

5 In re: MDL DOCKET NO. 764
6 TEXAS EASTERN TRANSMISSION : Deposition of:
CORPORATION PCB :
7 CONTAMINATION INSURANCE ROGER E. HATTON,
COVERAGE LITIGATION. : Ph.D.
8 Volume I

15 TRANSCRIPT of testimony as taken by
16 and before TOMMY LARUE MILLER, a Certified
17 Shorthand Reporter and Notary Public, at the
18 offices of HUSCH, EPPENBERGER, DONOHUE
19 CORNFELD & JENKINS, 100 North Broadway, Suite
20 1300, St. Louis, Missouri, on Wednesday,
21 January 24, 1990, commencing at 10:10 in the
22 forenoon.

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1 I N D E X

2 WITNESS DIRECT

3 ROGER E. HATTON

4 Mr. Krauss 12

5

6

7 E X H I B I T S

8 NUMBER DESCRIPTION IDENTIFICATION

9	Hatton-1	Letter to W.M.	70
10		Stephens from D.F.	
11		Smith, dated	
12		August 22, 1968	
		two pages, Bates	
		Nos. 000907285	
		through 000907286	
13	Hatton-2	Documents entitled,	75
14		"Facts About Fire-	
15		Resistant Lubricants",	
		Bates Nos. TEX 000330	
		through 000337	
16	Hatton-3	PROTECTED Exhibit	80
17		Letter to R.E. Moore	
18		from W.M. Stephens, dated	
19		June 28, 1968, Bates Nos.	
		010037983 through	
		010037986	
20	Hatton-4	Memo to T.L. Gossage	85
21		from C.L. Bradford,	
22		dated December 15, 1971,	
23		Re: Santovac 1 and	
24		2/Turbinol 153, Bates	
25		Nos. TEX 000797	
		through 000800	

E X H I B I T S

(Continued)

<u>NUMBER</u>	<u>DESCRIPTION</u>	<u>IDENTIFICATION</u>
Hatton-5/6	Call Report No. 1972-11 by R.E. Hatton, dated February 11, 1972 Bates Nos. TEX 000879 through 000883	97
(THIS Exhibit WAS INITIALLY MARKED AS HATTON-5, THEN WITHDRAWN AND REMARKED AS Exhibit HATTON-6)		
Hatton-5	Call Report No. 1972-1 by R.E. Hatton, dated February 8, 1972, Bates Nos. TEX 000315 through 000317	99
Hatton-6	Call Report No. 1972-11 by R.E. Hatton, dated February 11, 1972 Bates Nos. TEX 000879 through 000883	110
Hatton-7	PROTECTED Exhibit Memo to Files, Subject: File 3.20 - Monsanto Turbine Lubricant MCS 1223 by A.B. Jarnagin, dated February 4, 1972 Bates Nos. 000531567 through 000531568	115
Hatton-8	Call Report-Organic Division to C.L. Bradford from John G. Frederiksen date of call February 4, 1972, Bates Nos. TEX 000876 through 000878	118

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<u>NUMBER</u>	<u>DESCRIPTION</u>	<u>IDENTIFICATION</u>
Hatton-9	Call Report-Organic Division to Cumming Paton from John G. Frederiksen date of call July 24, 1972, Bates Nos. TEX 000897 through 000898	124
Hatton-10	Call Report No. 1972-23 by R.E. Hatton, dated July 24, 1972, Bates Nos. TEX 000866 through 000869	129
Hatton-11	PROTECTED Exhibit Document entitled "Membership List Study Group on Fire-Resistant Turbine Fluids, Tech C, ASTM D-2, undated, Bates No. 000907826	148
Hatton-12	PROTECTED Exhibit Minutes of Meeting Fire-Resistant Turbine Fluids Study Group, Technical Committee C, ASTM Committee D-2 dated June 25, 1963, Bates Nos. 0009078915 through 000907825	151
Hatton-13	PROTECTED Exhibit Typewritten memo to "Earl", dated January 23, 1981, Bates No. 010037863	160

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<u>NUMBER</u>	<u>DESCRIPTION</u>	<u>IDENTIFICATION</u>
Hatton-14	PROTECTED Exhibit Letter to Dr. Roger E. Hatton from Clif Williams, dated December 1, 1975, Bates No. 000844865	163
Hatton-15	PROTECTED Exhibit Letter to Clif Williams from R.E. Hatton, dated December 8, 1975, Bates No. 000844861	163
Hatton-16	Memo to T.L. Gossage from C.L. Bradford/N.T. Johnson, dated November 17, 1971, Bates Nos. TEX 000303 through 000306	166

1 MR. KRAUSS: Good morning,
2 Mr. Hatton. I'm Gregg Krauss, representing
3 Fidelity and Casualty of New York, and Boston
4 Old Colony Insurance Company in litigation
5 against Texas Eastern Transmission Company.

6 I do appreciate your taking your
7 time today to come talk to us.

8 At this time I'd like to go
9 around the table and have everybody identify
10 themselves for the record.

11 MR. HOOKS: Dr. Hatton, my name
12 is Michael Hooks. I represent the same
13 companies that Gregg represents.

14 MR. PIERDINOCK: Good morning,
15 my name is David Pierdinock, and I come from
16 the law firm of Haskell & Perrin, and we
17 represent Continental Casualty.

18 MR. GREGG: Doctor, my name is
19 Michael Gregg, and we represent Prudential
20 Reinsurance Company.

21 MR. PUPKE: My name is Don Pupke
22 and I'm with the firm of Rivkin, Radler,
23 Dunne & Bayh and we represent AEGIS and
24 National Surety.

25 MS. BENNETT: My name is Mary

1 Bennett. I'm with the law firm of Sheft and
2 Sweeney. We represent several excess
3 carriers.

4 MR. HART: I'm Laird Hart. I
5 represent Texas Eastern Transmission
6 Corporation.

7 MR. DAVIDSON: My name is Gerard
8 Davidson. I'm with the firm of Smith, Helms,
9 Mulliss and Moore in Greensboro, North
10 Carolina. I represent Monsanto and Dr.
11 Hatton.

12 I'd like to just put something
13 on the record at this point so that we're all
14 clear that the genesis of this deposition was
15 a Rule 30(b)(6) notice served on Monsanto
16 back last fall, with some designated areas of
17 inquiry, served by the insurance carrier
18 parties.

19 Dr. Hatton is a retired Monsanto
20 employee, and is being designated by Monsanto
21 to testify as to certain of those subject
22 matter areas.

23 In particular, my understanding
24 is that attorneys for the insurance carriers,
25 or Mr. Hooks, has indicated that specifically

1 as the relationship between Monsanto and
2 Texas Eastern for the development and use of
3 PCB lubricating oil for use in natural gas
4 compressors, and the relationship between
5 Monsanto and Texas Eastern on or about the
6 time Monsanto announced it would no longer
7 sell PCB lubricating oil for use in natural
8 gas compressors, that those are the general
9 areas of inquiry today.

10 Counsel for the insurance
11 companies were informed that more than one
12 witness would be necessary to cover all of
13 the areas originally designated in the
14 30(b)(6) notice, and that Dr. Hatton was not
15 the proper person to cover all those subject
16 matters originally noticed.

17 And we were told that at this
18 point, that is today, Counsel wanted to go
19 forward with the deposition of Dr. Hatton and
20 then make further decisions as to whether
21 other witnesses should be designated, or
22 served and noticed.

23 A subpoena was served -- well,
24 I'm sorry, was forwarded to in-house Monsanto
25 Counsel, I think day before yesterday, and

1 was handed to Dr. Hatton yesterday. He has
2 that subpoena. It asked for him to bring to
3 this deposition his personal files as it
4 relates to the subject matter of the
5 deposition.

6 Without waiving any objections
7 to the lateness of that subpoena service, or
8 the correctness of the subpoena service, let
9 me say for the record that Dr. Hatton has
10 indicated that he has no personal files
11 pertaining to the subject matter of this
12 deposition; the turbine lubricant fuels,
13 fluids, or any such as that, other than
14 several product brochures prepared for that
15 type of product, that are the same as the
16 product brochures that have already been
17 produced to the parties by Monsanto. There
18 are no documents that he has in his
19 possession personally that you do not already
20 have.

21 And that's all I have.

22 MR. KRAUSS: Okay. And that
23 comports with our understanding, as well.

24 MR. DAVIDSON: Okay.

25 R O G E R E. H A T T O N, Ph.D.,

R. E. Hatton

1 406 Claybrook Lane, Kirkwood, Missouri
2 63122, having been duly sworn by the
3 Notary, testifies as follows:

4 DIRECT EXAMINATION BY MR. KRAUSS:

5 Q. Dr. Hatton, would you please
6 give us a brief background of your education
7 after high school?

8 A. Okay. I have a Bachelor of Arts
9 degree from University of Omaha in 1940. A
10 Master of Science degree, actually from
11 Perdue University, in organic chemistry. And
12 a Ph.D. from Perdue University in 1944, also
13 in organic chemistry.

14 Q. Have you had any special
15 training or education relating specifically
16 to polychlorinated biphenyls?

17 A. The information that I gained was
18 on-the-job training type of thing. The PCBs
19 were at Monsanto when I got there, and were
20 one of the many products that I worked with
21 while I was there.

22 Q. Okay. Have you had any special
23 training or education with respect to turbo
24 machinery, such as turbines or centrifugal
25 compressors?

R. E. Hatton

1 A. I've had no formal education. Again,
2 since we were interested in the field, and I
3 had numerous contacts with the producers of
4 such equipment, I --

5 Q. Could you tell me --

6 A. -- learned, myself, what was required,
7 and listened to other people talk about it.

8 But no educational -- no formal
9 courses in the subject.

10 Q. What producers of such equipment
11 have you been in contact with?

12 A. General Electric; Westinghouse, to
13 some extent; Solar.

14 Somehow it seems like there were
15 other smaller ones, but those are the major
16 ones that I remember at the moment.

17 Q. Do you recall being in contact,
18 or speaking to anybody from Clark Brothers,
19 manufacturers of centrifugal compressors?

20 A. Compressors, yes.

21 Now, on the compressor side it
22 was Clark, and Cooper Bessemer. And there
23 was a third one. And I -- that I dealt with
24 directly, and I cannot remember that name.

25 Q. Would it be DeLaval?

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1 A. Sounds right, yes.

2 Q. Do you recall specifically who
3 at the centrifugal compressor manufacturers
4 it was that you came in contact with? I know
5 it's been a number of years ago.

6 A. I do not.

7 Q. Okay. Have you ever been
8 deposed before?

9 A. Oh, yes.

10 Q. How many times?

11 A. I don't know that I can give you an
12 exact number. It's somewhere in the range of
13 ten to 15.

14 Q. Would you please give a
15 background of your employment after you
16 received your Ph.D from Perdue in 1944.

17 A. Yes. 1944 through '46 I stayed at
18 Perdue University and worked on the Manhattan
19 project, on a program they had on campus.

20 In 1946 I joined Monsanto as a
21 research chemist and worked for Monsanto then
22 until 1982 when I retired.

23 Since retirement I have been
24 doing a minor amount of consulting work.

25 Q. And what is the subject matter

R. E. Hatton

1 of the consulting work?

2 A. Functional fluids.

3 Q. What was your first position
4 with Monsanto -- I'm sorry, you said
5 research chemist?

6 A. Research chemist, yes.

7 Q. Did your position change at all
8 within Monsanto?

9 A. Yes, considerably.

10 Q. What was your next position
11 after you were a research chemist?

12 A. Group leader in the research
13 department.

14 Q. And what were your
15 responsibilities as a group leader in the
16 research department?

17 A. Basically the supervision and
18 administration of a group of research
19 chemists, doing various projects within the
20 organic chemicals department.

21 Q. Were those projects at that time
22 dealing with synthetic fluids, functional
23 fluids?

24 A. Yes. Also some with -- in some
25 closely related areas.

R. E. Hatton

1 Q. Did you have any positions after
2 you were a group leader?

3 A. Yes. In 1960 I transferred from the
4 research department to the -- it was called
5 the development department, within Monsanto.
6 Development meant within the company, the
7 development of new products outside the
8 laboratory, mainly with customers.

9 We learned a customer's
10 requirements, we did market research, we took
11 new products out to the field and saw that
12 they were properly applied, or at least tried
13 to. And then we saw that the products were
14 properly handled and introduced until the
15 time that they were transferred to marketing.

16 Q. And did you have that -- were
17 you in that position for the rest of your
18 career, or did you --

19 A. No.

20 Q. -- did you have other titles
21 other than that?

22 A. In 1968 I transferred to the marketing
23 department. The company wished to make the
24 marketing department stronger technically,
25 and there were a number of us who ended up

R. E. Hatton

1 working under marketing, even though we
2 continued to do the development project --
3 development work I just talked about, as well
4 as supporting those commercial products which
5 were already out in the field.

6 If somebody had trouble with a
7 product, we acted in what would be called in
8 some companies as technical service
9 representatives, that type of activity.

10 So it was varied, but that
11 covers pretty much what I did from then on
12 until the time that I retired in 1982.

13 I had many titles during that
14 time, technical service manager, product
15 supervisor and so on. They are not really
16 that important because the function never
17 changed.

18 Q. Okay. How was your position in
19 1968 when you were in the marketing
20 department, how did that differ than the
21 position that you had in the research
22 department from 1960 to 1968?

23 A. Well, I was in the development
24 department from 1960 to '68, which was --
25 within the organization of Monsanto was a

R. E. Hatton

1 separate department from research.

2 We had research, we had
3 development, we had marketing. So those were
4 three steps within -- major divisions within
5 the company.

6 Within research you worked in
7 the laboratory with the products and got your
8 hands dirty.

9 In the development department
10 you got your hands dirty with the customers,
11 rather than the laboratory.

12 Q. Okay. And then how was the
13 development department different than the
14 marketing department?

15 A. Well, the development department never
16 took orders. The marketing department did.

17 Q. But your day-to-day contact with
18 the customer was similar between the two?

19 A. It was similar, but the emphasis was
20 on products which had already been introduced
21 as commercial products.

22 Q. I see. Throughout your course
23 of employment at Monsanto, were you ever on
24 any committees relating to lubricants?

25 MR. DAVIDSON: You mean

R. E. Hatton

1 committees within Monsanto or with any?

2 MR. KRAUSS: Within or without
3 of Monsanto.

4 Q. Within the industry.

5 A. The answer is yes. I worked
6 particularly with ASTM.

7 Q. And what does ASTM stand for?

8 A. American Society of Standards and
9 Materials, I think -- of Testing and
10 Materials, yes, rather than Standards.

11 Q. Okay.

12 A. American Society of Testing and
13 Materials.

14 Q. What was --

15 A. You tend to refer to these things by
16 acronyms. You don't very often have to
17 recite the full name of technical societies.

18 Q. And what year were you
19 associated with that committee?

20 A. I could not remember the exact dates,
21 but it was at least ten or 15 years; some
22 during research, some during development, and
23 some during marketing. It stretched most of
24 my career.

25 I also was a member of A.S.L.E.,

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1 which is the American Society of Lubrication
2 Engineers. That's a technical society.

3 Q. Were you on any committees
4 associated with that technical society?

5 A. They had groups that were involved in
6 hydraulic fluids and power generation,
7 synthetic lubricants and aviation fluids. I
8 was a member of all those panels at one time
9 or another.

10 Q. Did the ASTM committee which you
11 were a member of have a specific name?

12 A. Yes. It was called Technical
13 Committee N of Committee D-2.

14 The subject of the committee was
15 hydraulic fluids was -- or the title.

16 Q. Did that committee have any
17 special goals that they were working on, any
18 special projects?

19 A. That's a -- we're covering a
20 tremendous area of ground of what such a
21 Technical Committee would cover.

22 Q. Well, do you recall the reason
23 why the committee was formed?

24 MR. HART: Does he have an
25 understanding about why it was formed? I

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1 object to the form as stated.

2 A. The purpose of ASTM was to develop
3 test methods for all kinds of products, and I
4 mean all kinds. So that people could run a
5 given test and get an answer which they could
6 then feel quite sure that the next person
7 that ran that test would get the same answer,
8 or at least within the precision of the test
9 method. That was the basic reason for the
10 formation of ASTM, and it must be a hundred
11 years or more old.

12 Technical Committee N was set up
13 to do this kind of work on hydraulic fluids,
14 both petroleum based and synthetic.

15 Q. Was the committee's work geared
16 toward any specific end use of the product,
17 or was it more generalized?

18 A. The committee as set up had specific
19 groups working, I believe it was in four
20 areas; industrial fluids, aviation aerospace
21 fluids, marine fluids and, I believe the
22 fourth one was automotive fluids, limited, of
23 course, to the hydraulic fluids use.

24 Q. Was that committee further
25 broken down into anything called a study

R. E. Hatton

1 group, if you recall?

2 A. Well, we had a series of
3 subcommittees. The properties of the
4 hydraulic fluid are significantly broad that
5 you would study one property at a time, you
6 would develop a test for one property at a
7 time. And therefore, specific groups were
8 set up by properties.

9 Q. And were you a member of any of
10 these subcommittees?

11 A. All of them.

12 Q. All of them.

13 A. Yes. In the early days the committee
14 was quite small.

15 Q. Do you recall being a member of
16 a study group on fair resistant turbine
17 fluids?

18 A. Yes, I was a member of that group.
19 And that, I believe, was under Technical
20 Committee C instead of N.

21 Q. What are those designations;
22 Technical Committee N, Technical Committee C,
23 what do they stand for, if anything?

24 A. They are simply a way of dividing up
25 the field of petroleum products, which is the

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1 title of committee D-2, into handleable
2 sections.

3 We all know that petroleum is so
4 broadly used there is no way you can handle
5 it unless you start fragmenting it into
6 parts. And the D-2 broke things down into two
7 general ways of looking at it: One, which
8 was by application, and those were the letter
9 numbers, such as A, B, C, on up the line.

10 They then broke it down by
11 properties which crossed over between
12 applications. And you might have an
13 oxidation committee of viscosity study area,
14 and they, back when we started, were
15 generally given numbers.

16 Since then the designations have
17 all been changed. But that's what they were
18 at the time we're concerned about.

19 Q. Okay. And the subject of
20 Subcommittee N, I think you stated was
21 hydraulic fluids?

22 A. Yes.

23 Q. And I don't recall what you said
24 the subject of Committee C was.

25 A. Technical Committee C had to do with

R. E. Hatton

1 turbine lubricants. It's a broad field.

2 Primarily those were petroleum based at that
3 time that we're concerned about.

4 Q. Was the study group that I
5 referred to earlier, then, a subgroup of
6 Technical Committee C?

7 A. I cannot answer the exact designation
8 of that study group, whether it was a
9 subgroup or a study group, or what the
10 definition was. It functioned as a study
11 group.

12 Q. But it was some subset of
13 Subcommittee C.

14 A. Yes.

15 Q. Okay.

16 A. Yes.

17 Q. Any other committees besides the
18 ASTM and the A.S.L.E. ones that you referred
19 to?

20 A. Well, may I ask a question here?

21 Q. Sure.

22 A. You're referring to my memberships,
23 solely, or to my places where I was active?

24 Q. We'll stick to places where you
25 were active to narrow the field.

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1 A. I served with the Navy on an advisory
2 group on fluids and lubricants for a number
3 of years.

4 Q. Do you recall what years?

5 A. Not without checking records.

6 Q. Okay.

7 A. We dealt primarily with advising the
8 tripartide group, so-called, which were the
9 navies of the U.S., Canada, and England on
10 fluids and lubricants they used. Trying to
11 figure out ways to make one fluid work in
12 everybody's Navy was the goal.

13 Q. Was this during the course of
14 your employment at Monsanto --

15 A. Yes.

16 Q. -- that you were on this?

17 A. Monsanto sponsored me on that.

18 Q. What exactly is a fire-resistant
19 lubricant? What's meant by that term?

20 MR. HART: As the witness uses
21 it?

22 MR. DAVIDSON: As the witness
23 used it.

24 A. Well, it -- the product must meet at
25 least two criterion. One is that it must be

R. E. Hatton

1 fire-resistant, and by fire-resistant we
2 meant that it would be difficult to burn and
3 to ignite.

4 Secondly, it must be a
5 lubricant, and we would define being a
6 lubricant in terms of the requirements of the
7 application.

8 The term lubricant is so broad
9 that you could not just say the product is a
10 lubricant. It is a lubricant for gears, it's
11 a lubricant for bearings, it's a lubricant
12 for whatever, down the line.

13 Q. Did Monsanto manufacture
14 fire-resistant lubricants?

15 MR. DAVIDSON: At what time
16 period are you talking about?

17 MR. KRAUSS: During the course
18 of Dr. Hatton's employment.

19 A. Yes, Turbinol -- Turbinol series were
20 lubricants. Some of the other products that
21 we made had lubricating functions.

22 Q. Were you --

23 A. That was a requirement.

24 Q. Were you involved in working
25 with fire-resistant lubricants when you first

R. E. Hatton

1 joined Monsanto?

2 A. No.

3 Q. In what position at Monsanto did
4 you first become involved in any capacity
5 with fire-resistant lubricants?

6 A. I was assigned to a group leader in
7 1948 who covered the area of phosphate ester,
8 and fluids, and plasticizers, and several
9 related products. And it was his decision at
10 that time that I get involved with the fluids
11 program at Monsanto, and that's how I became
12 involved.

13 Q. Do you recall what the first
14 fire-resistant lubricant was that you were
15 involved with?

16 A. I'm a little bothered by the term
17 lubricant in that any of the fluids that we
18 made had a degree of lubricating ability.

19 Q. Would it be better to say
20 something more generic like functional
21 fluids?

22 A. Yes.

23 Q. Okay.

24 A. The reason being that you cannot even
25 run a hydraulic pump unless the fluid is a

R. E. Hatton

1 lubricant, to a certain extent. And
2 therefore, it would not make much of a
3 hydraulic fluid without being able to
4 lubricate the system. So -- a more generic
5 term, I think, is what we're looking for.

6 Q. Okay. And what was the first
7 product, then, that you were involved with?

8 A. A product which eventually became
9 trade named Skydrol.

10 Q. And what year was that?

11 A. 1948. S-k-y-d-r-o-l, trademarked.
12 You can see how well they trained that into
13 me at Monsanto.

14 Q. Do you recall what the
15 composition of Skydrol was?

16 A. Oh, absolutely. Skydrol was all
17 phosphate ester fluid. It was developed
18 primarily for use in aircraft, and came about
19 through efforts of Monsanto Company and
20 Douglas Aircraft to solve a fire problem
21 aboard commercial aircraft.

22 The product is still sold today,
23 in different forms, with improvements to the
24 product over the years.

25 And I was involved in some way

R. E. Hatton

1 with Skydrol from 1948 until I retired.

2 Q. Okay. And what was the next
3 product, then, that you were involved in?

4 A. The next product that we undertook to
5 develop, or to produce, research, was
6 fire-resistant hydraulic fluids, and
7 therefore the result of my efforts in that
8 area resulted in Pydraul F9.

9 Q. Was this when you were still in
10 the research department?

11 A. Oh, yes. This was early 1950 -- or
12 I'm not sure whether it was '50 or '51, but
13 in that time period.

14 Q. And you said the product was
15 Pydraul F9?

16 A. Yes.

17 Q. Do you recall what the
18 composition of Pydraul F9 was?

19 A. It came out of my laboratory as
20 formulation number 9, and my research
21 notebook, and it was a 50 percent of an
22 Aroclorin, and 50 percent of a tricresyl
23 phosphate.

24 Q. What do you mean by the term
25 Aroclor?

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1 A. Aroclor was our tradename at that time
2 for polychlorinated biphenyls.

3 Q. And what's a tricresyl --

4 A. Tricresyl phosphate --

5 Q. -- phosphate.

6 A. -- is a synthetic material made from
7 cresylic acid and phosphorus intermediates,
8 which was readily available at that time.

9 Q. Is that the same as a phosphate
10 ester?

11 A. It is a phosphate ester.

12 Q. Okay.

13 A. One of many. Phosphate ester is a
14 generic term. Tricresyl phosphate is a
15 member of that class.

16 Q. Okay. Is that phosphate ester
17 the same as the phosphate ester used in
18 Skydrol?

19 A. No way.

20 Q. How do they differ?

21 A. I don't want to give a chemistry
22 lesson, but --

23 MR. HART: You must get tired of
24 that.

25 A. -- we generally look at things by

R. E. Hatton

1 drawing pictures of them. And the easiest
2 way to talk about this is to say that the
3 phosphate ester group serves as a nucleus,
4 kind of here. It has stuck on it three
5 groupings, off to the side.

6 Q. Three bonding spots?

7 A. Three bonding spots, good term.

8 And those three bonding spots
9 can be filled with many types of hydrocarbon
10 fractions.

11 Q. Functional groups?

12 A. No. These are basically hydrocarbon
13 type groups, one of which is cresyl, which we
14 defined as a benzene ring attached to the
15 phosphorus through a CH₂ group. If there
16 are three there, then it would be tricresyl
17 phosphate.

18 Now, those can vary with all
19 sorts of substituents on those particular
20 groups, as well as the three groups can
21 vary.

22 Skydrol was made of one which
23 contained very different groups than
24 tricresyl phosphate because of the
25 requirements for viscosity and other uses.

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1 Q. Okay. Let me see if -- just so
2 we can avoid the chemistry lesson, the groups
3 that are bonded to the phosphate will change
4 the properties of the fluid. And you would,
5 depending on the function of the fluid, you
6 would alter the composition of the tricresyl
7 phosphate.

8 A. Yes.

9 Q. Fair?

10 A. Yes.

11 Q. Okay.

12 A. Okay.

13 Q. After the development of Pydraul
14 F9 were you involved in developing any other
15 synthetic functional fluids?

16 A. Yes, I stayed active in that field all
17 along and worked on the programs, and
18 generated some of them myself.

19 Q. What was the next fluid that you
20 were involved in the development of after
21 Pydraul F9?

22 A. I find it rather difficult to put the
23 Pydraul development in an exact time frame.
24 But one of the areas we worked on was
25 variations to Pydraul F9. Some hydraulic

R. E. Hatton

1 requirements are different than others,
2 obviously, and we tried to develop a line of
3 products that would be -- would satisfy the
4 needs.

5 Q. Were these all the Pydraul line
6 of products?

7 A. Well, when they were developed they
8 were never called Pydrauls. They were called
9 Pydrauls when they went out the door and were
10 sold. Many different code numbers, notebook
11 pages, numbers and what have you were used to
12 designate them for internal work until they
13 were ready to go.

14 Also looked for -- may I
15 backtrack?

16 When products were taken out to
17 the field to be tried in an application, if
18 the user found that the product didn't meet
19 the requirements exactly, and he wished a
20 little different viscosity, or he wished a
21 different density, or he wished some
22 different property, then it would come back
23 to the laboratory and we would vary the
24 composition, and take it back to him and let
25 him look at it.

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1 In doing such type of work we
2 also were very actively looking for other
3 applications of this type of product besides
4 hydraulic fluids. And one of those that we
5 picked at that time was as a steam turbine
6 lubricant.

7 Q. And which product was this?

8 A. The first product in that line was OS
9 58-1.

10 Q. And what was OS 58-1's
11 composition, if you recall?

12 A. It was a direct follow on to Pydraul
13 F9, and all I can tell you for sure is that
14 it contained Aroclor and tricresyl
15 phosphate.

16 Q. Was this a different tricresyl
17 phosphate than the one in Pydraul F9?

18 A. No.

19 Q. So, the difference between the
20 two was what, a change in the ratio?

21 A. Change in the ratio, a change in the
22 additives.

23 Q. What type of additives would be
24 included in these synthetic functional
25 fluids?

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1 A. Two, usually, that are of primary
2 importance. One is a viscosity index
3 improver, and the other would be a rust
4 inhibitor.

5 Q. Do you recall what year this OS
6 58-1 was developed?

7 A. Around the middle '50s.

8 Q. What was the next synthetic
9 functional fluid that you were involved in
10 the development of?

11 MR. HART: I'm going to object
12 to the form. It's my impression that the
13 witness was involved in a variety of fluids
14 simultaneously.

15 If I'm mistaken in that, then I
16 would withdraw my objection. But, I just
17 state it for the record.

18 A. That is quite true, that I worked many
19 areas simultaneously. I also had people
20 working with me, for me, who were working in
21 similar areas.

22 Q. Okay. Rather than ask what the
23 next one was, I'll ask what other synthetic
24 functional fluids were you involved in the
25 development of?

R. E. Hatton

1 A. The follow on products to OS 58-1.

2 And these would have eventually ended up as
3 Turbinol fluids.

4 I was also involved in further
5 developments in the Skydrol fluids. I was
6 involved in silicate ester chemistry. I was
7 involved in polyphenyl ether chemistry.

8 I also had a chemist working for
9 me who worked in very esoteric types of
10 fluids, which never became commercial. So,
11 it is an extremely broad range that I had.

12 Q. These follow on, or what you
13 refer to as follow on fluids from OS 58-1
14 that eventually became Turbinols, was one of
15 those OS-81?

16 A. The next -- the next member of that
17 family was OS-81 which followed OS 58-1.

18 Q. And what was the composition of
19 OS-81 when it was first developed?

20 A. It was about 90 percent Aroclor and
21 ten percent tricresyl phosphate --

22 Q. Did that composition for OS-81
23 as marketed, did that change over the course
24 of time at all?

25 A. Not to my knowledge. Not to my

R. E. Hatton

1 memory, I should say.

2 Q. You testified earlier that the
3 OS 58-1 was developed and marketed for steam
4 turbines --

5 A. No, it was not marketed, it was
6 developed for. And it was field tested in a
7 steam turbine, small steam turbine at Ducane
8 Power and Light. And that's where we found
9 that we needed some differences, and that's
10 why OS-81 was put together.

11 Q. I see. So, then OS-81 was then
12 developed and marketed --

13 A. Yes.

14 Q. -- for steam turbines.

15 Was OS-81 marketed to any other
16 industrial users?

17 A. Yes. We knew that the types of
18 bearings that were involved in steam engines
19 were also involved in huge industrial gas
20 turbines, so we went after the gas turbine
21 market.

22 Q. And what companies in specific
23 did you market this OS-81 to?

24 A. Primarily to General Electric,
25 although we took the product to all of the

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1 people that you have mentioned before in
2 terms of turbine suppliers.

