He was John Griswold, who was a recent MIT graduate and a very smart fellow, but very inarticulate. He was not really cut out to be a public speaker, or from where I sat, a teacher. He was a terrible teacher. He would get up to the blackboard, turn his face to the blackboard and mumble and mumble. If you really were interested in finding out what he said, you just had to listen like crazy and then ask a bunch of questions afterwards.

But he knew what he was talking about. He introduced us (me included) to chemical engineering as it really was. I began then to realize that this is a pretty broad field, a lot broader than water treatment. [laughter] I think that had something to do with my going to MIT. I was inspired by what he obviously had learned being there.

We went on to be good friends later on. I had a high respect for him. He never really became an orator, far from it. But he did a good job as a chemical engineering professor.

BOHNING: You said that you wanted to emulate your father, and yet he was a chemist and you selected engineering as opposed to straight chemistry. Is there any reason for that?

MCAFEE: You're quite right. He took chemistry because that's all there was to take, but he specialized in industrial chemistry. He was more of an industrial chemist and more of a chemical engineer than he was a chemist. I think he was a pretty good chemist, but he wasn't a research chemist. He wasn't a theoretical chemist, either physical or organic; he was more on the practical side. So chemical engineering wasn't that much different from what his real career had been, even though it was in the very early days of the profession.

BOHNING: Did you have any practical experience in chemical engineering at UT? Were there any laboratories that were directed specifically to chemical engineering?

MCAFEE: Minimal. In fact, I can't remember a single laboratory that I would call a chemical engineering laboratory. That was a new field for The University of Texas, and they were just getting into it. So no, there was not that sort of a facility. I didn't really get into the practical laboratory part of it until the Practice School at MIT (which we'll come to a little later), which was a very important part of my educational background.

I can't think of anything else that we really ought to mention at the university level.

BOHNING: How many students were in that chemical engineering program? Was it a small number?

MCAFEE: In all four classes, it was about a hundred to a hundred and twenty, something like that. In the individual class, maybe twenty. We were fairly low on the engineering college totem pole. At that particular time the civil engineers, the mechanicals, the electrical engineers, and to some extent, the petroleum engineers, were the glamour boys.

But chemical engineering came into its own. I was fortunate enough to be in it during its days of glory, its heyday, its golden age.

BOHNING: You sort of indicated why you went to MIT, because of the Griswold connection. Was there any other place, or was MIT the only choice you had?

MCAFEE: MIT is the only one I seriously considered. I did apply at Caltech and was offered a fellowship there, but I elected to go to MIT. I don't believe (I can't remember now) that I went through the application process in any other university, because those were the two outstanding ones, and I wanted to go to the best, if I could. The Tau Beta Phi Fellowship gave me the opportunity to go anywhere I wanted to, and so I was able to. It probably would have opened the door any place I had applied. But those were the two that I (by whatever means) had determined were the two I wanted to consider.

BOHNING: Had you done much traveling before this, or was going to Cambridge your first time out of Texas?

MCAFEE: Not quite the first time, but darn close to it. [laughter] The family had taken a trip to The World's Fair, The Century of Progress, in 1939. We'd gone up to Chicago, and that was quite an expedition. Most of our travel, though, had been in Texas. Of course, that doesn't limit you too much; [laughter] there are many places to go in Texas. We used to spend summers alternating vacations with my mother's sister's family, who lived in Uvalde, Texas, west of San Antonio. They would come to Port Arthur for the summer one year, and we'd go to Uvalde for the summer the next year. This went on for several years, when my brother and sister and I were growing up. So we got to know the west part of Texas a bit, by that association.

But no, it was a new experience, and I'd never been exposed to the northeast. The family made it a family expedition to take me up to MIT in the car. They made it a bit of a vacation trip. They dropped me off at MIT, and then drove back, and left me dangling amongst all those Yankees, [laughter] trying to get along.

It was a traumatic transition, as it would be for anybody making that move. Having been one of the smart boys in the chemical engineering class at The University of Texas and having been valedictorian in high school and all that, I thought I was pretty hot stuff, as one tends to think in a case like that. [laughter] But it wasn't too many days at MIT before I got my ears pinned back a time or two and realized that there were a lot of other people in the world who were actually a lot smarter than I was, [laughter] and I had to really stir my stumps to keep up.

I will never forget one of my first classes with Doc Lewis, W. K. [Warren Kendall] Lewis. I was in his "10.21" or whatever the course number was. He used Walker, Lewis, and McAdams as the textbook (1). Basically, it was just general chemical engineering. Unit processing is what I'm trying to think of. I was on the question mat, and I flubbed some questions and gave a dumb answer. Boy! He just pinned me up on the blackboard and started throwing darts at me. I said, "Lord!" [laughter] I didn't know what to say! I went home so humiliated that night; I just didn't know whether I was going to make it or not.

But I realized later that the man had been right, and I'd been just as crazy as heck! I tried to pull the wool over his eyes. That was the mistake I made. I realized that later. I tried to make Doc Lewis think that I knew something I didn't know, and boy, with him, you didn't do that. I soon learned that if you don't know, you say you don't know, and if you do know, you speak fairly crisply and stick to the subject at hand.

Doc Lewis was a wonderful man. He was really one of the inspirations for me for chemical engineering, as far as I'm concerned, and for a lot of other people too. He was "Dr. Chemical Engineering" and the epitome of the most complete blend of real solid scientific knowledge and practical application that I've ever known! Of great wit, and a very effective teacher. Sometimes a little brutal, but he would get the point over; no question about it!

I was extremely lucky, in that part of my career, to have been at MIT at the time the giants were there. Doc Lewis was the chief among the giants. But there were also Dr. [William Henry] McAdams ("Mac") and Ed [Edwin Richard] Gilliland, who I was closer to. [William H.] Walker, of course, had gone, but Lewis was still there. And Hoyt Hottel, as we talked about earlier, was one of the big guys and was a great source of inspiration to me, personally, and was very kind to me.

Later on, I became very close with Harold Weber, who's specialty was thermodynamics. He became my thesis professor later on, as it turned out. We were very close friends, and I had a very, very high regard for Harold. Tom [Thomas K.] Sherwood was there at the same time.

There are other names, but those are the ones who come to mind first. They were all more or less pioneers in the profession, and certainly, men of great stature in the profession who were highly regarded. They had a great regard for the profession as a profession, and recognized that it had a standing at least equal to the other engineering disciplines, and behaved themselves accordingly—both academically and professionally and personally. They were a fine bunch of people. I just will never be grateful enough for the exposure to them.

I somehow managed to get through the course work. Not with a great deal of distinction, although I got through everything and made reasonably good grades. I was a long way from being the smartest guy in that class; I knew it at the time, and I still know it. But I'd worked pretty hard, and it turned out all right.

My big break came when I was selected to go to the Practice School. That was the big eye-opener for me, as it has been for a lot of people who've gone through the Practice School. I don't know whether you're familiar with the Practice School or not, but it was an educational experience that I value extremely highly, as do most of the other people who've gone through it.

It was a unique arrangement, in that we were sent out in small groups of twelve to twenty to live for two or three months at that time, at each of three Practice School stations. I was at the Bethlehem Works in Lackawanna, New York; the Hercules Powder Plant in Parlin, New Jersey; and the Eastern Manufacturing Company, I think it was called, a paper mill in Bangor, Maine, as my three stations. We served for those two or three months as a technical team for that company and worked on technical problems that they had. Hopefully, in some cases, we came out with constructive solutions to a problem.

But in any event, whether we came out with a good solution or not, we learned a great deal about what the problems were and how to go about solving them, and how to work together, and how to explain it to your boss when you've finished; in other words, to apply what we had been learning in the classroom for three years. That was an eye-opening experience that without any question had a great deal to do with my continuing dedication to chemical engineering as a way to make a living.

BOHNING: So the companies actually gave you real problems to work on?

MCAFEE: Yes, that was one of the keys to it. Each station had a director who was full time on the faculty at MIT, at least assistant professor or maybe associate professor. He had an assistant, also on the faculty, at a lower level. Those two guys, together with appointed representatives of the companies, would work out a program of problems, of technical assignments, that needed to be done. They were real problems.

For example, I remember running a heat and weight balance on a blast furnace in the Lackawanna plant, and trying to measure the inflows and outflows, both in quantities and temperatures and analyses. Somehow, as it turned out, I got a pretty darn rough heat balance, but at least we knew approximately where the big heat losses were and the big heat consumers. The weight balance

showed, more or less, where the stuff went.

It was an eye-opener. It taught me what part of the steel business was all about. It also taught me how to get along with the guys in the open-hearth floor that had to shovel those buckets of dolomite or whatever into the open-hearth furnace from time to time.

It was a wonderful learning experience, in many ways. At each station, you had to learn to get along with your fellow [laughter] inmates, as it were—your fellow members of the team—and your landlady, and they varied from good to bad, in the new community. It was a wonderful growing-up experience.

I came back then and did a thesis under Harold Weber. It will never shake the world. I'm sure that it was one of the thinnest theses, both learning-wise and substance-wise, [laughter] that's ever been turned in at MIT. It was on, of all things, the "catalytic decomposition of normal heptane in the presence of a nickel catalyst." If you ask me how I got into that or why I was intrigued by this as a subject for chemical engineering research, I'm going to have to draw a blank, because frankly, to this day, I don't know. I guess I was attracted to it because at that time catalytic cracking was just beginning to raise its head. With Dad's background in aluminum chloride, that was catalytic cracking, in a sense; it was also reagent cracking but also catalytic, to some degree.

I said, "Well now, this is a great field. I know that nickel is an active catalyst for a lot of things, and if I could find the trick to putting that energy to work, as it were, in a constructive way, instead of just blowing everything it touches in the hydrocarbon area into smithereens, then maybe we'll have something." The idea was to somehow find a tag that you could hang on to, that would give a clue as to how nickel's catalytic effect might be directed into more useful purposes than carbon and hydrogen. The net upshot of it was that we turned up no such clues and demonstrated, once again, that nickel's effect on most hydrocarbons (certainly on normal heptane, which we used just for analytical convenience purposes) was to blow it to smithereens to carbon and hydrogen; period.

Therefore, we didn't contribute a great deal to the knowledge of the world, except that it was one more thing that didn't work. [laughter]

BOHNING: Did you devise that problem or did Weber assign it?

MCAFEE: Yes, I did. I have sometimes regretted that I didn't go around to the various professors and say, "What have you got that you're interested in, that I might be interested in?" What I

did, really, was to dream up the problem and go around to find a professor who would sponsor me. Harold had an interest in the Universal Oil Products Company and an interest in catalytic cracking. He was intrigued by the possibilities.

So he took it on. But the burden was really on me to try to plow the ground, rather than just relying on the professor to do the thinking and I do the work, which has its pluses and minuses. I don't regret that part of it at all, because I was a little bit on my own. Some of my thesis brothers, who simply were filling nooks-and-crannies for their professor's pet project, they got something out of that, that I didn't have, but I got something out of mine that they didn't have.

Somehow or other, I got through the doctoral exams; I don't know how.

Oh, there is another thing. I'm regressing now. Another of the giants who I should have mentioned earlier was Walt [Walter Gordon] Whitman, who was chairman of the department, during at least part of the time that I was there. Thinking of my thesis reminds me of him, particularly because I think he was perhaps one of my proponents in my thesis exam. He was a good deal kinder to me than some of the others. At least, I thought so at the time. But he was a nice man. Basically, he was just a very genuine gentleman. But I think he somehow took my side, maybe a little more than he had to; I will always be grateful to him for that.

[END OF TAPE, SIDE 2]

MCAFEE: Somehow I got past the thesis hurdle, and I think that was in March. By that time Harold Weber had already lined me up for a job with the Universal Oil Products Company [UOP] in Chicago. Harold was a consultant for UOP, and apparently he gave them a good recommendation. Without going through any interviewing, in the sense of seeing the recruiters as they came through, I went out to UOP and talked to Dr. Gustav Egloff, who was another giant of the industry, as I'm sure you know, and some of the others. They seemed to think I had possibilities, and I certainly was intrigued by what I saw of UOP. Before I graduated, I was offered and accepted a job.

As soon as I got the thesis over and had the degree assured, I took off from MIT and went to work. Part of the incentive was that, during the period that I had been at the university and MIT, I had courted and won the heart of the young lady that you met a little while ago, my wife Geraldine Smith, who happened to be the daughter of people who lived about a block from where we lived in Port Arthur. One of the things that brought us together was the fact that her father, who was a great tennis player,

built for his kids a tennis court, more or less halfway between their house and our house.

Her brother was about my age and he was a tennis player. I was trying to play tennis, and we played tennis frequently. And this little girl, Harold Smith's sister, would sometimes come out and get in the way. We'd shoo her away. So we kind of grew up together. She was a pal of my sister, and we were very close as family friends.

One thing led to another. She went to the Texas State College for Women in Denton, Texas, at that time known as the College of Industrial Arts. She took piano lessons and studied the teaching of piano. Her father was determined that she was a musical talent, and that she was going to learn to play the piano and teach piano, if it killed her. It almost did, because she didn't really have the talent, but she was a hard worker, and she worked at it and she did fine. But she never really loved it, never really got into it. She ought to have been a mathematician or economist; she's got that kind of a brain. She's wonderful, but a musician, bless her heart, she's not; she's not a musician much more than I am.

We went through a period of courtship, and then we fell apart and then came back together. As a matter of fact, when I was preparing for my doctoral exams, at that time they had a French and a German language requirement. I don't know whether they still do or not; I don't think they do. But you had to have a working knowledge of French and German. I had taken a course in German at The University and could somehow, with the help of a dictionary, make out what I had to.

I'd never had a French lesson in my life! But Geraldine had had French in college. So one summer, when I was at home, she said, "I'll teach you French if you really have to learn French." That was during our period of falling out, when we weren't seeing each other; we were seeing other people. We were dating other kids; that's what it amounted to. She said, "I know how to teach you French." And I said, "Wonderful."

I went up to her house, and we got the French book out and we worked on the French for two or three days. One thing led to another, and I said "Well, let's go to a movie." So we went to a movie, and one thing led to another, and before long we were courting again. You know how things work. We were engaged to be married at the time I finally passed the thesis in. She said she wouldn't marry me until I had both a degree and a job, so I was anxious to get on with both of them.

So I went to work for Universal Oil Products Company in Chicago, Illinois. At that time, they had their research laboratory at Riverside, Illinois, west of Chicago.

BOHNING: Had you had much contact with your father through this period? Were you getting any advice from your father, or did he sort of let you find your own way?

MCAFEE: To a remarkable degree, he let me find my own way, for which I'm grateful. He was always there, and I never for a moment doubted his support, but neither did he meddle in my business. He told me that he wanted me to make it on my own, and I wanted to. That's interesting. When it came time to decide where I was going to go to work, because of my father's association and because of the former work at Gulf in the summers, I had felt sure I could have gone back to work for Gulf. They were looking for technical people, hiring a bunch every year, and I think I could have, undoubtedly, wrangled a job there.

I consciously said, "I am not going to go to work for Gulf, because it will be seen that I got the job with the pull of my father. I'm going to make it on my own, damn it! If I make it, I'm going to make it on my own. And I'm going to establish myself someplace else."

UOP filled that bill very nicely. That whole company was an intriguing activity. As you may know, at that time particularly, they really were the technical arm—the research and development, the engineering, the innovative arm—of the independent refining sector. The big companies, the Standard Oils and the Texacos and the Shells and the Gulfs, had their own research establishment, their own technical people, their own engineers. But the little independent teapot refiner didn't have any of that.

What UOP did, primarily, was to provide engineering and technical service to those fellows, both by way of developing processes for them to use and then engineering the plants. Not building them, but engineering them, and then assisting in the start-up and the on-going—not maintenance, but surveillance of them. It was a real service to an important segment of the industry. They were innovative in developing new processes, starting with the Dubbs process, which was invented by Carbon Petroleum Dubbs, as you doubtless know. By means of a mechanism that I'm not familiar with, the Dubbs process became the property of UOP and was their mainstay for many, many years. They applied Dubbs cracking and delayed coking and various applications of Dubbs cracking in many different locations.

As an outgrowth of that, they realized that thermal cracking had its limitations, and they intentionally set out to develop new processes. That got them into the polymerization of propylene and butylene, primarily, as one of their first ventures outside the thermal cracking area.

Of course, thermal reforming, or a variation of it, upgraded octane quality, when at long last, octane was recognized for the quality that it was. In Gulf's days, and going back to the Gulf "No-Nox" day, there was no measure of octane quality; they just knew the gasoline ran better. It wasn't until the late 1920s that the octane scale came along, and they were quantitatively able to identify what made a good-running gasoline different from a poor-running gasoline. Thermal reforming was one way of increasing the octane of straight-run gasoline.

Then they got into the beginnings of catalytic cracking. It was the days of the first fixed-bed operations, à la [Eugene] Houdry, the so-called moving-bed TCC (Thermoform Catalytic Cracker), and finally the fluid-bed operation, using a powdered catalyst. (I'll go into that a little more later on.)

The war was coming on; everybody could see it. The need for 100-octane gasoline was out there. So there was a big research effort on UOP's part, along with a lot of others, to develop processes for making 100-octane gasoline. The first of these, in addition to polymerization, was alkylation of isobutane and butylenes. UOP had a hand, with Phillips, in developing HF-alkylation; hydrofluoric acid as opposed to sulfuric acid.

It was a tricky and dangerous operation, but it worked better than the sulfuric acid catalyst and made a better product with a higher yield. The big development came towards the tail-end of that effort, with the development of "Platforming." At the time that I was there at the laboratory was when Val [Vladimir] Haensel was there. He became a very close personal friend of mine, and incidently, somebody who you ought to interview, if you haven't.

