NEVER HAD FR

Confirming my telephone conversation today with Ms. Grace Branigan concerning use of Monsanto's Therminol[R] FR heat transfer fluids, it is our understanding that your location is a corporate office and that you do not have a heat transfer system or have any Therminol FR (PCB) fluids on hand.

I have enclosed a copy of a recent Wall Street Journal article which gives a good summary of the PCB situation.

Thank you for your cooperation. Please contact me at 314-694-2514 if you have any questions.

Any System Peculiarities or Precaut

Sincerely,

CUSTOMER CAN'T FIND FR SYSTEM (or doesn't know of)

Confirming our telephone conversation today concerning use of Monsanto's Therminol[R] FR (PCB) heat transfer fluid, our records indicate that 60 lbs (1 five gallon can) of Therminol FR-0 was sold to your location in 1968 and 1969. If this material was used in a heat transfer system, we would like to offer our assistance to help you to convert to a non-PCB product. If you still have some Therminol FR fluids at your location, we would like the material back so we can properly dispose of it by high temperature incineration.

Please contact a Monsanto heat transfer specialist at 314-694-2514 if you do have some Therminol FR fluids to return to insure proper disposition of the material.

I have enclosed a copy of a recent Wall Street Journal article which gives a good summary of the PCB situation.

12. Reply Replacement: T-55

Thank you for your cooperation. Please contact me at 314-694-2514 if you have any questions or additional information on this matter.

1968 1969 1970

Sincerely,

Total Volume
Orders/Year

MONS 058204

FR ANALYSES

For your request, I have enclosed a copy of the Monsanto and FDA gas-liquid chromotographic methods for PCB analysis. A list of private laboratories which can perform a PCB analysis is also included. If you wish to carry out a rough PCB analysis in your own laboratory, I suggest you use the ASTM D808-63 method to obtain % chlorine. Therminol FR-1 contains 42% chlorine and Therminol FR-2 contains 48% chlorine. The % PCB's in your Therminol 55 can then be calculated by multiplying the % chlorine by 2.4 or 2.1 depending on the FR series fluid previously used.

I have also enclosed a copy of the proposed FDA regulations concerning PCB's and a recent article from the Wall Street Journal which gives a good summary of the Therminol FR (PCB) situation.

Thank you for your cooperation. Please feel free to contact me (314-694-2514) if you have any additional questions.

With respect to Ron Swain's request for information on the proposed FDA rules and analytical procedures for PCB's, I have included copies of the proposed legislation, a Monsanto method for PCB analysis and a list of private laboratories which are qualified to analyze for PCB materials. You may also wish to perform a rough chlorine analysis (ASTM method D808-63 - % chlorine in new and used petroleum oils). Because Therminol FR-1 contains 42% chlorine, the PCB content can then be calculated by multiplying % chlorine by the ration100/42.

In order to determine the residual PCB level in your Therminol 55 flush fluid or Therminol 66 final fill, you may wish to send a sample to one of the private laboratories on the enclosed list for a PCB analysis. Your own laboratory may also obtain an approximate PCB concentration by analyzing for per cent chlorine using ASTM method D808-63 (per cent chlorine in new and used petroleum products). Because Therminol FR#1 contains 42% chlorine, the PCB level in then calculated by multiplying the per cent chlorine by the ratio of 100/42.

I have also included the Monsanto method for a direct PCB analysis; however, this procedure requires some special analytical equipment and for most plants it is more economical to send the several samples required to a private laboratory.

Lost Copy.

I was sorry to learn you have converted your Therminol FR system to a non-Monsanto heat transfer fluid. I have enclosed a bulletin describing our current family of Therminol fluids. We would certainly be happy to work with your people on future heat transfer applications which might utilize a Monsanto product.

Confirming our phone conversation, I understand you no longer have any Therminol FR (PCB) fluids in your plant at Decatur and, therefore, will not utilize our free return and incineration service.