3 Q. Was this fluid accepted by the
4 turbine manufacturers for use in their
5 turbines?

6 A. It was given sufficient approval that
7 it was put into field use.

8 Q. Did you also market OS-81 to the
9 end users, the people that actually owned and
10 operated the turbines?

11 A. Yes.

12 Q. And what companies were those?

13 A. Texas Eastern primarily.

14 Q. Any others?

15 A. We contacted many, but we -- we --
16 the only field use was by Texas Eastern.

17 Q. What specifically was it about
18 these synthetic functional fluids that would
19 be attractive to the end user?

20 MR. HART: Objection to form.

21 Q. Let me state that -- that when
22 Mr. Hart objects, it doesn't mean that you
23 should not answer.

24 MR. DAVIDSON: Do you understand
25 the question?

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1 THE WITNESS: No, I'm not sure
2 I do.

3 Q. Well, I'll ask it this way,
4 then.

5 Before OS-81 came onto the
6 market, what were companies such as Texas
7 Eastern using, if you know?

8 A. As far as I know they were using
9 petroleum oil.

10 Q. And what was it about your OS-81
11 that would encourage the end user to switch
12 from petroleum to the synthetic?

13 MR. HART: Objection to form.

14 A. OS-81 is fire-resistant. That's why
15 we marketed it.

16 Q. Were there any other
17 characteristics of the synthetic fluid that
18 would have been particularly attractive to an
19 end user, if you know?

20 A. Besides fire resistance?

21 Q. Besides fire resistance.

22 A. The products were extremely stable in
23 use --

24 Q. What do you mean by stable?

25 A. It means that there was little change

R. E. Hatton

1 in properties with time and in use.

2 Q. What types of products?

3 A. Primarily concerned with the oxidative
4 reaction with oxygen, or air. Reactions
5 caused by heat.

6 Q. Would that be --

7 A. Reactions with water --

8 Q. Thermal stability?

9 A. Thermal stability. Hydraulic
10 stability.

11 By stability we generally mean
12 unaffected or slightly affected by the
13 environment in which the product is used.

14 Q. Were these products, I take it
15 if they are interested in thermal stability,
16 oxidative stability, that they were used in
17 high temperature applications.

18 A. Yes.

19 Q. Would a high boiling point or
20 low vapor pressure also be of interest?

21 MR. HART: Objection.

22 A. Not necessarily.

23 Q. Did the products that you
24 marketed for this use have a high boiling
25 point, relatively high? Do you know --

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1 A. Compared to what?

2 Q. Yes. Okay. I understand. High
3 is a relative term, I'm sorry.

4 I'll scratch the question.

5 Strike the question.

6 Were any other products after
7 OS-81 developed and marketed to Texas
8 Eastern?

9 A. Yes. A product called MCS-153 was --

10 Q. What was the composition of
11 MCS-153?

12 A. -- developed -- it was a much more
13 complicated composition, but it did contain
14 phosphate ester, Aroclor, viscosity index
15 improver, and I believe a rust inhibitor.

16 Q. Do you recall specifically how
17 MCS-153 differed from OS-81?

18 A. Yes. The additive package was
19 different, to begin with.

20 Secondly, the PCB composition
21 was changed to improve the low temperature
22 properties of the formulation.

23 Q. What do you mean by the PCB
24 composition?

25 A. PCB is a family of fluids, and,

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1 depending on which particular one you use,
2 you have different properties of that
3 particular, so-called PCB, which is usually
4 still a mixture. And you can pick the
5 properties that the mixture has, it depends
6 on the specific one -- materials you use to
7 formulate it with.

8 Q. You're talking the differences
9 from one PCB composition to the other being
10 the chemical structure of the PCB?

11 A. Yes. I guess a good way to say it is
12 that the amount of chlorine the product
13 contains, and when we talk polychlorinated
14 biphenyls we mean putting an amount of
15 chlorine on the biphenyl molecule. The
16 properties of the resulting materials depend
17 upon that amount of chlorine.

18 Q. And so one of the differences
19 between OS-81, if I'm understanding you
20 correctly, is that it had a different
21 polychlorinated biphenyl in it than that in
22 MCS-153.

23 A. It certainly contained some different
24 ones.

25 Now, whether there was any

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1 overlap between the two, in terms of the
2 specific fractions of PCBs, I don't -- can't
3 remember without considerable looking at
4 formulations and so on. But yes, it was --
5 was significantly different.

6 Q. Were there any other differences
7 besides the additive package and the
8 particular poly -- ratio of polychlorinated
9 biphenyls in it?

10 MR. HART: Differences in
11 composition?

12 A. Composition? Or --

13 Q. Any other differences in
14 composition.

15 A. No.

16 Q. Was --

17 A. That's a very -- I mean, by the time
18 you've listed the things that you just
19 listed, that's a major part of the
20 composition, actually.

21 Q. Well, the only remaining
22 component I guess would be the tricresyl
23 phosphate, and that was the same.

24 A. Yes.

25 Q. Okay. When you refer to the

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1 stability of MCS-153, I guess that in a sense
2 is a relative terminology, as well, just like
3 high boiling point would be. Is that a fair
4 statement?

5 A. Well, yes. Any property can be
6 compared with fluids and how you talk about
7 more or less of a given property in a
8 material.

9 Q. So, to say that something is
10 extremely stable, it's stable within the
11 realm with which its used as a certain
12 application. Is that a fair statement?

13 MR. HART: I'll object to the
14 form.

15 A. Stability -- the general term
16 stability when used in connection with fluids
17 is almost always in terms of a specific test
18 or a specific use.

19 Q. Well, would you have
20 characterized the MCS-153 that went to Texas
21 Eastern's application as being unchangeable,
22 or indestructible, or very close to being
23 unchangeable or indestructible?

24 MR. HART: I object to the form.

25 MR. DAVIDSON: If you're going

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1 to question him about something that is in a
2 written document or letter, I'd like him to
3 be able to see that.

4 MR. KRAUSS: Yes. He didn't --
5 this one, I'm just seeing if he agrees with
6 that.

7 MR. HART: Well, I object to the
8 tense of the question. Are you asking would
9 he now do that? Did he ever do --

10 Q. At the time that MCS-153 was
11 developed and marketed to Texas Eastern, and
12 within the applications of Texas Eastern, was
13 it the next thing to being indestructible and
14 unchangeable?

15 MR. HART: Same objection.

16 A. If by your question -- do you mean was
17 it -- did it have a long life in that
18 application? I would answer yes.

19 Q. What do you mean by -- I don't
20 understand what you mean by a long life.

21 MR. HART: Well, then ask --

22 Q. What do you mean by a long life
23 as you used that term just now? Do you mean
24 that the MCS-153 would not decompose?

25 MR. HART: Objection to form --

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1 A. No, I --

2 MR. HART: I'm sorry.

3 A. I do not mean that the product would
4 never disappear, or would never degrade, or
5 would never change in use. We all know
6 better than that.

7 Things do wear out, even the
8 best of them. And to put a life factor on
9 any fluid is almost impossible because you do
10 not have control over how it's used, or what
11 people do to it. So, therefore you cannot --
12 when I say a long life, I mean compared to
13 another product in the same application.

14 Q. Okay. Why would oxidative
15 stability and thermal stability be important
16 to the end user?

17 MR. HART: Objection to form.

18 MR. DAVIDSON: If you know.

19 Q. If you know.

20 A. We were told that in the turbine
21 application the bearings and the surfaces ran
22 hot, and that air was present at all times.
23 Therefore those properties would be
24 important.

25 Q. At the time that you were

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1 involved in the development of the OS-81, and
2 more specifically in the marketing of it to
3 Texas Eastern, were you familiar with all of
4 Texas Eastern's applications for that fluid?

5 MR. HART: At the time he was
6 developing it?

7 MR. KRAUSS: Developing and
8 marketing.

9 MR. HART: Well, I object to the
10 notion that it was being applied at the time
11 that it was being developed.

12 MR. DAVIDSON: Now, I'm not sure
13 it's fair to ask him whether he knows all
14 about the operations of Texas Eastern. I
15 mean, he was looking at a specific type of
16 application.

17 A. I think I would --

18 Q. Well, let me ask it this way
19 then --

20 A. -- we were given general criteria
21 for the industry, I would say -- that would
22 be required in steam turbines and gas
23 turbines and other equipment. And we
24 developed the fluid in terms of those
25 requirements.

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1 Q. Okay.

2 A. But requirements, not any specific
3 customer.

4 Q. Okay. And where did you get the
5 information or the requirements for the
6 fluid? What was the source of that
7 information?

8 A. Most of them came from discussions
9 with experts in the field, through committee
10 contacts, and through calls on equipment
11 manufacturers.

12 Q. Were those equipment
13 manufacturers the ones that you listed
14 earlier?

15 A. Plus other people, who were --
16 supplied accessories to those units.

17 Q. When you were involved in the
18 development department, did you ever make any
19 customer visits to the customers' locations?

20 A. Oh sure. Yes.

21 Q. Did you ever visit a Texas
22 Eastern compressor station in that capacity?

23 A. Yes.

24 Q. Do you recall which compressor
25 station?

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1 A. No, I do not.

2 Q. Was there more than one
3 compressor station that you visited?

4 A. To the best of my memory, yes.

5 Q. You don't recall the name of the
6 station?

7 A. No.

8 Q. Do you recall what state the
9 station was in?

10 A. South of St. Louis.

11 MR. HART: Off the record.

12 (A discussion takes place off
13 the record.)

14 Q. Do you recall the purpose of
15 your visits to Texas Eastern compressor
16 stations?

17 MR. HART: This is during the
18 time he was in the development department?

19 MR. KRAUSS: Yes.

20 A. It would have been in the '60 to '68
21 period.

22 Primarily to see what the actual
23 equipment looked like.

24 Q. Let me backtrack a minute, as
25 well. Did you ever visit a Texas Eastern

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1 compressor station prior to 1960? Prior to
2 the time that you were in the development
3 department?

4 A. I think I accompanied the man who was
5 in development at that time, working in this
6 area -- once.

7 Q. Who was the man that was in
8 development at that time, that you were
9 referring to?

10 A. Jim Davis.

11 Q. Do you recall what station that
12 was?

13 A. No.

14 Q. Do you recall what year that
15 was?

16 A. No.

17 Q. Was this before the time that
18 OS-81 was available to the market?

19 MR. DAVIDSON: Are you talking
20 about did the visit take place --

21 MR. KRAUSS: The visit.

22 MR. DAVIDSON: -- take place
23 before OS-81 --

24 MR. KRAUSS: Yes.

25 Q. Did you go there --

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1 A. All right.

2 Q. -- as part of the development of
3 OS-81, during that project to see what the
4 application was to help your development
5 project?

6 A. The purpose of the visit was to
7 observe the types of environment the fluid
8 would possibly be exposed to. And to confirm
9 what we had learned from visits to the
10 manufacturers, such as GE and other --

11 Q. Was OS-81 a product on the
12 market already at that time when you went to
13 make that visit?

14 A. Yes.

15 Q. And what, specifically, was
16 Texas Eastern's application for this fluid?

17 A. As the lubricant in a gas fired
18 turbine, industrial type. And as a
19 compressor fluid -- or a compressor
20 lubricant on the natural gas compressor that
21 was attached to the turbine.

22 Q. Are you familiar with the
23 lubrication system on natural gas
24 compressors? Centrifugal compressors, let me
25 narrow that.

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1 MR. HART: Well, I'll object,
2 then. See if the witness is familiar with
3 the distinctions. I object to the form.

4 MR. KRAUSS: Let me strike the
5 question.

6 Q. When you visited the turbine
7 station, do you recall what type of
8 compressor was at that station?

9 A. It was a centrifugal compressor. I do
10 not remember the manufacturer.

11 Q. Okay. And you stated that this
12 synthetic functional fluid or synthetic
13 lubricant was going to be used as a lubricant
14 within the centrifugal compressor?

15 MR. HART: Objection to form.

16 A. I was told that it was going to be
17 there.

18 Q. Were you familiar with the
19 lubricating systems on such centrifugal
20 compressors?

21 A. I would like a definition of the word
22 familiar.

23 Q. Well, within your job of
24 marketing, or anticipating the needs of
25 industry, and developing fluids for the

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1 industry, were you familiar with the end
2 uses?

3 A. The equipment manufacturers had
4 supplied us with schematics of the
5 lubricating systems. And I was familiar with
6 that type -- with detail at that level, with
7 how the fluid was used and what it would be.

8 I was not involved with piping
9 diagrams, exact pipe runs and that type of --
10 of the system. But I was provided with
11 information, schematic drawings that showed
12 where the fluid went around the system.

13 Q. Yes.

14 A. What it was exposed to, and where --
15 and where, in that schematic.

16 Q. Okay. And this is all still
17 pre-1960 that we're talking about?

18 A. I -- it was either pre-1960, or when
19 I went to development. When I went to
20 development I also followed these same sorts
21 of programs, and I have trouble deciding
22 whether this is early '60s or late '50s that
23 this was being done.

24 Q. Okay. Do you have an
25 understanding for all of the purposes of

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1 lubricant in a centrifugal compressor?

2 MR. HART: I need that question
3 back.

4 (The pending question is read
5 back by the reporter.)

6 MR. HART: You want to rephrase
7 it?

8 MR. KRAUSS: Not really.

9 MR. HART: I object to the
10 form.

11 MR. DAVIDSON: Do you understand
12 the question?

13 THE WITNESS: I'm not sure that
14 I quite do.

15 Q. Okay. Let me ask, what are the
16 purposes of a lubricant within a centrifugal
17 compressor, if you know, based on your
18 familiarity with them, that you developed
19 from reading literature from the compressor
20 manufacturers?

21 A. In general terms, it must lubricate
22 the bearings, and must function as a seal oil
23 for the gas being compressed in the system.

24 Q. What do you mean by a seal oil?

25 A. The gas is compressed to high

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1 pressures, and it must keep the -- you must
2 maintain that gas within the system somehow,
3 and a liquid seal is one way of doing that.
4 And the lubricant, so-called lubricant often
5 functions that way.

6 Q. Do you have an understanding if
7 that was one of the functions of the
8 lubricant within the application at Texas
9 Eastern?

10 MR. HART: I'll object to the
11 form.

12 MR. KRAUSS: Well, are you
13 implying that there is something different
14 between what manufacturers were telling him
15 and showing him, and what Texas Eastern --
16 is that what you're getting at?

17 MR. KRAUSS: No. He mentioned
18 something in general that he said sometimes
19 fluid acts as the seal. And I want to know
20 if he has an understanding that that was one
21 of the uses at Texas Eastern.

22 MR. DAVIDSON: Okay.

23 A. It stated in a paper that Texas
24 Eastern wrote that that was one of the uses,
25 as a seal oil.

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1 Q. What paper are you referring to,
2 if you know?

3 A. One by Earl Farmer.

4 Q. Do you recall the title of that
5 paper?

6 A. Not an exact title. It was experience
7 with fire-resistant lubricants was the
8 general subject.

9 Q. You mentioned that the fluid can
10 act as a seal to keep the high pressured gas
11 in the system. Do you have a familiarity
12 with how that actually works?

13 A. Only to the extent of seeing a
14 schematic. How it would actually work in a
15 piece of equipment, I'm not sure I can
16 explain it to you.

17 Q. Within the seal system do you
18 have an understanding of whether or not the
19 seal oil contacts the gas?

20 A. The schematic shows that, yes, that
21 the fluid is put at high pressure by means of
22 a hydraulic type pump. And at high pressure
23 it does contact the -- whatever is being
24 pumped by the compressor.

25 Q. Do you have an understanding of

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1 what the pressure is relative to the gas
2 pipeline pressure?

3 A. I don't remember what I was told in
4 that case, specific numbers.

5 Q. In order for the fluid to
6 function as a seal, is it your understanding
7 that the pressures could be equal, the seal
8 oil versus the natural gas pressure?

9 MR. HART: Objection to form.

10 MR. DAVIDSON: Gregory, we have
11 not put him forward as a knowledgeable
12 witness on the physical functioning of a gas
13 pipeline and compressors, but for the
14 function of the fluid in those, and I --

15 MR. KRAUSS: I understand that.

16 MR. DAVIDSON: -- as long as we
17 stay on what he understood were the
18 requirements necessary for the fluid to
19 function, we're willing to let him testify as
20 to that. But I think we're getting into how
21 does this thing work.

22 MR. KRAUSS: I understand that.
23 And I believe that the witness testified that
24 he had to become familiar with the
25 application as part of the development of the

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1 different fluids. And I just want to know
2 how familiar the witness was with the
3 specific application.

4 MR. DAVIDSON: I understand
5 that. What I'm trying to say is that someone
6 from Texas Eastern is probably the most
7 knowledgeable person with respect to how the
8 pipeline and the compressors work.

9 What Dr. Hatton knows is, given
10 a specific set of requirements, or
11 specifications, or characteristics we tried
12 to make a fluid that would do that. And I
13 understand that may melt over into some
14 understanding as to what and how the system
15 functioned.

16 MR. KRAUSS: Okay.

17 MR. DAVIDSON: But as to
18 relative vapor pressures and so forth, I
19 think we may be getting a little far afield
20 of what he can be expected to know.

21 MR. KRAUSS: Okay. Well, then
22 if he doesn't have an understanding of that,
23 then he should just answer that he doesn't.
24 A. Okay. I do not have an understanding
2 of the exact function of that system.

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1 Q. Okay.

2 MR. DAVIDSON: I think the
3 record will reflect that he said this is
4 information being told to me about what was
5 required. So I think --

6 MR. KRAUSS: Right.

7 MR. DAVIDSON: -- that's fine.

8 MR. KRAUSS: You're correct.

9 MR. DAVIDSON: I don't want to
10 get too far off.

11 MR. KRAUSS: He reviewed the
12 schematic diagrams.

13 MR. DAVIDSON: Exactly.

14 MR. KRAUSS: Okay. I think I'd
15 like to take a ten minute break, if that's
16 okay with everybody else.

17 A. Fine.

18 (There is a recess.)

19 (A discussion takes place off
20 the record.)

21 MR. KRAUSS: Back on the
22 record.

23 Q. With respect to the pre-1960
24 Texas Eastern station visits that you made,
25 how many visits did you make before 1960?

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1 A. I -- I can't remember that. In those
2 days I was doing a lot of traveling, and I
3 don't -- I -- 30 years ago, I can't
4 remember where I went when, and on what
5 project, because I was also involved in many
6 projects.

7 Q. Do you recall who at Texas
8 Eastern that you spoke to?

9 A. One name I remember, O.M. Fletcher,
10 Ollie Fletcher.

11 Q. Do you know what Mr. Fletcher's
12 position was at the time?

13 A. He was in the engineering department.
14 I do not know his title --

15 Q. Did you meet --

16 A. -- any more.

17 Q. -- meet any station personnel at
18 that time?

19 A. One doesn't visit a station without
20 getting introduced to the people that are
21 there, so I have to answer yes. But I do not
22 remember the names.

23 Q. Do you know if there is anybody
24 else from the engineering department, besides
25 Mr. Fletcher, that was on that visit?

R. E. Hatton

1 A. No. Again, I cannot remember.

2 Q. Do you recall what you did when
3 you were at the station?

4 A. Looked around.

5 Q. What did you see?

6 A. Asked questions.

7 Q. What did you see?

8 A. I saw a gas pumping station. You
9 know, with the equipment operating.

10 Q. Did they have any unoperating
11 turbines there that you could look at?

12 A. I don't remember.

13 Q. What about compressors? Did
14 they have a compressor for you to look at
15 that wasn't operating?

16 A. Again, I can't remember.

17 Q. Not specifically relating to
18 station visits, but in general, in this time
19 frame prior to 1960, who else from Texas
20 Eastern were you dealing with with respect to
21 this OS-81?

22 A. My contacts were almost completely
23 with Ollie Fletcher.

24 Q. I know you testified that you
25 can't recall the name of the station, but do

R. E. Hatton

1 you recall the reason -- was there a
2 particular reason why you went to the station
3 that you went to?

4 A. To the best of my memory, it was
5 general information.

6 Q. Did Texas Eastern pick the
7 station for you to go to to view?

8 A. Texas Eastern was my host, yes.

9 Q. Do you recall if it was the St.
10 Francisville station?

11 A. I do not.

12 Q. Do you recall if one of the
13 reasons for the visit was that it was the
14 site of the big fire that led to the need for
15 these fire-resistant lubes?

16 A. I don't remember being told that.

17 Q. Was the composition of OS-81,
18 was that a trade secret?

19 A. Yes.

20 Q. Was it patented?

21 A. No. It was impossible to patent
22 phosphate ester Aroclor mixtures, as such.
23 Total compositions could be patented, based
24 primarily on the additives used.

25 Q. Texas Eastern, were they aware

R. E. Hatton

1 of the composition of the OS-81?

2 MR. HART: Objection to form.

3 Q. In 1958?

4 MR. HART: Restate the

5 objection.

6 A. I do not -- I don't know.

7 Q. With respect to station visits
8 that -- Texas Eastern station visits that
9 you made after 1960, how were they different
10 than the ones you made before 1960, as far as
11 the purpose of the visit?

12 MR. HART: I object to the
13 form. It assumes that they were different,
14 and there is no foundation.

15 Q. Were the visits different?

16 MR. HART: Do you mean did they
17 have a different purpose? I mean, they were
18 clearly different visits.

19 I object to the form.

20 A. The purpose of the visit was the same;
21 to generally observe what was going on, and
22 to talk about the properties of our products.

23 Q. Do you know if any records of
24 these visits were kept by Monsanto?

25 A. I doubt it. But I do not know.

R. E. Hatton

1 Q. Do you recall dealing with
2 anybody who you dealt with in the '50s, after
3 1960, from Texas Eastern, who you dealt
4 with?

5 A. My dealings were primarily with the
6 engineering department in Shreveport. And I
7 remember two names that I dealt with, one was
8 Walter Woods, and the other one was -- I
9 don't know his initials, but he was commonly
10 known as Buck Jarnagin.

11 I met many other people at Texas
12 Eastern, but those are the only two that were
13 -- that I seem to be able to dredge up.

14 MR. KRAUSS: I'm going to
15 recommend that we break for lunch now,
16 because I want to review where I've been and
17 where I'm going.

18 MR. HART: Off the record.

19 (A discussion takes place off
20 the record.)

21 (Luncheon Recess.)

22 (Afternoon Session.)

23 CONTINUED DIRECT EXAMINATION BY MR. KRAUSS:

24 Q. Dr. Hatton, earlier we were
25 talking about the use of MCS-153 as a sealing

R. E. Hatton

1 liquid, or a component of a seal system of
2 centrifugal compressors.

3 Do you have an understanding as
4 to what it's a seal between? Between what
5 and what? What is it sealing?

6 A. The schematic would show it as a seal
7 between the -- whatever fluid was being
8 compressed and the outside atmosphere.

9 Q. In the case of Texas Eastern,
10 what was the fluid being compressed, if you
11 can recall?

12 MR. HART: I object to the
13 form.

14 MR. DAVIDSON: What was the
15 fluid being compressed?

16 MR. KRAUSS: He referred to a
17 fluid being compressed.

18 A. Fluid was natural gas.

19 Q. And where would this natural gas
20 tend to go if there wasn't a seal?

21 MR. HART: Objection to form.

22 A. Escape into the atmosphere.

23 Q. So, to your knowledge, the seal
24 prevents the gas from going to the
25 atmosphere.

R. E. Hatton

1 MR. HART: Objection to form.

2 A. (The witness nods his head.)

3 Q. Now, is the gas somehow pushing
4 against this sealing lubricator?

5 MR. HART: I object. Counsel,
6 you have had --

7 MR. KRAUSS: Laird, you can
8 object -- I don't want a speech on the
9 record.

10 MR. HART: Well, I have a right
11 to make my objection on the record. I've
12 been restrained so far.

13 The witness' Counsel admonished
14 you before the lunch break that you're here
15 pursuant to a 30(b) 6) notice for deposition
16 of Monsanto. I think you're going way beyond
17 the parameters of that notice. I think it's
18 duplicative of discovery that carriers have
19 had earlier, on repeated occasions. I'm
20 stating for the record --

21 MR. PUPKE: May I state for the
22 record, Mr. Hart, I can appreciate your
23 concern with the scope of the testimony.

24 According to the Case Management
25 Order in this case, Mr. Hart, you have an

R. E. Hatton

1 objection to form. All another objections
2 are reserved, to be determined later.

3 And please state your objection
4 to form, no speeches on the record, and we'll
5 move a lot quicker.

6 MR. HART: I appreciate --

7 MR. PUPKE: For the benefit of
8 us all.

9 MR. HART: I appreciate your
10 point, Don.

11 It seems to me that the
12 precedent for the objections to form in the
13 context of whether a question is going beyond
14 the bounds of a 30(b)(6) notice was laid by
15 the carriers when they were defending their
16 30(b)(6) depositions --

17 MR. PUPKE: Mr. Hart --

18 MR. HART: -- and I don't think
19 this colloquy is helping anybody proceed.

20 MR. PUPKE: If Mr. Hatton's
21 attorney feels that it's beyond the 30(b)(6),
22 I'm sure he will object to that point.

23 MR. KRAUSS: Furthermore, I
24 understand that Dr. Hatton is not an expert
25 on seal oil systems. However, he has been

R. E. Hatton

1 significantly involved in the development of
2 the fluids that are used in those systems,
3 and he's already testified that as part of
4 his job at Monsanto, he became -- it was
5 within his realm to become familiar with the
6 applications of the fluids. And that's the
7 only area I'm going to. I think it's fair
8 game. I know he's not an expert on the
9 system.

10 MR. HART: I think you just
11 mischaracterized his testimony. I don't
12 think he's ever testified that that was
13 within his job. If you want to ask him about
14 that, that would be fine. But you haven't
15 done that.

16 MR. PUPKE: Let's move on,
17 please.

18 MR. KRAUSS: Would you please
19 read back the part before Mr. Hart's
20 objections, please.

21 (The following question is read
22 back by the reporter:

23 "QUESTION: So, to your
24 knowledge, the seal prevents the gas from
25 going to the atmosphere.")

R. E. Hatton

1 MR. HART: Counsel, I also might
2 object to the question on the grounds that
3 it's leading, among other things.

4 MR. KRAUSS: I think there was a
5 different question pending. I think he might
6 have objected to that question. But I think
7 he objected to another question. I think
8 there is a question pending.

9 MR. PUPKE: Why don't you just
10 reask the question.

11 MR. KRAUSS: I'll just reask the
12 question.

13 Q. Does the gas somehow push on the
14 sealing oil in the seal oil system, to your
15 knowledge, and with the familiarity that you
16 have with the systems that you've testified
17 to earlier?

18 MR. HART: Objection to form.

19 A. If you're asking the question of what
20 were the requirements placed on the fluid by
21 the seal system, we were told by the
22 producers of the seal oil system that it must
23 function as a high pressure, hydraulic
24 fluid. And we used those parameters in the
25 designing of the product.

R. E. Hatton

1 MR. KRAUSS: Could we please
2 mark this as Hatton Exhibit number one,
3 please.

4 (Letter to W.M. Stephens from D.
5 F. Smith, dated August 22, 1968, two pages,
6 Bates Nos. 000907285 through 000907286
7 is marked Hatton-1 for identification.)

8 Q. I'm handing you what's been
9 marked for our purposes today as Hatton
10 Exhibit number one.

11 This is a document that was
12 produced to the insurance carriers by Texas
13 Eastern, and it bears the Bates stamp number
14 000907285 and 000907286.

15 Could you please take a moment
16 to review that letter, please.

17 A. (The witness reads the document.)

18 Q. Okay.

19 A. I have read the letter.

20 Q. This letter was written by D.F.
21 Smith. Do you know a D.F. Smith?

22 MR. HART: I'll object to the
23 form of the question. That letter appears to
24 have been written by Mr. Smith.

25 A. I know Dale F. Smith.

R. E. Hatton

1 Q. Okay. And did you work with him
2 at Monsanto?

3 A. Yes.

4 Q. This letter appears to have been
5 written to a W.M. Stephens from Texas
6 Eastern. Have you ever met W.M. Stephens?

7 A. I don't remember.

8 Q. You don't know if he was one of
9 the people that you would have been involved
10 in, in your relationship --

11 A. No.

12 Q. -- with Texas Eastern?

13 A. No.

14 Q. The letter also refers to an
15 Earl Farmer. Are you familiar with a Mr.
16 Earl Farmer?

17 A. Yes.

18 Q. Do you know by whom he was
19 employed?

20 A. Texas Eastern.

21 Q. When did you first meet
22 Mr. Farmer, do you recall?

23 A. No, I do not recall the date. It was
24 on one of the many trips to Texas Eastern.

25 Q. On the second page, the first

R. E. Hatton

1 full paragraph and the first sentence of that
2 paragraph, do you agree with Mr. Smith's
3 characterization of MCS-153 as stated there?

4 MR. HART: I object to the
5 form. The question is ambiguous, it assumes
6 a foundation that has not been shown to
7 exist.

8 MR. PIERDINOCK: Excuse me,
9 Gregg, what paragraph do you mean?

10 THE WITNESS: "When surfaces
11 which come in contact --"

12 Q. My mistake. I thought that was
13 a continuation paragraph.

14 I'm sorry, it's the second full
15 paragraph, the first sentence. My mistake.

16 A. I did not author this particular
17 paragraph --

18 Q. I understand that.

19 A. I would have stated it in -- more
20 directly in terms of application and use in
21 that application, which I think Dale assumed
22 was understood.

23 Q. Okay. Why do you say you would
24 have applied it more to the application?

25 A. Well, due to my training from the

R. E. Hatton

1 laboratory, I tend to speak more precisely
2 than a salesman does.

3 Q. Okay. So, how would you have
4 phrased this with respect to the application
5 that Texas Eastern had?

6 MR. HART: Objection.

7 A. I would have stated it generally in
8 turbine use. And I would have said under
9 normal conditions, turbine applications, the
10 product is satisfactory for service for long
11 periods of time.

12 Q. With respect to whether it's
13 indestructible, would that be referring to
14 its characteristics of thermal stability,
15 oxidative stability?

16 MR. DAVIDSON: I'm going to
17 object. He didn't have any idea --

18 A. I did not write this. I do not know
19 what Dale meant, exactly, by indestructible.

20 MR. HART: In addition to the
21 objection as stated, I object to your using
22 the concept of indestructible, rather than
23 the document, which says "the next thing to
24 it".

25 MR. KRAUSS: Okay.

R. E. Hatton

1 Q. I believe you testified earlier
2 that MCS-153 was a trade secret. Do you know
3 if Texas Eastern was ever informed that it
4 contained polychlorinated biphenyls?