BOHNING: He's on my list.

MCAFEE: You'll enjoy him. He's an interesting, interesting fellow. I think he's one of the giants of the industry, over the years. As a matter of fact (and this is digressing) I was very pleased to have the opportunity to second his nomination for an engineering award whose name escapes me now. It's equivalent to the Perkin Medal. I think he may have gotten the Perkin medal, but this one is the engineering equivalent of it, and I don't think he got it. I haven't heard a final word, but I wrote a very strong letter of support. I sincerely believe that he was one of the big ones in chemical engineering development, because he took the germ of a laboratory idea and saw it through to commercial realization. He had a lot to do with each step, and to my mind, that's chemical engineering in its essence. He is a brilliant person. He's wonderful, a great chemist, and a good chemical engineer.

Anyway, he was there, and it was the beginnings of the development of that process, along with these other processes. We were working on depolymerization as well as polymerization, and dehydrogenation as well as hydrogenation, and all sorts of ways of rearranging molecules, all aimed at making 100-octane gasoline. As it turned out, the processes that were commercially feasible were catalytic cracking and alkylation, augmented by polymerization and isomerization. They were all used during the war.

UOP's role was to apply these new processes to the so-called defense plants, which the independent refining sector built and operated under the aegis of the government, with government money. They were scattered around all over the country in smaller units, but a very important contribution to the war effort.

Having explored, to some degree, fixed-bed catalytic cracking and to a lesser degree moving-bed, UOP elected to go the fluid catalyst route, and joined with Standard of New Jersey and Shell and Indiana and a couple of others to form a cooperative research agreement group, which jointly further developed the fluid technique, which Jersey had pioneered. We had pilot plants at Riverside for fluid catalytic cracking.

At the time I was at MIT, Doc Lewis was involved in some of the early phases of catalytic cracking and the mechanics of fluid-bed flow—how bubbles come up, what it takes to have a good dispersion, how you collect the fines, and all that. That was a large part of the problem in dealing with fluid catalysts.

BOHNING: How much sharing of information was there during the war? In the synthetic rubber project, everybody was sharing their technology.

MCAFEE: There was a great deal. That was another project that UOP was involved in. As it turned out, I was one of their representatives on the Toluene Technical Committee, which was the joint committee of industry and government which ran the toluene program. It was a very interesting experience, with synthetic rubber, butadiene, and catalytic cracking. But to answer your basic question, there was an enormous amount of free exchange of information, as between companies, as between industries, and as between industry and government.

It is a heartening thing, in these days of contention and antagonism and conflict and non-cooperation, particularly as between government and industry, to look back on those days and see the high degree of cooperation, genuine cooperation, that there was; it was very productive. And Jim, never once, to my knowledge, was there the slightest suggestion, with any merit to

it, of a conflict of interest on the part of any individual. Now, there might have been a few isolated instances that I don't know about. But certainly, by and large, the behavior of both the government people and the industry people was absolutely above reproach.

I've said in speeches, now and then, in public and private, from time to time, that it's a heartening thing to realize that that generation was able to realize real genuine government-industry cooperation, and worked together and got the job done. If they can do it, our generation ought to be able to do it too. Unfortunately, we don't have either the will, or maybe not the necessity at the moment. But, thank the Lord for that.

It was a wonderful thing to be involved in, the benefits of which we really didn't appreciate at the time; we took it for granted, that this was the thing you do. Everybody pitched in and made his best contribution. Boy! If you came up with an idea or a new development, then the next thing you did was to tell everybody about it, so that everybody could benefit from it. This applied to a lot of the new developments of the processes as we went along. You don't learn it all in the laboratory or the pilot plant, you learn a lot of it in the field.

That's where UOP served a very useful purpose. Part of their function, having engineered the plant and having overseen it's construction, would be to send a team of so-called experts out to the plant on shift work. They had a UOP man or two on every shift, working with the operators in the plant, helping them get the plant started, and getting it up and running and doing what it was supposed to do. They provided the technical help that was necessary at the time. This kept UOP not only in a position of keeping up with the laboratory and pilot plant developments, but also with the commercial problems that arose and what to do to solve them. That's the sort of thing, that sort of know-how, that was very definitely passed on just as soon as it became known.

I remember one experience, in particular, that I had when I was on the team that was starting up the catalytic cracking unit at the Eastern States Petroleum Company on the Houston Ship Channel. It's since changed hands several times, and I don't know what it is now. The last time I drove by that plant, that catalytic cracking unit was still standing there. I don't know what they're doing with it, but it's there.

One night on the graveyard shift (and I always seemed to draw the graveyard shift), [laughter] all of a sudden the catalyst level in the regenerator went down, down, down, and that's not supposed to happen. That's something that stays constant all the time, but it was going down. I said, "Where is the catalyst going?" It was a dark night, and I couldn't tell where the catalyst was going; I looked around and looked around.

When dawn came, I looked up at the stack, and lo and behold, it was black smoke. Black smoke! I said, "That's not supposed to smoke." It turned out that dust was coming down all around, and it was catalyst. This was my shift, mind you, so I said, "Now, what in the heck happened?"

It took some sleuthing, and I have to say, I went through some anxious moments before we got to the bottom of it. What had happened was that the carbon level on the regenerated catalyst got too high. As we found out later, if the carbon level on the regenerated catalyst got above one percent, the catalyst, as it were, took wings. It just took off. It caught fire and went out like a spark in a flame. That's really what happened; it got too high and it got carried away.

So that was a piece of know-how that we passed along, not only to the other UOP plants but to the other plants as well. It saved a lot of catalyst. That was a very rough night for me, [laughter] I'll tell you.

I went to UOP in 1940, when I graduated, and was at the Riverside lab until 1943. I was then sent out to be part of the start-up team for the catalytic cracking unit at Eastern States, near Houston; at Abercrombie-Harrison in Bay City, Texas, not far from Houston; and at Republic Oil Refining in Texas City near Galveston. Then we came back to Chicago and I worked in the engineering department there for six months or so, and then went out to the Frontier Refining Company in Cheyenne, Wyoming.

That was particularly interesting, because at the time that I was at the Riverside Laboratory, some of the young engineers, young Turks that we were, thought we ought to be able to design a better fluid catalytic cracking unit than "those fellows downtown". There was a certain amount of rivalry between the research lab and the downtown engineering group. The downtown engineering group were wedded to the Jersey design, and all they did was to copy the Jersey drawings, or so we thought. That is a bit of an exaggeration, but that was our interpretation. We said, "We can do a better job than this! There are all sorts of things that can be done."

I organized a group of a half-a-dozen or so of the chemical engineers at the lab, with the blessing of our laboratory director, who was a pretty farsighted fellow by the name of Roland B. Day. He patted us on the back and said, "Go to it; see what you can do." He gave us permission to use the offices on Saturdays and nights. We spent quite a few Saturdays and nights (I forget how many) designing what we thought was an improved catalytic cracking unit.

At the time, the principal innovation was the location of the regenerator and the reactor, side-by-side at the same elevation, instead of putting the regenerator up on top, as had

been the case in the Jersey design, and the reactor at the bottom, where the catalyst flowed down from the regenerator into the reactor, and the vapors bubbled up and carried it up to the regenerator. In our design, we had the two vessels side-by-side, with a complicated bunch of valving in between that let the catalyst flow from one to the other, and some aeration going one way and another way to make the catalyst circulate. It had the big advantage of getting away from some of these towering structures, that were necessarily required in the other designs.

After a while, after a certain amount of missionary work, the engineers downtown finally said, "There might be something to this. Let's build a plant along this line and see if it works." So they built the Frontier plant on the basis of this design. I was assigned to be among the team to go out and make the damn thing run, which was a bit of a personal challenge as well as part of the job, because I was surely interested in making it work.

[END OF TAPE, SIDE 3]

MCAFEE: We went out to Cheyenne in the first part of 1945, and we were out there during the first half of 1945 until May, starting up that plant. And it worked! Then the war was over, and Mr. Roosevelt passed on. It was possible then to get released from my defense job. Obviously, I'd been assigned to that, and that was my job during the war.

I'd made up my mind early, some time before, that whenever the time came, I was going to get out of this business of traveling around, because that was no way to raise a family. By that time we had two boys; one had been born in Chicago, and one had been born in Texas, while we were there. They were beginning to be a family, and I said, "This is no way to raise a family, so we're going to go somewhere else."

Gulf was desperate, they said, for technical people. By that time, I felt that perhaps I had established myself well enough, that I could go to work for Gulf on my own, as opposed to going with the pull of my dad. So I accepted a job at the Port Arthur refinery as technical specialist in May of 1945. I went to work there on the 15th of May.

BOHNING: I have a couple questions about UOP, before we move on to Gulf. We've talked about the information sharing. Houdry was another big factor in catalytic work at that time. How much interaction did you have with him?

MCAFEE: Not much. They were competitors. The cooperation I

mentioned was within the three fraternities. There was the Houdry fraternity, there was the TCC fraternity, and the fluid fraternity. There was not much cooperation between them, because they were highly competitive. Of course, we kept up with whatever they put in the literature and made generally available, but as far as direct contact, there was very little.

BOHNING: Given the impetus of the war effort and the urgency of accomplishing something, what considerations were given for the environmental aspects?

MCAFEE: Very few. That was before environmental aspects were a popular subject. I don't think we were guilty of any gross violations. Of course, there was a general concern. There was always a concern, but not like today, by any manner or means. The conservation that was justified was more to save the materials than it was to preserve the environment. I think the industry and all of us share some responsibility for a lack of responsibility, back in those days. It's a valid observation that industry was something less than completely responsible in all its actions. Which, jumping ahead, leads to this, as far as my career is concerned.

I'm getting way ahead of the story, but when I was active in API [American Petroleum Institute] technical activities, it was primarily in the then so-called "smoke and fumes" area that I spent most of my effort, mostly in air pollution and the industry's early efforts to do what they could to minimize air pollution. But that's another subject we'll get to later.

BOHNING: I was just curious about putting the urgency of the war effort on top of that whole attitude about the environment and whether shortcuts might have been taken just to get the job done rather than worrying about the long-term effect.

MCAFEE: I think that's probably true. Undoubtedly, true. I don't have anything specific in mind, but I'm sure that getting the job done was number one.

BOHNING: How big was this research group at Riverside?

MCAFEE: At Riverside, I would guess, Jim, on the magnitude of a hundred technical people, with a couple of hundred support people.

BOHNING: It was a big operation.

MCAFEE: Pretty big, of which maybe half of the technical people were strictly lab chemists, and the others were chemical engineers working primarily on the pilot plants.

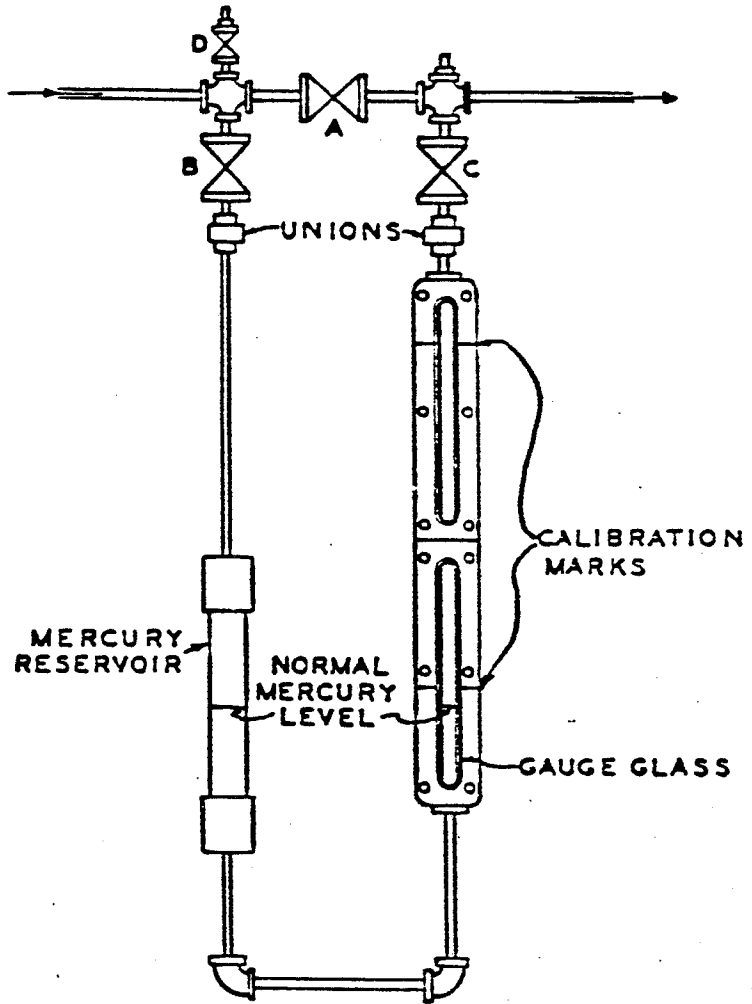
BOHNING: You had a number of patents and publications during that time. You had designed a flow meter (2), which I read somewhere else was called the McAfee gauge, later on?

MCAFEE: I think that baby was my one really original contribution to science and engineering—the McAfee gauge. It was really duck-soup simple. It was kind of like the wheel or fire, but so simple that it was ridiculous, in retrospect. At the time, we were working on propane dehydrogenation. We were trying to make propylene directly out of propane, with a nickel-chromium catalyst. The charge was liquid propane, and we did not have a good way to measure it. The problem was, how do you measure the propane in pilot-plant quantity? Of course, you could measure it in a regular meter, but we were talking about maybe a gallon an hour or something like that.

The essence of the McAfee gauge [see following page] was to take a Jerguson gauge, a pressure gauge, and have a reservoir at the bottom along side of it, and fill the reservoir with mercury. Then you attach it to the flow-line. In between where you attach the top of the Jerguson gauge to the pipe and where you connected the top of the reservoir, you put a valve. You'd have valves in the others, but they would be open. Normally, the flow would be going through the open valve of the bypass. When you wanted to measure the rate of the propane, you would close the bypass valve, which would force the propane down into the reservoir, which in turn would force the mercury up the Jerguson gauge glass, and you would take a stop watch and you'd time how long it took to go from a mark on the bottom of the gauge glass to the top of the gauge glass. Because you had calibrated it, you would know how fast the stuff was going through. If you were clever, you would open the valve in time to not have interrupted the flow and not carry mercury out into the system. That was the trick in the early embodiments of the invention.

It was so simple and so appropriate for the particular purpose at hand that it caught on like wildfire, and there were McAfee gauges all over the Riverside lab, before I left. As a matter of fact, when I came to work for Gulf, the first time I visited the Gulf research lab, a very fancy lab at Harmarville, Pennsylvania, I was told, "Ah, you're the McAfee of the McAfee gauge." [laughter] So my name was made before I got there by that little contrivance.

Later on, they got pretty fancy with it and built up an



electronic system, whereby you didn't have to remember to reopen the bypass valve in order to keep the mercury from going out. It was automatically done, and it counted it, integrated it, and digitized it and whatnot, so it became quite a gadget. That was far beyond my poor power to ever have conceived it, but the basic idea was still the same.

The other patents, just to touch on them for a moment, were all improvement patents on various aspects of the processes we were working on. That was the nature of the beast. You have an idea, a little improvement here, a little improvement there. UOP had a very aggressive patent department, which encouraged the prompt disclosure of ideas and then the pursuit of the ideas through the patenting phase. A lot of things were patented that really had very limited significance on their own, although taken as a package, it made quite a package of patented information.

BOHNING: I know that in certain areas there were government restrictions about releasing patents during the war for secrecy reasons. I know a lot of the fluorine-compound patents from Du Pont were held up until after the war, because of the war effort. I wondered if there was anything in the oil industry?

MCAFEE: Not to my knowledge, Jim. There may well have been, but I wasn't that familiar with that end of the business. I just don't know.

BOHNING: You and three others, [Charles L.] Thomas, [Nils K.] Anderson, and [H. A.] Becker, wrote an article in 1943 in the Petroleum Refiner on "Cracking With Catalysts" (3). In it you gave many details of the UOP process. But I was struck by one statement, "It seems certain that anhydrous aluminum chloride was the first catalyst used for cracking. The process employing this catalyst was developed by A. M. McAfee in 1913-15." It must have given you great pleasure to be able to write that. Here you are working in a similar area that your father had worked in.

MCAFEE: It gave me great pleasure, but I didn't write it. Charlie Thomas wrote it, and he insisted we put that in there. I said, "No, no, no." But he said, "Now, that's part of the background, and we ought to do it." So we did it. Of course, I was pleased, yes. And my dad was pleased. I'd forgotten that article. I'm interested that you dug it up.

BOHNING: I have a copy right here. [laughter] In fact, the very first paper that I could find that you published was in the Proceedings of the Australasian Institute of Mining and Metallurgy, which I thought was rather obscure.

MCAFEE: You got me there. What was that about?

BOHNING: Unless it's another Jerry McAfee. It's "Atmospheric Corrosion of Extruded Silver-Lead Alloys (4)."

MCAFEE: No, that's not me.

BOHNING: Okay, then there's another Jerry McAfee.

MCAFEE: Well, I'll be darned. There's also a Jerry McAfee who is a house painter in Houston. [laughter] And there's one here in Pittsburgh, who is a mechanic at the place where I bought my BMW. [laughter]

BOHNING: Well, let's move on to Gulf then. How did your father feel about your coming to Gulf?

MCAFEE: Oh, he was delighted; he was very pleased. He thought, "Here comes my son and his family and grandchildren!" They made a great thing of it. I had a pretty flexible job. It wasn't too well-defined, and I was able to spend a good deal of time, particularly at lunch hour, with Dad. The hoi-polloi ate lunch before the big shots; my dad was at the big-shot table. So we young engineers would go up and eat lunch, and then for a half hour or so afterwards, most of the time, I'd go down to my dad's office, just to chat about things. We spent a lot of good times together, on that basis, learning about the company, talking about the company.