For your information, I have enclosed a recent article from the Wall Street Journal which gives a good summary of the Therminol FR (PCB) situation.

Thank you for your cooperation. Please contact me (314-694-2514) if you have any questions concerning Monsanto Therminol fluids.

MONS 058206

CONVERSION SUMMARY

First, we again emphasize the importance of removing all the Therminol FR-1 (PCBs) from your two systems. I believe the attached article from the Wall Street Journal about the FDA requests explains quite well our recommendation.

Secondly, we also feel any PCB residue will seriously affect the life of any new fluid used, and through decomposition could cause serious system fouling.

We suggest draining all the PCB material, flushing with MCS 681 flushing fluid at temperature for one to four weeks, and refilling with either T-55 or T-66. Under those conditions we will absorb the return freight and incineration charges for both your 100% Therminol FR-1 system as well as your 50/50 contaminated system.

We feel that this is the only real way to insure a sound, safe PCB-free system without endangering the environment or your process equipment. Should you have questions please call me.

Ex-USA 3-16-72/by PATON (Conference Stamp) DISPOSAL

PCB Disposal Outside Continental U.S.A.

I have been informing correspondents from areas outside of continental U.S. that the preferred method for disposal of scrap PCB fluids or solid waste containing PCB is by incineration at temperatures exceeding 800°C with provision for scrubbing the resulting acidic gases to prevent atmospheric pollution.

In most cases there are no facilities available which are capable of providing the conditions required. Some Canadian customers have used our Sauget, Illinois service and the Chem Trol Services, Inc., unit at Blasdell, N.Y. Monsanto - U.K. has made arrangements with Purls Bros. at Essex. I understand Progil and Bayer have the capability but I do not know if they offer this service generally.

Lacking an incinerator, the use of properly located, properly operated landfills can be considered, consistent with local requirements and with the approval of local authorities.

CONVERSION SCHEDULE

Confirming our telephone conversation of April 28, I was glad to hear you plan to start conversion of your heat transfer system in the near future. It is our understanding you will order a 2000 gallon tmailer of our MCS-681 flush material for charging to your system the weekend of May 6, 1972. In about 1-2 weeks, you will order a 2000 gallon trailer of Therminol[R] 55 for the final system fill. Bulk pricing on these materials is listed as follows:

	MCS-681	Therminol 55
TC/TT, 2000 gallon minimum	$0.825/gal.	$0.825/gal.
F.O.B.	El Dorado, Arkansas	Alvin, Texas

We will also take back bulk shipments of used Therminol FR and flush materials for disposal at our cost:

1. Please arrange for a gasoline or fuel oil trailer to handle the used Therminol FR. The trailer should have heating coils and a 3" quick coupling connection on its rear outlet.
2. The trailer should be filled and leave your plant site on May 7, 1972. Please schedule delivery at our Sauget, Illinois plant at 7-8 a.m. No weekend delivery can be accepted. Monsanto will pay return freight on this fluid.
3. When shipment schedule has been finalized, please contact:
   Mr. Larry Russe, Monsanto Company
   (618) 271-5835, Extension 371
4. Monsanto will clean the trailer at the Sauget, Illinois plant site, however, the trailer should not be put back into food or food-related services.

RECOMMEND DRAIN SINCE DID NOT ORIGINALLY.

~~The first two problem [illegible] in the conversion bulletin which I have enclosed~~ Since you have not drained the system since your original Thermir[illegible] rsic three months ago, I suggest you drain the system, re[illegible] c[illegible] h ne[illegible] eat transfer fluid and add an inert gas blanket to [illegible] ansi[illegible] tank.

MONS 058208

T-55/T-66 NOT PCB
(CONVERSION SITUATION)

I wish to confirm our phone conversation of today stating that Therminol® 55 has not been discontinued. Therminol 55 does not contain polychlorinated biphenyls (PCB's) and, therefore, was not included in the heat transfer fluids that were terminated. Only fluids belonging to the FR series of Therminol products have been cancelled. Therminol 55, in fact, is currently being recommended to our customers as a possible replacement for FR fluids.