5 MR. HART: Talking about
6 MCS-153?

7 MR. KRAUSS: Yes.

8 MR. HART: All right.

9 A. Excuse me a minute.

10 (A discussion takes place off
11 the record between the witness and his
12 attorney.)

13 A. I believe that they were well aware of
14 the fact that there was chlorinated materials
15 in both OS-81 and in MCS-153.

16 And I know that by 1970 that
17 Earl Farmer wrote a paper in which he states
18 that the product contained chlorinated
19 biphenyls.

20 MR. PUPKE: Would you please
21 repeat that.

22 (The last answer is read back by
23 the reporter.)

24 MR. KRAUSS: Would you please
25 mark that as Exhibit 2.

R. E. Hatton

1 (Document entitled, "Facts About
2 Fire-Resistant Lubricants" Bates Nos. TEX
3 000330 through 000337, is marked Hatton-2 for
4 identification.)

5 MR. KRAUSS: Before we get into
6 this particular exhibit.

7 Q. Let me ask, do you know when
8 Mr. Farmer became aware that the MCS-153
9 contained polychlorinated biphenyls?

10 A. No, I do not.

11 Q. Do you know if he was told such
12 by Monsanto?

13 A. I do not know the source of Earl --
14 any of Earl Farmer's information.

15 Q. Did Mr. Farmer consult with you
16 regarding that paper that you referred to?

17 A. After the paper was given, we
18 requested permission to include it in one of
19 our bulletins -- excerpts from the paper in
20 the bulletin.

21 I did not make that contact,
22 someone else did. But the company was in
23 contact.

24 Q. Did Monsanto -- in 1970 did
25 Monsanto still consider the composition of

R. E. Hatton

1 the MCS-153 to be a trade secret?

2 MR. DAVIDSON: If you know.

3 A. At that time we did not publish this
4 information in our technical bulletins. But
5 our sales people, and others within the
6 company did talk about them that way.

7 Q. So, the sales people were in a
8 position to divulge the composition of the
9 product to the customer?

10 MR. HART: I object to the form.

11 A. I don't know what exactly they were
12 told. But they knew.

13 Q. Was there a time within the
14 company that it was -- that the salesmen
15 were given clearance to reveal that
16 information, if you know?

17 A. That I do not know.

18 Q. I'm handing you what's been
19 marked for our purposes today as Hatton
20 exhibit number 2. Is this the product
21 brochure to which you referred to earlier?

22 A. This is a product brochure. And the
23 only code date that I can find on it is
24 8/70.

25 Q. Could you please take a moment

R. E. Hatton

1 to review the document.

2 A. (The witness reviews the document.)

3 Q. Is the paper that's referred to
4 here by Earl Farmer, titled, "Fire-resistant
5 Lubricants in Gas Turbines" the paper that
6 you referred to earlier in your testimony?

7 A. Yes.

8 Q. Under the heading -- on the
9 second page of this exhibit, under the
10 heading "Texas Eastern Tries Synthetics" in
11 the last part of the first sentence it
12 characterizes the synthetic as a phosphate
13 ester based fluid.

14 Is that consistent with the true
15 nature of that product?

16 MR. DAVIDSON: Well, I object.
17 That doesn't necessarily say that it refers
18 to MCS-153 or anything else.

19 Q. Do you have an understanding as
20 to whether or not --

21 A. Let me make a statement as to the
22 general classification of fire-resistant
23 fluids.

24 Now, in the work which we have
25 mentioned briefly, such as with ASTM,

R. E. Hatton

1 fire-resistant fluids were divided into
2 phosphate esters, sometimes called whole
3 phosphate esters, but phosphate ester.

4 Phosphate ester based was a term
5 to cover any mixture of phosphate ester and
6 chlorinated material.

7 Q. So the fact that it says
8 based --

9 A. Petroleum.

10 Q. -- based does not necessarily
11 mean that it was the major component?

12 A. Not necessarily the major component.
13 If it was a component there --

14 Q. Does the --

15 A. They were put in that class because
16 the chlorinated materials changed the
17 properties sufficiently that you needed a
18 separate class for working with this.

19 These were then -- these two
20 classes were then followed by many classes of
21 other types of chemical products, such as
22 water oil emulsions, water glycol solutions,
23 silicate esters, silicones, and many other
24 types of products. And always including
25 petroleum oil as one of the standards to work

R. E. Hatton

1 from.

2 Q. Other than Mr. Farmer's article
3 that you testified earlier to, which was your
4 answer to a question regarding if Texas
5 Eastern knew that --

6 A. Uh-huh.

7 Q. -- MCS-153 contained PCBs, do
8 you have any other knowledge of Texas Eastern
9 employees knowing that they contained --
10 that the MCS-153 contained PCBs?

11 MR. DAVIDSON: Excuse me one
12 minute.

13 (A discussion takes place off
14 the record.)

15 MR. DAVIDSON: Go ahead and
16 answer it.

17 A. We are talking what time frame?

18 Q. Well, I believe that you said
19 that Mr. Farmer's article was 1970. And I'm
20 wondering if prior to 1970, if you have any
21 knowledge of anybody at Texas Eastern knowing
22 the composition of either the OS-81, or the
23 MCS-153.

24 A. I do not know, but I am aware of the
25 fact that our drum labels generally contained

R. E. Hatton

1 a statement which said they contained
2 chlorinated compounds.

3 Q. Chlorinated compounds, but not
4 anything more specific than that?

5 A. At that time we did not use the term
6 polychlorinated biphenyl, or PCBs.

7 Q. Did you ever deal with a man at
8 Texas Eastern named R.E. Moore?

9 A. R.E. Moore sat in on a meeting or two,
10 I believe. And I think he was the
11 vice-president of engineering.

12 Q. Now, do you recall when those
13 meetings took place?

14 A. Probably early '72.

15 MR. KRAUSS: Would you please
16 mark this as Hatton Number 3.

17 (Letter to R.E. Moore from W.M.
18 Stephens, dated June 28, 1968, Bates Nos.
19 010037983 through 010037986, is marked
20 Hatton-3 for identification.)

21 Q. Dr. Hatton, let me direct your
22 attention to the section of this document --

23 MR. KRAUSS: By the way for the
24 record, this document is a document produced
25 to the carriers by Texas Eastern, bearing the

R. E. Hatton - PROTECTED

1 Bates number 010037983 through 010037986.

2 MR. DAVIDSON: Have you had an
3 opportunity to read through it?

4 THE WITNESS: No, not all the
5 way.

6 MR. HART: Could I, on the
7 record, ask that we take a break at this
8 point. I'd like to go off the record.

9 (A discussion takes place off
10 the record.)

11 MR. KRAUSS: We're going to ask
12 to withdraw the last exhibit until we resolve
13 some --

14 THE WITNESS: Okay.

15 MR. KRAUSS: -- issues
16 regarding it.

17 MR. HART: And I want to state
18 for the record what the issues are.

19 Texas Eastern produced materials
20 under a Protective Order requiring
21 confidentiality of documents so designated,
22 and all Texas Eastern produced documents were
23 designated confidential.

24 I did not bring a copy of the
25 Protective Order with me to this deposition.

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1 I also was -- I don't believe,
2 advised prior to the deposition that Counsel
3 for the carriers intended to use as exhibits
4 any documents other than those produced by
5 Monsanto.

6 The introduction of documents
7 produced directly by Texas Eastern has raised
8 questions about the proper use of those
9 exhibits in this deposition, and what,
10 exactly, is required by the Protective
11 Order.

12 And as I understand it, we are
13 deferring those issues until such time as
14 anybody here can get a copy of the Protective
15 Order in front of us.

16 MR. KRAUSS: I apologize for the
17 delay.

18 Q. Dr. Hatton, did there come a
19 time when Monsanto decided that they would no
20 longer sell MCS-153 to Texas Eastern?

21 A. Yes, nor to anyone else.

22 Q. Was there anybody else that was
23 using MCS-153 at that time?

24 A. I did not have the sales records, but
25 we had been -- we had introduced it to a lot

R. E. Hatton

1 of people. It was out -- available to a lot
2 of people. Whether they were buying or not,
3 I don't -- I can't tell you that.

4 Q. All right.

5 A. I don't keep sales figures in my
6 mind.

7 MR. HART: Can we go off the
8 record for a second? This is an objection to
9 form, but I don't want to waste the record
10 doing it.

11 (A discussion takes place off
12 the record.)

13 Q. Did you have any substantive
14 involvement in advising Texas Eastern that
15 this product would be withdrawn from the
16 market?

17 A. I attended the meeting. I was less
18 actively involved in fire-resistant
19 industrial types of lubricants at that point,
20 and hydraulic fluids. But I -- I did come
21 back into the program and visit at Texas
22 Eastern.

23 Q. Were you involved in any
24 strategical discussions with regard to
25 possible alternatives to provide to Texas

R. E. Hatton

1 Eastern at the time that MCS-153 was
2 withdrawn?

3 MR. HART: I object to the
4 form. I'm sorry, Counsel.

5 MR. DAVIDSON: Let me clarify,
6 also, that at the time that I think you're
7 referring to, the product name had been
8 changed to a tradename known as Turbinol, and
9 it was no longer known as MCS-153.

10 MR. KRAUSS: Okay.

11 A. We're talking -- your question refers
12 to the specific time that it was taken --
13 withdrawn?

14 Q. Well, in anticipation of the
15 withdrawal.

16 A. No. I was not directly involved in
17 replacement products for Pydrauls and
18 Turbinols.

19 Q. Do you know if there was ever
20 any thought to helping out Texas Eastern with
21 regard to the withdrawal, and providing
22 incineration or alternative fluids?

23 MR. HART: Objection to form.

24 A. Those were management decisions, and I
25 was not necessarily involved.

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1 MR. DAVIDSON: Off the record.

2 (A discussion takes place off
3 the record.)

4 MR. KRAUSS: Please mark that as
5 the next Exhibit.

6 (Memo to T.L. Gossage from C.L.
7 Bradford, dated December 15, 1971, Re:
8 Santovac 1 and 2/Turbinol 153, Bates Nos. TEX
9 000797 through 000800 is marked Hatton-4 for
10 identification.)

11 MR. KRAUSS: So we have a clear
12 record, let me just state that we've marked
13 an Exhibit as number 4.

14 Exhibit number 3, there are some
15 issues pending whether or not it will be able
16 to be used today, and we're going to go ahead
17 anyway and mark this one as number 4. And
18 the record will reflect whether or not we've
19 used Number 3.

20 Q. Please review this document,
21 Exhibit.

22 A. (The witness reviews the document.)

23 Q. Does Exhibit number 4 refresh
24 your recollection as to your involvement in
25 the anticipatory withdrawal of Turbinol 153

R. E. Hatton

1 from the market?

2 A. Yes, it does.

3 Q. Who was C.L. Bradford?

4 A. Larry -- he was my direct supervisor
5 at the time.

6 Q. It refers to, in the first
7 paragraph this document refers to -- on the
8 page of this Exhibit marked TEX 000798, which
9 I believe are Monsanto's Bates numbers, or
10 stamp numbers for these documents, it refers
11 to Texas Eastern as "our only customer for
12 Turbinol 153".

13 Was Turbinol 153 generally not
14 accepted by the other natural gas pipelines
15 for use?

16 MR. HART: Objection to form.

17 A. Well, purchasing customers, I'm sure
18 that was right. Texas Eastern was the only
19 customer at that point.

20 Development activities had
21 continued when I was off the program for
22 awhile, with other potential customers.

23 Q. On the next page of the Exhibit
24 TEX 000799, it refers to chlorine/bearing
25 problems.

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1 Do you recall what was meant by
2 that terminology as you used it in this
3 document?

4 A. Some full scale tests, and some very
5 limited field data had shown dirty systems
6 and chlorinated materials of all sorts did
7 not live well together. And it was conceived
8 by people out in the industry that this was a
9 problem. It did not show up in many -- many
10 tests. Very isolated circumstances, but
11 enough to make it a problem that had to be
12 attacked.

13 Q. Do you know if it was -- at
14 this time that it was general knowledge that
15 Texas Eastern knew that their product
16 contained PCBs?

17 MR. HART: I object to the form.

18 Q. Turbinol 153 contained PCBs?

19 MR. HART: I object to the form.

20 MR. DAVIDSON: Do you understand
21 the question?

22 A. This is following the Earl Farmer
23 article where it was spelled out. They must
24 have.

25 This was the -- Christmas/New

R. E. Hatton

1 Year season of '71, and I had been off
2 working on aviation fluids.

3 I was brought back into this
4 program and another program to provide the
5 best information within the company as to
6 what would be the requirements to carry out
7 the management decision to withdraw PCBs.

8 Q. Were PCBs withdrawn for other
9 uses before this date, December 13th, 1971?

10 A. I was not actively involved in other
11 withdrawals.

12 MR. HART: And I object to the
13 form of the question.

14 Q. But to your knowledge, were such
15 other products withdrawn from the market?
16 Other PCB containing products.

17 A. Yes, they were. But I am not that
18 familiar with the chronology to say exact
19 dates.

20 Q. What --

21 A. And in fact, at this same
22 Christmastime period, I was involved in
23 withdrawing Santovac 1 and 2 from the market,
24 and those were PCB containing fluids.

25 Q. What were the end uses of

R. E. Hatton

1 Santovac 1 and Santovac 2?

2 A. Vacuum pump lubricants.

3 Q. When Monsanto made a decision to
4 withdraw PCB containing materials from the
5 market, did Monsanto make a distinction
6 between the end use application of the
7 liquid?

8 MR. DAVIDSON: Are you saying as
9 to whether it would be withdrawn, or how it
10 would be withdrawn?

11 MR. KRAUSS: Yes.

12 MR. DAVIDSON: Is that what
13 you're talking about?

14 MR. KRAUSS: Yes.

15 A. Yes. I know they did, but I'm not
16 aware of all the ins and outs of that
17 decision and implementation.

18 Q. Do you know what the distinction
19 between the end uses was --

20 A. No, I don't.

21 Q. -- that was the basis for the
22 decision?

23 A. No.

24 Q. Do you know if it was whether or
25 not the application was a controlled usage

R. E. Hatton

1 versus a non-controlled use?

2 MR. HART: Objection to form.

3 A. Those are very broad categories, and I
4 don't know that I can -- how to answer it.

5 You obviously are going to
6 withdraw any product, market by market if you
7 have a multi-purpose product. Therefore
8 there has to be some sort of lineup.

9 Q. Do you recall if Monsanto made a
10 distinction between closed system and open
11 system?

12 MR. HART: Objection to form.

13 A. I'm not sure which we -- the
14 categories.

15 Q. Do you recall the purpose for
16 which you wrote the two memos that make up
17 Exhibit number 4?

18 A. Well, the purpose was to provide
19 management with the best guidance that I
20 could, and any pitfalls they might run into
21 in withdrawing Turbinol 153. That was the
22 purpose of the first memo, was to detail the
23 information.

24 And the second memo was to
25 devise a suitable work plan.

R. E. Hatton

1 MR. DAVIDSON: Okay. Let me
2 point out that the --
3 A. Or program.

4 MR. DAVIDSON: -- the second
5 memo was not authored by Dr. Hatton.

6 MR. PUPKE: The first page on
7 that, I believe, addresses that. The first
8 page of this Exhibit addresses that.

9 MR. DAVIDSON: I understand.
10 But this second memo is signed by C.L.
11 Bradford.

12 MR. KRAUSS: I understand.

13 MR. DAVIDSON: There are
14 actually three memos; two are by Larry
15 Bradford, and one is by Dr. Hatton.

16 THE WITNESS: Yes.

17 Q. Was your advice as set forth
18 here in this memorandum given to Mr. Bradford
19 in anticipation of a particular meeting with
20 Texas Eastern?

21 A. It was supplied to Larry so that he
22 could go to management people and devise the
23 program.

24 Q. You mentioned earlier that you
25 did have some involvement in a meeting with

R. E. Hatton

1 Texas Eastern regarding the withdrawal. Do
2 you recall when that meeting was?

3 A. Well, it's the one that is given in
4 Larry Bradford's work plan, or withdrawal
5 plan as of the first of -- well, the 14th
6 day of January, 1972.

7 Q. Did you attend that meeting?

8 A. Yes.

9 Q. Do you recall who else from
10 Monsanto attended that meeting?

11 A. I know for sure that Larry Bradford
12 was with me. We -- there was in attendance,
13 also, a person from the local sales office in
14 Shreveport, who normally called on the Texas
15 Eastern account. And I am not sure whether
16 -- you know, there is -- a number of people
17 serve there, and I don't know who was there
18 in '71, '72 here.

19 I'm sure that if there were --
20 if -- these names are on call reports.

21 Q. Do you know how many people, all
22 told, from Monsanto attended?

23 A. Well, I've named at least three.

24 Q. Three?

25 A. There may have been another...

R. E. Hatton

1 Q. Okay. How about a
2 Mr. Frederiksen?

3 A. He was the local representative.

4 Q. He was the person --

5 A. Yeah.

6 Q. -- that you referred to before.

7 A. Yes.

8 Q. Okay. How about a Mr. Stegen,
9 D.W. Stegen?

10 A. Stegen.

11 Q. Stegen?

12 A. Don was a sort of an area supervisor
13 in the marketing department. He would have
14 been John Frederiksen's superior.

15 Q. Do you recall who from Texas
16 Eastern attended the meeting?

17 A. Well, a room full. A few more than in
18 here today.

19 Q. Was Mr. Fletcher still around
20 with Texas Eastern at that time, do you
21 recall?

22 A. I do not believe that Mr. Fletcher was
23 present at this meeting. I believe that by
24 that point in time he was elsewhere within
25 Texas Eastern.

R. E. Hatton

1 Q. Do you recall what was told to
2 Texas Eastern at the meeting?

3 A. Not in huge detail. But, we covered
4 at least several subjects, one of which was
5 the removal of the PCB containing products
6 from them, and from supplying them to them.

7 The other was a discussion of
8 alternate products that Monsanto could
9 provide for this same application, and --

10 Q. What were the other ultimate
11 products?

12 A. -- many, many other subjects.

13 At this stage it would appear
14 from my memo, dated -- that we just read,
15 that it was MCS 1223.

16 Q. How did MCS 1223 differ from the
17 Turbinol 153?

18 A. MCS 1223 was a so-called pure
19 phosphate ester fluid, which means it
20 contained nothing, except phosphate esters
21 and minor amounts of additives.

22 Q. Okay. Do you recall what else,
23 what other topics were covered, other than
24 replacement fluids?

25 A. Not in detail.

R. E. Hatton

1 Q. Was there any provision made
2 for -- or any means by which Texas Eastern
3 could continue to purchase Turbinol 153 after
4 the date of this meeting?

5 A. I believe this was discussed and it
6 was handled by Larry Bradford.

7 Q. Do you know if Texas Eastern was
8 given the opportunity to sign a hold harmless
9 agreement?

10 A. I understand they were.

11 MR. HART: I object to the
12 form. You can go ahead.

13 MR. DAVIDSON: Go ahead and
14 answer.

15 A. I understand that they were, yes.

16 Q. Do you know if Texas Eastern did
17 sign that hold harmless agreement?

18 A. I understand they did not.

19 Q. Do you recall any reasons given
20 by Texas Eastern --

21 A. No.

22 Q. -- at the time, or what the
23 reason was that --

24 A. No.

25 Q. -- they would not sign that

R. E. Hatton

1 agreement?

2 A. I really did not handle that part of
3 the program. I was there as the technical
4 expert.

5 Q. Okay. Do you recall if Texas
6 Eastern attempted to purchase remaining
7 fluids outside the guise of the proposed hold
8 harmless agreement?

9 MR. HART: Objection to the
10 form.

11 A. I --

12 MR. HART: I don't know what you
13 mean by guise --

14 A. No.

15 MR. HART: I don't know what you
16 mean by remaining. It's a very ambiguous
17 question.

18 MR. KRAUSS: Let me rephrase it,
19 then.

20 A. Yeah.

21 Q. Do you recall if Texas Eastern
22 attempted to purchase Turbinol 153, despite
23 the fact that they did not sign the hold
24 harmless agreement?

25 MR. HART: Objection.

R. E. Hatton

1 A. I was not directly involved in that
2 kind of a negotiation.

3 MR. KRAUSS: Would you please
4 mark this as Hatton Exhibit number 5.

5 (Call Report No. 1972-11 by R.E.
6 Hatton, dated February 11, 1972, Bates Nos.
7 TEX 000879 through 000883 is marked Hatton-5
8 for identification.)

9 (This Exhibit is subsequently
10 withdrawn and remarked on page 107 of the
11 transcript as Exhibit Hatton-6.)

12 Q. You've been handed what's been
13 marked for our purposes today as Hatton
14 Exhibit number 5. And I'd like you to take
15 an opportunity to read it.

16 A. (The witness reads the document.)

17 Q. Are you through reviewing the
18 document?

19 A. Yes.

20 Q. Did you author this document?

21 A. Yes.

22 Q. Did you author this document in
23 the regular course of your business as a
24 Monsanto employee?

25 A. Yes. It was customary for people in

R. E. Hatton

1 the -- either technical marketing areas, or
2 in the development department to prepare
3 summaries of the various visits we made.
4 This was the one to Texas Eastern, as dated.

5 Q. Does reviewing this document
6 refresh your recollection with regard to
7 Texas Eastern attempting to purchase
8 additional fluid outside the mechanism of
9 the --

10 A. I didn't read it that carefully.

11 Q. -- hold harmless agreement?

12 MR. HART: I object to the form
13 of that question.

14 Q. I'll direct you to page 2 of
15 your memo, which is TEX 000316.

16 MR. HART: Counsel, I think
17 you've marked the wrong document. Exhibit 5
18 is numbered Bates number TEX 000315 --

19 A. 879 is the one I was reading.

20 MR. PUPKE: I have 879, also.

21 MR. HART: I'm sorry, 879
22 through 883.

23 MR. KRAUSS: Well, I certainly
24 have a different one than you do. Let me get
25 the proper Exhibit. Why don't we go off the

R. E. Hatton

1 record.

2 (A discussion takes place off
3 the record.)

4 (There is a recess.)

5 (The Exhibit previously marked
6 as Hatton-5 bearing Bates Nos. TEX 000879
7 through 000883 is withdrawn.)

8 (Call Report No. 1972-1 by R.E.
9 Hatton, dated February 8, 1972, Bates Nos.
10 TEX 000315 through 000317 is marked Hatton-5.
11 for identification.)

12 Q. You've been handed what's been
13 marked for our purposes today as a remarked
14 Exhibit number 5.

15 Did you author this document,
16 Dr. Hatton?

17 A. Yes, I did.

18 Q. And did you author this in the
19 regular course of your business as an
20 employee of Monsanto?

21 A. Yes, I did.

22 Q. Does this document accurately
23 reflect the meeting that took place between
24 Texas Eastern and Monsanto on January 14th,
25 1972?

R. E. Hatton

1 MR. HART: I'll object.

2 A. If I put it on paper, it's what I
3 remembered at the time I wrote the document,
4 not necessarily what I remember 30 years
5 later.

6 Q. The document refers to General
7 Electric approval of a replacement fluid.
8 Why was it important or necessary to get
9 General Electric approval, if you know?

10 A. The answer to this requires just a
11 little bit of background.

12 The general control of the
13 functional fluid and lubricant that is used
14 within mechanical equipment is generally
15 recommended and/or controlled by the maker of
16 the mechanical equipment. They must satisfy
17 themselves that what they put in is usable.

18 Simple example is the lubricant
19 you use in an automobile. It's approved by
20 the maker of the automobile.

21 The turbines that Texas Eastern
22 was using at this time were produced by
23 General Electric in the gas turbine
24 department, and therefore it was very
25 important, in fact, necessary to get either a

R. E. Hatton

1 direct approval from General Electric, or a
2 no objection statement.

3 Q. With respect to the Turbinol
4 153, was it approved, or was it not objected
5 to by General Electric, if you know?

6 MR. HART: Objection, compound.

7 A. We had approval to use it.

8 Q. It was approved.

9 A. Yes.

10 Q. What about -- is an analogous
11 situation with the centrifugal compressor
12 manufacturers? Is there an analogous
13 situation that they have to provide approval?

14 A. Either approval or no objection, yes.

15 Q. Okay. And with respect to the
16 Turbinol 153, do you recall if -- or do you
17 know if Clark Compressors approved or did not
18 object?

19 A. I do not recall the -- supply -- a
20 machinery supplier, by supplier, who approved
21 and who didn't. Who said it was all right
22 and who didn't.

23 Q. Okay. Does page 2 of this
24 Exhibit, which is TEX 000316, refresh your
25 recollection regarding Texas Eastern's desire

R. E. Hatton

1 to purchase additional fluid before the hold
2 harmless agreement would be in effect?

3 MR. HART: Could you say which
4 paragraph you're referring to?

5 MR. KRAUSS: The top block,
6 starts with time of depletion, and then the
7 next sentence. -- next two sentences.

8 MR. HART: Thank you. Can I
9 hear the pending question back?

10 (The pending question is read
11 back by the reporter.)

12 A. Yes.

13 Q. Do you have an understanding why
14 Texas Eastern desired to purchase remaining
15 -- or additional fluid?

16 A. I did not negotiate this part of the
17 discussion with them. This was primarily
18 Larry Bradford.

19 This Call Report represents the
20 development department -- or the -- I
21 should say the marketing department. And
22 Larry and I attended as representatives, and
23 I wrote the report.

24 Q. Do you know if Mr. Bradford is
25 still alive?

R. E. Hatton

1 A. I do not know, no. I haven't heard
2 from him in years.

3 Q. You don't know if he's still
4 with Monsanto?

5 A. I know he is not with Monsanto. He
6 changed companies before I retired.

7 Q. Do you know where he resides?

8 A. I do not.

9 Q. Again, on page 2 of Exhibit 5,
10 the first full paragraph, it's the second
11 paragraph on the page refers to the,
12 "environmental situation." Do you have an
13 understanding of what you meant by the
14 environmental situation?

15 A. I did not make a presentation on this
16 section. This was handled primarily by
17 Larry. But I did understand that there were
18 environmental concerns, and that the products
19 were being withdrawn.

20 Q. To the best of your
21 recollection, at the meeting were
22 environmental concerns of Texas Eastern
23 discussed?

24 A. I do not remember.

25 MR. KRAUSS: Off the record.

R. E. Hatton

1 (A discussion takes place off
2 the record.)

3 MR. DAVIDSON: On behalf of
4 Dr. Hatton, he and I agree that we can be
5 bound by the terms of the Protective Order
6 that has been presented to us here today, to
7 respect these documents as confidential.

8 MR. HOOK: Off the record.

9 (A discussion takes place off
10 the record.)

11 Q. Dr. Hatton, I believe when we
12 were discussing Exhibit number 4, that you
13 mentioned that you were not particularly
14 involved in the Turbinol 153 program at
15 that time that you were asked to participate
16 in it --

17 A. Yes.

18 Q. -- is that a fair summary?

19 A. Yes.

20 Q. After the time that Turbinol 153
21 was withdrawn from the market, did you then
22 become substantially involved in the
23 marketing of a replacement fluid to Texas
24 Eastern?

25 A. During the introduction of the fluid,

R. E. Hatton

1 and some of the early activities, I was
2 involved, along with my other jobs, as a --
3 as a person to make visits and to maintain a
4 continuous contact. But it was not a full
5 time job.

6 Q. And what sort of activities were
7 you involved in with respect to the
8 replacement fluids?

9 A. Monsanto had a program under way for a
10 number of years to expand their line of
11 functional fluids to a new type, a new class
12 of phosphate esters, which they were
13 intending to market some day as companion
14 products to the Pydrauls and some of these
15 other things that contain PCBs.

16 That program was speeded up, and
17 out of it then came these so-called straight
18 or pure phosphate ester fluids, one of which
19 was eventually designated as a Turbinol.

20 Q. Okay.

21 A. This work was obviously being done by
22 research, primarily, at that point.

23 Q. Do you recall ever visiting
24 Texas Eastern at the time that they were
25 seeking a replacement fluid for their

R. E. Hatton

1 Turbinol 153?

2 MR. HART: Objection to form.

3 A. In Exhibit 5 it was indicated that we
4 would present data to them on the phosphate
5 ester fluid, and I was asked to do that. So,
6 I obviously went back to talk to them.

7 Q. Do you recall when you went
8 back?

9 A. Within a relatively short period of
10 time.

11 (A discussion takes place off
12 the record.)

13 Q. Do you recall what sort of
14 concerns Texas Eastern had regarding the
15 replacement fluids?

16 MR. HART: You mean what
17 concerns Texas Eastern may have expressed, or
18 any representative of Texas Eastern may have
19 expressed?

20 MR. KRAUSS: Yes. Concerns --

21 Q. What sort of issues would be
22 involved in changing out from Turbinol 153 to
23 a replacement product, on behalf of Texas
24 Eastern?

25 MR. HART: Objection.

R. E. Hatton

1 A. Now, let's back up and answer your
2 first question; what concerns were expressed
3 as what they wished to see in the product.

4 This included such things as
5 approvals by the proper people; a complete
6 set of our laboratory data as compared to
7 other products, both ours and the competitive
8 products. General properties, that type of
9 thing.

10 Q. Okay. What about compatibility
11 with the Turbinol 153?

12 MR. HART: Objection to form.

13 Q. Would that be an issue?

14 MR. HART: Objection to form.

15 A. Well, compatibility with existing
16 fluids in systems is always an issue, and it
17 was discussed.

18 Q. Do you recall whether Texas
19 Eastern was seeking the replacement fluid as
20 merely a fluid to top off the existing tanks
21 in use at their stations, or I should say,
22 lubricating oil tanks, or whether or not they
23 desired to have a complete change out?

24 MR. HART: Objection to form.

25 Ambiguous, compound, lack of foundation.

R. E. Hatton

1 A. I do not remember being fully aware of
2 what they were -- how they were going to
3 handle that.

4 Q. Would there have been any
5 problems, or would there have been any
6 concerns if Texas Eastern had a desire to
7 merely buy the replacement fluid as a topping
8 off fluid, as opposed to one that would be
9 completely changed out of their system?

10 MR. HART: Objection.

11 MR. DAVIDSON: Well, concerns by
12 who?

13 MR. KRAUSS: By Texas Eastern.

14 MR. HART: I restate my
15 objection.

16 MR. DAVIDSON: I object because
17 he has no way of knowing what was in Texas
18 Eastern's mind.

19 Q. What about concerns about
20 Monsanto?

21 MR. HART: Concerns about what?
22 Can we have the question back?

23 A. I need a specific question.

24 MR. KRAUSS: Would you read back
25 the question, please.

R. E. Hatton

1 (The following question is read
2 back by the reporter:

3 "QUESTION: Would there have been
4 any problems, or would there have been any
5 concerns if Texas Eastern had a desire to
6 merely buy the replacement fluid as a topping
7 off fluid, as opposed to one that would be
8 completely changed out of their system?")