He never interfered. I think we were pretty circumspect in what we talked about, so that he didn't tell me his business and I didn't tell him mine. But I got a lot out of it, by way of guidance, and counsel, and so forth. He was good enough, even before we got to Port Arthur, to pick out a house for us and had it all ready to go. It made the transition very easy. Shortly after we were there, we had a little girl to add to the two boys, and then, when we moved to Pittsburgh, we had our fourth child in Pittsburgh in 1950.

BOHNING: What were those five years like in Port Arthur, before you came to Pennsylvania?

MCAFEE: My title was "technical specialist", as I recall, which

was a fairly broad title. I was the only doctoral-level chemical engineer they had at the time. There was a bull-pen of young engineers that they put all of the young engineers into to start and gave them various technical assignments. I was stuck in there. I had a desk over in one corner. There were about twelve of us in that room, all working on more or less different assignments relating to the technical end of the operation of the refinery.

It was a group that was fairly separate from, but which had to work cooperatively with, the operating people. There was a certain amount of tension between the two, as you might well imagine. One of the things that I had gotten out of the MIT Practice School experience was the ability to get out in the plant and get my hands dirty and get a feel for the actual operation, in a way that did not offend the operators, which is no small task. Sometimes. And I was able to do that.

At first, they assigned me primarily to various troubleshooting jobs. "This still isn't operating right. What the heck's wrong?" So I would do some analyses and make some recommendations. Sure enough, every now and then, these things worked, I got to be pretty well regarded as somebody who had some inkling of what was going on.

At that time, while I was there, Gulf was enhancing its effort in research and development, particularly in catalytic research of various kinds. In particular, they had under development what we called the hydrodesulfurization process, HDS, the idea of which was to make a relatively low temperature and low pressure, catalytically-inspired hydrogenation for upgrading heavy oil.

The basic objective was based on the recognition that as you looked ahead in the crude oil supply situation, there were smaller and smaller available quantities of light, sweet crude, and probably more and more available quantities of heavy, sour crude. The heavy, sour crude needed to have the asphalt and the sulfur removed in order to make it economically competitive with the light, sweet crude. Gulf's reserves at the time, and for a long time thereafter, seemed to be concentrated in the heavy, high-sulfur. So Gulf had a great interest in developing a process which would take this heavy gunk and turn it into a better crude.

We had a major project in that area under the direction of Dr. Paul Foote, who was head of the Gulf research lab at the time. There was also a concerted effort to try to bring about better cooperation between Gulf research, as an entity, and the operating part of Gulf. There again, you had the usual tension between the technical end and the operating end. The operating people regarded those boys in research as a bunch of kooks, and the kooks in research felt that those oafs in the refinery just

didn't know what it was all about.

Therefore, there was a concerted effort to try to bring the two together. This whole scheme involved setting up a series of committees in different areas—geophysics and geology and processing and products. I was appointed to be the Gulf refinery representative on one of the so-called research panels which was primarily concerned with new processes. There was one on old processes, in the sense of thermal cracking. I was on the new process panel, of which hydrodesulfurization was the principal flagship at the moment.

As a result of that activity, the HDS development was felt to be far enough along that it would justify a pilot plant of some significant size. So in the Port Arthur refinery, largely under my direction, but with the cooperation of the Pittsburgh engineering department and the research people, we converted an old hydrogenation unit, which had been used for other purposes during some time period prior to the war. It was old equipment. We converted that into a pilot plant of some substance. It was fifty barrels a day or so, and it was a good size, semi-commercial unit (rather than a pilot plant) for the semi-commercial application of this HDS process, which by that time had gotten to be fairly well-developed.

It used a modified nickel-based catalyst. It was effective, technically. My principal assignment during most of that five-year period was to be responsible for the design and the direction and operation of that pilot plant as a step in the development of the HDS process. We also had some other little pilot plant operations that came under my wing, but they were relatively unimportant.

That was my big assignment there, and it was all a part of a very significant multi-million dollar research and development effort on Gulf's part. The outcome of all that was that the process was developed and was commercially used very successfully. Unfortunately, not in any of Gulf's refineries. It was in other refineries. One was built in Okinawa, with Gulf as a part participant. There were some others built from scratch.

But it was the sort of thing that either had to be built into the plant originally, or no go, economically. It wasn't the sort of thing that you could very well integrate into an existing refinery, partly because it obviously required hydrogen, and partly because of the competing economics of coking and thermal cracking and catalytic cracking. As catalytic cracking developed to accommodate heavier and heavier fractions, it made its application in an existing refinery a very marginal thing. It was a highly capital intensive thing, so it wasn't something that was easy to sell upstairs.

One of the questions that was put to me shortly after I

became chairman, was when I'd come out to the research lab to make a presentation and say how the world looks from where I sat. One of the fellows who I've worked with over the years on this process said, "Jerry, now that you're a big shot and CEO and all that, how come they haven't put in an HDS unit at the Gulf refinery?" [laughter] Well, it's a good question. I had to tell him that the perspective tends to change when you have to look at the overall economics and the bottom line, as well as the technical elegance of a project. It just didn't make economic sense.

[END OF TAPE, SIDE 4]

BOHNING: You mentioned economics, and that worry about the economic side of engineering, as it were, played a very important part, from here on out. What about your training? In the training of chemical engineers at the time you went through that, how much emphasis was there on the economic side of chemical engineering?

MCAFEE: Minimal, absolutely minimal. And it was a big deficiency, as far as my background was concerned, and something I'm proud to see more recent curricula seem to take into more account than they did at the time when I was going through. But certainly the recognition that the bottom line has got to be the determining line is a pretty doggone important thing to get over at an early stage. That's one of the things that the MIT Practice School experience brought home. There is a bottom line that's got to be met. No matter how fancy your equations may be, the fact of the matter is, if they don't make money for the company, they are not going to be very popular. [laughter]

BOHNING: Does that separate the academic engineer from the practicing engineer?

MCAFEE: Well, I guess sometimes it does. It's an essential ingredient in any well-rounded engineer, be he academic or practical, because you don't really appreciate what you're doing, even at the scientific level, unless you have some idea of how it's going to fit into the scheme of things. At least, that's what I think. That may be the practical engineer's interpretation of a well-rounded engineer. [laughter]

BOHNING: The move here to Hamarville was in 1950. How were you selected for that move?

MCAFEE: I don't know. All I know is that I was notified one day that I had been appointed the director of the chemistry division at Gulf Research and Development Company, and I was expected to report there as soon as convenient. I have never in my whole career, at Gulf or anywhere else, turned down an assignment or asked for a raise. I've never been disappointed in following the judgement of my bosses in those respects. Obviously, it was an opportunity, and I knew enough about the situation to know that this was a big step forward, and I was delighted by the prospect.

Frankly, I approached the move with a lot of temerity, because, after all, we had come back from UOP for the purpose of settling down in Port Arthur, to make our home and raise our family and put our roots down and be a member the Port Arthur community and the refinery. I expected to work the rest of my life in the Port Arthur refinery, just as my Dad had, and have a great life in Port Arthur, Texas. So it represented a major traumatic change in the whole outlook, family-wise and every way, and it was a traumatic experience for the whole family. But it was clear that it was a step forward and the thing to do. As it turned out, it was.

It was part of Dr. Foote's and the corporation's determination to bring about a better utilization of Gulf's technical potential. They thought that bringing a fellow from more or less the operating side into the research establishment would help bridge that gap a bit. I guess, to some extent, it did.

BOHNING: What was the R&D group like when you joined it here?

MCAFEE: It was a big, effective, first-class research organization. Their main claim to fame had been in the exploration side, more than in the product and process side. In particular, they were pioneers in geophysics. The airborne magnetometer was a Gulf research development, which was a very big factor in early exploration. They were also very strong in seismic technology. They were strong in geology, they were strong in production, in the sense of enhanced recovery and that sort of thing, and reservoir engineering.

The process and product side, which was about half of the lab insofar as people were concerned, was somewhat more amorphous and not nearly as focused. Frankly, it didn't have much in the way of solid accomplishment to wave the flag about. Partly, it was people involved who were fine folks but largely academic types. Partly, it was the reluctance of the operating people to accept what research came up with, both product- and process-development wise. Partly, it was just the inherent difficulty of the transfer of information from one to the other.

I was able, I think to a degree anyway, to help solve some of these difficulties. I believe by the time I left the research lab in 1955, we had somewhat improved the stature of the product and process end of the business with the operating people, and they'd made some significant contributions, of which the HDS process was probably the outstanding example, although there were some others, especially in the catalytic cracking areas, which were a definite improvement.

BOHNING: There were papers in the Petroleum Refiner about the HDS process (5), in which you really described the results of this long research project. You, [Charles W.] Montgomery, [Joel H.] Hirsch, [William A.] Horne, and [C. R.] Summers, [Jr.].

MCAFEE: Those names are all familiar. All but two were members of the of the so-called "panel two" of the research advisory committee, which the corporation had set up. We were the panel that was responsible for this development. In fact, Summers was my successor in running the pilot plant in Port Arthur when I was transferred.

BOHNING: You've mentioned several times this less-than-friendly relationship between R&D and operating people. What's the basis for that?

MCAFEE: Human nature. Just the very understandable and common characteristic that, "I'm smarter than you, and therefore what you know is not that important, and what I know is a lot more important." Which is dumb, of course, but it's true unfortunately, that we're all human beings and subject to it. In addition to that, which is the basic reason, there may have been in the past some more substantive reasons, of promises made and not kept, and claims made that didn't pan out, and a lack of confidence in what the technical people said, partly through their ignorance and maybe partly through misapplication. There's responsibility on both sides; I don't pinpoint either side or any person.

BOHNING: You said that you had a way of sort of bridging that gap. Was there anything specific in what you did?

MCAFEE: No. It's just something that you either do or don't. And I guess it's a God-given talent or lack thereof.

BOHNING: What's the situation today in that relationship? Has

that changed?

MCAFEE: Of course, Gulf research is no longer there, so that specific problem is not with us anymore. But I think that the basic tensions are potentially there in any organization. I think it's the nature of the beast. We'll never completely get away from it, and it's something that's got to be worked on, in any organization, all the time.

BOHNING: You came up here in 1950, but in 1952 they must have had their eyes on you for something, because you took the management course at Pittsburgh.

MCAFEE: Right. That was a very significant development, for which I am grateful. I was at a pretty responsible level, from a technical standpoint. But I had had substantially zero exposure to the real world of business and all that. This was an opportunity, at least to get some inkling that there is another world out there besides chemistry and chemical engineering and process and product development. It was really my first exposure to the non-technical end of our business, or any business, and it was a wonderful experience.

It was a very intensive eight weeks. The group was an interesting group of industry and government people, military and others. I think there were two or three of us in that class from Gulf, but there were some other oil industry people as well. I think the main thing that I got out of it (and I think most of us got out of it) was realizing that not all the problems were our problems and that other people had similar problems, wherever they were, and in whatever industry they were. There was a lot of similarity between the various battles we were fighting.

What you learned by way of real economics and finance and marketing and all that wasn't all that much; it was just an introductory course for that. But at least it gave you some speaking acquaintance with some of the jargon and some appreciation of the importance of some of these other elements when you put them together to make a business. It was a good time for me, a perfect time for me, just exactly when that sort of a course should have been given, and I was given the opportunity to do it.

BOHNING: You said you were going to spend the rest of your life at the refinery in Port Arthur.

MCAFEE: That's what I thought.

BOHNING: Now you were seeing a whole different world. Were you excited about the possibilities that were opening up for you?

MCAFEE: That's an interesting question, because I've been a lucky fellow, in that each job that I've had throughout my career, wherever it was in UOP or Gulf, I thought was the best job in the company. I was completely satisfied with it, and I was perfectly happy to do what I was doing, and do it as well as I knew how to do it. I guess, in the back of my head, there was the thought that if I do a good job maybe there will be something even better coming along. But as far as pointing toward the future and saying I want to be here or there or yonder, I never got into that. It just all seemed to work out. In that respect, I guess I'm extremely fortunate because not everybody's that lucky; but I was. Sure, I was excited by the new prospects each time I took on a new job, but it was to learn a new job and regard it as that rather than a stepping stone to something bigger and better.

You've done an amazing amount of research. You know more about me than I do. [laughter] I'm astonished.

BOHNING: Even though I had the wrong Jerry McAfee in there. [laughter]

MCAFEE: Well, it might improve the situation to include him. [laughter]

BOHNING: In 1955 you became vice president of engineering in the refining department. I'm not aware of how that was all organized and what that meant.

MCAFEE: At the time, Gulf was organized into several major departments. There was the production department, which included exploration; there was the manufacturing department, which was primarily refining; and there was the marketing department and legal and financial and all that. The big shots at Gulf were the vice presidents or senior vice presidents of those respective departments, and they were really the barons of the company, as it were.

When Mr. W. K. [William] Whiteford became chairman and CEO of Gulf, he undertook a major reorganization of the company. Part of that reorganization was bringing me and some others into the refining department to spread the wings, as it were, of the then senior vice president who ran the refining department as a one-man show. A very strong man, very able man. Did a heck of a

good job. But he was one man.

Mr. Whiteford's concept really, so far as the manufacturing department was concerned, was to get some other guys in there to make a team, rather than relying on one man. I was brought in to be the technical man, the engineering guy. There was also an operating guy, and what they called a coordinator, who was supposed to tie it all together.

Basically, that was the reason I was brought in; it was to broaden the manufacturing department's scope, as it were, and again, to further the ties between the technical end of the business and the operating end of the business, with the idea that here, Gulf has spent beaucoup millions of bucks on this research lab and they weren't really getting their money's worth out of it, a lot of them thought, with a certain amount of justification. If there was anything we could do to foster better utilization of that investment, that's something they wanted to do. That was part of it.

Also at the time, part of Mr. Whiteford's philosophy was that you don't really need a big engineering department. On that, he and I had some strong disagreements, but he was the boss. His philosophy was, we'll streamline the engineering department down to a minimum; we'll rely on outside contractors; and we'll have a small elite group of real smart people who will contract out and get other people to do the job for us, a lot less expensively than doing it ourselves.

That was not the Gulf way of doing it. Traditionally, Gulf had built up a very big and strong engineering department which did its own engineering and did all the construction in their refineries over the years. This was not Mr. Whiteford's concept. As it turned out, I think he was right. We had gotten too big and too fat and too hierarchish, and it was just an entity unto itself. It had kind of lost touch with what the real purpose of the business, which is to make money out of the oil business.

Part of my job, which was not the part I enjoyed the most, was the downsizing of the engineering department and streamlining of it. We accomplished it. We did it. I think we did it pretty well, and I think Mr. Whiteford, in the long run, was right, that we were a better, leaner, faster, more responsive group at the end than we were at the beginning. But it caused me a lot of heartache at the time.

BOHNING: When you moved in that position you were thirty-nine, forty years old?

MCAFEE: Let's see, I became vice president in 1955, so I was just about to turn forty, which was a fairly tender age at which

to become a corporate vice president. But there were a number of us who made vice president at about the same time. It was a whole new group of young turks that Mr. Whiteford was bringing into the picture, not just in the refining side, but in marketing and in production as well.

BOHNING: Did you have any particular plan as to how you were going to go about that, or did you just sort of feel your way as it developed?

MCAFEE: It was a matter of feeling my way as it developed. There were several of us who were involved—the operating man, the coordinator, and the senior vice president, who was our boss. We were all in a new situation and we kind of had to learn to work together. We had our tussles from time to time, and a little competition here and there. Organizational-chart wise, we were all competitive for the top job, and that's not always a situation that you like to find yourself in, but it's the nature of the beast. We worked it out. The other fellows who were involved were all first-class gentlemen, and we got along fine. They were good friends of mine, both before and after.

Interestingly enough, the operating man, vice president of operations, was Bonner Barnes. He was a chemical engineer from Texas A&M who my father had hired in the Port Arthur refinery in years gone by. He had worked for Dad. As I was a kid growing up, he frequently came and baby-sat me and my brother and sister. He was a good friend of the family, and he was one of our baby-sitters. Of course, at that time, Dad was the big boss, and he could ask a young engineer to come and baby-sit and get away with it, [laughter] which he did.

Therefore, there was a certain relationship there that both Bonner Barnes and I had to handle with some delicacy, because he remembered me as being this kid that he used to babysit for. I remembered him as being the babysitter, and the big shot in the refinery, relatively speaking. He was considerably my senior, and of course he knew infinitely more about the refinery than I ever would.

I had to be pretty careful, being a young whippersnapper, as it were, particularly with the research background (some might say, stigma) to be careful that I didn't tread on his toes or his people's toes, and that was sometimes a very tricky thing. It was a test of diplomacy which sometimes I didn't quite meet as satisfactorily as I would have liked.

The first coordinator was a man named "Slim" Kirberg, who was an engineer and a gentleman, who unfortunately succumbed to lung cancer. He was succeeded as coordinator by Bob Dorsey, who later became chairman and whom I succeeded as chairman and CEO of

Gulf. He was more on the operating side, and had come up through the Venezuelan refinery, in part. We were good friends and worked together. We've been good friends in Port Arthur, when we were both in the engineering bull-pen together.

That was one of the characteristics of Gulf that I found very interesting. That bull-pen of young engineers, where everybody started out, was a great source of people for Gulf over the years. Practically everybody who came into responsible positions in the refining side of Gulf in later years went through that particular bull-pen. The production side was a completely different fraternity. But most of the refining people came through the Port Arthur bull-pen.