9 MR. HART: You want to rephrase
10 the question now?

11 Q. Why don't I be a little more
12 direct.

13 Did Monsanto recommend against
14 using their replacement fluids as merely
15 topping off fluids?

16 MR. HART: I object to --

17 Q. Do you recall?

18 MR. HART: -- object to your
19 use of the word merely.

20 A. Somewhere in this report I think it
21 suggests that they drain and refill with new
22 fluid.

23 Q. Somewhere in which report?

24 (A discussion takes place off
25 the record.)

R. E. Hatton

1 A. Okay. Something I just read. But
2 that's basically it.

3 (Call Report No. 1972-11 by R.E.
4 Hatton, dated February 11, 1972, Bates Nos.
5 TEX 000879 through 000883, is marked Hatton-6
6 for identification.)

7 Q. You've been handed what's been
8 marked for our purposes here today as Hatton
9 Exhibit 6, which is a memorandum which was
10 produced by Monsanto to the carriers.

11 The numbers are TEX 000879
12 through TEX 000883.

13 A. I think I had read this in a previous
14 designation.

15 Q. That's the --

16 A. It's the same one.

17 Q. -- Exhibit that was --

18 A. Yes.

19 Q. -- given to you before --

20 A. Yes.

21 Q. -- and was withdrawn.

22 A. That's correct.

23 Q. Do the last two sentences
24 refresh your recollection regarding any
25 advice from Monsanto regarding whether to

R. E. Hatton

1 completely drain their systems, or to just
2 top off their systems?

3 MR. HART: I object to the
4 form. The document doesn't say "completely
5 drain".

6 The document says, "drain units
7 as well as possible."

8 MR. DAVIDSON: Go ahead.

9 A. The wording of this -- these last two
10 sentences is what we used in any change outs
11 from fluids to fluids.

12 Q. So, when you say "that we used
13 in a change out from fluid to fluid," are you
14 saying that Monsanto had some sort of a
15 position on this? Was that a corporate
16 position?

17 A. If somebody was using a petroleum oil
18 in his system and wanted to shift to a
19 fire-resistant fluid, this is basically the
20 information we gave him as far as, he ought
21 to drain the unit as well as possible before
22 he put in the new fluid.

23 And the compatibility sentences
24 and statements ahead of that, of what we
25 would normally do and so on, information we'd

R. E. Hatton

1 be looking for is what we would do any time
2 anybody changed from any lubricant or
3 hydraulic fluid over to one of our
4 fire-resistant fluids.

5 Q. And what's the reason for that
6 position?

7 MR. HART: Wait a minute.

8 A. Because if you do not have compatible
9 materials, you end up with mixtures. And
10 predicting the performance, and life, and
11 usabilities of mixtures is a much more
12 difficult job than trying to predict on new
13 fluids. Therefore, you must know something
14 about the mixture.

15 Q. Okay. In this particular
16 instance, was there any other reason besides
17 performance?

18 A. Yes. The last sentence says that
19 primarily on ecology considerations.

20 Q. And what did you mean by ecology
21 considerations at the time that you wrote
22 this memorandum?

23 A. Basic reason for withdrawing the
24 polychlorinated biphenyls was because of
25 getting in the environment.

R. E. Hatton

1 Q. Was there any specific concern
2 with respect to Texas Eastern's use of this
3 fluid that would have raised ecology
4 considerations?

5 MR. HART: Objection to form.

6 MR. DAVIDSON: You mean
7 different from any other PCB user? You're
8 distinguishing between all --

9 MR. KRAUSS: Texas Eastern's use
10 of Turbinol 153 and the change out here.

11 MR. DAVIDSON: -- all other
12 uses?

13 MR. HART: I object to the form
14 of the question as stated.

15 A. If you mean was there anything
16 different about this recommendation than we
17 made to other people? The answer is no.
18 This recommendation was made to all change
19 overs.

20 Q. Yes. Was there any special
21 consideration or special concerns with
22 respect to Texas Eastern, if you know?

23 A. Not that I expressed, that I can
24 remember.

25 Q. Do you recall if one of your

R. E. Hatton

1 reasons for recommending the drainage of the
2 units as well as possible would be to prevent
3 Texas Eastern from operating with a lubricant
4 containing PCBs for years to come?

5 MR. HART: Objection to form.

6 A. The reason for suggesting draining the
7 system completely was that the new product
8 was a new product being approved by General
9 Electric, based on their testing. And that
10 in order to get the best chance possible of
11 performing in the field, we wanted as much of
12 that fluid as possible in the machine as
13 possible. That was the performance reason
14 for suggesting it.

15 Q. But, did you advise against
16 operating with a lubricant containing PCBs
17 for years to come?

18 MR. HART: I object to the form.

19 A. I -- that statement I -- I -- I
20 don't know.

21 MR. KRAUSS: Will you please
22 mark this as Hatton-7.

23 (Memo to Files, "Subect: File
24 3.20 - Monsanto Turbine Lubricant MCS 1223"
25 by A.B. Jarnagin, dated February 4, 1972,

R. E. Hatton - PROTECTED

1 Bates Nos. 000531567 through 000531568, is
2 marked Hatton-7 for identification.)

3 MR. HART: Off the record.

4 Q. You have been handed what was
5 marked for our purposes today as Hatton
6 Exhibit number 7, which I'll represent to you
7 was produced by Texas Eastern to the
8 carriers.

9 MR. KRAUSS: It's a Texas
10 Eastern document, and it's my understanding
11 that this is going to be marked as
12 protected.

13 It bears Texas Eastern's Bates
14 stamp numbers 000531567 through 531568.

15 A. Yes.

16 Q. Based on your review of this
17 document, do you understand it to be a
18 summary of the February 4th, 1972 meeting
19 that is also the subject of Hatton Exhibit
20 number 6?

21 MR. HART: I object to the
22 form.

23 MR. DAVIDSON: I object, too. I
24 mean, this is not something he authored, and
25 it is what it says it is, I suppose.

R. E. Hatton - PROTECTED

1 MR. KRAUSS: Well, I said based
2 on his review.

3 Q. This document appears to be a
4 Texas Eastern memorandum summarizing the
5 February 4th, 1972 meeting, which is also the
6 subject of Hatton Exhibit number 6.

7 MR. HART: The document speaks
8 for itself.

9 Q. Does numerated paragraph Number
10 3 refresh his recollection as to advising
11 Texas Eastern against operating with a
12 lubricant containing PCBs for years to come?

13 MR. DAVIDSON: I'm going to
14 enter an objection, because I don't think you
15 can refresh your recollection with a document
16 he didn't create or have anything to do
17 with.

18 You've asked him, and refreshed
19 his recollection with his document. What
20 somebody else remembered about the meeting is
21 just totally irrelevant to what he may have
22 recollected.

23 MR. HART: And I want to state a
24 further point for the record, that there is
25 no indication in this document that that

R. E. Hatton - PROTECTED

1 concern was raised by anybody other than
2 Texas Eastern employees.

3 Q. Well, did you attend the
4 February 4th, 1972 meeting with Texas
5 Eastern?

6 A. Obviously.

7 Q. Well, apparently --

8 MR. DAVIDSON: Just answer yes
9 or no.

10 MR. KRAUSS: Apparently some
11 Counsel doesn't find it so obvious.

12 THE WITNESS: Okay.

13 Q. Do you recall advising Texas
14 Eastern against operating with a lubricant
15 containing PCBs for years to come?

16 MR. HART: Objection to form.

17 A. The statement made would have been
18 that we wanted to prevent PCBs from getting
19 into the environment. The interpretation of
20 that, as Texas Eastern put it, is here.

21 MR. HART: I'm going to move to
22 strike as nonresponsive to the question, and
23 elaborate my concern about whether that is a
24 fair characterization of the document.

25 In any event, the witness wasn't

R. E. Hatton

1 asked to characterize the document, so I move
2 to strike.

3 (Call Report - Organic Division
4 to C.L. Bradford from John G. Frederiksen,
5 date of call, February 4, 1972, Bates Nos.
6 TEX 000876 through 000878 is marked Hatton-8
7 for identification.)

8 A. (The witness reads the document.)

9 MR. DAVIDSON: Okay.

10 Q. Well, you've been handed what's
11 been marked as Hatton Exhibit number 8. And
12 have you reviewed it?

13 A. Yes.

14 Q. All right. Do you recall
15 advising Texas Eastern that it would probably
16 be possible to use MCS 1223 by adding it to
17 Turbinol 153 as a top off material, but that
18 from an environmental standpoint it would be
19 to their advantage to change the materials
20 out completely?

21 A. What is said here by John Frederiksen
22 from his report of the meeting, same meeting
23 that we've already covered in Exhibits 6 and
24 7, that is the statement that was made. And
25 it certainly reflects what I remember.

R. E. Hatton

1 Q. And who is -- I think you
2 testified earlier that Mr. Frederiksen was a
3 local sales representative?

4 A. Yes. And you will note if you will go
5 back that he is listed as an attendee on both
6 the Exhibits I just cited.

7 Q. Looking back now at Hatton
8 Exhibit number 6, there is a list of people
9 who were present for Texas Eastern.

10 Do you recall what Mr. Means'
11 position was at the time that this meeting
12 took place? Do you know what it was?

13 A. No, I do not recollect a Mr. Means.

14 Q. Do you know what any of these
15 people being listed as present for Texas
16 Eastern, what their positions were at the
17 time of the meeting?

18 A. I don't know what their titles were,
19 but I know that Walter Woods and Buck
20 Jarnagin were in the engineering department
21 primarily. And I don't know what division of
22 engineering, but concerned with lubricants.

23 And I believe that Bill Hartman
24 was concerned with the actual station
25 maintenance, and operation and scheduling,

R. E. Hatton

1 and that type of thing.

2 Q. Do you recall at that meeting
3 whether Mr. Woods expressed a desire to know
4 the effects of Turbinol 1223 on the land if
5 it is spilled?

6 A. Yes.

7 Q. Do you recall --

8 A. I'm -- it is indicated that here --
9 that way, and yes, he did.

10 And at a later date we supplied
11 the phosphate ester data that was available,
12 St. Louis.

13 Q. Do you have an understanding as
14 to why he would have that particular concern
15 with respect to Turbinol 1223?

16 MR. HART: I didn't get the
17 tense, Counsel. Did he have such an
18 understanding at the time? Does he have an
19 understanding today?

20 MR. KRAUSS: Does he have an
21 understanding today.

22 A. Do I have an understanding? How was
23 the sentence worded?

24 Q. Did you have an understanding at
25 the time that you were at this meeting on

R. E. Hatton

1 February 4th, 1972, why Mr. Woods would have
2 such a concern regarding the specific effects
3 of Turbinol 1223 on the land if it is
4 spilled?

5 A. Yes. I could understand it. He had
6 just been told that he could no longer get
7 the lubricants that he was using because of
8 environmental concerns. And one of the first
9 questions that would pop in anybody's mind
10 would be, what is the new product going to be
11 like in that respect?

12 Q. Do you know if Mr. Woods
13 expressed any particular incidents that Texas
14 Eastern may have had that would impact on
15 environmental effects?

16 A. No.

17 MR. HART: Objection.

18 A. I don't remember.

19 Q. In the application of Turbinol
20 153 as it was used by Texas Eastern, would it
21 have been used up?

22 MR. HART: Are you done with the
23 question?

24 MR. KRAUSS: Yes.

25 MR. HART: I object to the

R. E. Hatton

1 form.

2 A. I do not remember specific data.

3 However, any time you use a fluid in a system
4 there is some use, some consumption of
5 material.

6 Q. And how is this material -- how
7 would a material like this be consumed?

8 A. Mostly in terms of leakage, untight
9 joints, bad seals, things such as this.

10 Q. Bad seals where, if you know?

11 MR. HART: Objection to form.

12 A. Pump shafts, rotating machinery,
13 statics, seals in ordinary piping.

14 Q. The seal oil system itself on a
15 centrifugal compressor?

16 MR. HART: I object to the
17 beating that you're doing throughout this
18 deposition, Counsel. This is not an adverse
19 witness.

20 MR. PUPKE: Is there a question
21 pending?

22 THE WITNESS: Yeah.

23 MR. KRAUSS: Yes, there is.

24 (A discussion takes place off
25 the record between the witness and his

R. E. Hatton

1 attorney.)

2 A. My answer to this is that any system
3 that has any potential opening will have some
4 leakage at some time or other.

5 Q. Do you have an understanding as
6 to what would be -- within a usage in a
7 centrifugal compressor usage of your Turbinol
8 153, what would be a normal rate at which the
9 Turbinol 153 would be consumed?

10 A. I do not have that kind of data.

11 Q. Do you know if the consumption
12 of 11,000 gallons of Turbinol 153 over a six
13 month period would be excessive?

14 MR. HART: I object to the form
15 of the question.

16 MR. DAVIDSON: I object.

17 A. That --

18 MR. DAVIDSON: That's --

19 A. In order --

20 MR. DAVIDSON: -- that's just
21 too much of --

22 A. In order that --

23 MR. DAVIDSON: Depends on how
24 much machinery you're talking about, how
25 long, how far, how big the -- how big the

R. E. Hatton

1 reservoirs are, and all that --

2 A. How many hours they operated, what
3 have you.

4 MR. KRAUSS: Why don't we take a
5 quick break, please.

6 (There is a recess.)

7 MR. KRAUSS: Would you please
8 mark this as the next Exhibit.

9 (Call Report - Organic Division
10 to Cumming Paton from John G. Frederiksen,
11 Date of Call July 24, 1972, Bates Nos. TEX
12 000897 through 000898 is marked Hatton-9 for
13 identification.)

14 Q. Dr. Hatton, you've been handed
15 what's been marked for our purposes today as
16 Hatton Exhibit number 9. This appears to be
17 a Call Report referencing a July 24th, 1972
18 call by Monsanto on Texas Eastern.

19 A. Yes.

20 Q. Do you have an understanding --
21 I'm sorry. Have you reviewed this document?

22 A. Yes.

23 Q. Do you have an understanding as
24 to who would have prepared a document such as
25 this within Monsanto?

R. E. Hatton

1 A. It was a standard Call Report by the
2 marketing department, and the author would be
3 the salesman in the upper right-hand corner.

4 Q. And in this case that's J.G.
5 Frederiksen?

6 A. Yes.

7 Q. And would he have prepared this
8 in the ordinary course of business?

9 A. Yes.

10 Q. Of Monsanto?

11 A. All calls were covered by a report.

12 Q. Were documents such as this Call
13 Report maintained in the ordinary course of
14 business by Monsanto, and maintained
15 somewhere in files?

16 A. I assume so.

17 Q. Who was Cumming Paton?

18 A. Cumming Paton was in the marketing
19 department. I think at this time he headed
20 up the group I was in.

21 Q. And who is J. Armentor?

22 A. He was the one who took Stegen's place
23 out of Houston as Frederiksen's supervisor.

24 Q. Do you recall this visit with
25 Texas Eastern?

R. E. Hatton

1 A. After having seen this document, yes.

2 Q. Do you recall Texas Eastern
3 representing to you that they had used 11,000
4 gallons of your Turbinol 153 in a six month
5 period?

6 A. I did not remember that today. I read
7 it here.

8 Q. You mentioned earlier that there
9 is always some amount of use of a fluid
10 within a system.

11 With respect to Texas Eastern's
12 application, do you have any knowledge as to
13 where the used fluid would go?

14 MR. DAVIDSON: I'd like to
15 reiterate on the record that Dr. Hatton has
16 not been designated as any sort of expert, or
17 even knowledgeable with respect to the
18 system, or the operation of the system, or
19 the results of the use of the fluid in the
20 system at Texas Eastern.

21 MR. HART: I, too, would like to
22 object to the form of that question, I think
23 it's extraordinarily ambiguous.

24 Q. Dr. Hatton, I'll take an answer,
25 please.

R. E. Hatton

1 A. If you're asking if I was surprised at
2 the time, I do not recollect whether I was or
3 not. And I was not familiar enough with all
4 of the units in operation to know where it
5 would have gone.

6 Q. Do you recall Walter Woods
7 bringing up a question of what responsibility
8 Monsanto would take if the EPA told Texas
9 Eastern to stop using Turbinol 153
10 immediately?

11 A. I have a vague recollection of Walter
12 asking questions. Such questions at this
13 period of time were always referred back to
14 the group within Monsanto that was handling
15 the PCB.

16 Q. And what was the group within
17 Monsanto that was handling it?

18 A. See, I think this one would have gone
19 directly from me to Bill Papageorge. I'm not
20 exactly sure of that --

21 Q. Well --

22 A. -- because -- you know, it was
23 actually a group of people.

24 Q. Yes.

25 A. But the questions that I got from the

R. E. Hatton

1 field would have been referred back to this
2 group who were working on the PCB situation.

3 Q. What was Mr. Papageorge's
4 position, do you know?

5 A. Some -- he headed up a good deal of
6 the coordination effort that was required.
7 Information collecting, all of this sort of
8 thing were handled through one office, and he
9 was in charge of that office. I do not
10 remember his title.

11 Q. On the second page it indicates
12 a list of future actions, and one of the
13 future actions states establish Monsanto's
14 position on "ETA/PCB? ASAP". Are those your
15 initials next to that --

16 A. Yes.

17 Q. -- future action?

18 A. Yes.

19 Q. And does that designate you to
20 be responsible for that future action?

21 A. The action as stated was not my
22 responsibility. My responsibility was to
23 refer it to the proper people ASAP. And that
24 I did on return to St. Louis.

25 Q. And would the communication back

R. E. Hatton

1 to Texas Eastern regarding Monsanto's
2 position also have been through you?

3 A. No.

4 Q. Who would that have been from,
5 do you know?

6 A. It could have been -- I don't know
7 who replied to this particular inquiry.

8 Normal procedure would have been
9 for either Bill Papageorge to reply, or to
10 relay the reply back to the field salesmen to
11 take in to the customer.

12 MR. KRAUSS: Mark this as the
13 next Exhibit please.

14 (Call Report No. 1972-23 by R.E.
15 Hatton, dated July 24, 1972, Bates Nos. TEX
16 000866 through 000869 is marked Hatton-10 for
17 identification.)

18 Q. Dr. Hatton, you've been handed
19 what's been marked for our purposes today as
20 Hatton Exhibit number 10.

21 Did you author this document?

22 A. Yes.

23 Q. And did you author this in the
24 ordinary course of business as an employee of
25 Monsanto?

R. E. Hatton

1 A. Yes.

2 Q. Were records such as this
3 maintained by Monsanto in the ordinary course
4 of its business?

5 A. I assume so.

6 Q. Did you have a chance to
7 adequately review this?

8 A. Pretty well.

9 Q. Okay. On the top of page 3,
10 which is document TEX 000868 --

11 A. Yes.

12 Q. At the end of the first
13 paragraph there it mentions that, "It is
14 their --" and I believe it means Texas
15 Eastern's "present intention to continue to
16 operate with Turbinol 153, moving it from
17 station to station until it is essentially
18 all consumed."

19 Do you have an understanding of
20 what you meant by "essentially all consumed"?

21 A. I'm not absolutely sure what I meant
22 by that phrase. But I think it meant until
23 the supply was insufficient to lubricate a
24 turbine.

25 Q. And this is after the date that

R. E. Hatton

1 Monsanto withdrew Turbinol 153 from the
2 market; is that correct?

3 A. Yes.

4 Q. Now, you testified earlier that
5 Turbinol 153 is very stable, oxidatively
6 stable, thermally stable?

7 A. Yes.

8 Q. Do you have an understanding as
9 to where Turbinol 153 would go if it was,
10 "consumed"?

11 MR. HART: I object to the
12 form.

13 MR. DAVIDSON: Well, I think he
14 just told you that he's talking consumed the
15 49,000 gallons they had on hand. Isn't that
16 what he just said?

17 MR. KRAUSS: Right.

18 Q. But where would it end up after
19 it was consumed, if you know?

20 A. I do not know Texas Eastern's
21 housekeeping and maintenance practices.

22 Q. Did you find it unusual that
23 this very stable compound, which was marketed
24 for its stability was being, "consumed"?

25 MR. HART: Objection to form.

R. E. Hatton

1 A. If you mean is it normal for products
2 to be depleted in use in a piece of
3 machinery, then the answer is no, I'm not
4 surprised. Because it is true that machinery
5 does manage to use up fluid by leakage, by
6 foaming, by maybe air containment, by many
7 different schemes.

8 And the other products that
9 Monsanto marketed at this time for hydraulic
10 applications and others were also in this
11 class, and very stable materials, but our
12 customers kept buying more.

13 Q. If it's very stable and it was
14 not being oxidized -- do you know if it was
15 being oxidized within Texas Eastern's
16 application?

17 MR. HART: I object to the
18 form. I think it's -- I gather, Counsel,
19 you withdrew the first part of that question
20 and then --

21 MR. KRAUSS: I did.

22 MR. HART: Okay.

23 Q. Do you know if Turbinol 153 was
24 being oxidized in Texas Eastern's
25 application?

R. E. Hatton

1 A. Over a period of time samples of used
2 lubricant were examined, and they certainly
3 did not indicate any large degree of
4 oxidation.

5 Q. Do you know if Turbinol 153 was
6 being vaporized in the application of Texas
7 Eastern?

8 MR. DAVIDSON: Again, Counsel,
9 he's not offered as an expert on what was
10 happening on the Texas Eastern pipeline
11 system, and in their compressors, and on
12 their turbines. And he's already told you
13 that he was not familiar with their
14 housekeeping and the operation of their
15 system.

16 I think you're barking up a tree
17 that's already been answered.

18 MR. KRAUSS: Well, it's my
19 understanding, and I don't wish to become
20 hostile here, by any stretch of the
21 imagination.

22 But it's my understanding that
23 Dr. Hatton has a large degree of familiarity
24 with the system because he was involved in
25 developing the fluid that would be used in

R. E. Hatton

1 the applications. And I'm just trying to
2 explore that area.

3 MR. DAVIDSON: Well, I don't
4 mean to -- if I did, I didn't mean to sound
5 hostile, either.

6 But I think from the very
7 beginning this morning you've been told that
8 what he knew was what he was told about the
9 requirements of the system, and some
10 observations that he made. The questions
11 you're asking seem to me to go to a fairly
12 intricate knowledge of how it operated, and
13 what its problems were, and where it leaked,
14 if it did. Questions that would be more
15 appropriately directed to people at Texas
16 Eastern who have that knowledge. That's my
17 point.

18 MR. KRAUSS: Okay. Let me --

19 MR. DAVIDSON: Go ahead and
20 answer it, if you can.

21 A. Well, my major concern was in
22 establishing the requirements of the
23 lubricant in terms of properties, performance
24 and so on, not in monitoring actual units to
25 see what happened to them in use.

R. E. Hatton - PROTECTED

1 Q. All right. But, with the
2 knowledge that Texas Eastern has given you;
3 what their application is going to be, and
4 the requirements of their fluid, do you know
5 if it was desirable to them to have one that
6 would not vaporize in their system?

7 MR. HART: Objection to the
8 form.

9 A. None of the requirements spelled out
10 related to terms of vapor pressure or
11 vaporization. That was not a consideration
12 of the requirements given us.

13 Q. Okay.

14 (A discussion takes place off
15 the record.)

16 Q. You've been handed what's been
17 marked earlier as Exhibit number 3.

18 MR. KRAUSS: This document was
19 produced to the carriers by Texas Eastern,
20 and is protected material. It bears
21 Bates stamp number 010037983 through
22 010037986.

23 Earlier we were discussing Texas
24 Eastern's knowledge that of -- when Texas
25 Eastern acquired the knowledge that Turbinol

R. E. Hatton - PROTECTED

1 153 contained PCBs. And I believe that at
2 that time we established that it was -- that
3 based on an article by Earl Farmer you have
4 put the date at 1970.

5 MR. HART: I'm going to object
6 to the characterization.

7 (A discussion takes place off
8 the record between the witness and his
9 attorney.)

10 MR. HART: In any event,
11 Counsel, why don't you move --

12 MR. DAVIDSON: Let me stay on
13 the record that what the witness has
14 indicated is that certain logic indicated by
15 an article that was prepared by Mr. Farmer --

16 MR. KRAUSS: Okay.

17 MR. DAVIDSON: -- placed the
18 time at some point in 1970 --

19 MR. KRAUSS: He did not --

20 MR. DAVIDSON: -- in 1970 --

21 THE WITNESS: Yes.

22 MR. KRAUSS: Okay. That's
23 fine.

24 Q. This appears to be a letter
25 written by W.M. Stephens to R.E. Moore.

R. E. Hatton - PROTECTED

1 Did you have any dealings with
2 W.M. Stephens from Texas Eastern?

3 A. Ever?

4 Q. Ever.

5 A. I'm sure I met him and talked to him.
6 I don't remember any specific instance.

7 Q. Do you recall, you know, what
8 dates, what time frame you're talking
9 about --

10 A. No.

11 Q. -- meeting Mr. Stephens?

12 A. No.

13 Q. Did you ever inform Mr. Stephens
14 that Turbinol 153 or MCS-153 contained
15 polychlorinated biphenyls?

16 MR. HART: I'm going to object
17 to the form.

18 A. I don't remember.

19 Q. Is there a difference between a
20 chlorinated polyphenyl and a polychlorinated
21 biphenyl?

22 MR. HART: In general?

23 THE WITNESS: Yes.

24 Q. In general.

25 A. Chlorinated polyphenyl actually covers

R. E. Hatton - PROTECTED

1 a much wider range of chemicals than
2 chlorinated biphenyl.

3 Chlorinated polyphenyl can be
4 anything from two to 200 benzene rings hooked
5 together, which are then treated with
6 chlorine, some of the hydrogen replaced with
7 chlorine. So polyphenyl is a whole wide
8 world of materials.

9 Biphenyl is the one which has
10 two rings, and that's the one that's commonly
11 known as PCBs.

12 Q. Are you familiar with the
13 product Pydraul 135?

14 A. Pydraul 135 is a development that I
15 was aware of, but did not actively
16 participate in.

17 Q. Do you have any knowledge of
18 what the composition of Pydraul 135 was?

19 A. A very general knowledge.

20 Q. And what is that knowledge? Do
21 you know what it's composed of?

22 A. It was a mixture which contained
23 petroleum oil, some of the Aroclors, and a
24 phosphate ester.

25 Q. Was the Arocloric contained in

R. E. Hatton - PROTECTED

1 Pydraul 135 the same Aroclor that was
2 contained in MCS-153?

3 A. I do not know.

4 Q. Do you know if the phosphate
5 ester was the same phosphate ester?

6 A. Not positively, no. That is, I don't
7 know whether it was or not. It may have
8 been.

9 MR. HART: Let me state for the
10 record an objection to the second previous
11 question which is, I think you implied there
12 was only one Aroclor.

13 MR. PUPKE: Can I try to guess
14 which question you're objecting to there?

15 MR. HART: Not the immediately
16 previous question, but the question prior to
17 that one.

18 MR. PUPKE: Are you sure?

19 MR. HART: I believe so.

20 MR. PUPKE: Okay.

21 MR. HART: I think it should
22 have been Aroclors, plural.

23 THE WITNESS: I hoped I said
24 that.

25 Q. Would you please take a minute

R. E. Hatton - PROTECTED

1 to review the part of this Exhibit regarding
2 thermal and oxidative stability on the second
3 page.

4 A. (The witness reviews the document.)

5 Yes.

6 Q. Okay. It states here in this
7 letter that the lighter constituent of
8 Pydraul 135 had a boiling point of 450
9 degrees F.

10 Do you have an understanding as
11 to what the boiling point of the Arocloric
12 component of MCS-153 was?

13 A. No. That's a number I don't remember.

14 Q. Do you know if it was greater
15 than or less than 450 degrees F?

16 A. No, not without consulting the data.

17 Q. Do you know generally whether
18 Aroclors have boiling points greater than 450
19 degrees F?

20 A. I don't remember that -- the boiling
21 point data of all of Aroclors that were made
22 and sold. And I -- I cannot answer your
23 question.

24 Turbinol 153 had a vapor
25 pressure of 200 degrees F of .025

R. E. Hatton - PROTECTED

1 millimeters.

2 Q. And you're referring to --

3 A. I'm referring to Exhibit number 2.

4 Listed below that is the boiling
5 point of the total fluid as 625 degrees F.

6 MR. HART: Could the record
7 reflect what page you're looking at?

8 MR. DAVIDSON: TEX 000332.

9 Q. Now, knowing that the total
10 fluid of Turbinol 153 had a boiling point of
11 625 degrees F, are you able to make a
12 judgment as to whether or not the constituent
13 proponents had a higher or lower boiling
14 point than that, than 625 degrees F?

15 MR. DAVIDSON: I'm not sure I
16 understand the question.

17 MR. HART: I'm certain I don't
18 understand the question.

19 A. Are you still trying to get back to
20 the boiling points of the materials?

21 Q. Of the constituent components,
22 yes.

23 Now, knowing that the --

24 MR. DAVIDSON: The Aroclor
25 components? Or are you including all the --

R. E. Hatton - PROTECTED

1 MR. KRAUSS: I'm going to ask
2 about the other one later, so we can do it
3 both.

4 MR. HART: Also, the components
5 of what?

6 MR. KRAUSS: Of Turbinol 153.

7 MR. HART: You started with the
8 components of Pydraul 135.

9 MR. KRAUSS: I did change. I
10 did change.

11 MR. HART: All right.

12 A. Boiling points of mixtures are related
13 to the boiling points of the individual
14 components. But there is no direct method I
15 can think of, of taking a given boiling point
16 and going backwards to the boiling points of
17 individual components.

18 I would have to have that
19 information, as such, to answer your
20 question.

21 Q. Okay. Now, under the discussion
22 of thermal and oxidative stability in Hatton
23 Exhibit number 3, it states that, "Under our
24 operating conditions, this lower boiling
25 component" which they referred to earlier as

R. E. Hatton - PROTECTED

1 having a boiling point of 450 degrees,
2 "should experience very little
3 vaporization."

4 Knowing that regarding Texas
5 Eastern's operations, do you have any opinion
6 as to whether or not the Turbinol 153 would
7 vaporize under the same operating
8 conditions?

9 MR. DAVIDSON: I'm going to
10 object to that. Are you asking him to accept
11 as a hypothetical a statement made by Mr.
12 Stephens as a result of his own tests and
13 evaluation?

14 This is not a test run by
15 Monsanto or by Dr. Hatton.

16 If you are posing some
17 hypothetical situation, he's already
18 testified that he didn't know about the
19 Pydraul 135, what it was or why it was
20 presented in there, or under the
21 circumstances in which it was presented to
22 Texas Eastern.

23 And you are apparently also
24 asking him for an opinion, is that just a
25 layman's opinion?

R. E. Hatton - PROTECTED

1 MR. KRAUSS: Just a layman's
2 opinion.

3 MR. DAVIDSON: Are you
4 qualifying him as an expert or what?

5 MR. KRAUSS: No, a layman's
6 opinion.

7 MR. HART: I --

8 MR. DAVIDSON: Do you understand
9 the question?

10 THE WITNESS: Not -- I'm not
11 sure that I do.

12 Q. Let me ask it this way, then.

13 If we can take it on faith here
14 that the operating conditions of Texas
15 Eastern are such that a 450 degree -- a
16 fluid with 450 degree F boiling point would
17 not vaporize, do you know if Turbinol 153
18 would vaporize under the same operating
19 conditions?

20 MR. HART: Well, I object to the
21 form.

22 And Counsel, I am sorry --
23 could you show me where in the document there
24 is any basis for what I think you describe as
25 a leap of faith that under Texas Eastern's

R. E. Hatton - PROTECTED

1 operating conditions there would be no
2 vaporization at 450 degrees Fahrenheit?

3 MR. KRAUSS: I didn't
4 characterize that as a leap of faith. That's
5 clear in the document.

6 MR. HART: Where?

7 MR. KRAUSS: I said we would
8 rely on that under thermal and oxidative
9 stability.

10 MR. HART: Right.

11 MR. KRAUSS: Second paragraph.

12 MR. HART: Right.

13 MR. KRAUSS: The 11th line
14 down. "Under our operating conditions, this
15 lower boiling component should experience
16 very little vaporization."

17 MR. DAVIDSON: I think we're
18 getting -- let me just make this
19 statement --

20 THE WITNESS: Well --

21 MR. DAVIDSON: -- the reference
22 is to apparently one constituent called the
23 lighter constituent of Pydraul 135 --

24 MR. KRAUSS: It has --

25 MR. DAVIDSON: -- has a boiling

R. E. Hatton - PROTECTED

1 point --

2 MR. KRAUSS: My question --

3 MR. DAVIDSON: We've already
4 told you we don't know what the other
5 constituents are. Your comparables are -- it
6 might be talking about phosphate ester, if
7 there is one in there. You're taking Pydraul
8 135, and comparing it to Turbinol 153, which
9 is a blend, and which Dr. Hatton already told
10 you about the boiling point of that.

11 I'm sorry, under the lower
12 boiling component -- you're just talking one
13 part, and we don't even know what part we're
14 talking about.

15 MR. KRAUSS: I understand that.
16 And they are talking about the petroleum part
17 of Pydraul 135.

18 MR. DAVIDSON: How do you know
19 that?

20 MR. KRAUSS: Well --

21 MR. DAVIDSON: Petroleum boils
22 at 400 -- impossible.

23 MR. HART: I --

24 MR. DAVIDSON: Wouldn't
25 petroleum boil --

R. E. Hatton - PROTECTED

1 THE WITNESS: Benzine boils
2 almost at room temperature, it comes from
3 petroleum.

4 MR. HART: I would also like to
5 state my objection to this whole line of
6 questioning, because now that I understand
7 the predicate in the document that's led you
8 off on this, it doesn't say "no
9 vaporization," it says, "very little
10 vaporization."

11 MR. KRAUSS: Let me find the
12 reference to identifying the lower boiling
13 component as the petroleum part first, then
14 we'll deal with that.

15 Well, let me see if we can ask
16 it a different way, then.

17 Q. If a component of fluid used in
18 Texas Eastern's application, a synthetic
19 fire-resistant lubricant, if a certain
20 component that boiled at 450 degrees F did
21 not vaporize when it was used in Texas
22 Eastern's application, do you know if
23 Turbinol 153 would vaporize under those
24 conditions?

25 MR. HART: Objection. No

R. E. Hatton - PROTECTED

1 foundation.

2 A. If you specify that we're talking
3 about the exact same conditions in the unit,
4 I would expect the MCS-153 to show less
5 vaporization than the component you're
6 talking about in this memo here, Exhibit 3.

7 Q. Okay. Thank you.

8 Earlier we discussed your
9 participation in a study group on
10 fire-resistant turbine fluids. Do you recall
11 if anybody from Texas Eastern was involved in
12 that same study group?

13 A. I do not have specific memory of
14 that. But the meetings were generally open
15 and could be attended by anyone who desired
16 to come. They were not closed meetings by
17 any means.

18 Q. Okay.

19 MR. KRAUSS: Please mark this as
20 the next Exhibit.

21 (Document entitled, "Membership
22 List Study Group on Fire Resistant Turbine
23 Fluids, Tech C, AST, D-2, undated, Bates No.
24 000907826 is marked Hatton-11 for
25 identification.)

R. E. Hatton - PROTECTED

1 Q. You've been handed what's been
2 marked today for our purposes as Hatton
3 Exhibit 11.

4 This appears to be a Membership
5 List.

6 MR. KRAUSS: This is protected.

7 Q. Of the study group on
8 fire-resistant turbine fluids, Tech C, ASTM
9 D-2.

10 MR. KRAUSS: And this is a Texas
11 Eastern document Bates numbered 000907826.
12 And it's protected under the Protective
13 Order.

14 A. Okay. I glanced through it.

15 Q. Does this refresh your
16 recollection as to whether or not anybody
17 from Texas Eastern was a member of the study
18 group on fire-resistant turbine fluids?

19 A. Yes, it does. O.M. Fletcher is
20 listed.

21 It also refreshes my memory that
22 I served as secretary of that group for
23 awhile, which I had forgotten.

24 Q. What were your duties as
25 secretary, if you recall?

R. E. Hatton - PROTECTED

1 A. Gordon Night, who was chairman, ran
2 the meeting, and it was up to me to prepare a
3 set of minutes of the meetings, and then see
4 that -- I also had to see that they were
5 circulated to the attendees, whether they
6 were members of the group or not. And those
7 who didn't attend that meeting, who were
8 members, got copies of the minutes.

9 Q. How frequently did this study
10 group meet?

11 MR. HART: Are you asking about
12 a particular time?

13 Q. Well, at the time that you were
14 on the study group, how frequently did it
15 meet?

16 A. Periodic meetings were held every six
17 months in connection with meetings of Tech C
18 and D-2.

19 Generally a week of meetings was
20 held, and an hour was set aside during that
21 for a study group, or a subcommittee, or a
22 working group, whatever you had, to conduct
23 your business.

24 Q. And were minutes of these
25 meetings kept each time?

R. E. Hatton - PROTECTED

1 A. Any formal, scheduled meeting was
2 documented, and minutes issued.

3 MR. KRAUSS: Please mark that as
4 the next Exhibit.

5 (Minutes of Meeting,
6 Fire-Resistant Turbine Fluids Study Group,
7 Technical Committee C, ASTM Committee D-2,
8 dated June 25, 1963, Bates Nos. 0009078915
9 through 000907825 is marked Hatton-12 for
10 identification.)

11 Q. You've been handed what's been
12 marked for our purposes today as Hatton
13 Exhibit 12.

14 I'd like to direct your
15 attention to -- well, first of all, are
16 these minutes of a meeting such as the type
17 that you kept when you were secretary of the
18 study group on fire-resistant turbine fluids?

19 A. Yes.

20 Q. Would you please refer to the
21 fourth page from -- I'm sorry --

22 A. Yeah, I signed this particular set,
23 too, as secretary.

24 Q. You did?

25 A. Yes.

R. E. Hatton - PROTECTED

1 Q. Did you author this particular
2 document?

3 A. Yes, I did, then.

4 Q. I'd like to direct your
5 attention to the section enumerated as number
6 2, and have you review that, please. It's on
7 000907817.

8 A. (The witness reads the document.)

9 MR. DAVIDSON: Off the record.

10 (A discussion takes place off
11 the record.)

12 A. I've read all of section two, now.

13 Q. Okay.

14 A. No further. I say no further than
15 section two --

16 Q. Right --

17 A. -- at the moment.

18 Q. Fine. Now, section two is
19 headed, "Use of Fire-resistant Fluids in Gas
20 Turbines." And it reports that O.M. Fletcher
21 of Texas Eastern reported on their experience
22 with fire-resistant turbine lubricants.

23 Do you recall the presentation
24 by Mr. Fletcher?

25 A. Not in detail, no.

R. E. Hatton - PROTECTED

1 Q. Do you have any doubt that
2 what's written here accurately reflects the
3 presentation of Mr. Fletcher?

4 A. No. It reflects what I heard at the
5 time, and what I would have reported as such.

6 Q. Okay. On the top of page 4
7 there is a discussion about compatibility or
8 the potential for attack by the
9 fire-resistant lubricants. And it states
10 that the tachometer generator was coated with
11 epoxy materials, and that there were no
12 problems.

13 Do you have any idea of what a
14 tachometer generator is?

15 A. Well, the definition of the word
16 tachometer is something that measures speed.

17 But I don't know the term
18 generator, how it was connected.

19 Q. All right. Was compatibility
20 with the pipeline components a general
21 concern to the industry with regard to using
22 synthetic lubricants?

23 MR. HART: Objection to form.

24 A. Capability of materials with the fluid
25 always presented a major concern to us

R. E. Hatton - PROTECTED

1 because if the fluid attacked any of these
2 materials that were used in building the
3 machine, then you would be in difficulties
4 with deterioration of the materials.

5 Q. Which particular -- or which
6 components, if you know, would there be
7 concern about attack? Which components
8 within a pipeline system?

9 MR. HART: Objection to form.

10 A. I don't -- I am not completely
11 familiar with what's in the pipeline, so I
12 can't answer that question.

13 We generally looked at
14 compatibility with paints, sealants, hose
15 materials, coatings.

16 Q. Components that came in contact
17 with --

18 A. With -- we generally were concerned
19 about the organic materials that came in
20 contact with our fluids.

21 Maybe that's a very general
22 answer, but that covers all of the things --

23 Q. Yes?

24 A. -- I listed, plus many more.

25 Q. Okay. Also at the top of page 4

R. E. Hatton - PROTECTED

1 there is an indication that Mr. Fletcher
2 reported that Texas Eastern's pipeline is
3 internally coated with epoxy materials, and
4 that the particular ones they used are quite
5 satisfactory, and have caused no
6 difficulties.

7 Do you have an understanding as
8 to why the internal coating of a pipeline
9 would be of concern with respect to
10 fire-resistant lubricants?

11 MR. HART: I object to the form
12 of that because I don't see the use of the
13 word "concern" here. I don't know whose
14 concern that question refers to.

15 MR. KRAUSS: Just object and
16 that's it.

17 MR. DAVIDSON: If you know.

18 A. I can only indicate that attack of any
19 kind of a coating by the fluid would be of
20 concern to us as fluid producers. And we
21 would run tests on any coating that we were
22 asked to, whether we knew where it went or
23 not.

24 Q. Okay. And this particular
25 coating here is stated as being internally

R. E. Hatton - PROTECTED

1 -- an internal coating of the pipeline. Is
2 that an indication that your lubricants were
3 going to get into the pipeline?

4 MR. HART: Objection to form.

5 A. We were asked to evaluate these
6 particular epoxy materials. I am not well
7 aware of why we were asked. We were just
8 told to do it.

9 Q. Okay. During the -- did you
10 have an understanding of why Mr. Fletcher
11 would have reported this particular fact,
12 that their pipeline is internally coated with
13 epoxy materials, and that the particular ones
14 that they used are quite satisfactory, and
15 have caused no difficulties with respect to
16 the topic of his presentation, which is the
17 fire-resistant fluids they use?

18 MR. HART: Did he have such an
19 understanding? Does he have one today? Can
20 he figure one out?

21 MR. HOOK: You may object to the
22 form of the question.

23 Q. Did he have one at the time it
24 was made, at the time the presentation was
25 made?

R. E. Hatton - PROTECTED

1 MR. KRAUSS: Does he have an
2 understanding of what? Why that was a part
3 of Mr. Fletcher's presentation?

4 MR. HART: I object to the form.
5 A. I would not put myself in Mr.
6 Fletcher's mind to determine what he was
7 thinking then.

8 And I can only suppose that if
9 the previous speaker had talked long and loud
10 about effects of fluids, fire-resistant
11 fluids on materials, that Mr. Fletcher would
12 have covered that in his presentation in some
13 form or other.

14 Q. Okay. Do you know if there was
15 an understanding within the industry, and the
16 industry I'm referring to here is those
17 represented on the study group of
18 fire-resistant turbine fluids.

19 Do you know if there was an
20 understanding that these synthetic
21 lubricants, when used in natural gas
22 centrifugal compressors would find their way
23 into the pipeline?

24 MR. HART: Objection.

25 A. I have no way of answering that

R. E. Hatton - PROTECTED

1 question as to what they knew or didn't know.

2 Q. Did you have any knowledge that
3 -- at this time, in 1963, that there was an
4 issue regarding the compatibility of the
5 synthetic fire-resistant lubricants and the
6 internal coatings of a pipeline?

7 MR. HART: Objection.

8 A. I can't remember specific discussions,
9 beyond a request for compatibility data,
10 concerning the coating. That type of work
11 was quite commonly undertaken by Monsanto on
12 their products.

13 Q. Okay. Did you at any time learn
14 that Turbinol 153 or MCS-153, or OS-81 found
15 its way into Texas Eastern's pipeline?

16 MR. HART: Objection to form.

17 A. I -- I don't remember such
18 information.

19 Q. Not at any time?

20 MR. HART: Objection to form.

21 A. It's impossible to say, or to cover in
22 any way all the things that were discussed
23 over the period of time that I was in contact
24 with Texas Eastern. I do not remember all
25 the subjects that were covered, by any means.

R. E. Hatton - PROTECTED

1 MR. PUPKE: May I ask for a five
2 minute break here?

3 MR. KRAUSS: Yes.

4 (There is a recess.)

5 Q. Dr. Hatton?

6 A. Yes.

7 Q. Okay.

8 A. I was reviewing these minutes. I find
9 them very interesting.

10 Q. Did you ever hear about the
11 incident regarding PCBs being found in the
12 natural gas pipeline on Long Island in 1981?

13 MR. HART: Can I have that
14 back?

15 (The pending question is read
16 back by the reporter.)

17 MR. HART: Objection to the
18 form.

19 A. Well, my only knowledge that I can
20 bring to mind on that subject was what I read
21 in the newspapers at the time.

22 Q. Were you ever consulted by Texas
23 Eastern regarding means by which to cleanse
24 PCBs from their pipeline?

25 MR. HART: Objection to form.

R. E. Hatton - PROTECTED

1 MR. DAVIDSON: Ever? At any
2 time?

3 A. My answer --

4 MR. DAVIDSON: At any time?

5 A. Yeah. Is that your question, ever at
6 any time?

7 MR. KRAUSS: Well, after 1981.

8 MR. DAVIDSON: After 1981?

9 Okay.

10 A. Answering this on a personal basis,
11 no.

12 Q. You don't recall being asked
13 what a good solvent would be for cleansing
14 PCB from a pipeline?

15 MR. HART: Objection.

16 A. At that point in time such questions
17 would have been referred to the company in
18 general and not to me specifically.

19 MR. KRAUSS: Mark this as the
20 next Exhibit.

21 (Typewritten memo to "Earl"
22 dated January 23, 1981, Bates No. 010037863
23 is marked Hatton-13 for identification.)

24 Q. You've been handed what's been
25 marked for our purposes today as Hatton

R. E. Hatton - PROTECTED

1 Exhibit number 13.

2 This appears to be an internal
3 memorandum from Texas Eastern. It was
4 produced to the carriers by Texas Eastern,
5 and it's Bates stamped 010037863.

6 Have you had a chance to review
7 this?

8 A. Yes.

9 Q. Do you recall giving the
10 information listed here in this document
11 regarding solvents for PCBs?

12 A. I have no recollection at all of
13 having done this.

14 Q. Okay.

15 A. I have no recollection of -- of
16 performing that action.

17 Q. Okay. Were you involved with
18 Texas Eastern at this period of time? The
19 document is dated 12/23/81. Did you have any
20 involvement with Texas Eastern at this time?

21 A. I do not remember any. And at this
22 period of time I was working primarily on
23 heat transfer fluids.

24 Q. Okay. Did you have any
25 involvement with Texas Eastern after the date

R. E. Hatton - PROTECTED

1 of this document, January 23rd, 1981, other
2 than with respect to this particular
3 litigation, or this deposition?

4 A. No.

5 Q. Were you consulted at all
6 regarding means to clean up PCBs from soil,
7 or in any capacity?

8 A. No.

9 Q. Do you know when your last
10 substantive involvement with Texas Eastern
11 was, to the best of your recollection?

12 A. I cannot fix an exact date. But the
13 contacts with Texas Eastern had been turned
14 over to other people by about the time that
15 they began to field trial MCS 1122, or
16 Turbinol 1122, the same product.

17 That program was handled by
18 someone else.

19 MR. PIERDINOCK: Can you repeat
20 his answer for me?

21 (The last answer is read back by
22 the reporter.)

23 MR. KRAUSS: Off the record for
24 a minute.

25 (A discussion takes place off

R. E. Hatton - PROTECTED

1 the record.)

2 MR. KRAUSS: Please mark these
3 as the next two Exhibits.

4 (Letter to Dr. Roger E. Hatton
5 from Clif Williams, dated December 1, 1975,
6 Bates No. 000844865 is marked Hatton-14 for
7 identification.)

8 (Letter to Clif Williams from
9 R.E. Hatton, dated December 8, 1975, Bates
10 No. 000844861 is marked Hatton-15 for
11 identification.)

12 Q. Dr. Hatton, you've been handed
13 two Exhibits, 14 and 15, and these are --
14 Exhibit 14 is 000844865, and Exhibit 15 is
15 000844861.

16 MR. KRAUSS: These were produced
17 by Texas Eastern to the carriers, and are
18 subject to the Protective Order.

19 Q. Do you recall being contacted by
20 Texas Eastern regarding disposing of a large
21 quantity of MCS-153?

22 A. Exhibit 14 indicates that -- quotation
23 marks, "disposing of a large quantity of
24 Monsanto MCS-153 fire-resistant lubricant."

25 My memory does not bring this up

R. E. Hatton - PROTECTED

1 as an event that I remember.

2 Q. Yes.

3 A. But I'm quite sure that if a letter
4 was sent to me, I got it.

5 Q. And do you recall when the
6 MCS-153 was withdrawn from the market?

7 A. It was, I think January 14th, 1972 was
8 the call --

9 Q. Okay.

10 A. -- report that -- it's in one of
11 these Exhibits back here that talked about
12 it.

13 Q. So this is some four years
14 later --

15 A. Uh-huh.

16 Q. -- that Texas Eastern is asking
17 you how to -- or if you can be of any
18 assistance in disposing of a large quantity
19 of Monsanto MCS-153?

20 MR. HART: Is there a question
21 pending?

22 MR. KRAUSS: No.

23 Q. Did Monsanto provide such a
24 service as indicated in this document?

25 A. Yes.

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1 Q. Did other companies that
2 utilized your PCB containing fluids avail
3 themselves --

4 A. Certainly.

5 Q. -- of this service?

6 A. Certainly. General letters of
7 notification on the availability of this
8 service were sent out to all Pydraul
9 customers, I believe in '72 or '73.

10 Q. Yes.

11 A. And were -- it was indicated that
12 such a service was available.

13 I'm not sure of the exact date
14 that this service first became available, but
15 we did have a group within Monsanto that were
16 charged with being sure that the materials
17 came back right, and that they got to the
18 incinerator. And then there was another
19 group that managed and operated the
20 incinerator.

21 Q. Yes. Do you recall if Monsanto
22 charged for this service?

23 A. I do not remember how much, but there
24 were -- there was a charge involved.

25 Q. Okay. Do you recall if free

R. E. Hatton - PROTECTED

1 incineration was offered to Texas Eastern at
2 any time?

3 A. I do not, no.

4 MR. KRAUSS: Would you please
5 mark this as the next Exhibit.

6 (Memo to T.L. Gossage from C.L.
7 Bradford/N.T. Johnson, dated November 17,
8 1971, Bates Nos. TEX 000303 through 000306 is
9 marked Hatton-16 for identification.)

10 Q. You've been handed what's been
11 marked for our purposes today as Hatton
12 Exhibit number 16.

13 This document was produced to
14 the carriers by Monsanto. It's TEX 000303
15 through 306. And it appears to be a Monsanto
16 memorandum to a T.L. Gossage.

17 Who is Mr. Gossage?

18 A. I'm not sure of his exact title.
19 Titles back then are hard to recall. But he
20 was the top man in the organic -- or, let's
21 say in the fluids area at this time. And I'm
22 sure he had other responsibilities. But he
23 would have been our man up the ladder several
24 steps.

25 Q. Okay. And what about N.T.

R. E. Hatton - PROTECTED

1 Johnson? Do you recall what his position was
2 at the time?

3 A. Yes. Norm was one of our product
4 managers in the sales department, and would
5 have been involved with Turbinols, hydraulic
6 fluids, heat transfer fluids and so on.

7 Q. I direct your attention to page
8 2.

9 A. Uh-huh.

10 Q. Towards the middle of that
11 paragraph it states, "In addition, we
12 recommend Monsanto absorbing the cost to
13 incinerate their current charge of Turbinol
14 153 (estimated at 54,000 gallons - a cost to
15 Monsanto for incineration and freight
16 equaling \$27,000)."

17 Do you know whether such an
18 offer was made to Texas Eastern?

19 A. This document is -- was written by
20 Larry Bradford, and was the proposal that he
21 was making as to a way in which this could be
22 handled at Texas Eastern. I do not know
23 whether it was ever relayed to Texas
24 Eastern --

25 Q. You don't know --

R. E. Hatton - PROTECTED

1 A. -- as such.

2 Q. -- whether such an offer was
3 made.

4 A. No, I don't know.

5 Q. Do you know who within Monsanto
6 would know that?

7 A. Beyond Larry Bradford, I'm not sure.

8 Q. Okay. All right. That's as far
9 as I'm going to go this evening. So we can
10 go off the record.

11 (A discussion takes place off
12 the record.)

13 MR. HART: I think my attempt to
14 effectuate --

15 MR. DAVIDSON: I would like to
16 make it clear that we are adjourning the
17 deposition at about 5:15. That the deponent
18 is here and available for questioning. That
19 we have indicated we will start back at nine
20 tomorrow morning. And that I have previously
21 indicated that we would need to conclude
22 hopefully, or adjourn otherwise by four
23 tomorrow afternoon.

24 And that my schedule and others
25 don't permit us to continue on this Friday.

R. E. Hatton - PROTECTED

1 And I don't believe the notice included any
2 further than these two days, or at least
3 indicated these two days at this session.

4 MR. HOOK: That's correct.

5 MR. PUPKE: Can I just address
6 that before you go, Larry? Thank you.

7 Mr. Davidson, I appreciate your
8 taking your time out to be here.

9 Mr. Hatton, I appreciate you
10 taking your time to be here today.

11 Speaking on behalf of my
12 clients, I can tell you that we will most
13 assuredly conclude or adjourn by the time
14 that you need to conclude or adjourn
15 tomorrow. We'll work with you on that, and
16 that won't be a problem.

17 We have offered to start
18 whatever time tomorrow morning is
19 convenient. We can start at seven a.m., if
20 possible, if everyone could be here then. We
21 could start at eight a.m. We could start at
22 whatever time anybody wants to start.

23 At this point I think it's
24 probably better for everyone concerned to
25 cull out material that's been covered already

R. E. Hatton - PROTECTED

1 so that there is very little duplication of
2 what's been gone over today, and I think that
3 this process of breaking at 5:20 would be
4 appropriate.

5 MR. DAVIDSON: I appreciate
6 that. Don, and I know I have duly noted the
7 Judge's admonition in the Order governing
8 these depositions that you will not be
9 repetitive, or will be minimally repetitive,
10 and I intend to hold you to that.

11 MR. PUPKE: Okay.

12 MR. HART: I'd like to state on
13 the record Texas Eastern's objection to
14 concluding at this early hour.

15 Texas Eastern will insist on a
16 full and fair opportunity for conducting its
17 own examination. I, too, agree that under
18 the circumstances we should adjourn no later
19 than four o'clock tomorrow afternoon, but
20 want to express my understanding that if we
21 can't conclude by then and we need to
22 adjourn, that we will have a further
23 opportunity down the line to resume the
24 deposition of Dr. Hatton.

25 And I've gotten the impression

R. E. Hatton - PROTECTED

1 from everybody that that's in the cards for
2 us if we can't finish tomorrow. And I want
3 to state that understanding on the record.

4 MR. DAVIDSON: Well, we don't
5 have any intention of cutting anybody short,
6 or cutting your examination short and not
7 letting them have their due opportunity
8 within the confines of the Order governing
9 the deposition.

10 I would like to keep this as
11 short as possible, and not get strung out
12 over a long period of time, and of course it
13 would be subject to rescheduling of Dr.
14 Hatton according to his schedule and when he
15 can continue.

16 (The deposition is concluded at
17 5:20 in the evening.)

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J U R A T

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3 I, ROGER E. HATTON, do hereby
4 certify that I have read the foregoing
5 transcript of my testimony, taken on January
6 24, 1990, and have signed it. I have listed
7 the following changes or corrections to that
8 transcript below.

10	PAGE	LINE	CHANGE / CORRECTION
----	------	------	---------------------

20 Date: _____
Sworn to and subscribed
21 before me this _____ day of
_____, 1990
22
Notary Public _____

waga and spinelli
certified shorthand reporters

405 Northfield Avenue
West Orange, N. J. 07052
201-731-9666

C E R T I F I C A T E

I, TOMMY LARUE MILLER, Notary
Public and Certified Shorthand Reporter of
the State of New Jersey, do hereby certify
that prior to the commencement of the
examination ROGER E. HATTON, was duly sworn
by me to testify to the truth.

I DO FURTHER CERTIFY that the
foregoing is a true and accurate transcript
of the testimony as taken stenographically by
and before me at the time, place and on the
date hereinbefore set forth.

I DO FURTHER CERTIFY that I am
neither a relative nor employee nor Counsel
of any of the parties to this action, and
that I am neither a relative nor employee of
such counsel, and that I am not financially
interested in the action.

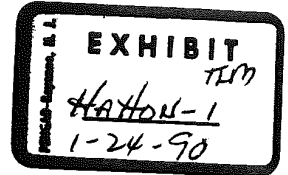
-----*Tommy Larue Miller*-----
Notary Public of the State of New Jersey
My Commission expires May 18, 1993
License No. XI00806

Dated: January 26, 1990

Haddon Exhibits

1-24-90

Monsanto
C O M P A N Y



800 N. Lindbergh Blvd.
St. Louis, Missouri 63110
(314) 631-4100

August 22, 1968

Mr. W. M. Stephens
Superintendent
Design and Construction
Texas Eastern Transmission Corporation
P. O. Box 1612
Shreveport, Louisiana 71102

Dear Mr. Stephens:

In a recent conversation with Earl Farmer, he suggested we write to you outlining various control limits for MCS-153, the safety fluid used in remote controlled gas turbines on Texas Eastern's pipeline system. Earl indicated this information would be useful to station operating personnel especially in view of the frequent changes in manpower. A formal technical bulletin on MCS-153 has not been published and this letter would fill the need.

MCS-153 is a straight synthetic fire-resistant gas turbine lubricant which provides safety and excellent lubrication and is compatible with all common metals of construction, such as brass, bronze, steel, iron, aluminum, etc. usually found in hydraulic and various lubrication systems. The number one recommendation for seals and gaskets particularly dynamic elastomers is Viton. Silicone, Fluorel, Teflon are equally compatible but often not available in desired configurations. Butyl rubber elastomers and EPR are acceptable but service life with MCS-153 may be reduced depending upon operating conditions. Temperature is an important variable when using the less acceptable seals and packing materials.

000907285

00138098

Mr. W. M. Stephens
Page 2
August 22, 1968

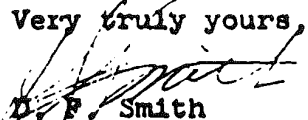
When surfaces which could come in contact with the fluid are to be painted, we recommend cured epoxy, cured phenolic and nylon base paints. The enclosed booklet "Converting to Pydraul Fluids" contains information on seals, paints, hoses, couplings, etc. applicable to MCS-153. We are sending extra copies should you desire to circulate them to station personnel.

As to the fluid itself, we do not claim it to be unchangeable or indestructible--just the next thing to it. MCS-153 with normal use and periodic filtration will provide satisfactory service indefinitely. There is nothing to wear out in MCS-153 thus it can be virtually considered as a permanent part of the system. Occasionally minor shear down in viscosity is found in sample analysis. The main property to check in MCS-153 is specific gravity. Specific gravity is the most unchangeable part of MCS-153 and will be altered only by the addition of a solvent or lesser viscosity fluid such as petroleum oil. Such contamination is easy to spot on the frequent checks of fluid from your various stations.

Our laboratory personnel are alert to the importance of picking up any major deviation in fluid quality in samples from Texas Eastern stations. They are quick to report any such changes and we in turn will be in direct contact with you or other Texas Eastern personnel recommending necessary adjustments.

Hopefully this information will provide some general guidelines to operating personnel at Texas Eastern's many stations using MCS-153--now and future. If we may provide additional information or service, please let us know immediately.