Again, referring to my Dad, among his assignments as technical guru, as it were, of the Port Arthur refinery, he was largely responsible for technical recruiting at one stage of the game.

Incidentally, he and Bob Dorsey teamed up in the post-war years as a team to recruit technical people for Gulf, particularly from the southwest schools, where they knew people and had contacts. Dad in particular, and then Bob Dorsey with him later on, hired some of the top people. As a matter of fact, one of their hires was Jimmy [James E.] Lee, who succeeded me as chairman of Gulf. So Gulf was very much a family company in those years. Therefore, the ties to the company and to the people in Gulf were perhaps a bit unique in industrial circles. It was more of a family institution than most big companies.

BOHNING: How far did employee loyalty extend down? Did it permeate the whole company?

MCAFEE: All the way, all the way. It was a very, very important factor, over the years. Yes sir, if you were a Gulf man, you were a Gulf man, and proud of it. I guess this started from the Mellons, but it extended throughout the whole organization. Yes. Definitely. It was a major characteristic of the company.

[END OF TAPE, SIDE 5]

BOHNING: At this time you were active in the professional societies. You were on the World Petroleum Congress starting in 1955. You organized an ACS Petroleum Division Symposium in 1955. I'm looking at these general activities within your professional societies.

MCAFEE: I had this job as vice president of engineering, and

formerly vice president and associate director of Gulf research; later, in 1960, I became executive technical advisor and a little bit later in 1962, director of planning and economics. All of these jobs put me in a position of some technical responsibility in the Gulf organization, at a reasonably high level, and gave me a platform from which to participate in professional society activities.

So yes, the things you mentioned, I did do. I was active in AIChE, went through the directorship, the vice president, the president, and all that. With ACS, I served from 1961 through 1963 as a member of the Advisory Board of the Petroleum Research Fund, which was the machinery set up to award research grants from the funds generated by ACS's temporary ownership of UOP. From 1955 to 1964 it was one of three U.S. representatives on the Permanent Council of the World Petroleum Congress.

BOHNING: Oh yes. Petroleum Research Fund.

MCAFEE: Petroleum Research Fund. Exactly. By a complicated series of maneuvers, it ended up that for a period, the American Chemical Society owned UOP. [laughter] That's another long story; I don't pretend to understand it at all. That made a considerable amount of money available for petroleum research, and the ACS set up this committee to allocate the funds, and I was on that for a while. I was a member and later chairman of that committee.

I was also very active, particularly in the 1960 to 1964 period, in the API. As I mentioned earlier, it was particularly in the so-called smoke and fumes area, air pollution reduction area. They had a committee called the Smoke and Fumes Committee, of all things. It was not ideal, from a public relations standpoint. [laughter] I was a member and later chairman of that committee.

It was responsible for API's considerable efforts in trying to elucidate the mechanism of Los Angeles smog. Some of the research we sponsored was absolutely basic to understanding that the smog situation out there is this complicated chemistry of hydrocarbons and ozone and smoke, as well as the things that conventionally had the finger pointed at them.

I think we came to an understanding of some of the atmospheric chemistry that was involved in the thing, and the fact that it wasn't the refineries that were spewing out most of the smog, but it was the automobiles, and they were the cause. I think the contribution of that effort was to get the finger of scorn pointed a bit away from the refineries, per se, and the chemical plants, and point it toward the real culprits, the automobiles.

So I was quite active in API circles at that time as well.

BOHNING: That's sort of a two-edge sword, isn't it? As you said, you're making what the automobiles are using. [laughter]

MCAFEE: We were going to get it one way or the other. [laughter] No question about it.

BOHNING: In the seventy-fifth anniversary volume of the AIChE, you wrote about your year as president (6). It looked like a very exciting time.

MCAFEE: It sure was. I enjoyed that year. It's been a long time now. That was 1960. That was exciting at the time. I forget a lot, of course, but it was a good time. I got a lot out of the AIChE experience, a lot of contacts that I valued highly over the years. It's part of why I'm so much a chemical engineer, through and through, because of my very high regard for the people I know in the profession.

BOHNING: Who were your contacts when you reached this level? Who were your contacts with your counterparts in other companies?

MCAFEE: There were several. A lot of them were through the professional societies; that was one of the advantages of active participation, both in API and in AIChE and ACS. You did get to see on a personal, professional basis, some of your counterparts, as you say.

Even after the war, there were a number of continuing cooperative efforts. Gulf entered into a cooperative venture for hydrodesulfurization with Shell that continued over several years and was beneficial to everybody. There were some other continuing cooperative things, from time to time. But I would guess the best answer to your question is through the professional society connections.

BOHNING: Was there any organization of research directors?

MCAFEE: There was, but I wasn't a member of it. There was an organization of research directors, but before I reached the level at which I would have qualified for membership in that, I had departed the research development scene, per se, and therefore I didn't participate in that.

BOHNING: After you became vice president, in that period from 1955 to 1960, you still had a number of patents (7). Was that still left over from earlier work, or were you still involved in some way, that patents were coming out in your name?

MCAFEE: Mostly earlier work. Frankly, I've forgotten that there were any in that period, but it was mostly earlier work.

BOHNING: What does it mean to become executive technical advisor?

MCAFEE: It means that I'd worked myself out of a job as vice president of engineering. The original concept that Mr. Whiteford had, that I explained a little while ago, had been pretty well realized. We had decentralized the engineering to the refineries, and the need for a centralized engineering group was considerably less than it was. Such as it was, we—mostly Mr. Whiteford—decided it was better located closer to the refinery operating end, which by that time was largely at Houston.

So that transfer was gradually made. My job was somewhat eliminated. They really were looking for something for me to do, and they appointed me "executive technical advisor." I didn't have any more idea of what those words meant when I took the job than they did, which I don't think was very much. Except that it sounded good, and it gave me a platform from which to be active in other things, like the API, for example.

It was a wonderful experience that Mr. Whiteford gave me. As part of the preparation for this job, he sent me on a round-the-world tour of Gulf facilities—to Europe and the Philippines, and to Japan and Korea, and every place except South America. I never got to South America, but all the other places.

Part of his organizational concept was to have area representatives in the principle areas to get Gulf's nose in the tent, as it were, in new businesses and opportunities. We had particularly active area representatives in Rome and in Spain and in Japan and the Philippines. Part of my world tour was visiting with each of these guys and spending a little time with them and just learning about the business. It was a wonderful, wonderful way to learn about Gulf's worldwide business. And from time to time, I'd get some special assignment that came along.

In 1962 they made me also director of planning and economics, which was the corporate planning group that had a lot to do with Gulf's efforts to kind of coordinate things. It was part of the Whiteford reorganization of the company which was

major and drastic and traumatic.

He was quite a man. He was a very dynamic person who, I've often said, influenced everybody he came in contact with, for better or worse, for good or ill; and it wasn't always one or the other. There were things he did that I very strongly disagreed with or disapproved of, decried, deplored, but there were other things that were great. He made Gulf an international company. It had been a regional company and a family company, except for Kuwait and Venezuela—and Mexico years earlier. He took that basis and made it into a truly international company, at least in part, through these area representatives.

So that was really what was going on there.

BOHNING: Were you given any specific charge in 1962, in terms of planning and economics?

MCAFEE: No, except to do a better job than we'd been doing. Again, it had been a pretty good job, and we had some able people. But it didn't quite have the focus that we were trying to give it. I guess I was able to come in and give it a certain amount of focus.

BOHNING: What specifically did you accomplish in that two-year period, before you went to London?

MCAFEE: We had very able people, and to a considerable extent, it was a learning experience for me. I was learning the economics, planning side of the business. I learned a great deal more than I put into it, I can assure you of that.

During that period, not as director of planning and economics but as a special assignment as executive technical advisor, I had an experience which turned out to be most rewarding. Mr. Whiteford appointed me chairman of a team of three people, including a production man and a financial man, to go to Gulf Canada, then known as the British American Oil Company. As a team of outside consultants, we were to examine that company and see what needed to be done to improve its operation.

Mr. Whiteford had served as president of British American before he came to the Gulf job, and particularly from his standpoint, he didn't think it was doing as well as it ought to be. Some of his successors had turned in what he regarded as disappointing results; he wasn't at all happy. "So you go up there and see what's wrong with that outfit, and tell me what I ought to do."

For about six months, this team traveled all over Canada and interviewed maybe as many as one hundred people in what later became the Gulf Canada organization, then the British American organization. We evaluated people and tried to figure out things that could be done better. We came back and made some basic recommendations to Mr. Whiteford as to some personnel changes, some of which were made, and some changes in practices, some of which were done.

Some recommendations were made over my objections and really behind my back. We got pretty well acquainted with the Gulf Canada (British American) people, and I got along pretty well with them, in spite of the fact that we were designated, as we were called up there, behind our backs, "the three wise men" [laughter] and therefore subject to a certain amount of snide remarks and a certain amount of resistance, as you might imagine. "What are these guys doing here?"

Nevertheless, we got along pretty well, and I developed a high regard for a lot of the people. The production member of my team, who was a guy who had just retired, as a matter of fact, from the production department, went privately to Whiteford and said, "You ought to put McAfee up there to run that show." I didn't think it was a particularly good idea to put a member of the team into that job, and when the idea was brought up, I told Mr. Whiteford so, and he agreed. So we made some other changes instead, and put a Canadian in charge.

That was when Mr. Whiteford sent me to London, to be senior vice president of Gulf Eastern and senior vice president of Gulf Oil, and to be the coordinator of Gulf's operations in Europe and Africa and the Middle East. That was a new job which had not been defined before, and neither I nor anyone knew really what it was supposed to be. It turned out to be an impossible job, in a sense, because I was, it says here, "responsible for coordinating the activities of these various departments," which were autonomous. They had officers in London, the refining department, the marketing department, the supply and crude oil department, the production department, exploration, finance. They all answered to their bosses in their respective functional fields in Pittsburgh.

But this fellow, who'd been appointed coordinator, was supposed to make them work together and make things come out even. He had no authority over any of these fellows, but he had the responsibility of making them work together. If there was ever a test of diplomacy, that was it. As I said, basically, it was an impossible job.

But somehow we managed it, and I had a wonderful experience. As part of that job (it came with the territory), I was Gulf's representative on the board of directors of the Kuwait Oil

Company, which was our joint operating company with BP for Kuwait. I was Gulf's representative on the Iranian consortium, which was the consortium of seven major oil companies and a bunch of independents for Iran after [Mohammad] Mossaddeq. Speaking of opportunities to have contacts with opposite numbers, that was a marvelous opportunity, because each of the companies in the consortium had a man in London of fairly senior level who was in the consortium, and each spoke for his company.

They had a complicated bunch of rules, like a kind of a mini-United Nations, and each company had a vote, depending on its ownership. And it took a certain number of ownership shares to take certain actions. None of these guys, including me, had enough authority to make very many decisions on his own. So most of the things that came up had to be referred back to the head office to get the party line. There was a lot of back and forth, and a lot of meetings, and a lot of shenanigans. Not shenanigans in a shady sense, but a lot of red tape and a lot of doing.

It also involved going out to Iran every year, for an annual tour. One six months we'd go to Iran, and the next six months the Iranians would come to London or Holland. Shell was a big factor in it; they had a big part of the ownership. So we had a lot of contact with the Iranians in that way, and I got to see some of Iran.

That was an interesting part of that coordinating job, which turned out to be a fascinating thing. We were there only three years, which was really just long enough to begin to learn the ropes. We were really beginning to feel at home and they yanked me out and put me in Canada. But it was a great three years, and I was grateful for it. Actually, the round-the-world trip that Mr. Whiteford had sent me on and the contacts I'd made were very useful in that regard.

BOHNING: Being in Iran and the relationship with Kuwait at that time, did you have any inkling of what was coming in the future?

MCAFEE: Yes and no. OPEC [Organization of Petroleum Exporting Countries] was beginning to rattle its sword by that time. They were just coming into their own. I was one of the "experts" who confidently predicted that OPEC would not last a year, that it would fall apart, that the Arabs could not possibly work together well enough to make it work. Therefore, I was confident that this was a passing fancy that would go away.

I have made some mistakes in my day, but none worse than that. The beginnings of OPEC's encroachment into the province of the oil companies was evident. I forget how it went, but first there was a disallowance of royalties as a tax, and then wanting higher than a fifty percent share of the profits. I forget how

much all these steps took but with each one, the OPEC countries were taking a bigger bite. Eventually, they took the rest of it. [laughter]

BOHNING: Were your views on OPEC shared by others at that time? Was that the general feeling?

MCAFEE: Yes, I think it was. That was conventional wisdom; these guys can't work together, they never have and never will. Well, they did, and they did a good job of it.

BOHNING: Why were you removed? Why were you sent to Canada? You already had that connection once before.

MCAFEE: I asked that question of myself, at the time and subsequently, and I'm not real sure of what the answer was. I was doing well. I got along with my other industry people. I thought that we were bringing things along pretty well. Again, I thought this was a wonderful job. I could finish my career right there and be perfectly happy. So I don't really know, except that the then senior executives in Pittsburgh (with Mr. Whiteford in the background) decided that the time had come to make some personnel moves. The Canadian we had put in as head of the company was reaching retirement age. I think they concluded that there had been enough time since the task force, the three wise men, that I could go in as a viable leader.

[END OF TAPE, SIDE 6]

MCAFEE: So they sent me there as executive vice president of British American. At the same time, they brought back the Canadian whom they had brought into the Gulf organization as coordinator of the refinery department, a man named Lorrie Blaser, who was a Canadian of long standing in the company. So the two of us came in, which made it easier for both of us, and certainly for me to have the Canadian guy who had some Gulf exposure, coming in at the same time I was coming in. So it was pretty evident that the plan was that after a suitable time, I would take over as president and CEO, in the setup at British American.

The setup at that time was that the president, not the chairman, was the CEO. The chairman was somewhat more of a figurehead. Not entirely so by any manner or means, but not the operating guy. The president was the CEO. After a couple of years, I would succeed as president and CEO. During that couple of years, though, we made that transition from British American

to Gulf Oil Canada, and later to Gulf Canada. It was a sort of a traumatic thing, but there was no question that was the thing to do. At that time, if you were going to pick two names that were an anathema in Canada, you couldn't do better than British and American. Neither nationality was real high on the popularity polls. And to have your company called British American, of all things!

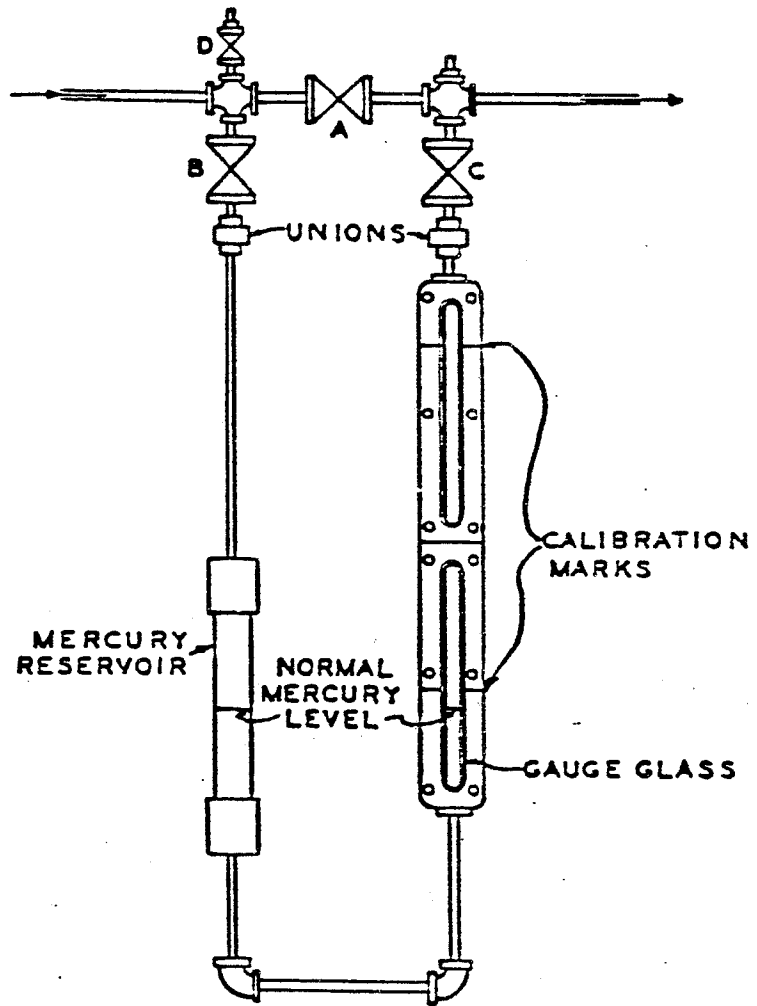
So with a certain amount of trauma and a considerable amount of expense and trouble and effort since changing the name of a company is no small undertaking, we did change from British American to Gulf Canada.

One of the keys to success was employing the Canadian comedy team of [Johnny] Wayne and [Frank] Shuster. They were a famous television team introduced by Ed Sullivan. They were Canadian through and through. We brought them in before this transition and got them established as spokesmen, as it were, for British American. We used them to facilitate the transition to the new name and also used them to epitomize the corporate advertising campaign, marketing campaign, which involved running shoes and, "hurry up and get it done." I forget the slogan now, but it was some trick slogan like, "We hurry", or some damn thing like that. [laughter] Anyway, it worked. It was fun. They were a lot of fun themselves.

When Charlie [Charles] Hay retired, I succeeded him as president and CEO. The nine years that we were in Canada were the most gratifying years of my career. It was a wonderful time to be there. Canada's oil industry was on the ascendancy. Gulf had an enviable position in the industry; it was well respected. And we were lucky. We got in on some of the exploration efforts in the Beaufort Sea, and in the offshore Atlantic, and domestically in Canada. We did very well by way of reserves and buildup.