Very truly yours,

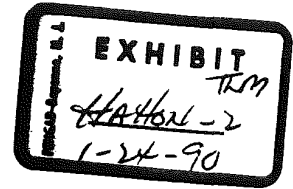

D. P. Smith
Senior Product Specialist
Functional Fluids

/mmms

cc: Walter Woods, Head of Turbine Section Engineering
Earl Farmer, Engineering Department
Ted Harrison, Asst. Purchasing Agent, Houston Office

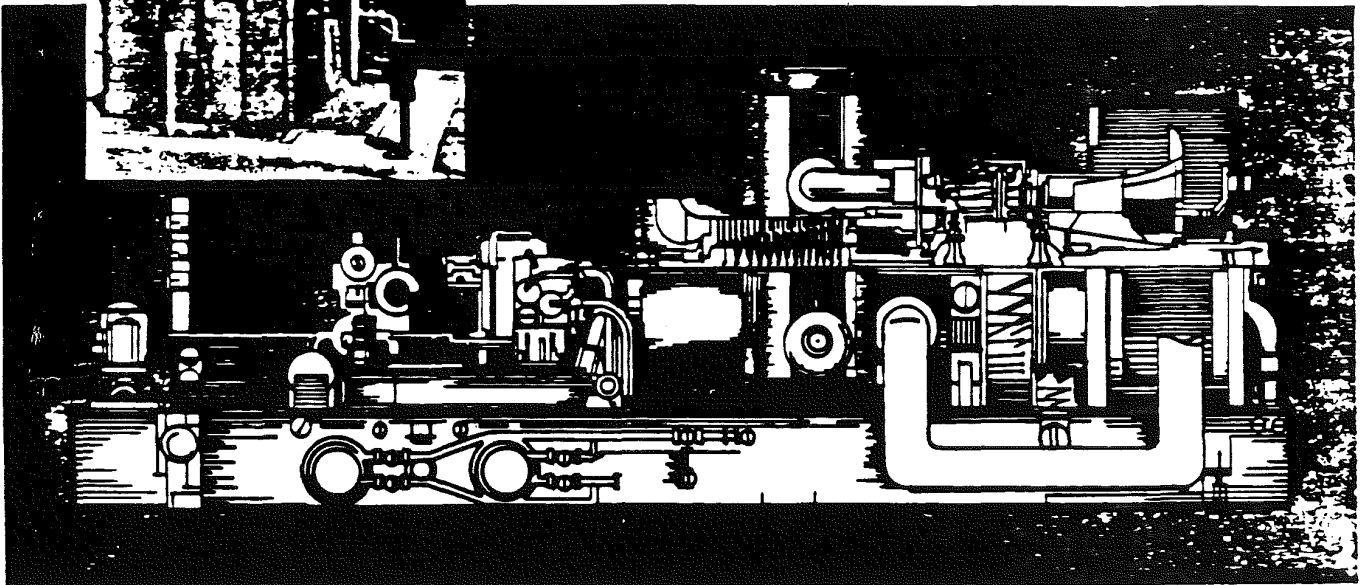
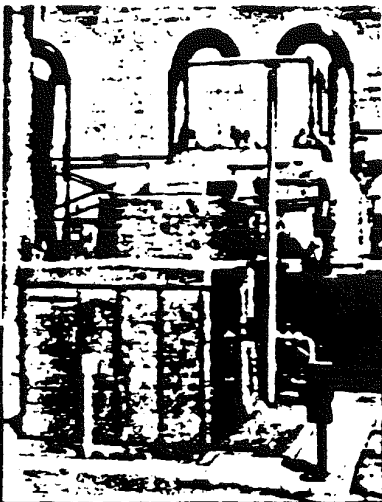
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DO505738

Facts About Fire-Resistant Lubricants



O/FF-23

TURBINOL

TURBINE LUBRICANT BY **Monsanto**

TEX 000330

Introduction

Monsanto's Turbinol® 153 is a fire resistant synthetic fluid specially designed for turbine systems. Turbinol 153 has years of safe, continuous operation as both the lubricant and control fluid in commercial pipe line gas turbines. The unique chemistry of Turbinol 153 offers excellent thermal-oxidative and hydrolytic stability.

The following abridged excerpts are from a paper titled, "Fire Resistant Lubricants In Gas Turbines," by Earl P. Farmer, Jr., of Texas Eastern Transmission Corporation. The paper was presented during the annual meeting of the American Society of Lubrication Engineers (ASLE), Power Generation Council Technical Session, in Chicago on May 4-7, 1970. It will appear as an article in *Lubrication Engineer*, the official ASLE magazine.

Hazards of Petroleum Lubricating Oils

The potential hazards inherent in using petroleum lubricating oils in high speed, high temperature gas turbine installations prompted Texas Eastern to investigate the applications of fire-resistant lubricants in our gas turbine installations. From our experiences, several potentially disastrous lube oil fires were prevented by alert operators who happened to be in the right place when turbine failures occurred. In another case, a turbine failure caused a lube oil fire, resulting in a complete station outage. A load compressor failure was responsible for another lube oil fire, which resulted in damages far more critical in the station operation than the compressor failure.

Still another hazard exists in the use of centrifugal pipe line compressors. These units require high-pressure seal oil systems with considerable external piping and controls. Even minor control and piping failures initiate emergency shut-down conditions, which, when using petroleum

oil, necessitate the immediate shut-down of oil pumps to prevent feeding of possible fires. This means the high speed rotating elements must coast down with no lubrication, resulting in the strong possibility of wiped bearings. If the bearings are wiped badly, additional internal damage to the rotating elements and seals can result. Thus a minor failure can lead to a major station outage.

Advancing technology combined with rising operating costs led to the development and rapidly increasing use of automatic, remotely controlled, unmanned pipeline compressor stations. Obviously, this type of installation becomes most vulnerable to the potential hazards of lube oil fires. The obvious solution to these potential hazards is the use of fire-resistant lubricants.

Texas Eastern Tries Synthetics

In 1958, Texas Eastern pioneered the use of fire-resistant lubricants in large, industrial gas turbines when we installed four 13,400 HP @ 80°F. units with the phosphate ester based fluid as the only lubricant.

Today, we have twenty industrial type gas turbines in service using the fire resistant fluid in the oil systems. These twenty units, with a total of 323,800 HP, have operated in excess of 410,000 hours without any failures attributed to the fire resistant fluid.

Our operating experience over the past twelve years has proven the fire resistant fluid used in our gas turbines to be extremely stable, both thermally and oxidatively. None of the units using this lubricant have experienced an oil change because of excessive oxidation. Periodic tests have indicated little change in the neutralization number. A coupling guard leakage at one station provided a practical test of the oil's fire resistance by spraying oil against a 700 F. exhaust housing with no fire resulting. Modifications and repairs by welding on oil piping within the oil tanks further demonstrated fire resistance.

Because of the added safety factor and the proven reliability and stability of the fire resistant fluid, it has become the standard lubricant in all our industrial type gas turbine installations placed in service since 1958.

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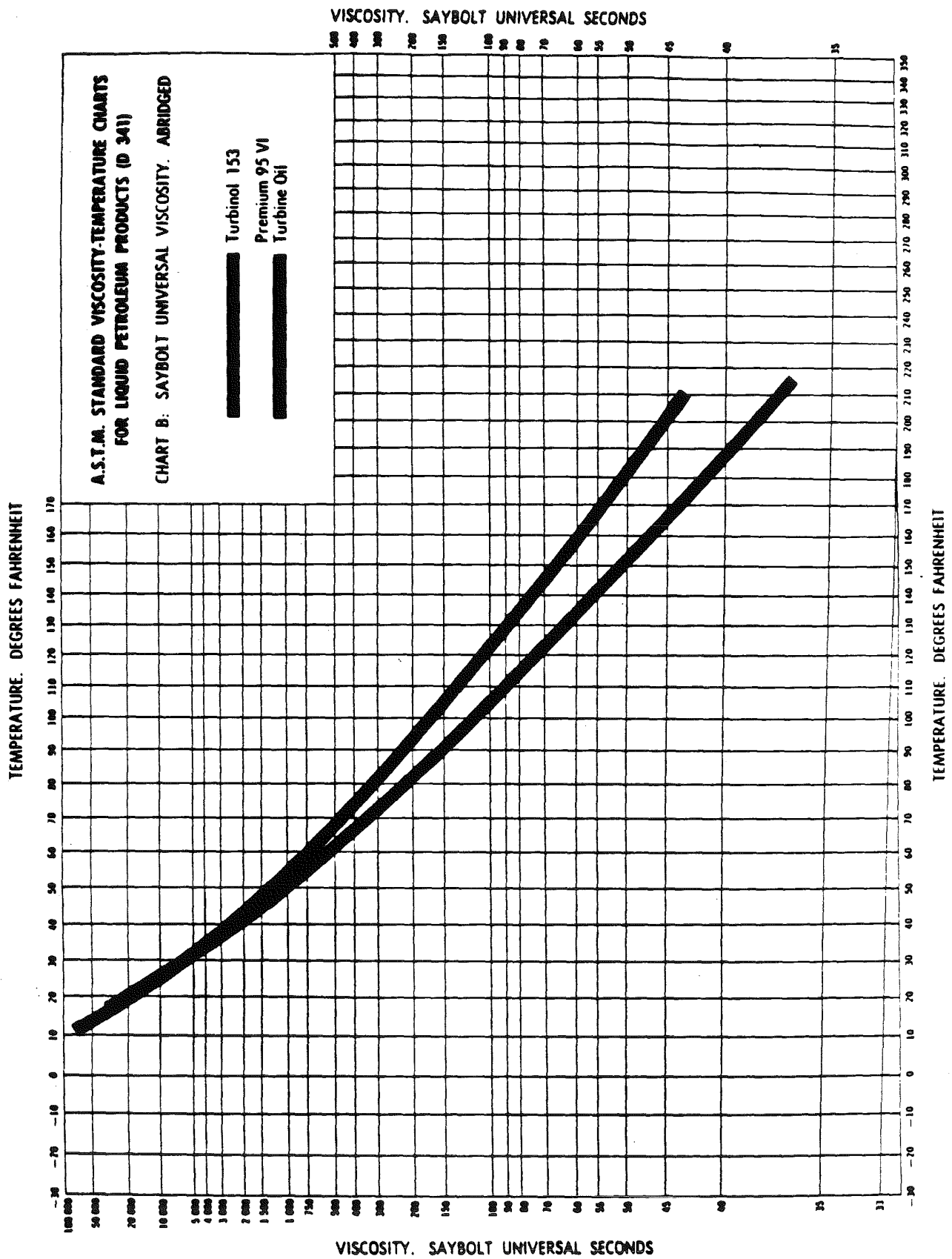
Typical Properties of Turbinol

PHYSICAL PROPERTIES

Appearance	Clear, amber colored oily liquid	
Specific Gravity, variation with temperature:	40°F./60°F.	1.356
	100°F./60°F.	1.325
	200°F./60°F.	1.273
Neutralization Number (Acidity) (Mg KOH/gm)	0.02-0.1	
Moisture (Max.)	0.15%	
Viscosity		
Saybolts (SSU) Measured: @	40°F.	2160
	100°F.	108
	210°F.	37.1
Absolute-centipoise: @	40°F.	469
	100°F.	29.7
	210°F.	4.1
Pour Point	0°F.	
Vapor Pressure (mm Hg @ 200°F.)	0.025	
Boiling Point	625°F.	
Secant Bulk Modulus (psi) @ 100°F.	412,000	
Coefficient of Thermal Expansion cc/cc/°F.	0.00037	
Solubility In Water	Negligible	

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TEX 000333

LUBRICATION PROPERTIES

	Turbinol 153	Typical Premium R&O Turbine Oil
Four-Ball Wear Test (mm scar diameter) 620 rpm, 167 F., 1 hr.		
Steel/steel 10 kg	0.23	—
40 kg	0.53	0.6 to 1.0
Steel/bronze 10 kg	0.92	2.0 to 3.0
Timken Test Passing Load, lbs.	40	15
Falex Load Jaw Load, lbs.	4050	880
Torque, lb. inches	60	27

STABILITY AND CORROSION PROPERTIES

	Turbinol 153	Typical Premium R&O Turbine Oil
ASTM Rust Test D-665 140°F. Distilled Water	Pass	Pass
ASTM Emulsion Test D-1401 ml Emulsion after 30 minutes	0	0
ASTM Foam Test D-892 Sequence 1	Pass	Pass
Sequence 2	Pass	Pass
Sequence 3	Pass	Pass
ASTM Turbine Oil Stability Test D-943 (Modified*) Hrs. to reach 2.0 mg KOH/g	>2000	2000
Hydrolytic Stability Test (MILH 19457—Beverage Bottle Test) 200°F. water, 48 hrs., Cu strip	Pass	Pass
Oxidation/Corrosion Test 168 hrs., 250°F., air		
Metal Attack, mg/cm²		
Al	-0.01	0.0
Mg	-0.01	0.0
Cu	-0.04	0.0
Fe	0.0	0.0
Cd	-0.01	0.0
Viscosity		
% Change, 100°F.	+8.5	+1.7
% Change, 210°F.	+0.6	+1.1
Acidity, TAN Change	+0.02	+0.41

*Because of the higher specific gravity of Turbinol, water used in the test would not settle to the bottom of the test cylinder. Hence, oxygen stream was saturated with water before being bubbled through the test fluid.

FIRE RESISTANCE PROPERTIES

High-Pressure Spray Test (AMS 3150-C and Federal Test Method Std. 791)	Localized flashing in contact with flame but self-extinguishing.
Low Pressure Spray Test	Slight increase in flame intensity.
Hot Manifold Test (Federal Test Method Std. 791)	

1300°F. Tube Intermittent flashing on tube. Does not propagate flame to pan below.

950°F. Tube Does not flash.

Molten Metal Ignition (Aluminum alloy @ 1200°F.) Does not ignite spontaneously. Flashes intermittently with ignition source, but self-extinguishes.

ALCOR DEPOSITION TEST

48 hours, 250°F. fluid, 1000 ml/min. air flow @ 400°-475°F. tube temperature.

	Turbinol 153	Petroleum Oil
Total Deposit Rating	10.5	10.5
Filter, mg.	10	13
Acidity, TAN Change	+ 0.03	+ 0.02

TEX GGG334

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Seals and Packings Information

Materials compatible with Turbinol are necessary for dynamic or moving seals. For static seals they are preferred, but not essential. The following table indicates materials recommended. Packing materials such as impregnated asbestos are usually satisfactory with Turbinol. Consult your Monsanto fluid specialist for specific recommendations.

This list of component manufacturers is a guide to obtaining seals compatible with Turbinol. Please contact your equipment manufacturer or seal supplier for their most current recommendations.

Acushnet Process Company
776 Belleville Avenue
New Bedford, Massachusetts 02745

Anchor Packing Company
401 North Broad Street
Philadelphia, Pennsylvania 19108

Bearings, Inc.
3634 Euclid Avenue
Cleveland, Ohio 44115

A. W. Chesterton Company
Everett
Massachusetts 02149

Chicago Rawhide Manufacturing Company
1311 Elston Avenue
Chicago, Illinois 60622

C. E. Conover & Company, Inc.
333 Passaic Avenue
Fairfield, New Jersey 07006

Crane Packing Company
6400 Dakton Street
Morton Grove, Illinois 60053

Garlock Packing Company
Palmyra
New York 14522

Goshen Rubber Company, Inc.
P. O. Box 416
Goshen, Indiana 46526

Greene, Tweed & Company
North Wales
Pennsylvania 19454

Hercules Packing Corporation
11061 Walden Road
Alden, New York 14004

International Packing Corporation
Bristol
New Hampshire 03104

Johns-Manville
22 East 40th Street
New York, New York 10016

C. W. Marsh Company
36 Hudson Street
Muskegon, Michigan 49441

Minnesota Rubber Company
3630 Wooddale Avenue
Minneapolis, Minnesota 55416

Parker Seal Company
10567 Jefferson Boulevard
Culver City, California 90230

Plastic & Rubber Engineering, Inc.
756 East Florence Avenue
Los Angeles, California 90001

Plastic & Rubber Products Company
2100 Hyde Park Boulevard
Los Angeles, California 90047

Precision Rubber Products Corporation
Hartmann Drive
Lebanon, Tennessee 37087

Raybestos-Manhattan, Inc.
Packing Division
Passaic, New Jersey 07055

Reliable Rubber Products
Eddington
Pennsylvania 19020

Rockwell Mechanical Packing Company, Inc.
1634 Long Beach Avenue
Los Angeles, California 90021

W. S. Shamban Company
11617 West Jefferson Boulevard
Culver City, California 90230

Vellumoid Company
Rockdale Street and Beaman Avenue
Worcester, Massachusetts 01606

The James Walker Packing Company, Inc.
P. O. Box 75
Chicago Heights, Illinois 60411

Filters and Hoses

FILTERS Most standard oil filters are satisfactory. You can use active earth or clay types. Filter manufacturers include:

Briggs Filtration Division
Bowser Corporation
Cookeville, Tennessee 38501

Capital Engineering Company
5839 Ashland Avenue
Chicago, Illinois 60610

Commercial Filters Corporation
(Honan-Crane)
Lebanon, Indiana 46052

Cuno Engineering Corporation
Sub. of American Machine & Foundry
4627 S. Vine Street
Meriden, Connecticut 06450

Dollinger Corporation
20 Centre Park
Rochester, New York 14608

Fulflo Specialties Company, Inc.
410 Fancy Avenue
Blanchester, Ohio 45107

Hilliard Corporation
98 W. Fourth Street
Elmira, New York 14903

Marvel Engineering Company
7227 North Hamlin Avenue
Chicago, Illinois 60645

Pall Corporation
32 Sea Cliff Avenue
Glen Cove, L. I., New York 11542

Purolator Products
1000 New Brunswick Avenue
Rahway, New Jersey 07065

Rosaen Filter Corporation
1776 E. Nine Mile Road
Hazel Park, Michigan 48030

Schroeder Bros. Corporation
101 Nichol Avenue
McKees Rocks, Pennsylvania 15136

Serfilco Division
Service Filtration Corporation
7408 North Milwaukee
Niles, Illinois 60048

HOSES Butyl, nylon, Viton or Teflon are preferred when new hoses are installed. Suppliers include:

Anchor Coupling Company
3600 N. Fourth Street
Libertyville, Illinois 60048

Eastman Mfg. Company
(See Imperial-Eastman Corp.)
Department T. R.
6300 West Howard Street
Chicago, Illinois 60648

Electric Hose & Rubber Co.
1201 Duro Street
Wilmington, Delaware 19899

Gates Rubber Company
999 South Broadway
Denver, Colorado 80217

Imperial Eastman Corp.
6300 W. Howard Street
Chicago, Illinois 60648

Lewis Products
Hohenwald, Tennessee 38462

Samuel Moore Co.
Mantua, Ohio 44255

Resistoflex Corp.
Roseland, New Jersey 07068

Stratoflex, Inc.
222 Roberts Cutoff Rd.
Fort Worth, Texas 76114

Weatherhead Corp.
302 E. 131st Street
Cleveland, Ohio 44108

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Other Components

SWIVEL COUPLINGS

Systems for Turbinol fluids often contain swivel couplings. Some suppliers are:

Chiksan Division
FMC Corporation
332 N. Brea Boulevard
Brea, California 92621

PIPE JOINT SEALERS

... can be bought from:

American Sealants Company
(See Loctite Corporation)
115 N. Mountain Road
Hartford, Connecticut 06111

Crane Packing Company
6410 Oakton Street
Morton Grove, Illinois 60053

Dow Corning Corporation
Midland, Michigan 48640

Friesland Plastics Company
Friesland, Wisconsin 53935

General Electric Company
Insulating Materials Department
1 Campbell Road
Schenectady, New York 12306

Permatex Company
Department T. R.
Flagler Court Building
West Palm Beach, Florida 33401

W. S. Shamban & Company
11617 W. Jefferson Boulevard
Culver City, California 90230

Shell Chemical Company
110 W. 51st Street
New York, New York 10019

ACCUMULATORS

... some systems for Turbinol contain an accumulator which uses a bladder to separate the fluid from air or nitrogen pressure. For these, a rubber compatible with the fluid is necessary. Suppliers include:

Greer Hydraulics, Inc.
5930 W. Jefferson Boulevard
Los Angeles, California 90016

PAINTS

... resistant to Turbinol are supplied by:

Amercoat Corporation
Department T
Brea, California 92621

Andrew Brown Paint Company
5413 S. District Boulevard
Los Angeles, California 90022

Carboline Company
32-R Hanley Industrial Court
St. Louis, Missouri 63130

Carrol Products
148 Macine Street
Farmingdale, New York 11735

Finch Paint & Chemical Company
Torrence, California 90507

W. P. Fuller & Company
1645 W. Valencia Drive
Fullerton, California 92633

The Glidden Company
900 Union Commerce Building
Cleveland, Ohio 44114

Interchemical Corporation
Finishes Division
1255-T Broad Street
Clifton, New Jersey 07011

Lowe Brothers Company
Third & Madison Streets
Dayton, Ohio 45426

Magna Coatings & Chemical Corporation
1785 N. Eastern Avenue
Los Angeles, California 90032

Nycote Laboratories
15002 Delano Street
Van Nuys, California 91401

Pittsburgh Plate Glass Company
One Gateway Center
Pittsburgh, Pennsylvania 15222

Rinshed-Mason Company
5935 Milford
Detroit, Michigan 48210

Royalty Paint & Varnish Company
Pasadena, California 91101

Saran Protective Coatings Company
2415 Burdette at Reed
Ferndale, Michigan 48220

Sherwin-Williams Company
101 Prospect Avenue, N. W.
Cleveland, Ohio 44115

Titanine, Inc.
Seagrave Corporation
Elmwood & Morris Avenues
Union, New Jersey 07087

U. S. Paint, Lacquer & Chemical Company
2101 Singleton
St. Louis Missouri 63103

SOLUBILITY WITH OTHER FLUIDS

Other Phosphate Ester and
Phosphate Ester-Base

Soluble in all proportions

Petroleum Oils

Soluble in all proportions, but petroleum oil can reduce the fluid's fire resistance.

HEAT TRANSFER PROPERTIES

Specific Heat
BTU/lb/°F

60°F.	0.297
100°F.	0.304
150°F.	0.318
200°F.	0.327

Thermal Conductivity
BTU/°F./ft/hr

60°F.	0.061
100°F.	0.061
150°F.	0.060
200°F.	0.060

ELECTRICAL PROPERTIES

Dielectric Constant @ 25°C.

@ 60 cycles/sec.	6.52
@ 1000 cycles/sec.	5.94

Power Factor @ 25°C., %

@ 60 cycles/sec.	52.00
@ 1000 cycles/sec.	3.45

Specific Resistivity (ohm-cm)

@ 25°C.	1.7×10^{10}
@ 100°C.	2.0×10^9

TEX CCG336

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DISTRICT SALES OFFICES ALL DIVISIONS

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260 Springside Drive
Montrose Development Park
Tel. (216) 666-4111

ATLANTA, GEORGIA 30326

Lenox Towers East
3400 Peachtree Rd. N. E. — Suite 1711
Tel. (404) 577-2260

BOSTON, MASSACHUSETTS 02149

Everett Station
Tel. (617) 387-5010

CHICAGO, ILLINOIS

3158 Des Plaines Ave.
Des Plaines, Illinois 60018
Tel. (312) 296-6688

CINCINNATI, OHIO 45206

1501 Madison Road
Tel. (513) 751-6707

DETROIT, MICHIGAN 48235

500 Northland Towers East
Tel. (313) 357-0910

HONOLULU, HAWAII 96812

205 Pacific International Bldg.
677 Ale Moana Blvd., P. O. Box 3824
Tel. (808) 531-2744

HOUSTON, TEXAS 77027

1301 Post Oak Tower
5051 Westheimer Road
Tel. (713) 621-9550

LOS ANGELES, CALIFORNIA 90022

6670 E. Flouille St.
Tel. (213) 723-2492

NEW ENGLAND AREA

Hydrocarbons & Polymers Div.
730 Worcester St., Indian Orchard, Mass. 01051
Tel. (413) 788-6911
Plastic Products & Resins Div.
P. O. Box 2130, Springfield, Mass. 01101
Tel. (413) 788-6911

NEW YORK, NEW YORK 10017

277 Park Avenue
Tel. (212) 922-4111

ST. LOUIS, MISSOURI 63166

800 N. Lindbergh Blvd.
Tel. (314) 694-1000

SAN FRANCISCO BAY AREA

2710 Lafayette, Santa Clara, Calif. 95052
Tel. (408) 243-0414

SEATTLE, WASHINGTON 98121

2112 Third Avenue
Tel. (206) 622-4203

WILMINGTON, DELAWARE 19803

2005 Concord Pike, Feltex
Tel. (302) 658-6531

Additional District Offices are maintained by:

Agricultural Division

ALLENTOWN, PENNSYLVANIA 18104

Park Professional Building
2200 Hamilton Street
Tel. (215) 437-6471

DECATUR, ILLINOIS 62523

207 Decatur Professional Building
383 South Main Street
Tel. (217) 423-6031

DES MOINES, IOWA 50310

312 Merle Hay Tower
Tel. (515) 278-8503

FREMONT, NEBRASKA 68025

150 South Main Street
Tel. (402) 727-1230

INDIANAPOLIS, INDIANA 46205

Suite 218, 4000 Meadows Drive Building
Tel. (317) 547-9148

KANSAS CITY, MISSOURI 64133

701 Blue Ridge Tower
4240 Blue Ridge Boulevard
Tel. (816) 383-6060

LULING, LOUISIANA 70070

P. O. Box 174
Tel. (504) 784-6263

MANKATO, MINNESOTA 56001

111 Madison East
Tel. (507) 387-3406

MEMPHIS, TENNESSEE 38104

303 Union Plaza Building
1838 Union Avenue
Tel. (901) 278-7811

MUSCATINE, IOWA 52761

P. O. Box 473
Tel. (319) 283-1331

Hydrocarbons & Polymers Division-Lien Oil

EL DORADO, ARKANSAS 71730

Lien Oil Building
Tel. (501) 863-3111

JACKSON, MISSISSIPPI 39209

P. O. Box 10937, Westland Station
Tel. (601) 352-3648

N. LITTLE ROCK, ARKANSAS 72119

410 West 8th Street, P. O. Box 5821
Tel. (501) 376-2437

MEMPHIS, TENNESSEE 38113

1023 Riverside Drive, P. O. Box 13248
Tel. (901) 948-4451

Organic Division (Rubber Instruments)

AKRON, OHIO 44311

820 Brown Street, P. O. Box 2307
Tel. (216) 434-1962

Plastic Products & Resins Division

EUGENE, OREGON 97401

P. O. Box 1819
858 Seneca Road
Tel. (503) 342-7201

KENILWORTH, NEW JERSEY 07033

North Seventh St. & Monroe Ave.
Tel. (201) 276-2900

Textiles Division

ATLANTA, GEORGIA 30303

Atlanta Merchandise Mart
240 Peachtree St. N. W.
Tel. (404) 577-2260

CHARLOTTE, NORTH CAROLINA 28210

6230 Fairview Road, Suite 400
Tel. (704) 384-0110

GREENVILLE, SOUTH CAROLINA 29606

McAlister Plaza
P. O. Box 5584, Station B
Tel. (803) 238-9171

NEW YORK, NEW YORK 10001

360 Fifth Ave.
Tel. (212) 686-5100

Monsanto

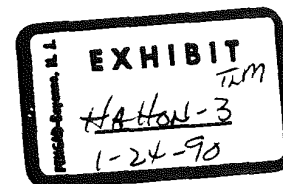
Monsanto Company / Functional Fluids / 800 North Lindbergh Blvd. / St. Louis, Missouri 63166

TEX C00337

ICI-LRA-0870

WATER_PCB-SD0000061900

W. M. STEPHENS
SUPERVISOR DESIGN & CONSTRUCTION
ENGINEERING



June 28, 1966

To: Mr. R. E. Moore

Subject: Evaluation of the Fire Resistant Lubricant Pydraul 135

Monsanto Chemical Company has introduced Pydraul 135 as a candidate for application as a fire resistant lubricant in gas turbines. This fluid was evaluated in the fall of 1966 and the results were forwarded in my memos dated October 11, 1966 and November 23, 1966.

A recent visit was made with Monsanto in their St. Louis facilities to discuss the properties and application of this fluid in our system. This memo will present a resume of the data collected to date and the recommendations of this department.

Historical Background

MCS-153, our present gas turbine lubricant standard, is formulated with a chlorinated polyphenyl (Chlorinated aromatic hydrocarbon) and a phosphate ester. The halogen, chlorine, is added to the hydrocarbon ring through chemical reaction to increase the fire resistant properties of the fluid. Additional chlorine molecules could be added to further increase the fire resistance, but the viscosity of the fluid would increase rapidly. The phosphate ester, also a fire resistant lubricant, is added to increase the lubricity and viscosity/temperature characteristics of the mixture.

Phosphate esters exhibit excellent lubricating properties in film lubrication, good viscosity/temperature characteristics and excellent fire resistance. The chlorinated polyphenyls exhibit poor viscosity/temperature characteristics, excellent thermal and oxidative stability, excellent fire resistance, and excellent EPL or boundary lubrication. Therefore, the proper formulation of the two fluids creates a superior lubricant exhibiting the desired properties of both fluids.

Pydraul 135 is a chemical mixture of the chlorinated polyphenyl, a phosphate ester, and petroleum oil. The petroleum oil was added to primarily lower the fluid cost, but it also enhanced the viscosity/temperature characteristics of the mixture.

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Physical Properties

A complete list of physical properties for both MCS-153 and Pydraul 135 can be furnished if desired. However, the basic differences in physical properties exist in the viscosity/temperature characteristics, density, and the specific heat. For our applications, the differences in the above properties favor the Pydraul 135.

Lubricity

In all lubricating tests, Pydraul 135 exhibited superior lubricating properties over MCS-153, which equalled or exceeded petroleum oils in the same tests.

Thermal and Oxidative Stability

Because of its major constituent, chlorinated polyphenyl, MCS-153 has proven to be extremely stable, both thermally and oxidatively. To date, none of the units using MCS-153 on our system have experienced an oil change because of excessive oxidation. Periodic tests have indicated little change in the neutralization number.

All laboratory tests on oxidation and thermal stability performed by Monsanto have indicated that the Pydraul 135 should approach the stability of MCS-153. Under extreme oxidative and thermal conditions, the lighter constituent of Pydraul 135, which has a boiling point of 450°F, could be depleted by vaporization. This condition is noted by an increase in the viscosity, measured at 100°F, of the fluid. However, the viscosity measured at 100°F would increase fifty to seventy five percent, but the viscosity measured at 210°F would increase only some ten to twenty percent. The fluid can be returned to its original composition by adding a small amount of the lower boiling component. This was proven in laboratory test. Under our operating conditions, this lower boiling component should experience very little vaporization. In the event sufficient vaporization does occur causing the viscosity measured at 100°F to double its original value, a measured volume of the lower boiling component can be added to the system, thereby restoring the fluid to its original state. This means that the fluid will not require changing as we originally thought. Actually with normal make up and our operating conditions, the life of the Pydraul 135 may equal or exceed MCS-153. Only actual operating test can determine this factor.

Fire Resistant Properties

Among all fluid properties, fire resistance is the most difficult to measure and the most controversial. There have been many attempts to standardize fire test methods, and although several similar test types have emerged from these attempts, there is still essentially no standardization.