As a result of that and a lot of work, we also strongly enhanced Gulf Canada's refining facilities. We built a new refinery in Nova Scotia and one in Edmonton and upgraded the others and closed down some smaller ones. The final result was that Gulf Canada's stock increased by a factor of about four, and whereas Imperial had dominated the industry before (that's the Exxon affiliate) by the time I left, if I may say so, Gulf Canada was at least as widely respected as Imperial and, in many respects, more profitable and more efficient. I thought it was a better company by a number of standards; but that was of course a biased view.

They were good years. Among the reasons they were good years is because Canada itself is, of course, made up of some wonderful people. It is a small enough country, and the industry is small enough, that even an outsider, a newcomer, in a relatively short time, by working at it, could get in there and



be a part of the scene and make his influence felt and feel like he was accomplishing something. There's a lot of gratification in that. I feel like we really accomplished something in Gulf Canada.

[break]

BOHNING: We had gotten to Canada, and I guess we were talking mostly about the reasons you ended up there.

I'm looking at a couple of these newspaper articles I told you about, that we had extracted from Canadian newspapers. In 1969 there was one that talked about your advocating reserving the market west of the Ottawa Valley for Canadian crude (8). There was some regulation that you wanted enforced. I wasn't sure what that meant exactly.

MCAFEE: That was one of the industry issues that was alive at the time. The government imposed restrictions on the use of imported crude in order to protect the Canadian oil industry. They decreed in their wisdom that there was a magic line somewhere just west of Montreal. East of that line could be supplied by offshore crude, but west of it had to be supplied by Canadian crude. There was always controversy as to where that line ought to be drawn, and there was a lot of leakage across the line, depending on how people's interests lay. Those who had imported crude, of course, wanted to bring their products into Ontario, and those who had more western crude wanted to put their products into Montreal. There was a lot of lack of enforcement on that, and that was part of the issue.

BOHNING: In that same article, you were also talking about capital expansion projects. Was this expansion of new refineries underway before you arrived?

MCAFEE: No. I'm not saying I was responsible for it, but I was there at the time that we undertook the expansions. It was a company effort, a corporate effort. Charlie Hay was the leader at the time, and I was certainly part of it and had something to do with the planning and execution of it. But it was part of taking advantage of Gulf Canada's potential, which was one of the reasons that Mr. Whiteford felt that changes were necessary. They thought they had kind of got into a rut and were in a comfortable position and they ought to be making more of themselves. That really was what it was all about.

BOHNING: You also at that time took a trip to the Arctic, when

Gulf had a lot of permits on a lot of land.

MCAFEE: Part of the job was to get around the territory, and Gulf Canada was completely represented in all aspects of the business, in all areas of the business. We were fortunate in getting a very substantial position in the Beaufort Sea, and made a few discoveries up there. Never quite enough to justify the pipeline, as it turned out, but significant, nevertheless, and still significant. Someday those things will come into being in a big way.

We had good holdings on the east coast offshore, off Nova Scotia, and very extensive holdings in the country, in the inland areas. Part of my job was to get around to see the troops, which was a wonderful opportunity. I loved getting across Canada. It's a wonderful country.

One of the advantages of being there, as I mentioned, was the fact that it didn't take too long to get involved in things sufficiently that you felt like you had some influence. By the time I left, I guess by seniority or whatever, I had sort of become the spokesman for the industry. As you probably could tell from some of the newspaper clippings, it seems like every time they had a question for the oil industry, they got my two cents worth in.

I was called on for what seemed to me like a great many speeches across the country, from time to time. I always talked about just one thing, and that was the oil business. [laughter] But it was a hot topic at the time. It was a fairly burgeoning time for the Canadian oil industry, and things were moving along. There were great prospects and great potential and great realizations as well.

BOHNING: 1970 is when Gulf started its uranium ventures, which shows up later on, as well. Were you involved in any of those decisions?

MCAFEE: In an indirect way. Gulf Canada, by inheritance from a company that British American had taken over, was the owner of uranium prospects in the Rabbit Lake area of Saskatchewan. It was close to the border, way up north. Gulf had some plans to develop that. It was a time of life when the oil companies, along with others, were diversifying and getting into various other things. Gulf, including British American, saw getting into nuclear power as one way of diversifying into a related area. So we were encouraged in British American, and Gulf Canada later, to go ahead and see what we could do, by way of developing this uranium property. It got to be a pretty substantial undertaking before long. We obviously would need help to do it; we couldn't

justify it on our own.

So Gulf Oil joined us in a partnership. We had the ownership. But they came in for ninety percent and carried the bulk of the burden. In effect, we got a ten percent free ride, from a financial standpoint. It was a Gulf operation (I'm using Gulf now, as distinct from Gulf Canada). They set up a separate Gulf subsidiary called Gulf Minerals Company, which in turn was a subsidiary of a division of the company that they, at that time, called Gulf Mineral Resources Company, which was headquartered in Denver, under delegation of authority to operating companies and made them more or less autonomous. That's the way we talked, anyway.

One of the autonomous delegated companies was Gulf Mineral Resources Company in Denver, which had this subsidiary in Toronto, which was separate from Gulf Canada, to operate the uranium mine, along with any other mineral activity. They were looking at gold and copper and various other things. Primarily, it was to explore any mineral opportunities which Gulf's oil exploration efforts turned up. The uranium venture developed into a more or less fifty million dollar development of this Rabbit Lake property. Gulf Canada had a ten-percent interest in it, and therefore it was part of my job to keep tabs on it, to some extent, as to what they were doing. But we did not have control over it. So to that extent, I was involved in the Canadian end of the uranium business.

When I came back to Gulf Oil, uranium litigations became one of my major headaches for quite a long time, longer than I would have liked.

BOHNING: We'll come back to that.

In 1971, in an article in Canadian Welfare, you said "No corporation can now afford to measure its results solely in terms of its own earnings. It will be held accountable for the larger implications of its business activities (9)." This is very early in the days of environmental concerns.

MCAFEE: We were beginning to feel some of our responsibilities, and I was expressing what was becoming an increasingly real concern.

BOHNING: Was that a corporate concern, was that your concern, was it an industry-wide concern?

MCAFEE: All of the above. Certainly, I felt strongly about it, and the company did, and the industry, more and more, was

realizing that just what I said there was the case, that you just can't stop at the bottom line.

BOHNING: I remember Ted Doan telling me that when Dow found itself in this position, there was much concern within the company. He said, "No, we can use this to make a profit. If we do it right, if we approach it right, we'll still come out and make a profit." I think a lot of the industry concern for a while was how to do that.

MCAFEE: Yes, and realizing that, if everybody does it and is faced with those extra costs, it's one thing. But if you're the only guy, or the first guy, then you're going to take a beating. That made it very difficult, to take that initial step. It emphasizes the importance of doing it as an industry, which, by and large, we did, so that everybody moved along more or less together.

BOHNING: That was my next question, whether you had to drag the others kicking and screaming along.

MCAFEE: Well, to some extent. There were some that were more reluctant than others. Yes, no question. That was true in Canada, and even more so in the United States.

BOHNING: In 1972 the newspaper headline read, "Gulf Oil Canada Held in Best Shape Ever" (10). That's based on an interview with you.

MCAFEE: Maybe I was a little biased. [laughter]

BOHNING: Then, "Gulf Canada Had Record '73" (11) and "Gulf Oil Canada '74 Net Up" (12). I read somewhere that you quadrupled the earnings in the four or five years you were there?

MCAFEE: Quadrupled the earnings, and quadrupled the price of the stock. Yes. It was really the payoff of the investments we'd made in refining and marketing and exploration and production. It was a classic example of having resources and having opportunities and putting them to work and having them pay off. It doesn't always work that way, but in that case it did, by golly! We were lucky enough to live to enjoy the fruits of our labors, as it were. And it was a very gratifying experience.

BOHNING: In 1973 you were quoted as saying that it was "an interesting, but not easy, time to run an oil company" (13).

MCAFEE: I think that would be a fair. I stick by those words, yes. [laughter] Interesting, perhaps, in the Chinese sense of the word.

BOHNING: In 1974 you were talking about Canada being self-sufficient in energy (14). I guess that was a concern that goes back even before that. It wasn't clear to me, but it seemed as if you were saying that it really wasn't possible, that you couldn't always be self-sufficient in energy. Or am I reading too much into that?

MCAFEE: No, I think that was the realistic situation. But I think I said, and I believe it was true, that Canada enjoyed the potential, rare in the world, of being able to be self-sufficient. But that, as a practical matter, it was unlikely, because of the economics involved in the development of the frontier areas, and because of the availability of cheaper offshore crudes, against which domestic crude and particularly frontier crudes simply could not compete. So potentially, though Canada had, and I think still has, the chance to be self-sufficient in oil, I don't think it will ever be a reality.

BOHNING: How was Gulf involved in the Syncrude project in Alberta?

MCAFEE: That's a logical extension of what we've just been talking about. Recognizing that a lot of Canada's potential lay in the tar sands, it a lot of the potential reserves resided in the form of the tar sands, it was pretty clear that sooner or later that reserve had to be tapped. An outfit in which Sun was the primary mover, Great Canadian Oil Sands, had made the initial commercial start with a plant to extract oil or bitumen from the tar sands. Gulf Canada got into it because a company which it bought, Royalite, which Charlie Hay headed when British American bought it out, owned a slice of the Athabasca tar sands, as did Imperial, as did Cities Service of Canada, and Arco. The other three had approximately equivalent holdings. Gulf Canada's were smaller, so we ended up forming a joint company consisting of thirty percent Arco, thirty percent Imperial, thirty percent Cities Service of Canada, and ten percent Gulf Canada. We formed this company called Syncrude, which undertook to commercialize a process which had been developed, to a point, by the company that Gulf Canada had acquired, Royalite, and had been brought to a semi-commercial stage, but which had never been reduced to active commercial use.

It's basically a simple process. It mostly involves taking the tar sand and digging it out of the ground and hauling it to a central place and washing it with hot soapy water and washing the bitumen out and then handling the bitumen. All these, primarily, are basic material handling processes, well known, well established, but costly and cumbersome and awkward. There was a trick or two in the emulsifying agent that you used to soak whatever, but that was really a secondary feature of it. There's a lot of ways of duplicating or improving on that.

With a great deal of courage, as it particularly looks now in hindsight, these four companies set out on this Syncrude project, which eventually ended up costing close to two billion dollars, as I remember. We thought it was going to cost a billion and that was an awful amount of money in those days, especially for companies our size. Each of these were the Canadian subsidiaries of their respective companies and more or less had to stand on their own feet.

The development went ahead and we got pretty far down the road. We were in the construction phase and Arco got cold feet and pulled out. Arco decided that they couldn't see their way to go ahead. Because the cost had escalated from one billion to two billion, or whatever. They didn't see the economics, which were, at best, marginal. They decided they just would cut their losses and leave.

That left the three of us holding the bag. It was already a big burden, and it was already pretty marginal. We came awfully close, all of us, to throwing in the sponge, saying, "This is just too much." I guess I had as much to do with it as anybody.

[END OF TAPE, SIDE 7]

MCAFEE: I was persuaded, and others were too, that Canada eventually would need to tap the tar sands and that we had a pretty good chance of having a commercially viable way to do it, and that this project needed to go ahead, in the interest of Canada. That's what I said, and that's what I meant. It sounds a little altruistic, if you will, but it was the truth. Of course, we expected, eventually, to make some money out of it. But nobody thought it was a bonanza or that we'd get rich quick overnight, but it was a big undertaking that ought to be done.

At that time, Donald McDonald was Minister of Energy in Canada. He and I had a number of very strong conversations on the subject, one of which I particularly remember. He put to me the blunt question, "Why do we need this project, with all the oil there is in the world, and all the domestic crude oil and conventional crude we've got?" My answer to him was that Canada

is going to need this potential resource someday, and now is the time to find out what it takes to get it.

After a great deal of negotiations, we finally worked out a scheme. I will never forget the long, long day in the middle of winter, in January, in Winnipeg, in the middle of the worst snowstorm I've ever seen in my life. We sat in a motel in Winnipeg and had representatives of the three companies involved, as well as Shell, whom we were trying to get to come into the project but eventually were unable to persuade, the Ontario government, as a consuming government, the Alberta government, as a producing government, and the federal government.

In the course of that day, which culminated a lot of preliminary negotiations, we worked out a scheme whereby the three governments would come in for a half interest, equity interest, mind you, in the project. The companies would continue with their half, on the same basis they had been on, a thirty-thirty-ten split of the half. (No, that's not right, because Arco was out.) It was going to be thirty-thirty-ten, and the governments would not go more than the fifty percent. The net upshot of it was that Gulf Canada increased its portion to twenty percent, and the other increased theirs to forty percent of the private half of the project. So Gulf Canada, took a larger percentage share of the private companies' half than it had previously. (I forget the exact percentages, but that is about the way I remember it.)

So it became a joint industry-government undertaking. Absolutely unique, to the best of my knowledge, either before or since, either in Canada or the United States. Unique in a number of respects. The three governments—two provincial governments and the federal government—were involved. The three companies were involved and the governments were involved on an equity basis. They weren't just loaning money, but they were participating on a risk basis. If the thing went kaput, they lost their money the same as we did. If it was a bonanza they got some return on it as well.

We insisted on a number of things. We did not ask for any special breaks of any kind, regulation-wise or tax-wise or otherwise. What we said we wanted, and must have, is unrestricted access to the world market with this product. We don't want any government, provincial or federal, telling us that we have to limit our production to thus and so, and thereby not get the full economic advantage of it. We want equal treatment, so far as royalties are concerned. We don't want a special royalty to apply to this. And we want your assistance in working out labor negotiations, which will let us do this project on a reasonable basis. Those were all the conditions that we asked for, and they were all granted.

So, on that basis, we went ahead. In addition, this was a

big undertaking for Gulf Canada. It involved an additional hundred million bucks that we didn't have. Both the increased cost and our share being increased, required us to find another hundred million dollars that we hadn't budgeted for this project. We had to borrow it from somewhere. So we made a deal with the Alberta government, who had oodles of money at the time from royalties from other oil and gas operations, and were really looking for places to put it. We took out a hundred-million-dollar loan from them, on a convertible basis. So they had the option if the thing went well, as it finally did, to convert some of their debt to equity. So they were in a position to, and did take back some of Gulf's additional equity in the project, and they became a larger equity owner as a result of converting their debt.

On that basis, the project went ahead. Gulf Canada had a lot to do with the technical success of it, if I do say so, because we provided the man who ran the thing from a technical standpoint. There had been an Imperial guy before, but he pretty well played out, and he took retirement. Our man, Brent Scott, H. B. Scott, went in and took over the project and ran it and did a superb job.

The net upshot of it, Jim, was that it was a classic textbook example of industry-government cooperations and inter-government cooperation in the development of a project in the national good, which I take great pride in, frankly. I wish we were able to have followed it somewhat in this country, with respect to the development of alternate fuel sources, shale and coal and other things. But it was a very, very interesting project to have been involved in, and I'm glad to have had a piece of the action.

I remember one little vignette that touched me greatly. My friend Don McDonald, as he became my friend, was the Minister of Energy at the time that we found ourselves in the position of being faced with higher crude oil prices from offshore crude, and therefore having to raise product prices at a time of price controls, price ceilings on everything, when the Minister was out of the country. I had checked with the Minister's office and told them we were going to do this. When he got back into the country, he found that in his absence Gulf Canada had taken the lead in taking on certain price increases, which was a necessity and completely justified, but which he felt was not justified at the time. It turned out we were able to completely satisfy him that we'd done the right thing.

But he had a tendency to get carried away sometimes. In the house of Parliament one night, he got up and called Gulf Canada a poor, bad, irresponsible corporate citizen. (That's what Geraldine referred to at lunch.) To be named by name in the House of Parliament in Canada is a pretty serious thing! That's a real slap in the face. I was pretty upset about it. I went to

see him the next day or so and eventually got it all sorted out. Later on, we became good friends, and I have a high regard for him.

But what brings this to mind is that, in the course of this long day in Winnipeg, while we were trying to work out the final details of this Syncrude arrangement, the key to it turned out to be Gulf Canada and our willingness to take on the additional share and somehow finance the additional burden. I made the offer to do what we did. He sent me a little note privately and I unfolded it. "Now, that's what I call good corporate citizenship." [laughter] I've still got that note in my scrapbook somewhere. It meant a great deal to me.

Well, I've gone on too long about that. But it was a major undertaking, and we were glad to have had a part in it. I think it was a worthwhile venture.

BOHNING: In 1975, Dorsey reorganized the company into global units, except for Gulf Canada. Why not Canada?

MCAFEE: There were three reasons, I think. One was that Gulf Canada was only a partially owned affiliate. Gulf owned only seventy percent, more or less, and the other thirty percent was owned widely, mostly by individual Canadian shareholders. Under the laws of Canada or any country, you've got to respect the rights of the shareholders. It was not just something that Gulf here or anybody in Gulf could do by decree. It had to go through an awful lot of rigmarole. That was one reason.

The second reason was that we were doing pretty well, and Dorsey recognized that. The third reason was that we were already organized on the basis on which Dorsey's reorganization was based, which was basically to separate the upstream from the downstream, and the chemicals, as separate functional entities. You said global, and you're right. There were also regional companies, but this superseded the regional company setup and it was more of a functional division than regional, although regional was still involved. There was GORAM, which was Gulf Oil Refining and Marketing, which was responsible for all of Gulf's refining and marketing operations, wherever. But they had a domestic division in Houston and a European division in London. Similarly, there was Exploration and Production, as they called it, and Minerals and Chemicals.

Gulf Canada had already been separated functionally, either by design or happenstance or developments or circumstance. Because of the fact that our production was entirely in Western Canada, the operations were headquartered in Calgary, primarily, and were more or less separate and autonomous from the central corporate office in Toronto. The marketing operations were

centered in Ontario and also extended throughout the whole country, but their headquarters was in Toronto. So already there had been that functional separation in our setup, and there wasn't anywhere near the need to make that separation as there was in the corporation.

BOHNING: During this time that you were in Canada, who were you reporting to, if anyone? You had your own board?

MCAFEE: Yes, we had our own board. That was an interesting setup. Gulf Canada was an independent, autonomous, stand-alone Canadian corporation, of which Gulf Oil was the major shareholder owning about seventy percent. The board consisted of twelve people. Two of us were officers of the company. Clarence Shepard, the chairman of the board, served as chairman, and I was president and CEO. The other ten were well-regarded Canadian businessmen across the country, from Nova Scotia to Vancouver. They were selected because of their stature. The board had functioned, over a period of some years, in a very satisfactory way.

It involved only one person who had any connection with the Gulf Oil Corporation, except me. I had severed connections with Gulf Oil Corporation. I was a Gulf Canada employee, paid in Canadian dollars and everything, although I kept some benefits from Gulf Oil.

But Beverly Matthews, a lawyer in Toronto, served on the Gulf Canada board and had for many years. Whiteford brought him in to the Gulf board when Whiteford moved to Pittsburgh. So there was that connection. But in each case, he operated when he was in Pittsburgh as a member of the Gulf Oil board, and when he was in Toronto, as a member of the Gulf Canada board. He wasn't a channel of communication, in any shape, or form, or fashion.

So my real bosses were the Gulf Canada board of directors. But I was not born yesterday, and I knew that I also had to satisfy my colleagues in Pittsburgh. After all, they were the major shareholder. So I again had the diplomatic challenge of not taking to the Gulf Canada board something that I didn't have reason to be pretty sure would be acceptable in Pittsburgh, nor taking to Pittsburgh something that I wasn't pretty sure would be eventually approved by the Gulf Canada board. That sometimes presented a bit of a challenge, as you can appreciate. It eventually worked out. But I really had the two bosses, and I had to satisfy them both.

As to personalities, my direct reporting responsibility changed from time to time. For a while it was Dorsey. Then it was Grady Davis, who was an executive vice president. Later, it was Ed Walker, who was a senior vice president. I forget what

the order was, but they more or less changed around, depending on circumstances at the moment. But I felt completely free to go to anybody in Pittsburgh that I felt I needed to for advice, financial or legal or production or marketing or refining or whatever.

BOHNING: What kind of relationship did you have with Dorsey during this time?

MCAFEE: Very friendly. Bob Dorsey and I go way back as good personal friends in Port Arthur. Our families are good friends. His dad worked in the Port Arthur refinery. I forget in what capacity. Not a real high level capacity, but he was there. He was a couple of years ahead of me in high school, and was a bit of a legend. He went to the University of Texas after I did, I believe, because he worked a while before he went to college.

I think I'd gone to MIT by the time he went to the university. Then he came back and we were associated as starting engineers. He was in the bull-pen, along with the rest of us. He handled a lot of Gulf's relations at the time with the Neches butadiene complex, and he was responsible for keeping track of the feedstocks we sent them and the materials we got back, among other things. Over the years, we kept in close touch, and I enjoyed a very happy relationship with Bob.

When I was in London, he and Del Brockett, who was then chairman, came over frequently to see us. By frequently, I mean two or three times while we were there the three years, and we spent some time together. I have nothing but respect for the man, as far as our relations are concerned. Now some of the things that he got involved in later, questions of judgment, of course I have to deplore that. But as far as our relations are concerned, they were fine.

BOHNING: Did you have any inkling of the trouble that was to come? When were you first aware of the trouble that was brewing in the Dorsey administration?

MCAFEE: I had no prior knowledge of it, and what I knew about it entirely was what I read in the newspaper. There was very little internal communication that I was aware of, as to what was going on. Naturally, I was disturbed, like everybody in the company was, by what we read in the newspaper, and wondering what in the heck was going on. But as far as having any idea that it was as serious as it turned out to be, we didn't know. It was a big surprise and a big disappointment.

There was a great deal of sadness that that development came

about as it did. I think some of it, unfortunately, has to go back to Mr. Whiteford, who as I said, didn't always do what I regarded as what he should have done. Some of the things he did, some of the things he set in motion, some of the people he put in positions of responsibility, I think really led to the problems which Bob Dorsey somewhat inherited and had to take the kick and carry the can for.

BOHNING: So you're saying that some of that was in place. How far back?

MCAFEE: Back when Whiteford was in charge, and that would have been in the 1950s. Some of it goes way back. Now, don't misunderstand me; Bob Dorsey had his share of the responsibility in this. Some things that he did, he shouldn't have done; and some things that he should have done, he didn't do. Some of the overseas shenanigans were obviously out of line. Frankly, his big mistake, Jim, was not keeping the board properly informed, and not taking them into his confidence early on, and getting the benefit of their advice and counsel and guidance. Had he done that, the Gulf board, a group of very astute people, would have guided him to his advantage. But he didn't see fit to do that; that wasn't his style.

I made a conscious effort to be sure that I brought the board into everything we undertook, on a completely open basis. I was extremely forthcoming with the board about everything I was doing and planning to do and had done, and I think that was part of why I enjoyed a very happy relationship with the board, throughout my tenure.

BOHNING: I guess the Mellon's weren't aware of any of this either, were they, until it broke? Or were they?

MCAFEE: They were aware, to the extent that the board was aware. Remember, the Mellon influence had declined considerably. When I was a young engineer, as vice president of engineering in the refining department job, for example, I had a few occasions to go before the board and make a presentation, make a sales pitch. General [Richard King] Mellon was there, and he was very much there; he was a presence. He sure did know what was going on. He was such a presence that everybody kind of watched what General Mellon did. If he nodded his head, you were home free. If he shook his head, you might as well quit. [laughter]

I was given some very wonderful advice by Mr. David Proctor, who was then the chairman of the board, but it was a kind of a nominal position. He had formerly been general counsel. It was before my first presentation at the board. He said, "Jerry, if

you get in there and the General nods his head up and down, you better quit pretty soon, because you've made a sale. If he shakes his head, you're in deep trouble. If he nods his head when I ask for questions, for Pete's sake, shut up; you've made the sale! [laughter] And it was good advice.

But the Mellon's continued to be represented, of course, through Nate Pearson; and to some extent through Jim Walton, a member of the family; and to some extent through Jim Higgins as president of the Mellon Bank (or chairman or CEO, whatever he was). So their influence was there, but not in anywhere near the degree that it had been before.

BOHNING: Was the Gulf board more internal or external?

MCAFEE: The majority were external. At the time I was there, there were thirteen members of the board, of whom four were internal members. The rest were external.

BOHNING: Dow removed a chairman at almost the same time, but for different reasons. The board simply said, "That's it!" And he'd only been there a few years. These two incidents are interesting, in the sense that this doesn't happen very often.

MCAFEE: It didn't then. It's happened more frequently lately, as you undoubtedly notice. But it was almost unprecedented, at the time. I must say that, as far as I'm concerned, the Gulf Oil board did their job, and they did it very well, and they did it responsibly. It was a tough job, particularly with the family atmosphere of Gulf, which extended to the board. It was a hard thing to do. They didn't want to do it, and understandably so. But they did it; they did what was necessary.

[END OF TAPE, SIDE 8]

MCAFEE: What the board did, when they began to get inklings that something was not right, was to appoint this partly outside committee, headed by John McCloy, with Bev Matthews and Nate Pearson as board members. They, in turn, employed some of Mr. McCloy's legal associates to make a thorough investigation. Which they did. They interviewed a lot of people in Gulf and got pretty well to the bottom of the thing. You know the story from there; it's public record.

BOHNING: Who made the decision to tap you?

MCAFEE: The board. I think Beverley Matthews probably had something to do with it. Once the board made the decision that Dorsey had to go, they were obviously looking for someone to take his place. Jimmy Lee was there, but Jimmy was too close to it; he had been too much involved. I think that must have been the reason. (I don't know any of this; this is conjecture.) But they looked around, and I had been sufficiently out of the loop for a sufficiently long time, that I didn't know what was going on, as I had nothing to do with it. Therefore, I was "Mr. Clean," as I was sometimes characterized.

I had been around the Gulf circuit pretty well, thanks to a lot of planning, some conscious, some fortuitous, on Mr. Whiteford's part and others. I had a pretty good background. I had the overseas experience in London, and then in Canada. I think, perhaps as much as anything else, the Gulf Canada job was the nearest thing in the Gulf organization to another CEO. I was CEO of Gulf Canada, which was a ten percent slice of the total corporation. I had all the responsibilities of all the phases and all the aspects. Whether I liked it or not, that was part of the job. You just can't be in a job like that without learning a good deal about how it's done.

That had something to do with it. I said Beverley Matthews, because Beverley and I got along very well. I'm a great admirer of his, and he seems to think well of me. I'm sure he did; he put in a good word for me.

So they selected me. You might be interested in the circumstances of the way I was informed. There was a regular meeting of the regional company presidents, the Chairman's Council, as it was called at the time. That was a regularly scheduled meeting. We met once a month to review how things were going and plans for the future, and all that sort of thing. It was usually shortly after the board meeting, so that Dorsey or whoever could bring any message from the board to the operating group and get it underway soonest.

There was a meeting of the board scheduled for Tuesday, and a meeting of this management group for Wednesday. Bob called me in Toronto on the Thursday or Friday before and said, "Look, I don't know what the board is going to do, but they're going to take some sort of action. I think they may want to talk with you and some of the others about what they're going to do. You better come down early." So I went down on Sunday night and twiddled my thumbs in the visitors' office all day Monday; the board was meeting all day.

Finally, after spending a day reading my briefcase and whatnot, I went back to the hotel. I ordered a Scotch and soda and a steak to be brought up. I was sitting in my room waiting for it to come, and the phone rang. It was Jimmy Lee's secretary

who called and said, "The board would like you to come over and talk with them."

So I canceled my room service order and went back over to the office. I sat around and twiddled my thumbs some more until about eight o'clock. I was in Jimmy Lee's office; he was in the board meeting. Directly, I was waited on by committee consisting of Nate Pearson and Bev Matthews and I believe Eddie Singer. In effect, they said, "The board would like you to take the job of chief executive." Of course, I was surprised, humbled, and all the things that you naturally would be under the circumstances.

Mostly, shocked, because I really hadn't expect this. I expected to stay in Canada the rest of my career. I was perfectly happy. I could see myself continuing as one of the principal people in the Canadian industry and a good representative of Gulf, and involved in a good operation. We had a farm outside Toronto, and it was a good life. We thoroughly enjoyed it. I was perfectly content and I wasn't looking for this or any other job. Obviously, though, it was not something you say "no" to without a very good reason. So I said, "Of course, I'll do it." But with certain provisions, stipulations that I set forth.

First of all, I wanted to be clear that there was no question that I was to be the chief executive officer. If I was going to take this responsibility on, I wanted to have all the necessary authority to go with the responsibility; that was okay. I said I wanted to be sure that the board was one hundred percent behind the selection. "I do not want to take on this job with a divided board. If there is a division of the board, I want to know about it. Either we fix the division by somebody's resignation, or I don't go with the job." "This absolutely didn't happen." So I was assured on that.

I said, "The third stipulation is, you've got to understand that I'm not Bob Dorsey. I'm a completely different character; my style is different. I'm not flamboyant, I'm not charismatic, I'm not a lot of things that Bob was, and I admired him for it. I'm a lot more plebeian and pedestrian, just plain vanilla. I'm not going to do things very spectacularly, but I hope to do them solidly and get the job done. I'm willing to give it everything I've got to do that." And they said that was one of the reasons they wanted me on the job. They thought the change was desirable.

For the fourth stipulation I said, "Now, look. I'm fifty-nine years old, and I'm a strong believer in retirement at the proper time. When you lose some things, you gain some things. Unless something unforeseen happens, I would hope to work to the age of sixty-five, but not beyond. We've got six years to do whatever I can do. Whatever contribution I can make, I'd like to make it in that six-year period. That's the time frame.

Frankly, there's a lot more wrong with the company than any of us knows, at the moment, until you get into it." And there was.

"If we're able to turn it around in six years' time and have something to be proud of, we will have done pretty well. I want to be sure that, assuming good behavior, you're going to stand by me for the whole six-year period and that you won't come up at the end of a year, and say `You haven't changed white to black or black to white, so what the heck?' You've got to stick with me." They said, "We're prepared to go with the long haul." "On that basis, I'll take it and I'll do the best job I can."

That was the basis on which I took the job, and I was glad to do it. That's the way it worked out. It worked out, I must say, pretty well.

We had our problems. In some respects, it was not as satisfying a job as the Canadian assignment had been, because it was so much more complicated and so much more difficult to surround and to really understand. There were problems that they had not encountered before, some of which I was able to handle, some of which I wasn't. But I did the best I could.

BOHNING: You certainly had your hands full. You had a corporate image which had been severely tarnished by that incident. You had the oil industry image at large, which was not in the best of times then. In terms of the company, earnings were off, foreign properties had been nationalized, there was a new energy bill. I was struck by this comment you had made earlier, "An interesting, but not an easy, time to run a company." The odds that you were facing at that time must have been enormous.

MCAFEE: In addition to the things you've mentioned, Gulf had lost, in addition to its overseas producing properties where most of our reserves were, a substantial chunk of our domestic reserves. That was the result of legal action in the State of Texas, which terminated a big lease that we had in west Texas. We thought that was completely unjustified, but that's the way it turned out.

During the Whiteford days, we had made an overly ambitious contract with Texas Eastern to supply them with a great deal of gas out of the Gulf of Mexico, which we thought we had. But, when we got into it, we found out we didn't have it. We were restricted by the then existing regulations from getting out and developing additional fields to supply the contract. So, we had a contract with Texas Eastern that was very onerous, because to supply it, we had to buy gas at fifty cents (or whatever it was), and sell it at twenty cents. It was terrible.

Gulf had gotten into this uranium business, into the nuclear

power business, thinking it was a good possible diversification, and we had gotten in over our heads, where we didn't really know what we were doing. We were in the midst of extricating ourselves from that unfortunate piece of timing and judgment. We were paying through the nose to do it, to get out of the contracts we'd made to build these General Atomic high-temperature gas-cooled reactor plants all over the country, and to supply the uranium for those plants.

We'd made contracts to supply the uranium, and contracts to get the uranium from the uranium producers. Then, the producers flunked out on us, and that led to the uranium litigation that we got involved in. We were buying our way out, but then this other wrinkle of the litigation came up. All those things, added together, make, as you say, quite a plateful. Yes.

BOHNING: How did you decide what to tackle first?

MCAFEE: I don't think I really decided. [laughter] As you said earlier, some of those things are decided for you. You just do each day what needs to be done. I'll tell you what I did, to the extent that I decided anything. I said, "First of all, the thing this company needs is to get back to work, and to reestablish our values and reestablish what it is we're trying to do, and to set some basic rules as to how we're going to conduct our business, both as a company and as an industry." We were tarred with this political contributions brush and a lot of other things. We were, I think unjustifiably in many cases but not completely without some justification, tarred with having done some inappropriate political activities."

(I made a point of sitting down and digging out of a pile a few pieces of paper that I thought might be of interest to you. I'll loan you these, subject to your making copies and getting them back to me. It'll save some talking).

One weekend, shortly after I took the job, Geraldine and I went up to our farm, to kind of catch our breath and recover. I spent a good deal of that weekend working on a statement of business principles, which we turned out. It turned out to be a one-page statement, and there were four basic principles that went out in a letter to the employees [see following page].

This was circulated through the company, and it formed the basis of a more comprehensive "Statement of Business Principles" and a "Code of Business Principles," which we circulated and used to some advantage. We put it in a proper form so it was something you could frame and hang on your wall.

I was astonished, as I went around the country, to see how many people had this little "Statement of Business Principles"

February 27, 1976

Dear Fellow Employees:

Recent events have made it desirable to reaffirm clearly and concisely the guidelines which are expected to govern the conduct of Gulf's business around the world. At its meeting on February 10, 1976, the Board of Directors unanimously endorsed in principle and its Committee on Business Principles subsequently approved in detail the following:

STATEMENT OF BASIC BUSINESS PRINCIPLES

GULF WILL ADHERE RIGOROUSLY TO THE HIGHEST ETHICAL STANDARDS OF BUSINESS CONDUCT. TO THIS END THE FOLLOWING SPECIFIC PRINCIPLES ARE HEREBY CONFIRMED AS CORPORATE POLICY, EFFECTIVE IMMEDIATELY, BINDING ON ALL GULF EMPLOYEES WHEREVER LOCATED:

1. GULF'S BUSINESS WILL BE CONDUCTED IN STRICT OBSERVANCE OF BOTH THE LETTER AND THE SPIRIT OF THE APPLICABLE LAW OF THE LAND WHEREVER WE OPERATE.
2. WHERE A SITUATION IS NOT GOVERNED BY STATUTE--OR WHERE THE LAW IS UNCLEAR OR CONFLICTING--GULF'S BUSINESS WILL BE CONDUCTED IN SUCH A MANNER THAT WE WOULD BE PROUD TO HAVE THE FULL FACTS DISCLOSED.
3. IN CASES OF DOUBT, EMPLOYEES SHOULD SEEK COMPETENT LEGAL AND OTHER ADVICE, WHICH THE COMPANY IS PREPARED TO MAKE AVAILABLE THROUGH REGULAR CHANNELS.
4. GULF REAFFIRMS ITS CONVICTION THAT IN ANY DEMOCRATIC SOCIETY PROPER AND CONSTRUCTIVE PARTICIPATION IN THE POLITICAL PROCESS IS A CONTINUING RESPONSIBILITY OF INDIVIDUAL CITIZENS AND GROUPS OF CITIZENS, INCLUDING GULF EMPLOYEES AND THE COMPANY ITSELF. SUCH PARTICIPATION, HOWEVER, MUST BE IN FULL ACCORD WITH THE REGULATIONS, LAWS, AND GENERALLY ACCEPTED PRACTICE OF THE JURISDICTION INVOLVED.