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The fire resistant rating of a fluid can not be established by one or two tests alone, but must be evaluated from all the possible tests that are usually run. For example, the AIT (Autogenous Ignition Temperature) for MCS-153 is 1130°F while that for Pydraul 135 is 760°F. However, the AIT for Benzene, a specialized fuel, is 1200°F. Looking at the AIT only, one would rate Benzene as the most fire resistant, but it is highly flammable and its heat of combustion is more than sufficient for Benzene to be self propagating. The flash point of MCS-153 and Pydraul 135 is 360°F for both fluids, while the fire point of Pydraul 135 is greater than 725°F as compared to only 560°F for MCS-153.

For our purposes, the Hot Manifold Test is a good test for judging the fire resistancy of a fluid. From our visual witness of this test at St. Louis, it was apparent that MCS-153 has the advantage over Pydraul 135 by about 110°F. The Pydraul 135 would flash at about 920°F while MCS-153 would flash at about 1030°F. However, at both temperatures and past 130°F, neither fluid would carry flames to the fluid containing pan just below the manifold. This is explained by the fact that both fluids are endothermic compounds. This means that heat or flame must be applied for the fluids to burn. They do not emit sufficient heat upon combustion to propagate flames.

Again, as in the case of thermal stability, we are looking at conditions that should not be encountered in our system. The exhaust gases of the non regenerative turbines exit near 1000°F, but the exhaust piping is insulated and jacketed to protect personnel. In most cases, temperatures in excess of 900°F are encountered only in case of a drastic failure, in which case the temperatures encountered will also be in excess of 1000°F. Therefore, the fire resistancy of the Pydraul 135 is more than adequate for our normal operations, and in case of a drastic failure, the MCS-153 would also be subject to temperatures above the fire resistant fluids are used in our gas turbine systems to afford additional protection when a disaster or failure occurs. We feel that either fluid will supply this protection in our system. The Pydraul 135 is listed by the underwriters laboratory as fire resistant.

Advantages and Disadvantages

Compared to MCS-153, Pydraul 135 is a better lubricant and represents a substantial savings in cost (\$2.55/Gal vs \$3.65/gal LTL). Also, this fluid will be a standard stock item, while the MCS-153 usually is formulated when ordered.

The MCS-153 fluid appears to offer a slightly more stable compound and does require a somewhat higher temperature for combustion. This fluid is more viscous and requires special handling when at low temperatures. However, this has not presented any unusual problems to date. Both of the first two advantages may not be significant in our applications.

Recommendations

We strongly recommend that the Pydraul 135 be given extensive field tests

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Mr. R. E. Moore
June 26, 1968
Page 4

in one of our gas turbines. Since the Yaroo unit has performed extremely well to date, this would be the ideal machine to use for testing the fluid properties, stability, and performance. Monsanto has offered to supply the fluid, technical assistance, and a complete testing program for field testing this fluid. Barring unsatisfactory preliminary results, the test should be run for several years to accurately determine the stability of the fluid.

The Pydraul 135 has been used by British Petroleum in several steam turbines with excellent results. Copies of the British Petroleum field tests are available for study.

Original Signed
W. M. STEPHENS

W. M. Stephens

EF:jd

cc: Messrs. J. J. Ball
F. P. Gertson
F. V. Gordon
C. W. Marvin
D. S. Walsh
Walter Woods

010037986

Monsanto

FROM (NAME & LOCATION) C. L. Bradford - G. O.

C

December 15, 1971

CC R. E. Hatton

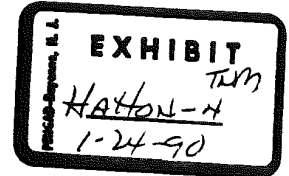
SUBJECT

SANTOVAC 1 and 2/TURBINOL 153
TRANSITION PROGRAM

REFERENCE

TO

T. L. Gossage



Tom, attached are two memos to me from Roger Hatton outlining the steps that will be necessary to get out of the Santovac 1 and 2 business and the Turbinol 153 business. We will start on the Santovac 1 and 2 program as soon as you tell us the date we should get out of the business. Turbinol 153 will be coordinated with our total Pydraul program.

Your comments, please.

C. L. B.
C. L. Bradford

/pep
Attachments

MONSANTO
D0506181

TEX 000797

Monsanto

FROM (NAME & LOCATION):

R. E. Hatton - G. O.

TE

December 13, 1971

SUBJECT

TURBINOL 153 PROGRAM

REFERENCE

TO

C. L. Bradford

The program to stop supplying PCB containing Turbinol 153 to Texas Eastern Transmission Corp. (our only customer) involves the following basic steps:
a. inform them by personal visit that Turbinol 153 will not be available after June 1, 1972 (except under "hold harmless" conditions if necessary), b. sell them and General Electric on converting to MCS 1223 (all phosphate ester fluid) and c. assist in conversion and disposal of used fluid.

Successful accomplishment of this program involves a number of actions which are detailed below.

- a. Visit to Texas Eastern should involve appropriate Monsanto personnel and Texas Eastern purchasing, operations and engineering groups. This visit should be scheduled to coincide with or closely follow the general Monsanto PCB announcements.
- b. The cut-off date of June 1, 1972 should be firm. However, if turbine and gas compressor change over from Turbinol 153 cannot be accomplished by then, a "hold harmless" agreement must be negotiated.
- c. Conversion to MCS 1223 in gas turbines will require both General Electric and Texas Eastern approvals. We will probably need Texas Eastern help in expediting G. E. approval. Gas compressor OEM acceptance and/or approvals will be required but less difficulties are expected.
- d. To insure G. E. cooperation, their technical, engineering, production and marketing should be informed of our program promptly after the Texas Eastern visit.

TEX CUC798

MONSANTO
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- e. We should cooperate fully with Texas Eastern during the conversion and subsequent start-ups. Proper disposal of used Turbinol 153 must be arranged.
- f. Field sales and turbine manufacturers other than G. E. should be informed of these actions and their reasons, 1) to prevent continued damage to our image by "more chlorine/bearing problems" and 2) to be sure all potential Turbinol 153 customers do not design to use this fluid and are aware of our all phosphate ester turbine lubricants.

Roger

R. E. Hatton

/pep

MONSANTO
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TEX 000799

CLB

C. L. Bradford

January 7, 1972

R. E. Hatton

TURBINOL 153 WITHDRAWAL PLAN

REH Memo to CLB - 12/13/71
Turbinol 153 Program

& CLB Memo to TIG - 12/15/71
Santovac 1 & 2/Turbinol 153
Transition Program

MUNSANIC
D0506184

T. L. Gossage
B2SL

Trip file

Tom, supplementing Roger Hatton's and my previous memos to you, following is our plan for moving Texas Eastern Transmission Corporation away from Turbinol 153 and hopefully to one of our own substitute fluids.

Date

Action

1/14/72

Present our hold harmless agreement to Texas Eastern indicating that we will sell them no more fluid after January 15, 1972 unless they sign this agreement, and in any case, we will not sell them any Turbinol 153 after June 30, 1972. On that same date we would hope to present them a substitute fluid.

2/15/72

Start a field trial on an alternate fluid in one of Texas Eastern's turbines.

6/3/72

Begin selling Texas Eastern our new fluid and stop sales of Turbinol 153.

Attached is a copy of the hold harmless agreement which we expect to have Texas Eastern sign.

C. L. Bradford

/pep
Attachment

TEX CCC600

MONSANTO INDUSTRIAL CHEMICALS CO.
St. Louis, Missouri

February 8, 1972

CALL REPORT NO. 1972-1

TEXAS EASTERN TRANSMISSION CORP.
Milam at McNeill
P. O. Box 1612
Shreveport, La. 71130

cc: C. L. Braiford
T. L. Gossage
J. F. Herber
L. R. Stark
W. R. Richard
J. G. Frederiksen
D. W. Stegen
H. R. Ford
P. L. Slayton
D. R. Hansen
E. L. Shimley

Date of Call:

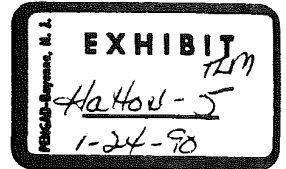
January 14, 1972

Present for Texas Eastern:

Walter Woods
A. B. Jarnagin
B. R. Purgitorio
E. P. Farmer
R. E. Moore
D. H. Sloan
E. C. Riall, Jr.
Jack Simpon
J. Y. Briggs

Present for Monsanto:

C. L. Bradford
D. W. Stegen
J. G. Frederiksen
R. E. Hatton



SUMMARY:

Texas Eastern Engineering and Operational personnel were informed that Turbinol 153 will no longer be available to them without signing a Special Agreement letter. Texas Eastern will not sign such a letter and has sufficient material to finish out the current season. However, they will change from Turbinol 153 to another fire resistant turbine lubricant and expressed a willingness to work with Monsanto. They will provide one or more test units, pending G.E. approval, to field trial our product and to gain some operating experience before their entire system is changed over from Turbinol 153.

DETAILS:

The purpose of this call was to review with Texas Eastern Engineering and Operating personnel the situation caused by the discontinuance of Turbinol 153. Previous contact had been made with the Purchasing Department and a copy of a proposed Agreement had been submitted.

Texas Eastern personnel had reviewed their lubricant supply situation and had determined they had at least sufficient Turbinol 153 to complete winter and summer operations. A more careful analysis will be made to determine the exact

TEX 000315

time of depletion. This will be done on a station-by-station basis and include transferring new fluid around as required. A desire was expressed to order a small amount of additional fluid if it could be obtained before the deadline of signing the Agreement letter. However this was not possible and no additional fluid was supplied to Texas Eastern following our visit.

The environmental situation with the PCB containing Turbinol 153 was discussed in detail. Texas Eastern stated that they would not sign the special Agreement letter. They felt they would be able to continue to operate for a sufficient period of time to make an orderly and satisfactory changeover to another fluid.

We were asked concerning our replacement fluid and reviewed our total phosphate ester program aimed at providing chlorine-free hydraulic fluids and lubricants. It was stated that information on a replacement product would be available in 1-2 weeks and would be supplied in terms of a comparison with Turbinol 153. It was pointed out that these are relatively new products and that we do not have a large background of service experience. They requested that we supply our test data as rapidly as possible.

One area of considerable concern was conversion procedures required to change from Turbinol 153 to any new product they select. Therefore, adequate data on compatibility between our new all phosphate ester fluid and Turbinol 153 must be obtained. It was their feeling that they could clean and drain their gas turbine units so that about 10% of the original fluid would remain in the system.

One necessary step before conversion is General Electric approval or at least acquiescence for the particular product to replace Turbinol 153. It was indicated that work is underway with General Electric, that they were aware of our phosphate ester program and had examined some samples of our material. Texas Eastern will also be in contact with General Electric to determine what mechanical changes may be made necessary in existing turbines. It was indicated that materials compatibility should be satisfactory but that the two fluids would have different densities and viscosities. Questions were asked concerning heat transfer characteristics since this is important in sizing coolers. It was emphasized by Texas Eastern that Monsanto should work very closely with General Electric to be sure that complete information exchange is obtained. In addition, they suggested contact with Clark, Cooper Bessemer, DeLaval and Westinghouse for their approval on our new fluids. The

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TEX CCC316

first three companies supply the natural gas compressors which are driven by the gas turbines, both using Turbinol 153 from a common reservoir. Westinghouse has supplied one gas turbine which is lubricated with Turbinol 153.

During the discussion, the Vice President of Engineering asked his people as to what steps would be involved in going back to petroleum fluids. Both Operating and Engineering personnel affirmed that fire resistance was the important characteristic and that they have no desire to use flammable lubricants at unmanned units. There also appeared to be a desire to cooperate with Monsanto on a new fire resistant product.

R. E. Hatton

/pep

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TEX 000317

WATER_PCB-SD0000061911

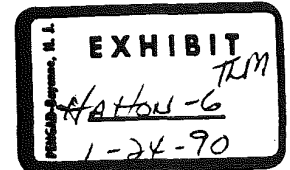
MONSANTO INDUSTRIAL CHEMICALS CO.
St. Louis, Missouri

February 11, 1972

cc: C. L. Bradford
T. L. Gossage - B2SL
J. F. Herber - T3G
L. R. Stark - W4A
W. R. Richard - T3A
J. G. Frederiksen - 1460
D. W. Stegen - 1460
H. R. Ford - 1070
P. L. Slayton - 1650
D. R. Hansen - 1800
E. L. Shimley - 1010

CALL REPORT NO. 1972-11

TEXAS EASTERN TRANSMISSION CORP.
Shreveport, La.



Date of Call:

February 4, 1972

Present for T. E.:

Walter Woods
A. B. Jarnagin
Bill Hartman
Ben Means

Present for Monsanto:

John Frederiksen
R. E. Hatton

SUMMARY:

Monsanto's all phosphate ester turbine lubricant MCS 1223 was discussed in considerable detail and compared with Turbinol 153 in a meeting held at the request of Texas Eastern. It was indicated basically that this product should perform in their turbines and that General Electric was aware of the product but that their approval would depend upon Texas Eastern's position.

Competitive fluids are also being considered by this group. They are also quite interested in looking at a fluid in the 150 SSU range. Texas Eastern has been in contact with Trans Canada Pipelines concerning their experience with various fire resistant lubricants in gas turbines and is completely aware of the programs under development.

Texas Eastern has made no definite commitment as yet as to which fluids they will use to replace Turbinol 153. Continued attention to this account in terms of visits and additional data and coordination of efforts with their suppliers will be required.

DETAILS:

This meeting was called by Walter Woods to review the information provided on Monsanto's all phosphate ester turbine lubricant MCS 1223 compared to Turbinol 153. This information

TEX 000879

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had been provided in bulletin form earlier in the week by John Frederiksen and resulted in this request for further discussion by the undersigned.

The meeting followed the format of a review of the properties of MCS 1223, particularly in terms of how they might relate to performance in General Electric gas turbines. It was quite apparent from the questions asked and from the information files that the attendees had with them that the competitive fluids are also being evaluated and that these are primarily the Fyrquel products.

The results of the undersigned's visit to the General Electric Gas Turbine group in Schenectady were reviewed. It was pointed out that this group will probably not give approval but will hopefully indicate no objections to running actual turbine tests on MCS 1223 or other synthetic phosphate esters. It was also indicated that the G.E. Medium Steam Turbine-Generator group at Lynn had given Turbinol 50 approval for use in their electrohydraulic control units and that the Gas Turbine Department generally considered such approvals sufficient for their purposes (control units only).

Each of the properties in the brochure were discussed in more detail and only the highlights will be reviewed here.

One particular area of concern seemed to be the rust inhibition characteristics. They indicated that they understood rust inhibitors had been added to MCS 153 sometime during its history. Since this was unable to be confirmed or denied by the undersigned, it was agreed that the past history would be reviewed on this subject. The rust seems to occur primarily on idle machines and Walter Woods and Bill Hartman both indicated that they had seen large amounts of rust on gears when Turbinol 153 was used. However, they do not really know that this has been a major or real problem and, as far as they know, has not affected operations in any way. Buck Jarnagin indicated that he had been discussing the Trans Canada Pipeline experience with Paul Knight. Apparently these discussions have been quite extensive and frequent. He stated that Paul Knight says that Fullers Earth does not remove the rust inhibitors that are put in the competitive fluids. I indicated that this may be true if sufficient make-up fluid is added or if rust inhibitors of low acidity are used. Based upon these discussions it would appear that we need to be sure that coordination between the Texas Eastern and Trans Canada test programs be full and open and that we work closely with both

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TEX CCCBHC

groups. We must also examine the requirements and performance of rust inhibitors in our proposed turbine lubricants.

Walter Woods pointed out that there appear to be some differences in fire resistance between MCS 1223 and Turbinol 153. This opening was used to indicate why we had stayed so long with the chlorinated materials in spite of the opposition by certain units of General Electric. We indicated that the fire resistance of our MCS 1223 type fluids were equivalent in performance type tests to those of competitive products. Walter asked if we would be willing to run such comparisons in our laboratory for their observation. It was indicated that the laboratory would be made available together with personnel any time that they cared to come and watch or run such tests.

The area of stability and its meaning was reviewed with emphasis upon the Alcor test and the oxidation-corrosion data. This did not seem to raise any particular problems but neither did it seem overly important to them. However, it was pointed out that such type of testing is extremely important to Trans Canada and will undoubtedly become more important as higher powered machines such as the Frame 7000 G.E. units are put in operation. It was also indicated that the Trans Canada Westinghouse units were particularly critical in terms of such type stability as measured by coking in bearing housings.

In the area of lubrication it was pointed out that the LFW-1 test was considered to be of some importance by General Electric and that they might discover on discussing it with them that there was some difference as to test results. I indicated that our results show that metallurgy and surface finish were important in determining comparative ratings of the fluids. I also indicated that this was only one laboratory test and was not really indicative of field performance.

It was emphasized that we did not prepare "me too" fluids and did not expect our new phosphate esters to be equivalent in all respects to the competitive cresylic acid base products. The advantages of our approach in terms of total stability and availability were emphasized and these points seemed to be of considerable interest to some of the operations people present.

The question of price came up and this group was told that MCS 1223 would be no higher in price than Turbinol 153.

They asked for written confirmation of this and it will be handled through John Frederiksen and Don Stegen with the group in Shreveport as well as the Purchasing group in Houston.

Toward the end of the discussion the question of viscosity requirements for the General Electric units was brought up. Texas Eastern was told that we were working on a 220 Saybolt second fluid (MCS 1223) at the direct instigation of General Electric since this was their recommended viscosity level. Walter Woods stated that most of the units operating in the field that he had heard about were running on a 150 Saybolt second fluid and indicated that this discrepancy would have to be cleared up with General Electric. He asked if we could provide a 150 Saybolt second fluid and was assured that we would be most happy to do so and that we had done preliminary work on such fluids. A short data sheet on MCS 1121 and MCS 1122 was left with them. These two products are the ones which are under consideration by Paul Knight for use in the Trans Canada Pipeline fluid test and I had the distinct impression that they had been discussed between Jarnagin and Knight. It was pointed out that we do not have complete data on these products since Trans Canada is primarily concerned with the results of the National Research Council testing as compared to other information which we could provide. It would appear that we should be prepared to offer Texas Eastern this type of product together with additional data.

At the end of the discussion Walter Woods indicated that they plan to get together very shortly with General Electric to determine exactly what needed to be done in order to shift from Turbinol 153 to the phosphate ester fluids. There was considerable discussion among the Texas Eastern group concerning the necessity of changing impellers on the lubricant and hydraulic pumps. They do not feel that there will be any on the natural gas compressors on changing the lubricants. At the present time they are working out a program of how many and which units should be changed out and should be used as trial machines on phosphate ester fluids to cause minimum operational upset to their total system and also the timing involved.

It was quite obvious that competitors are working hard to obtain selection of their fluid by Texas Eastern. However, there was no indication that a positive commitment had been made to any fluid at this time.

One particular area of concern is that of compatibility of the materials in the present Turbinol 153 turbines and the compatibility between MCS 1223 and Turbinol 153. Texas Eastern was told that they could top up the Turbinol 153 with MCS 1223 if this is the way they desired to proceed. It was reported that after standing, mixtures of the two products in 10:90, 50:50 and 90:10 ratios showed a trace of material rising to the top which was identified as defoamer. This material separation was explained on the basis of the differing solubility of the silicone materials in the two base stocks. This related directly to experiences they had previously had and therefore created no problems. It was stated unequivocally that all the materials they have been using with Turbinol 153 can also be used with MCS 1223. During this compatibility discussion it was pointed out that Monsanto's basic position would be that they ought to drain the units as well as possible and then start operations on the new fluid. It was pointed out that this recommendation is based primarily on ecology considerations and not on performance.

R. E. Hatton

/pep

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TEX 000883

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TEXAS EASTERN

Transmission Corporation

INTER-OFFICE CORRESPONDENCE

E. C. RIAL, JR.
SUPERINTENDENT
COMPRESSOR STATIONS

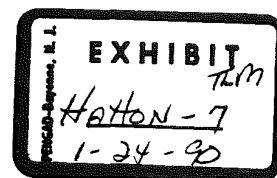
P. O. BOX 1612
PHONE 424-0331

Office: Shreveport, Louisiana

Date: February 4, 1972

TO: Memo to Files

SUBJECT: File 3.20 - Monsanto Turbine Lubricant MCS 1223



On February 4, 1972 representatives of Monsanto and Texas Eastern met to discuss the above lubricant. Attendance was as follows:

Monsanto

Dr. Roger Hatton
Mr. John Frederickson

Texas Eastern

Mr. Bill Hartman
Mr. Walter Woods
Mr. Benny Means
Mr. A. R. Jarnagin

The attached brochure was discussed at length and the following points of interest were brought out:

1. The new lubricant Monsanto is proposing to take the place of Turbinoil 153 is MCS 1223.
2. MCS 1223 is a 220 grade lubricant. Monsanto stated that General Electric had expressed a preference for 220 grade lubricant as opposed to a 150 grade. The viscosity of a 220 grade lubricant may cause problems on start-up with cold oil. Monsanto can supply 150 grade lubricant also.
3. The MCS 1223 can be used with Turbinoil 153 as make-up. This may not be advisable however since we would be operating with a lubricant containing PCBs for years to come. There would be no problem in changing from Turbinoil 153 to MCS 1223 as far as compatibility is concerned according to Monsanto.

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February 4, 1972

4. The MCS 1223 has not been used in turbines as of this date. Trans-Canada Pipeline is planning to test this product in one turbine starting this summer.
5. The price of MCS 1223 has not been established as of this date except that it will not be higher than Turbinoil 153 which is as follows (F.O.B. St. Louis):

2,000 gal. min. in bulk	\$3.55/gal.
24,000 lb. min. in drums	3.75/gal.
Less than truck load drums	3.85/gal.

A. B. Jarnagin
A. B. Jarnagin

ABJ:jnd

D0307143

00531568

Monsanto

CALL REPORT-ORGANIC DIVISION

DICTATE IN SEQUENCE:

1. HEADING INFORMATION
2. NAMES OF ADDRESSEES
3. NAMES OF CARBONEES
4. IMMEDIATE ACTION NEEDED
5. REPORT ON CALL

REPORT CAPTIONS:

1. OBJECTIVE
2. PERSONS CONTACTED
3. RESULTS
4. ACTION REQUIRED

CUSTOMER NAME TEXAS EASTERN GAS TRANSMISSION CO		DATE OF CALL 2/4/72	
CITY AND STATE SHREVEPORT, LA	DATE RECEIVED 2/10	DATE TYPED 2/10/72	
CUSTOMER MAILING LIST CHANGES - SERVICE CENTER USE ONLY			
NAME AND TITLE	PUT ON	TAKE OFF	MP MAG. CATEGORY CODES
XC LRS-JFH-CLB			
Only - file			
REGION SOUTHERN	SERVICE CENTER HOUSTON	SALESMAN J G FREDERIKSEN Pr	

00506260

TO C. L. BRADFORD - ST. LOUIS CC D. W. STEGEN
R. E. HATTON

CONTACT: BUCK JARNIGAN - OP. ENG. WALTER WOODS - ASS'T CH ENG
JACK HARTMAN - ASS'T MGR COMPRESSOR STATIONS BEN MEANS - SR ENG.

CALLED WITH R. E. HATTON

OBJECTIVE: DISCUSS MCS 1223

RESULTS - MCS 1223 - Roger did an excellent job of discussing the comparison between MCS 1223 and Turbinol 153. Time was quite short for Texas Eastern people, so it was necessary to be very direct and to the point. In discussing the typical properties, fire resistance, and performance properties several points were given special attention by Texas Eastern people. They were as follows:

1. Viscosity - They questioned the differences in low and high temperature viscosity versus 153. They also questioned whether pump impellers would have to be changed using 1223. The consensus was that most of the pumps used in their stations were positive displacement pumps versus centrifugal pumps - however they were not sure. This was one point Texas Eastern was going to check with G.E.
2. Additives - Roger stressed that this was a straight Phosphate Ester with no chlorine, but which did contain an additive package. They asked whether we had a rust inhibitor and was told "no" because fuller's earth filters the rust inhibitor, they expressed that they want to have one added to 1223 because of the large amounts of rust that form in the turbine during the summer months. They have only one unit that does have a fuller's

EXHIBIT

HATTON-8

1 - CENTRAL OFFICE COPY

TEX CCC67c

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DICTATE IN SEQUENCE:

1. HEADLINE INFORMATION
2. NAMES OF ADDRESSEES
3. NAMES OF CARBONEES
4. IMMEDIATE ACTION NEEDED
5. REPORT ON CALL

REPORT CAPTIONS:

1. OBJECTIVE
2. PERSONS CONTACTED
3. RESULTS
4. ACTION REQUIRED

CUSTOMER NAME TEXAS EASTERN TRANS. SHREVEPORT					DATE OF CALL	
CITY AND STATE PAGE TWO				DATE RECEIVED		DATE TYPED
CUSTOMER MAILING LIST CHANGES - SERVICE CENTER USE ONLY						
NAME AND TITLE				PUT ON	TAKE OFF	MP
REGION		SERVICE CENTER		SALESMAN		

 MONSANTO
DO506261

TO _____ CC _____

earth filter.

3. Fire Resistance - The basic test for this were discussed very briefly. Walter Woods expressed a possible desire of Texas Eastern people to come to St. Louis to see the fire resistance tests actually performed on MCS 1223 and other Phosphate Esters. We indicated that there would be no problem in doing this, and that they were to let us know when they would like to visit St. Louis if they wished to do so.

4. ENVIRONMENTAL EFFECTS: OF 1223 - Woods expressed a desire to know the specific effects of 1223 on the land if it is spilled, the water, air if it evaporates, or air if it burns.

5. Pricing and supply ~~xxx~~ timing: They were very curious as to ~~xxx~~ what our pricing would be, and when we could deliver material. We indicated the price would be no more than for Turbinol 153, and that we would most likely be able to deliver material within four to five weeks after the order is placed. There was some discussion regarding our material, which is a 220 second material, versus a 150 second material. Woods was quite confused on this particular point, thinking that MCS 1223 was a 150 second material and that G.E. wanted Texas Eastern to use a 150 second material. Hatton indicated G.E. had recommended to him that they wanted a 220 second material used in their turbines. This will be confirmed by Texas Eastern with G.E., and we indicated we could make a 150 second liquid if required.

6. CHANGE-OVER - The question was raised whether MCS 1223 could be added

Monsanto

CALL REPORT - ORGANIC DIVISION

DICTATE IN SEQUENCE:

1. HEADING INFORMATION
2. NAMES OF ADDRESSEES
3. NAMES OF CARBONEES
4. IMMEDIATE ACTION NEEDED
5. REPORT ON CALL

REPORT CAPTIONS:

1. OBJECTIVE
2. PERSONS CONTACTED
3. RESULTS
4. ACTION REQUIRED

CUSTOMER NAME TEXAS EASTERN - SHREVEPORT		DATE OF CALL	
CITY AND STATE	PAGE THREE	DATE RECEIVED	DATE TYPED
CUSTOMER MAILING LIST CHANGES - SERVICE CENTER USE ONLY			
NAME AND TITLE	PUT ON	TAKE OFF	MP MAG. CATEGORY CODES
REGION	SERVICE CENTER	SALESMAN	

TO _____ CC _____

AS TOP OFF material for Turbinol 153. Roger indicated he thought it would probably be possible to do this, but from an environmental standpoint, it would be to their advantage to change the materials out completely.

Roger stressed our advantages of our independent synthetic source of raw materials, our superior thermal stability, and our reduced amount of residue as shown by the Alcor test. Though rather rushed, it seemed the group was quite satisfied with the information supplied to them. The next step is Texas Eastern going to G.E. to have other questions answered.

It was rather obvious from discussions that those attending had done their home work on other Phosphate ~~ester~~ esters, and that 1223 was being compared directly to them. Woods indicated that price would not be a major factor, but that it may come into play. Woods also said he recognized our advantages in thermal stability.

FUTURE ACTION

JGF Check with Woods for progress Mid Feb

John G. Frederiksen

JGF/pr

JGF. Let final Price Type to Woods cc Balls when decided

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DICTATE IN SEQUENCE:

1. HEADING INFORMATION
2. NAMES OF ADDRESSEES
3. NAMES OF CARBONEES
4. IMMEDIATE ACTION NEEDED
5. REPORT ON CALL

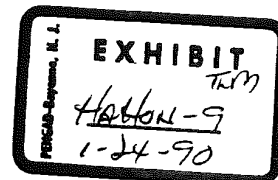
REPORT CAPTIONS:

1. OBJECTIVE
2. PERSONS CONTACTED
3. RESULTS
4. ACTION REQUIRED

CUSTOMER NAME Texas Eastern Transmission Corp.		DATE OF CALL 7-24-72	
CITY AND STATE Shreveport, La.		DATE RECEIVED 8-3-72	DATE TYPED 8-3-72
CUSTOMER MAILING LIST CHANGES - SERVICE CENTER USE ONLY			
NAME AND TITLE	PUT ON	TAKE OFF	MP MAG CATEGORY CODES
<i>[Handwritten signature]</i>			
REGION Southern	SERVICE CENTER Houston	SALESMAN J. G. Frederiksen/em	

TO Cumming Paton - St. Louis CC J. Armentor - Houston
R. E. Hatton - St. Louis

CONTACTED: Walter Woods - Asst. Chief Engineer
Buck Jarnigan - Operations
Ben Means - Sr. Engineer
 Called with R. E. Hatton



D0506281

OBJECTIVE: Obtain initial trial of Turbinol 1122.

RESULTS: TURBINOL 1122: We presented two pieces of information regarding Turbinol 1122:

- 1- General Electric had established that they favored a 150 second fluid and that we recommend Turbinol 1122 to Texas Eastern.
- 2- Turbinol 1122 does have a rust inhibitor package added to it which keeps the fluid clear, will probably not be filtered out by Fullers earth filter, and which enhances the stability of the product.

All concerned were very interested in the information, and it was received very favorably. It came very clear that both operations and engineering were both in favor of trying Turbinol 1122. They have both decided to recommend Turbinol 1122 be used in replacing Turbinol 153 at the Barton, Ala. pump station. This will require 3400 gal. fluid as the fill, plus about 1500 gal. of flush fluid. Woods, however, cautioned us not to be absolutely certain we would have this fill because his recommendations to upper management were not always taken. Operations said they would proceed with filling the Barton station with 1122 until they were told not to. Presently, Barton will be changed out sometime in September.

Woods is quite anxious to try different types of fluids so that Texas Eastern can purchase the best, as well as to maintain competition in the turbin lubricant field. He mentioned several times that he thought we would have an advantage over Stauffer's fluid, and was anxious to try it.

Woods brought up one critical question - what responsibility would Monsanto take if the Environmental Protective Agency told Texas Eastern to stop using Turbinol 153 immediately. This question needs to be answered. They have consumed 11,000 gals. of Turbinol 153 in six months, and have now 49,000 gals. in inventory.

Woods requested a price quote for Turbinol 1122 in which the rust inhibitor should be mentioned. He asked for a price FOB plant and also a delivered Barton, Ala. plant price because Stauffer's prices are on a delivered basis.

Monsanto**CALL REPORT - ORGANIC DIVISION****DICTATE IN SEQUENCE:**

1. HEADING INFORMATION
2. NAMES OF ADDRESSEES
3. NAMES OF CARBONEES
4. IMMEDIATE ACTION NEEDED
5. REPORT ON CALL

REPORT CAPTIONS:

1. OBJECTIVE
2. PERSONS CONTACTED
3. RESULTS
4. ACTION REQUIRED

CUSTOMER NAME Texas Eastern Transmission Corp.		DATE OF CALL 7-24-72	
CITY AND STATE		DATE RECEIVED 8-3-72	DATE TYPED 8-3-72
CUSTOMER MAILING LIST CHANGES - SERVICE CENTER USE ONLY			
NAME AND TITLE	PUT ON	TAKE OFF	MP MAG CATEGORY CODES
REGION	SERVICE CENTER	SALESMAN	
		J. G. Frederiksen/em	

TO Page 2.CCFUTURE ACTION: REH - Establish Monsanto's position on ETA/PCB? ASAPREH - Letter to Woods carbon copy Riall summarizing rust inhibitor in 1122 - ASAPJGF - Letter to Woods copy to Riall re 1122 pricing - ASAPJGF - Check Stauffer price to Texas Eastern with Riall - week of July 31.JGF/emMONSANTO
D0506282

MONSANTO INDUSTRIAL CHEMICALS
St. Louis, Missouri

August 2, 1972

CALL REPORT NO. 1972-23

TEXAS EASTERN TRANSMISSION CORP.
Shreveport, Louisiana

cc: T. L. Gossage
C. Paton
J. H. Davidson
W. R. Richard - T3A
L. R. Stark - W4A
J. F. Herber - T3G
J. G. Frederiksen - 1460
J. Armentor - 1460
H. R. Ford

Date of Call:

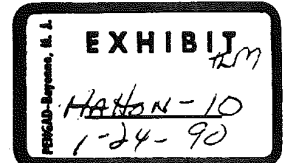
July 24, 1972

Present for Texas Eastern:

Walter Woods
Ben Means
Buck Jarnigan

Present for Monsanto:

John Frederiksen
Roger Hatton



SUMMARY:

Operations and engineering working levels at Texas Eastern are interested in using Monsanto's Turbinol 1122 or 1223 in a field trial in the next gas turbine to be converted from Turbinol 153. This will probably be the unit at Barton, Alabama sometime in September. This decision is subject to review by their management. Price, trade relations and Monsanto's position on the PCB problem are involved. We must continue efforts to insure a field trial of our products.

DETAILS:

The purpose of this call was to present the latest information on Monsanto's phosphate ester turbine lubricants and to determine Texas Eastern's intentions on a field trial.

Monsanto recent activities on gas turbine fire resistant lubricants were reviewed. Texas Eastern personnel were particularly concerned with the reports of my visits to General Electric. It was pointed out to them that the gas turbine groups at G.E. have finally settled on a 150 SUS at 100°F. fluid such as Monsanto's Turbinol 1122. General Electric personnel have made this selection based upon viscosity similarities to their present petroleum lubricant and the fact that bearing losses are approximately 45% greater for a 220 SUS phosphate ester fluid and 15% greater for the 150 SUS fluid as compared to the petroleum oil. It was pointed out that the original G.E. preferences for the 220 SUS fluid had been greatly influenced by the group at Lynn who are more concerned with gear lubrication than with journal bearing lubrication. It is still generally agreed throughout General Electric that the heavier fluid would be more satisfactory from the gear lubrication standpoint. Texas Eastern indicated that they would probably go along with the General Electric recommendation but that they were still interested in Monsanto's Turbinol 1223, a 220 SUS fluid.

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Remaining questions from previous visits were discussed. One concerned the possibilities of wire wooling with phosphate esters and it was reported that General Electric had only raised this as a question and that no data are available on any of the phosphate esters. The differences in product performance in the bench scale LFW-1 test were noted. General Electric now believes that this test may not be completely meaningful and are conducting a series of low speed "turning gear" tests on all competitive products. The group at Texas Eastern was not aware of this work.

Some comments were made during the discussion concerning the change in General Electric attitudes toward the fire resistant lubricants in gas turbines. Texas Eastern personnel stated positively that General Electric did not have any objections to using our fluids and were quite interested in obtaining field tests on them.

Texas Eastern reported that they have changed out two units from Turbinol 153 to the Fyrquel fluids. They are using Fyrquel 22Q R and O in the Huntsville unit. At the time of changeover, some mechanical modifications were made in the compressor area. They have had some difficulties in maintaining lubricating system pressure with the pumps recommended by General Electric. At this stage Texas Eastern does not believe this is due to the field. They are using Fyrquel 150R and O in the Yazoo unit. Here no mechanical changes were made and operations have been quite satisfactory. However, Texas Eastern was quick to point out that there has not been sufficient time to develop any real operating experience. They feel that at least 6 months will be required to get meaningful data.

It was reported to Texas Eastern that Turbinol 1122 is now formulated with a rust inhibitor and that combined with its already good oxidation characteristics it is a superior "R&O" fluid to the Fyrquel R and O products. Oxidation corrosion test data were presented on Turbinol 1122 and the competitive products. Performance in the General Electric film tenacity test was described and it was indicated that Turbinol 1223 passes this test without additional additives and that we will therefore supply Turbinol 1223 without an additional rust inhibitor. Texas Eastern was quite pleased to learn that we did have products which were good on rust inhibition and offered increased stability. Walter Woods volunteered that he felt, based on all the data, that the Monsanto turbine lubricants were the most stable products on the market and that he would like to see them run in a turbine.

Walter Woods posed a direct question as to what Monsanto's responsibility would be, along with Texas Eastern's, if the EPA banned PCB's and told Texas Eastern that they would have to change out all remaining units. It was indicated that this problem would have to be discussed with our management and that we would provide an answer. During this discussion they indicated that they have reduced their stock of Turbinol 153 from approximately 60,000 gallons as of January 1 to 49,000 gallons. It is their present intention to continue to operate with Turbinol 153 moving it from station to station until it is essentially all consumed.

Walter Woods requested that we give him a price quotation in writing for Turbinol 1122 and Turbinol 1223. They would like this in terms of F.O.B. plant and F.O.B. delivered, for example to Barton, Alabama. We confirmed the previous statements that the prices would be no higher than those for Turbinol 153. It was intimated this figure was probably somewhat high compared to competition because of differences in delivery costs and ways in which prices are being quoted. We stated that we could have product available in a week but would like 30 days notice if possible. They indicated that they had used about 1500 gallons of Fyrquel as a flushing charge which will be used to flush other turbines and will eventually be worked off in actual operation. The charge in the turbine is about 1500 - 2000 gallons.

Walter Woods stated that both Mobil and Humble have contacted Texas Eastern promoting their fire resistance turbine lubricants and that both are applying pressure to Texas Eastern to purchase through them. Both companies are distributors for the Fyrquel fluids and Texas Eastern is well aware of this. Both Mobil and Humble are major customers of Texas Eastern. During these discussions Walter stated that he would like to try at least two different types of products and therefore would recommend a Monsanto product trial.

At the conclusion of the meeting Jarnigan indicated that we would get a field trial unless somebody specifically told them not to. Walter Woods said that he would recommend our product but that this did not necessarily guarantee a field trial. Totally it appears that the operations and engineering people at the working level are convinced that we have good products and are very interested in having a field trial occur. If there is any opposition it must be at some higher level and efforts will be made to determine if this is the case.

TEX CCC888

On the basis of the discussions three things must be done.
First, a price quotation must be furnished in about a week.
Second, a letter must be written to Walter Woods summarizing
our discussions and third, Monsanto's stature in terms of the
PCB government problem must be resolved.

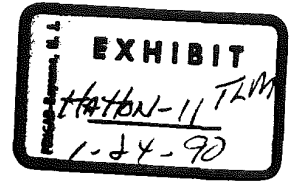
R. E. Hatton

/pep

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*Julius
F. R. G. G. G.
General
on
ASTM*



MEMBERSHIP LIST

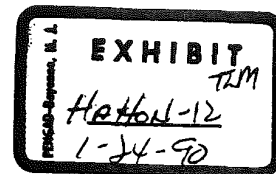
Study Group on Fire-Resistant Turbine Fluids

Tech C, ASTM D-2

	<u>Name</u>	<u>Affiliation</u>
Ch.	Knight, R. G.	Duquesne Light
Sec.	Hatton, R. E.	Monsanto
	Cantrell, T. L.	Gulf Research
	Fletcher, O. M.	Texas Eastern Transmission
	Furby, N. W.	California Research
	Glassman, N.	U.S. NEES
	Katzenstein, Wm.	General Aniline and Film
	Kottcamp, C. F.	Gulf Research
	Lewis, H. D.	Consolidated Edison
	Manley, L. W.	Socony
	Mathe, J. A.	E. F. Houghton
	McBride, R. B.	General Electric
	Megahan, F. N.	Philadelphia Electric
	Millett, W. H.	Union Carbide
	Shatynski, J. J.	Celanese
	Shibe, W. J.	Hollingshead
	Skoglund, R. D.	Texaco
	Teeter, F. C.	Sinclair Research
	Vona, J. A.	Celanese
	Whirl, S. F.	Duquesne Light
	Zabetakis, M. G.	USBM

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MINUTES OF MEETING

FIRE-RESISTANT TURBINE FLUIDS STUDY GROUP

Technical Committee C
ASTM Committee D-2

Atlantic City, New Jersey
June 25, 1963

The Fire-Resistant Turbine Fluids Study Group met June 25, 1963 in Atlantic City with 65 members and guests in attendance. Chairman R. G. Knight presided.

Minutes of the previous meeting held June 28, 1961 were read and approved. The membership list of the Study Group was presented and additions and corrections made.

Chairman Knight indicated that the meeting would be devoted to discussions of experience with fire-resistant turbine lubricants in a prepared agenda. These minutes include brief abstracts of the various presentations and summarize the discussion from the floor.

1) Laboratory Tests for Effects of Fluids on Electrical Insulation

Mr. J. C. Botts of the Westinghouse Electric Corporation reviewed the area of electrical insulation with respect to its influence on the use of fire-resistant fluids. It was pointed out that insulation is always subject to accidental exposure by the fluid and that a number of factors are involved in determining fluid-elastomer compatibility. Problems with currently installed machines would be much more difficult than those with newly built machines. Both mechanical design and new insulation systems can make the compatibility problem easier to handle.

Mr. Botts pointed out that insulations in the older machines include shellac bonded micas and a number of varnishes. Many of these materials are not resistant to the fire-resistant fluids. In recent years various synthetic resins have been developed which are nearly as resistant to fire-resistant lubricants as asphalt is to petroleum oils. Only two approaches exist to the

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problem---one involves coating the entire windings which must give 100% coverage and in obtaining satisfactory co-efficients of expansion for all materials. The second approach is to use resistant materials.

Mr. Botts believes that there would be no more problems with current insulations and fire-resistant lubricants than those previously existing with petroleum oil. Westinghouse will work with anyone who desires such lubricants, but the customer must accept some of the cost and risk.

Mr. R. B. McBride of the General Electric Company presented a review of their work with fire-resistant turbine lubricants, starting with initial screening in 1953. A number of departments have continued to work in this area. Based on their initial screening, it appeared that the phosphate ester and phosphate ester-chlorinated hydrocarbon formulations offered the most promise for fulfilling turbine requirements. Most General Electric work has been focused on these types although others have been examined. Considerable study has been made of the effects of such fluids on generator insulating materials. The tests used have varied from simple exposure immersion tests to large-scale electrical and mechanical tests of major components. The introduction of new insulation systems resistant to fire-resistant fluids plus the knowledge gained concerning satisfactory substitutes for minor items makes the picture much brighter, and General Electric is confident that new machines can be built that would satisfactorily withstand these fluids. Changeover of machines now in service is not recommended.

General Electric does not feel that protective coatings are the answer to the compatibility problems of older equipment. Mr. McBride pointed out that, although they felt that the problem of insulating generators was well in hand, problems in other areas have been uncovered which have prevented the installation of commercial units. One involves severe scoring of shafts under some conditions with fire-resistant lubricants. He indicated that they do not have complete understanding of the phenomena but have considerable evidence that the scoring is started by foreign material. Once the process is started, it feeds on itself, causing increasingly severe scoring. The scoring problem is elusive because it only occasionally occurs and is very difficult to reproduce. This area is continuing to be studied.

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Mr. McBride also reported some difficulties with rusting when using fire-resistant turbine lubricants. The rusting occurred only in those sections from which the fluid had drained. Wherever the fluid was trapped, there was no rusting. Suitable rust inhibitors are under investigation and are being evaluated in various tests. Until such a time as these problems have been solved, General Electric is postponing any commitments to customers to actually install units with fire-resistant lubricants.

Laboratory test procedures were discussed. General Electric indicated that they run exposure tests in laboratory and in full-scale components at room temperature and 100°C. Westinghouse indicated that their tests involve various dip and spray methods on test panels. Actual sections are also tested in vapors, bulk liquid, and sprays. Westinghouse also has run some tests on insulation materials in motors, particularly with regard to carbon dust pick-up.

Most of the work on rusting has been done with the ASTM method or in full-scale components.

2) Use of Fire-Resistant Fluids in Gas Turbines

Mr. O. M. Fletcher of Texas Eastern Transmission Corporation reported on their experience with fire-resistant turbine lubricants in gas turbine-compressors used in natural gas transmission. Texas Eastern started their work in 1958 because of the hazards involved and because of the requirement to maintain all units on the line since no spare equipment exists. Mr. Fletcher stated that all new gas turbines installed by Texas Eastern will use fire-resistant turbine lubricants. The gas turbine and the compressor use the same fluid system. Full-flow filters are used before the fluid goes to the bearings and seals. Micronic filtration is also used on the seal and control systems. In four units which have bare metal throughout the system, no rust has been experienced. These units breathe air while standing idle for 7-8 months of the year. Mr. Fletcher presented a table which summarized their experience with gas turbine operation and this table is attached to these minutes. Each of the installations was reviewed in detail. Mr. Fletcher stated that some difficulties had been experienced but that all of the so-called failures which had originally been blamed on fluid were found to be due to other causes.

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The tachometer generator on these units was coated with epoxy materials and had no problems with attack by the fire-resistant lubricants. Foaming difficulties were corrected by providing the proper vents and by the use of foam suppressors. Their pipeline is internally coated with epoxy materials; the particular ones they use are quite satisfactory and have caused no difficulties. Mr. Fletcher also indicated that they have as yet never discarded any of the fire-resistant fluid because of deterioration.

Mr. Fletcher feels that circumstances have occurred which would have resulted in fires if petroleum oil were being used. However, they have been unable as yet to obtain any reduction in insurance for the use of this material. In answer to questions from the floor, Mr. Fletcher pointed out that there had been no shear with the fluid and that their lubrication system operated at around 60 psi and the seal system at about 1,000 psi.

3) Application of Fire-Resistant Fluids in Lubrication and Control Systems of Steam Turbo-Generators

Mr. E. G. Noyes, Westinghouse Electric Corporation, pointed out their experiences with the use of fire-resistant lubricants. Mr. Noyes stated that in the mid-30's they had used Aroclor in the control systems of units at Philadelphia Electric Company and at Public Service Company of New Jersey. Performance was satisfactory but viscosity-temperature relationships were poor and there were some questions with regard to toxicity. Westinghouse is presently studying fire-resistant fluids in new types of control systems operating at 1600-1800 psi with vane pumps. The first two fluids studied sheared too much. A fluid which does not contain a VI improver is now being evaluated.

Mr. Noyes indicated that the increased density of these fluids gives problems in the lubrication area. Increased heat losses, which amount to as much as 20-30 BTU's per kilowatt are caused by the higher density.

Mr. Noyes indicated that they have been operating a boiler feedwater pump for five years on a fluid which does not contain a viscosity index improver. Performance has been satisfactory thus far and they plan to use a similar product in their control system. Westinghouse plans to

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provide units having oil in the lubrication system and fire-resistant fluid in the control system. Major problems to acceptance of fire-resistant lubricants throughout the system are reduction in the heat rate and contamination problems.

A number of questions from the floor were discussed by the speakers. Mr. McBride said that the scoring problems occurred under very heavy loads and that they felt that contamination was certainly a major factor. The good solvent characteristics of the fluid also entered into this. The heat loss problem was reviewed by the Westinghouse representatives. It was suggested from the floor that the lubrication system might be redesigned so as to reduce this loss. It was reported that a pipeline in Canada using synthetic lubricants in their gas turbines had to shift to a lower viscosity grade in order to obtain satisfactory operations.

4) Comments by Fluid Suppliers

Dr. Hatton of Monsanto Chemical Company indicated that current field experience with Monsanto's fire-resistant turbine lubricants has been in gas turbines operated by Texas Eastern as reviewed by Mr. Fletcher. Rust inhibitors were said to be available which will operate in lubrication systems and work is underway to evaluate some of these more completely. It was also pointed out that the toxicity of these fluids has been studied and that the necessary precautions have been recommended to all users. Monsanto plans to continue their work in this field and is quite hopeful of obtaining large-scale steam turbine use.

Mr. J. A. Mathe of E. F. Houghton & Company pointed out that this is an extremely slow-moving field and that the major problem appears to be a lack of field activity. Customers have just not given active participation in the program. Mr. Mathe questioned the use of current rust tests and felt that work should be undertaken by Technical Committee C to develop rust procedures which are more applicable to the fire-resistant type of materials.

Mr. T. G. Smith of the Celanese Chemical Company reported that a phosphate ester fluid is being used in pipeline applications with gas turbines in Canada. Eventually, sixteen stations will be in operation with several turbines

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per station. They are now using a 150 SSU fluid. Mr. Smith feels the remaining problems are insulation compatibility and rusting. Rust inhibitors are available which perform satisfactorily in the fluid phase but none have yet been developed for vapor phase rust protection. Mr. Smith also pointed out that various European-built turbines are operating with fire-resistant fluids in their control systems.

5) Report on Field Tests

Mr. Fletcher reported that in addition to those applications he had discussed, phosphate ester fluids are being used in a number of Cooper-Bessemer RT-248 units in pipeline service. It is thought that three such units are now in operation.

Mr. Knight indicated that their test work on two fluids in boiler feedwater pumps is continuing and that operations have been completely successful. Chairman Knight plans to issue a summary of applications of fire-resistant turbine lubricating fluids and requested additional input from the Study Group members.

Considerable comment was made concerning the problems of dirt in the systems. Filters are used in many cases. General Electric plans to use a filter before each bearing with fire-resistant lubricant to surmount some of these problems. Mr. Fletcher pointed out that Texas Eastern had had the same problems as with petroleum oil and generally followed the same practices, which include full-flow filtration. Special filtration, including some magnetic type filters, is used on the seal oil and control systems.

Mr. Botts pointed out that what is really needed from the equipment manufacturers viewpoint is motivation to do the work. Equipment with fire-resistant lubricants will cost more money at the present time, but primarily because of the large development costs involved.

6) Discussion of Future Work

Chairman Knight reviewed the past history and past aims of the Group, pointing out that development of fire-resistant turbine lubricants was undertaken in 1954 as the result of some rather serious fires and some very

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intensive interest by the utilities. A number of comments were received from the floor as to the future activities of the Study Group. It was generally agreed that the meetings of the Study Group should be continued because they have served as an excellent way to distribute information and to keep people up-to-date on current developments. It was pointed out that much of the selection of fluids had been based on tests developed for petroleum type products. Probably new tests specifically designed for fire-resistant types of fluids will be required.

Mr. R. Q. Sharpe, Chairman of Technical Committee N, Section II on Industrial Uses, stated that his group was reviewing test procedures used for fire-resistant materials. He felt that the requirements in the turbine lubricant and hydraulic fluid applications are somewhat similar and that there is a need for exchange of information between the two groups. Section II has recently prepared a report indicating status and need of various types of tests and this report was made available to the Study Group. A copy is attached to the minutes.

It was agreed that the Study Group should be continued and that a meeting should be held in 1-2 years to review progress and problem areas.

R. E. Hatton, Secretary

R. G. Knight, Chairman

/pz

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DOI38129

Socony Mobil Oil Company, Inc.
150 East 42nd Street
New York 17, New York

June 26, 1963

MEMBERS SECTION II -
TECHNICAL COMMITTEE N

cc: Members Advisory Committee - Tech N
Members Technical Committee C

At the January, 1963 meeting of Section II, it was agreed that the writer would appoint a small study group to again review existing ASTM methods and their applicability to the round-robin test fluids involved in Technical Committee N activities. This study group consisted of:

R. Q. Sharpe, Chairman - Socony Mobil Oil Company, Inc.
K. G. Henrikson - Socony Mobil Oil Company, Inc.
John Shatynski - Celanese Corporation
John Haaga - Union Carbide Company

The committee comments refer to the applicability of test methods to the following test fluids:

- 1-A-1 - Petroleum Oil
- 2-B-1 - Water Base
- 3-C-1 - Phosphate Ester
- 4-D-1 - Halogenated Base
- 5-D-1 - Phosphate Base
- 6-E-1 - Oil Emulsion

It should be emphasized that these comments are not intended to cover other fluids or other fields of application that may not ordinarily be categorized as industrial.

Attached is a brief summary of comments concerning the approval of existing test methods, or the indicated need for additional information or work in connection with the principal chemical or physical properties of the lubricants involved.

It will be very much appreciated if you will provide us with your comments concerning the attachment. It will be our intention to consolidate suggestions that are received for correction or addition and prepare a complete release for discussion at the next meeting of Section II in Atlantic City in January, 1964.

During the panel discussion of Technical Committee C on their experiences with fire-resistant fluids, it was indicated that they would be interested in essentially the same products and methods falling within the scope of Section II. We are therefore providing the Secretary of Technical Committee C with sufficient copies of this letter and attachment for distribution to their members.

RQS/es
Attachment

 000907822
R. Q. Sharpe, Chairman Section II
Technical Committee N

SUMMARY AND COMMENT ON TEST METHODS
INVOLVING INDUSTRIAL HYDRAULIC FLUIDS

<u>CHEMICAL OR PHYSICAL PROPERTY</u>	<u>ASTM TEST</u>	<u>COMMENT</u>
API Gravity @ 60 F	D-287	O.K.
Viscosity SUS @ 100 F	D-88	O.K.
Viscosity Centistokes @ 100 F	D-445	O.K.
Viscosity Conversion	D-446	O.K.
Viscosity Temperature Chart	D-341	O.K.
Viscosity Index	D-567	O.K.
Color	D-1500	O.K.
Flash	D-92	O.K. for non-aqueous fluids.
Pour Point	D-97	O.K.
Rust Resistance		
Liquid Phase	D-665	O.K. for non-aqueous fluids.
Vapor Phase	---	An acceptable test method required. Refer to Section IX.
Corrosion	---	Should be a standard method to determine weight loss, pitting, or other forms of chemical attack applicable to metals commonly found in hydraulic systems. Refer to Section IX.
Oxidation Stability	D-943	Ask Section VIII for an up-to-date report on their work and discussion of the applicability to industrial test fluids. A short-term test is highly desirable.
Thermal Stability	---	Work by Section VIII should continue.
Neutralization Value	D-664	Reasonably acceptable, but one supplier is studying an indicated need for better reproducibility and definition of end point of D-664 and D-974 with synthetic fluids.

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<u>CHEMICAL OR PHYSICAL PROPERTY</u>	<u>ASTM TEST</u>	<u>COMMENT</u>
Hydrolytic Stability	---	A report from Section VIII is required as to whether they are ready to recommend the beverage bottle test as a standard. Work should continue on other methods that evaluate fluid stability in the presence of water.
Compatibility		
Rubber or Elastomer Swell Tests	---	An up-to-date report on the status of this work is required.
With Other Environmental Materials	---	An up-to-date report of the status of this work is required.
With Other Fluids	---	No new recommendation deemed necessary--continue general screening test reported in 1961.
Lubricating Properties	---	Work should continue--need still exists. Need clarification as to whether Tech L is actively pursuing the development of methods for bench testing that would be applicable to industrial hydraulic test fluids.
Fire Resistance		
A.I.T.	D-286	Need better method. RD XIII reviewing modified method now.
Spray Flammability	---	Need for method still exists.
Static Liquid Flammability	---	Need for method still exists.
Bench Test	---	Need for method still exists.
Toxicity	---	Not within the scope of Tech N.
Foam Test	D-892	O.K. 000907824
Shear Stability	---	Work should continue--need still exists for a simple bench method to define this. Research Division VII should be advised.

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3.

CHEMICAL OR PHYSICAL PROPERTY

ASTM TEST

COMMENT

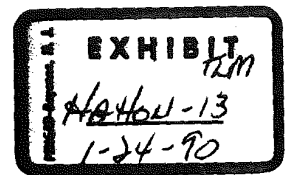
Vapor Pressure

A method is needed that is applicable to both petroleum and synthetic industrial fluids.

R. Q. Sharpe
June, 1963

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Earl,

Roger Hatton of Monsanto gave the following information about solvents for PCB:

1. Kerosine has been used for flushing heat transfer equipment involved in PCB related operations.
2. Kerosine or higher boiling hydrocarbons are better solvents than methanol. However, the kerosine or hydrocarbons should be as aromatic as possible, i.e. highly paraffinic materials are not effective solvents for PCB.
3. Any solvent is only as good as the contact we can achieve. Mechanical aspect of the flushing operation is very important.
4. Make sure the solvent will not attack the coating of pipeline.
5. Disposal of the solvent after use would be a potential problem.

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✓XC to EL Colvin

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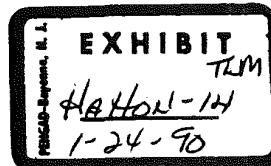
ROLAND E. MOORE

TEXAS EASTERN

525 MILAM - P. O. BOX 1612

SHREVEPORT, LOUISIANA 71130

Transmission Corporation



December 1, 1975

REC.

DEC

E. L. COLVIN

Dr. Roger E. Hatton
Monsanto Industrial Chemicals Company
800 North Lindbergh Boulevard
St. Louis, MO 63166

Dear Dr. Hatton:

Consideration is being given to disposing of a large quantity of Monsanto MCS-153 fire resistant lubricant. We are concerned with how to properly detoxify or dispose of this material due to its polychlorinated biphenyl (PCB) content.

We have been advised that Monsanto at one time provided a disposal service for such material at your St. Louis, Missouri, installation. Will you please let us know if Monsanto still provides this or some other approved disposal service for this material at St. Louis or at another location. If you provide such a service, please advise us the details of how we may avail ourselves of the service.

Any assistance you can give us in this matter will be greatly appreciated.

Very truly yours,

Original Signed
CLIF WILLIAMS

Clif Williams

CW:eo

bxc: J. Y. Briggs
✓ R. E. Moore
W. T. Young

12-3-75 - ELC Distribution: Mr. E. C. Riall
Mr. Gerald Walker
Operating Department Reading File

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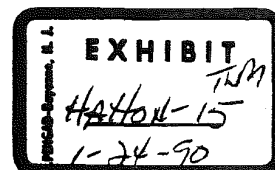
Cliff Williams

Monsanto

SPECIALTY & PROCESS CHEMICALS DIVISION

MONSANTO INDUSTRIAL CHEMICALS CO.
800 N. Lindbergh Boulevard
St. Louis, Missouri 63166
Phone: (314) 694-1000

December 8, 1975



Mr. Cliff Williams
Texas Eastern Transmission Corp.
525 Milam
P. O. Box 1612
Shreveport, Louisiana 71130

Dear Mr. Williams:

Your recent letter requests information concerning the disposal of Turbinol 153 (MCS 153) fire resistant turbine lubricant. This lubricant as you indicated does have polychlorinated biphenyls (PCB) as a major ingredient and proper disposal is recommended.

Monsanto does offer an incineration service for PCB containing materials. Attached is a copy of a letter usually sent with labels to those wishing to use the disposal service. Mr. Cliff Field is the coordinator of the program and can provide you further details. His phone number is (314) 694-3024.

If you have further questions, please contact Cliff Field, Ken Rosenberg (314) 694-4357) or myself.

Very truly yours,

R. E. Hatton
R. E. Hatton
Technical Manager
Hydraulics & Lubricants

/spp

cc: C. R. Field - Monsanto Co.

000844861

Monsanto

FROM (NAME & LOCATION) C. L. Bradford/N. T. Johnson

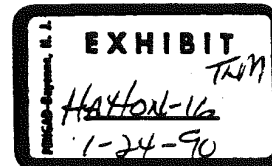
DATE November 17, 1971

cc

SUBJECT CHLORINATED TERPHENYLS

REFERENCE

TO T. L. Gossage



We have given considerable thought to your posed question what would happen should we completely remove polychlorinated biphenyls and polychlorinated terphenyls from our industrial fluids. Following are our observations.

TURBINOL 153

We have one customer for this PCB-containing product, Texas Eastern Transmission Corporation. They use it as a lubricant in 18 or so turbine-compressor combinations, each installation being worth \$1M or more. They are the major supplier of natural gas to the East Coast including New York City.

To our knowledge, there is no approved fire resistant lubricant that can directly replace Turbinol 153. The best candidate would be a straight phosphate ester, but for a reasonable change-over General Electric (the turbine manufacturer) should first approve the product and then Texas Eastern would probably require 5,000 hours of running time before agreeing to the switch.

TEX 000303

To avoid the possibility of shutting this pipeline down, and/or causing such a great expense to this customer that they would sue us, we recommend giving them 8 months grace from the time G. E. has approved an alternate fire resistant fluid - hopefully our own straight phosphate ester. In addition, we recommend Monsanto absorbing the cost to incinerate their current charge of Turbinol 153 (estimated at 54,000 gallons - a cost to Monsanto for incineration and freight equaling \$27,000) plus providing them a free charge of straight phosphate ester, should they decide to remain with us. Our 1972 budget for this product is 325,000 pounds at \$107,000 - all of which we expect to lose if we withdraw from the market with less than the notice recommended above.

TEX CCC304

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TEX CC0305

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