STRICT ADHERENCE TO THE FOREGOING PRINCIPLES IS HEREBY MADE A CONDITION OF CONTINUED EMPLOYMENT.

Recognizing that Gulf is composed of a great reservoir of skilled and dedicated people who can be counted on to preserve and enhance Gulf's standing as a vigorous but ethical competitor, I am confident that we will all be guided accordingly. By so doing, we have a remarkable opportunity to further advance Gulf as a strong and successful business institution and to serve as an example of high ethical conduct to the United States and to the world.

Sincerely,

Jerry McAfee
Chairman of the Board

stuck on their wall. I think it had something to do with the resurgence of morale in the company and their renewal of the pride that we all felt in Gulf.

But it was an important step. As far as priority is concerned, I thought the first thing to do was to do what I could to restore the pride of Gulf people in what they were doing. That was a big part of the initial undertaking. I knew that everybody I saw in Gulf knew more about their respective jobs than I did. I didn't have panaceas. I didn't have all the answers. I had no solutions to all the problems, by any manner of means. But I had, and still have, great confidence in the people who were doing the jobs. They were a fine bunch of people, who, by and large, were outstanding in their respective areas. I told them so in the beginning. I would rely on them to do their job, and it would be their job; if I can help, I wanted to, but it was their job.

That's the way we left it. I'm sure there were some disappointments. Some things didn't work out and we had to make changes and all that. That's part of it. But, by and large, that was my approach to life.

The second priority, I guess, was to get the organization straightened out a bit. I said early on, "Gulf does not need another reorganization, for God's sake! We've had a reorganization every time there's been a new CEO, and sometimes two or three with the same CEO." The whole company was in a turmoil, because nobody really knew who was responsible for what. That was really one of the basic things wrong with the company. There was a great deal of confusion about who was supposed to do what.

Dorsey had, in his wisdom, brought in some outsiders as advisors and consultants, and as it turned out, strong participants in the planning and operation process, which they had no background for and didn't know what they were doing. They were hotshots from the business schools and whatnot, and frankly, they sometimes caused more problems than they solved. But I did see that there was a necessity for, not a reorganization, but a realignment of responsibility.

One of the first things I did was to clarify the functional, or as we called it, strategy center organization. Each of these functional areas was called a strategy center. In a business school phrase, it's suppose to be a profit center, only in some cases there weren't many profits.

That was the operating element. I said, "Look. These are the guys who really are responsible for making things go." These other staff departments, the planning department and the finance department and the personnel and the legal and all that, they're fine and necessary, and we have to have them, but they're staff

to the operating people. Under the previous setup, one of the problems was that a lot of these staff people had taken on operating responsibilities. The people in the field were confused about who was the boss. They were getting word from Pittsburgh, and when Pittsburgh said something, "Boy, that was the law." Sometimes, Pittsburgh spoke out of two sides of its mouth.

In fact, the only real organization change I made immediately, was to change the Chairman's Council, as it was then called, to the Chairman's Advisory Council. Now, that's just one word change, but it made a big difference, because then the planning department and the economics, and the personnel and legal and all that were advisory to the CEO and the senior executives, and to the operating people. It was the operating people to whom I delegated the responsibility. I think this did a lot to get things sorted out.

I wrote some things down in that connection also, which will save some talking, if I just loan you this piece of paper as well. It summarizes that part of it. [see following two pages]

Now, as to the real technical problems, the big problem was changing Gulf from a big net producer of crude oil to a big net buyer of crude oil. With Kuwait and Venezuela and Iran, we were among the biggest, when it came to worldwide crude supplies. In fact, we were at least as big as any, maybe the biggest, when it came to selling crude oil as crude oil. At the time, we did not have much by way of downstream operations in Europe, and practically nothing in Asia. But we sold an awful lot of crude oil, both in Europe and in Japan and elsewhere in Asia. A lot of the crude oil in Europe went to Shell, under a profit-sharing agreement. But it went there as crude oil, not as products.

When that supply was cut off, instead of having crude oil to sell, we had to buy crude oil to supply our limited, relatively small operations. Maybe half of our total crude oil development was used in our own operations. To supply crude required for that half of our operations, we had to buy crude oil, a lot of crude oil. Some of it from our former concession grantors, Kuwait, Iran, Nigeria, and elsewhere. Sometimes at very fancy prices.

It was a completely different world, because we were at their mercy. Instead of our having something to say about the terms—not as much as we were purported to have to say, or as much as we would sometimes liked to have said, but a good deal—they set price, and they set the quantity, and that was what we lived with. I guess that was the number one technical problem. I must say, our boys did a remarkable job there.

The second problem was this Texas Eastern thing. Finding the gas to supply that contract was a major, major undertaking.

Some Thoughts About
G.O.C. Organization and Management

1. What Gulf needs now is not another reorganization! The present structure, while not the only arrangement which would work, is basically sound and has considerable merit. Our job is to make it work well and smoothly. We have now had sufficient experience with the new organization to be able to make some fine-tuning adjustments toward this end.

2. It needs to be remembered, of course, that no matter how we slice it or what we call it, the Corporation is still one entity. In the final analysis we will all be judged -- by our shareholders, by our employees, and by the general public -- on the basis of the Corporate "bottom line," both short-term and long-term. No matter how brightly an individual element may shine, none of us will deserve or receive any real and lasting credit unless the Corporate short-term results and long-term prospects are good.

3. We need to recognize honestly and realistically that what we have in the new structure is not seven equal and autonomous Companies. Rather we have an aggregation of eight Divisions, each having an essential function to perform.

In the first place, we have five Operating Divisions; namely, GEM, GORAM, GOICHEM, GOCAN, and GOREDICO. Each of these companies is truly a profit-or-loss center which can and should enjoy a high degree of autonomy and independence. By properly allocating resources and valuing transfers of materials and services between Divisions, we can realistically evaluate the performance of these Divisions on a profit-or-loss basis, including return on investment, cash flow, and related measures.

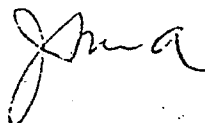
Then we have two Divisions whose function is primarily service in nature; namely, GS&T and GT&T. The principal mission of GS&T is, of course, to provide optimum technical support for the Operating Divisions, both now and for the future. Recognizing that the Corporation's technical capability is an important factor in both short-term profitability and long-term viability, the objective of GS&T is to strive to realize the optimum cost/benefit ratio and GS&T's performance evaluation will be based on their degree of achievement of this goal. Similarly, the principal mission of GT&T is to provide optimum logistic support for the Operating Divisions, facilitating the transfer of materials between Divisions and supplying marine transportation service at fair market value on a cost-reimbursement basis. GT&T is expected to be a principal guardian of the Corporate weal and their logistic support performance will be judged on the basis of optimization of Corporate benefit in this area.

To the extent that these Service Divisions are able, in addition to their support functions, also to sell technology, materials, and services to third parties or to engage in profitable related trading activities, they also have significant operating functions which can and should be judged on the same bases as those employed for the Operating Division.

Finally, we have the Headquarters Division, whose function is neither operating nor service in nature, but rather coordinating, motivating, evaluating, controlling, and planning. In short, the Headquarters Division's mission is to provide Corporate leadership.

4. It is in the area of the operations of the Headquarters Division that I believe our primary immediate efforts should be concentrated. As in any corporation, the authority in Gulf flows from the shareholders to the Board of Directors and from the Board to the Chief Executive Officer. I have elected to delegate a substantial portion of this authority to the President and to the chief executive officers of the seven Strategy Centers, while recognizing that the responsibility I have accepted must necessarily remain with me.

In order to perform the function of the Headquarters Division, the Chairman and President are surrounded by five essential groups; namely, the Law, Finance, Planning, Human Resources, and Public Affairs Departments, each headed by a senior Corporate officer. These officers, together with certain others as designated from time to time, comprise the Chairman's Advisory Council. The purpose of this group is to provide the Chairman, the President, and the chief executives of the Strategy Centers with advice and support in their respective areas. While participating in developing the decisions taken by the line officers, the members of the Chairman's Advisory Council will not make executive decisions except in their own areas of responsibility.



Jerry McAfee

JMcA:c
February 3, 1976

In order to do it, we got very big in offshore exploration, and we put a great deal of money into offshore leases and our exploration and then production. To make a long story short, eventually we were able to meet that contract and satisfy it completely.

Another big one, of course, was extricating ourselves from the uranium business. That was a long saga in itself, which eventually we got out of at a considerable, but not at an intolerable cost.

The whole business of what to do with the refining and marketing end of our business was a major challenge. We were facing a shrinking market. As I mentioned earlier, Gulf's crude availabilities tended toward heavy high-asphalt crudes. But our refining facilities, regrettably, had been built over the years primarily to take advantage of our then considerably available light sweet crudes from Algeria and west Texas and the Gulf Coast and whatnot.

Here we were faced with a limited supply of those kinds of crudes, and more and more having to run Kuwait and other things like that which were more available. Whether or not we were going to have the market that we had at the time, and would be able to hang on to it economically, and the refining facilities required to do it, was a dilemma of the first order. We had some very, very smart people working at it, over the years. It was a continuing battle, which had no simple solution to it. What we ended up doing, however, was some considerable upgrading of our refining facilities. Eventually, we solved the problem reasonably well.

Another ongoing thing, of course, was the continuing battles with the government, both regulatory and tax-wise. The regulators got more and more into our business, and it was an ongoing chore that we dedicated the time and effort of a great many excellent people to doing nothing but satisfying the government requirements.

In all that there is a hidden cost, that will never be fully recognized. Every company, as Gulf did, had to spend an enormous amount of time just trying to understand, and then comply, with the regulations that we were faced with. Of course, we had price controls, which stayed on oil products long after they'd been lifted from other products. And on crude oil as well, which was completely in the wrong direction.

[END OF TAPE, SIDE 9]

MCAFEE: The price control situation was another whole saga in itself; it stimulated demand and inhibited production. We were

not able to generate the capital necessary for the exploration program that it really took to replace the reserves we were producing. It was a continual fight to keep our reserves somewhere in sight. Even then, we were not completely successful. We were able to turn the curve at the bottom in the gas area, but hadn't yet succeeded in the oil area.

Then when Mr. [President James Earl] Carter, to his credit, began decontrol of crude oil prices, at the same time he slapped on the so-called windfall profits tax. It was no more a profits tax than nothing; it was an excise tax placed on domestic production, whether you made a nickel on it or not. It was just an additional tax burden, which further robbed the companies of about eighty-five percent of the incremental revenues which we enjoyed from the decontrol of the prices. As the prices went up, the government took eighty-five percent of it. That left fifteen percent. We were glad to have that, and it helped.

But, my gosh, how much more we would have been able to do, if we had the whole ball of wax. Now, that eighty-five percent includes income tax which would always take about half the profit. So, if we had the other thirty-five percent, let's say, that the windfalls profit tax took away from us, we could have put ourselves in a heck of a lot better position. We, and other companies, as well.

The very fact that we were able to survive, under all these circumstances, is a considerable accomplishment, if I do say so. As a matter of fact, I'm able to go further than that. I think at the end of my six years, the company was in a stronger position and better position, in almost every respect, than it was when I came on the job. So I've got to feel good about the whole thing, in retrospect.

Don't misunderstand me; there are lots of things I'd like to do over, with the benefit of hindsight. I'm sure I made some mistakes. Most of all, perhaps some of the moves I made, I should have made sooner and more decisively. But I did what seemed to be the thing to do at the time. I did my best!

Therefore, I ended my term with some regrets but no apologies. Regrets, yes, of course. Regrets that we hadn't accomplished as much as we would have liked to have done. But apologies, no. Regrets, only in the sense of not accomplishing more than we did. I have no regrets about what we tried to do.

I know that sounds like a bit of a self-serving apologia, if you will, but if you want to know how I feel about my career, I feel good about it. I feel good because I gave it everything I had, and feel like I made a contribution. I was fortunate enough, at the end, to be in a position to turn it over to Jimmy Lee and Ed Walker and Harold Hammer and the operating people and the other people as well, the whole team. I had every confidence

in them. I felt we had started the shift in the right direction, and they were going to continue in that same direction. And they did, as long as they were able. So I'm bound to feel good about it.

My whole career, Jim, I have to tell you, and I'm sure it's been evident in my conversation, has been characterized by the fact that I was extremely fortunate at every turn, and things just happened, and happened in my direction each time, it seems like. One good thing led to something even better. I was extremely fortunate in my various career assignments, in my professional opportunities, and in my personal life. I'm thoroughly enjoying retirement.

I was able to make the break and turn loose of things very satisfactorily. Not everyone is that fortunate. Some people are just not able to let go. I was, I'm glad to say. I stayed on the board as an outside member of the board, until the merger with Chevron. I was glad to be there, and I think perhaps I helped Jimmy in some respects, here and there.

But I was only a member of the board, and not a member of the management. At no time, I believe, was I ever guilty of looking over Jimmy's shoulder and telling him what I thought he ought to do. It was his show, and I broke clean, as far as the management of the company is concerned.

The people I feel sorry for are some of my peers in the oil business and elsewhere, who for whatever reasons, have not been able to let go, and try to continue beyond their time of usefulness. They're sad cases to themselves, and I don't think they do their companies a favor. Sometimes, of course, a man goes too soon when he's still got a contribution to make; the other side of the coin is that some people stay on too long. That's why I'm a strong believer in retirement at sixty-five being a pretty good way to do it.

Now I'm enjoying life, and concentrating on taking advantage of the blessings the Lord has seen fit to give me. I've got enough fingers in enough little pies, here and there, to keep me interested. There again, I've been lucky, and those outside interests have declined, as my energies and interest have declined. And they do, let's face it. We all do get older, and time does take its toll, and one's energy is not what it was.

I've had a few health problems, but fortunately they are under control at the moment. I've enjoyed basically good health. We have the two places, a very nice place here in Pittsburgh for summertime and in Florida for the wintertime. We have a wonderful family and many friends at both ends of the line, and we feel very fortunate.

(I have a couple of other pieces of paper that might be of

interest to you.)

At one point, I did set down some thoughts on goals and strategies and basically adhered to that. At the end of my term, I sat down and wrote a little paper of reflections on my years, which summarize some of the accomplishments that I think we can justifiably point to with some pride (15).

In the whole thing, I would emphasize this. There's nothing spectacular in my term as CEO of Gulf, nothing that would really make the Harvard Business School casebook or the Wall Street Journal. I'll never be a glamour boy in the profiles of the business magazines. But I know I gave it all I had. I think for our needs at the time, it was what the company needed. And I think I filled a need.

(I've talked much too much, and I apologize for being so voluble.)

BOHNING: No, not at all. It's been very valuable.

MCAFEE: I appreciate the opportunity you provided to do some reflecting and recollecting and reminiscing. With apologies for going into more detail than you would have wanted in some areas.

BOHNING: No, not at all.

MCAFEE: I've enjoyed the conversation. Any other areas that you want to cover?

BOHNING: You've said a lot about your years as CEO of Gulf. I do have one question. I was somewhat struck by the irony, if I can use that word, that when you became CEO, at the same time you had made, legally, political contributions in Canada. You had indicated, as CEO, that as you said earlier, you would follow the law of the land.

MCAFEE: Right.

BOHNING: So that, in Canada, that process would continue. Which, I believe, Sister Jane Scully objected to. Did she not want to cut all political contributions of any kind, at any time?

MCAFEE: There was a school of thought, that thought we should do that. I can't remember now, that Sister Jane was necessarily the

ring leader of it, but she may have well have been. There were people, on the board and elsewhere, who thought that the only thing to do was just to cut out all politics. That was the reason for that statement number four, in the "Statement of Business Principles." Because, I said, "That would be the wrong thing to do."

First of all, as far as the Canadian situation is concerned, political contributions by a company in Canada were completely legal and encouraged and wanted. We had a policy in Gulf Canada, that we would not support any candidate. What we did was to support the parties that we could recognize as being legitimate governing parties. At the time, they were the liberals, who had the prime ministership at the time; and the progressive conservatives, as they called themselves.

We supported them, more or less equally; the incumbent usually got a little bit more than the "out" guys. But they both got a substantial share, and it was up to the party to distribute it to their candidate. We did not support the Socialists, because they just don't believe in life as we believe in it. But we did support the system, as it were.

Gulf Canada's contribution was piddling, maybe \$100,000, at most. I know it was small, but was significant as far as Gulf Canada was concerned. It was a consistent policy. So it was a completely legitimate activity for Gulf Canada to have been in and to continue.

I feel and felt very strongly that participation in the government process is a responsibility, and if you do it right, you've got to do it! It's part of life, it's part of what we're here for in a democratic society, both as individuals and as a company. I felt very strongly on that point. I would not yield an inch to Sister Jane or anybody else on that one, because I was not about to duck our head in the sand and take the position that whatever they do to us was just something we have to live with. Doggone it, we have a voice that should be heard. When we think things aren't going right, we ought to say so, and we ought to do what we can constructively to improve them and to make them go right, to the extent that we can.

Both through the industry efforts of the API and separately as Gulf itself, I did everything I knew how to do, and we did everything we knew how to do, to try to constructively influence the course of government and government action.

BOHNING: You had mentioned during lunch your testimony and your depositions. I think some of that also came out of the uranium litigations, did it not?

MCAFEE: Yes.

BOHNING: I'm not quite clear about the Westinghouse involvement. Westinghouse was precipitating all of these problems, wasn't it?

MCAFEE: To a significant extent, that's true. Westinghouse got itself in a bind. They built a lot of nuclear plants, as you know. They made contracts to supply the uranium to those plants, at a time when uranium was cheap. They made contracts which later became impossible to fulfill, because they couldn't buy the uranium at anywhere near the price that they had contracted to sell it.

They were not uranium producers themselves. They did not have long-term contractual access. They made a major boo-boo in contracting to sell something they didn't have. When they found themselves in this bind, which was more or less a two-billion-dollar bind, which could have wrecked the company (it came close to wrecking the company finally), they thrashed out in every direction they could to cover their tracks and to recoup their losses. One of the directions they thrashed out in was Gulf and the uranium cartel.

It's a complicated thing I that won't have time to cover. Not that I could. It's more complicated than I understood at the time, much less remember now. But it involved Gulf Minerals Canada, having been required by the Canadian government to participate in the cartel, which Canada and South Africa and France and one other country had set up to counter the actions of the United States government, in closing the United States' market to foreign uranium, in protection of the domestic U.S. uranium industry. Gulf Minerals Canada had no choice but to do what the Canadian government said to do.

The United Nuclear Corporation was successful in a state court in New Mexico in claiming that the reason the price of uranium went up drastically, by several-fold, was the actions of this cartel. Actually, there were many other reasons which were involved. One of the most important of which was the Westinghouse activity of going into the market and paying panic prices for uranium, which they just had to have in order to supply their contracted amounts to their own nuclear plants. They bid the price up, and the cartel got blamed for it.

Actually, the cartel was a toothless tiger, if you really want to know my opinion. If the cartel had tried to control the price of uranium, they wouldn't have gotten to first base. Westinghouse claimed that it was the general price of energy, and it was the time of the OPEC price increases, oil crises, and all that, and everything was out of sight. As it turned out, it was mostly "pie in the sky." The high uranium prices that people

feared never came about, and uranium became a drug on the market, after Three-Mile Island.

In retrospect, we could have gotten rich, had we stuck with our contracts and supplied it by buying cheap uranium after a while. But that's hindsight.

Nevertheless, it was a major irritation and distraction, and it took an awful lot of my personal time, in both the extrication of our commitments, with respect to the General Atomic plants, and the uranium aspect of it as well. As I said, we eventually settled out of court at a considerable, but tolerable, cost.

BOHNING: There's only one more thing I wanted to mention briefly. Since your retirement, you were quite influential in raising funds for the MIT School of Chemical Engineering Practice, which you so fondly talked about earlier. I wondered if you wanted to comment about that.

MCAFEE: It wasn't just since my retirement. I started this when I was still very much a CEO. As a matter of fact, I was able to utilize my good offices to get some support.

The MIT Practice School has an ongoing institution since 1916; it's the same age that I am. Under the inspiration of Walker and Lewis primarily, it was for a long time the elite educational opportunity for chemical engineering at MIT, and that meant the world. But after the war, for various reasons, it sort of fell into disrepute. There was a strong tendency toward more theoretical chemical engineering, doing things on the computer instead of doing them in the laboratory, and getting away from the practical aspects and more into the theoretical. That was part of it, but there were a lot of other reasons as well.

In the late 1970s, 1978 or so, it became pretty evident that something had to be done, or the Practice School was going to go down the drain. Because it is an extra expense situation, it sticks out like a sore thumb, as far as cost is concerned. If the Institute picks up the tab for the whole thing, a lot of other departments get their nose out of joint, because chemical engineering is getting much too much of their share of the pie.

So at the request of the MIT people, I organized a committee, of mostly oil companies but some chemical companies, and persuaded them to come into the picture on what we called "Friends of the Practice School" or something like that. We asked them to agree to contribute ten thousand dollars a year, for five years, which made up the funds that were then needed to provide the additional fellowship support that these Practice School people required.

When those five years ran out, we renewed it with some other companies. There were a couple of dozen companies, eventually, that participated on that basis. They got a little special quid-pro-quo treatment, in that they were given an opportunity to interview the Practice School people in advance of others, with no commitment on either side, but at least an early chance to get at these guys who were at the time in some demand.

That led to the fact that this sort of support would not go on forever. It was what they called "soft money" that couldn't be counted on. The conclusion was that we really needed to have endowment money to keep the Practice School, the extras—the icing on the cake, as it were—on a firm foundation. That's when we then pitched the alumni campaign. Eventually, with big help from David Koch, we ended up with an eight-million-dollar endowment to support the Practice School fellowships.

It was a gratifying endeavor to be involved in, and I feel like it was worthwhile, because I feel so strongly that the Practice School approach to chemical engineering is the right approach. It somehow manages to bring together theory and practice at a critical time in a fellow's career.

BOHNING: That history that came out a year or so ago was a marvelous accounting of the school (16).

MCAFEE: I thought the author did a good job. He, John Mattill, was the former Editor of the Technology Review. He did a good job. I think it added considerably to the stature of the profession and the MIT Practice School.

BOHNING: I've come to the last of my notes. Is there anything else that you would like to add that we haven't covered?

MCAFEE: Not at the moment, that I think of, Jim. After you leave, I'm sure I'll think of a dozen things that I wish I'd gone into with you. But we've pretty much used our time. There haven't been too many lapses. [laughter] You let me talk an awful lot, and I apologize for that, Jim. But I appreciate the chance to reminisce with you.

If, as you go over your notes and whatnot, there are some gaps that you would like to fill in, don't hesitate. We can either do it by telephone or correspondence, or another visit to Florida in February.

BOHNING: That sounds good. [laughter] Thank you very much for spending the day with me. I really appreciate it.

MCAFEE: It's been my pleasure, and I appreciate it. I think that probably, from my standpoint as well, it served a useful purpose in getting me to focus my thoughts a little bit about what I really think about some things. As you can see, I kind of fell into a lot of very good fortune over the years, and I feel very blessed by the things that have happened to us.

[END OF TAPE, SIDE 10]

NOTES

1. William H. Walker, Warren K. Lewis, and William H. McAdams, Principles of Chemical Engineering, 3rd. ed. (New York: McGraw-Hill Book Company, 1937).
2. Jerry McAfee, "Positive Displacement Flowmeter," Industrial and Engineering Chemistry, 16 (1944): 303.
3. C. L. Thomas, N. K. Anderson, H. A. Becker, and J. McAfee, "Cracking with Catalysts," Petroleum Refiner, 22 (1943): 365-370.
4. J. Neill Greenwood, Henry Hirst, and J. McAfee, "Atmospheric Corrosion of Extruded Silver-Lead Alloys," Proceedings of the Australasian Institute of Mining and Metallurgy, No. 123 (1941): 135-40; No. 124 (1941): 235-237.
5. Jerry McAfee, C. W. Montgomery, J. H. Hirsch, W. A. Horne, and C. R. Summers, Jr., "Gulf HDS Process Upgrades Crudes," Petroleum Refiner, 34 (1955): 156-162; McAfee, Montgomery, Summers, Hirsch, and Horne, "The Gulf HDS Process for Upgrading Crudes and Residues," Proceedings of the American Petroleum Institute, 35, III (1955): 312-323.
6. Terry S. Reynolds, 75 Years of Progress: A History of the American Institute of Chemical Engineers, 1908 - 1983 (New York: American Institute of Chemical Engineers, 1983); see pp. 133-134 for McAfee recollections.
7. Jerry McAfee (to Gulf Research and Development Company), "Hydrodesulfurizing," U.S. Patent 2,723,943, issued 15 November 1955; McAfee and Albert G. Smith (to Gulf Oil Corporation), "Continuous Acid Treatment of Petroleum Oils," U.S. Patent 2,753,293, issued 3 July 1956; McAfee (to Gulf Research and Development Company), "Transfer of Fluidized Catalyst Between Two Vessels of a Hydrocarbon Conversion Assembly," U.S. Patent 2,892,772, issued 30 June 1959; Joel H. Hirsch and McAfee, "Transfer of Fluidized Solids," U.S. Patent 2,892,773, issued 30 June 1959; McAfee, "Granulated Petroleum Pitch," U.S. Patent 2,896,261, issued 28 July 1959; McAfee (to Gulf Research and Development Company), "Destructive Hydrogenation," U.S. Patent 2,944,961, issued 12 July 1960.
8. "Why Gulf Canada's New President Wants Oil Policy to be Enforced," Financial Post (Toronto), 23 August, 1969, p. 6.
9. Jerry McAfee, "Industry's Response to Its Social Responsibilities," Canadian Welfare 47 (Jan.-Feb. 1971): 10-12, 30.

10. "Gulf Oil Canada Held In Best Shape Ever," Wall Street Journal, 10 January 1972, p. 7.
11. "Gulf Canada Had Record '73," Wall Street Journal, 31 January 1974, p. 10.
12. "Gulf Oil Canada '74 Net Up," Wall Street Journal, 13 February 1975, p. 2.
13. "An Interesting, But Not Easy, Time to Run an Oil Company," Executive, 15 (1973): 59, 61, 63-67.
14. Jerry McAfee, "Risking Energy Vulnerability," Financial Post (Toronto) 19 October 1974, p. C-3.
15. Jerry McAfee, "Reflections on the McAfee Years," 9 December 1983; typescript in Chemical Heritage Foundation oral history research file #0114.
16. John Mattill, The Flagship: The M.I.T. School of Chemical Engineering Practice 1916 -1991 (Cambridge, Massachusetts: David H. Koch School of Chemical Engineering Practice, 1991); see p. 83 for McAfee contributions.

INDEX

A

Abercrombie-Harrison, 21
American Institute of Chemical Engineers [AIChE], 37, 38
Alberta, Canada, 49, 51, 52
Alkylation, 19
Aluminum chloride [alchlor] process, 3-4
Aluminum chloride, 3-4, 14
American Chemical Society [ACS]
 Petroleum Division Symposium, 36
 Petroleum Research Fund Advisory Board, 37
American Petroleum Institute [API], 23, 39, 68
 Smoke and Fumes Committee, 37-38
Anderson, Nils K., 25
Arco Chemical Company, 49-50

B

Bangor, Maine, 13
Barnes, Bonner, 35
Bay City, Texas, 21
Bayonne, New Jersey, 2
Beaumont, Texas, 7
Becker, H. A., 25
Bethlehem Works, 13
Blaser, Lorrie, 43
British American Oil Company, 40-41, 43-44, 46, 49
Brockett, Del, 55
Bryn Mawr College, 5
Butadiene, 19
Butylene, 17, 18

C

Calfee, Marguerite [mother], 5-6
Cambridge, Massachusetts, 11
Canadian Welfare, 47
Canadian House of Parliament, 52
Canadian crude oil, 45
Carbon Petroleum Dubbs, 17
Carter, President James Earl, 65
Catalytic cracking process, 3, 4, 14, 15, 18, 19, 20, 21, 25, 28, 31
Chevron Chemical Company, 66
Cheyenne, Wyoming, 21, 22
Chicago, Illinois, 11, 15, 16, 21, 22
Cities Service of Canada, 49
Columbia University, 2

D

Davis, Grady, 54
Day, Roland B., 21
Denton, Texas, 16

Depression, 7
Doan, Ted, 48
Dorsey, Robert, 35, 36, 53, 54-56, 59, 62
Dow Chemical Company, The, 48, 57
E.I. Du Pont de Nemours & Company, Inc., 25
Dubbs process, 17
Dubbs cracking, 17

E

Eastern States Petroleum Company, 20, 21
Eastern Manufacturing Company, 13
Egloff, Gustav, 15
Exxon Chemicals Company, 44

F

Foote, Paul, 27, 30
Friedel-Crafts reagent, 3
Frontier Refining Company, 21, 22

G

Galveston, Texas, 21
General Atomic Company, 70
Gilliland, Edwin Richard, 12
Great Canadian Oil Sands, 49
Griswold, John, 9, 10
Gulf Oil Corporation, 2-3, 5, 7, 17-18, 22, 23, 26-29, 33-37, 38, 39, 40, 41, 47, 54, 60-62
 Board of Directors, 56-59
 Chairman's Advisory Board, 63
 Chairman's Council, 63
 Canada 40-41, 42, 43, 44-54, 58, 68
 Board of Directors, 54
 Edmonton, 44
 Nova Scotia, 44, 46
 Europe, 39
 Rome facility, 39
 Spain facility, 39
 Kuwait facility, 40, 41-42, 63, 64
 Japan facility, 39
 Korea facility, 39
 Mexico facility, 40
 Philippines facility, 39
 Research Division, 37
 South America, 39
 Venezuela refinery, 36, 40, 63
Gulf Mineral Resources Company
 Denver, 47
 Toronto, 47
Gulf Minerals Company, 47
Gulf Minerals Canada, 69
Gulf Eastern, 41

Gulf Oil Refining and Marketing, 53
 Houston Division, 53
 London Division, 53
Gulf Pride motor oil, 4
Gulf Research and Development Company, 30-31, 32

H

Haensel, Vladimir, 18-19
Hammer, Harold, 65
Harmarville, Pennsylvania, 24, 29
Hay, Charles, 44, 45, 49
HDS process, 28, 29, 31
Hercules Power Plant, 13
HF-alkylation, 18
Higgins, Jim, 57
Hirsch, Joel H., 31
Horne, William A., 31
Hottel, Hoyt, 1, 12
Houdry, Eugene, 18, 22-23
Houston, Texas, 21
Houston Ship Channel, 20
Hydrofluoric acid, 18

I

Imperial Oil Company, 44, 49
Iran, 42
Isobutane, 18

J

Jerguson gauge, 24
Jersey design, 21-22

K

Kirberg, --, 35
Koch, David, 71

L

Lackawanna, New York, 13-14
Lee, James E., 36, 58-59, 65, 66
Lewis, Warren Kendall, 12, 19, 70
London, England, 40-41, 55
Los Angeles, California, 37

M

Massachusetts Institute of Technology, 8, 9, 11-14, 15, 19, 55
 Practice School, 10, 13, 27, 29, 70-71
Matthews, Beverly, 54, 57-58, 59
Mattill, John, 71
McAdams, William Henry, 12
McAfee, Almer McDuffie [father], 2-6, 8-9, 17
McAfee gauge, 24
McCloy, John, 57

McDonald, Donald, 50, 52
Mellon, General Richard King, 56-57
Mellon Bank, 57
Mellon family, 36
Montgomery, Charles W., 31
Montreal, Canada, 45
Mossaddeq, Mohammad, 42

N

Nickel, 14
Nickel-chromium catalyst, 24
No-Nox gasoline, 3-4, 18
Octane scale, 18
Okinawa, Japan, 28
Ontario, Canada, 51, 54
Organization of Petroleum Exporting Countries [OPEC], 42-43, 69
Ottawa Valley, Canada, 45

P

Parlin, New Jersey, 13
Pearson, Nate, 57, 59
Perkin Medal, 18
Petroleum Refiner, 25, 31
Phillips Petroleum Company, 18
Pittsburgh, Pennsylvania, 4, 26, 32, 41, 43, 54, 55
Platforming, 18
Port Arthur Refinery, 26, 28, 30, 31, 32, 36, 55
Port Arthur, Texas, 2, 4, 5, 6, 7, 22, 55
Proceedings of the Australian Institute of Mining and Metallurgy, 26
Proctor, David, 56
Propane, 24
Propylene, 17
Republic Oil Refining, 21

R

Riverside, New Jersey, 19, 21, 23-34
Riverside, Illinois, 16
Roosevelt, Franklin D., 22
Rotary Club President, 5
Royalite, 49

S

San Antonio, Texas, 11
Schoch, Eugene Paul, 9
Scott, H. B., 52
Scully, Sister Jane, 67, 68
Shell Oil Company, 17, 19, 51, 63
Sherwood, Thomas K., 12
Shuster, Frank, 44
Singer, Edward, 59
Smith, Harold, 16
Smith, Geraldine [wife], 15-16

Snycrude project, 49-50, 53
Spindletop Crude, 2
Standard Oil of New Jersey, 17, 19
Sulfuric acid, 18
Sullivan, Ed, 44
Summers, C. R., Jr., 31
Sun Oil Company, 49
Synthetic rubber, 19
Synthetic rubber project, 19

T

Tau Beta Phi Fellowship, 8, 9
Technology Review, 71
Texas Eastern, 60, 64
Texas City, Texas, 21
Texas State College for Women [College of Industrial Arts], 16
Texas, University of, 5, 8, 10, 11, 55
Texas A&M University, 35
Texas Company, The, [Texaco], 2-3, 6, 17
Thermal cracking, 28
Thermoform Catalytic Cracker [TCC], 18, 23
Thomas, Charles L., 25
Three-Mile Island, 70
Toluene Technical Committee, 19
Toluene, 19
Toronto, Canada, 53-54, 59

U

United Nuclear Corporation, 69
Universal Oil Products Company, 15, 16, 17-19, 20, 21, 22-23, 25
30, 33, 37
Uvalde, Texas, 11

W

Walker, Lewis, McAdams [textboo], 12
Walker, Edward, 54, 65, 70
Walker, William H., 12
Wall Street Journal, 67
Walton, Jim, 57
Waxahachie, Texas, 5
Wayne, John, 44
Weber, Harold, 12, 13-14
Westinghouse, 69
Whiteford, William K., 33-35, 39-40, 41, 43, 44, 54, 56, 60
Whitman, Walter Gordon, 15
Winnipeg, Canada 51, 53
Woodville, Texas, 6
World Petroleum Congress, 36
Permanent Council, 37
World's Fair [1939], 11