I was happy to learn that your single FR system has been successfully converted to Therminol 55. I would like to remind you that, unlike Therminol FR products, Therminol 55 is not fire resistant. Accordingly, you may wish to establish that everything is satisfactory to your insurance carrier, if you have not already done so.

I am sorry that our December 15, 1971 letter confused your management. Please call me (314-694-2514) if I can be of further assistance.

Sincerely,

T-77

Confirming our telephone conversation on March 2 concerning conversion of your Therminol® FR heat transfer system, I have enclosed literature on two possible replacement fluids, Monsanto's Therminol 66 and 77. Therminol 77 has the higher maximum operating temperature (700°F vs. 650°F) and is suggested for your 640°F system in order to provide maximum fluid safety.

We want to point out that unlike the Therminol FR products, Therminol 66 and 77 are not classified as fire resistant heat transfer fluids. Consequently, you should consider the use of protective devices to minimize any added fire risks. We suggest you consult with the insurer of your property relative to this matter. While we have no data concerning insulation fires with Therminol 77, we believe an insulation fire is unlikely because the fluid is very resistant to oxidation. It is not necessary to inert the expension tank in Therminol 77 systems due to this oxidation resistance.

EQUIPMENT LIMITATION

We do not recommend copper or copper alloys for Therminol FR, 55 or 66 service. The copper corrosion rate in Therminol FR service is 9-10 mils/year at 600°F. While Therminols 55 and 66 contain no chlorine, copper is not recommended for these fluids (or other petroleum based fluids) because oxidation/corrosion can occur which may result in accelerated fluid breakdown or copper tube failure.

LEGAL

I have enclosed a package of documents covering legislative and company actions relating to the use of Polychlorinated Biphenyls (PCB's). When you review your plant's PCB situation next week ~~with Cargill's lawyer, Jim Moe,~~ please feel free to consult Monsanto if we can be of further assistance. I suggest you direct questions of a legal nature to our attorney, John F. Stapleton (314-694-2817). Mr. Stapleton is quite familiar with the PCB situation.

MCS - 681 FLUSHING FLUID

As discussed by telephone today we are recommending an alternate to the use of Therminol 55 as a flushing fluid because of a temporary availability problem with T-55.

We are recommending the use of MCS 681 Flushing Fluid which is priced the same as Therminol 55 except that its FOB point is Eldorado, Arkansas. This should be advantageous because it is closer than Alvin, Texas (T-55 FOB point).

MCS 681 can be used for temperatures up to 575°F during the flushing period. Should a small amount of MCS 681 be left in the system after flushing we assure you that it will be compatible with the Therminol 55 used as final fill.

Literature on MCS 681 is enclosed. Please call should you have questions about this material.

[redacted]

OR

Confirming our telephone conversation of last week we wish to include a bulletin describing our MCS 681 heat transfer fluid as an alternate for Therminol 55.

MCS 681 could be used as an emergency top up for your FR-1 system and we are also suggesting it as the flushing fluid because of a temporary availability situation with Therminol 55.

MCS-681

System Clean-Out

When converting your system to Therminol 55 or 66, we suggest you thoroughly drain the Therminol FR. Flush the piping, equipment and expansion tank with MCS-681 or a non-chlorinated solvent and again drain into leak-free drums. If MCS-681 is selected as the flush fluid, it may be advantageous to operate the system several days before draining to loosen and remove system soil.

We normally suggest the use of MCS-681 as the system flushing fluid. MCS-681 is priced identically to Therminol 55 except that its FOB point is ElDoRado, Arkansas. This should be advantageous because it is closer to your plant than Alvin, Texas (Therminol 55 FOB point).

MCS-681 can be used at temperatures up to 575°F during the flushing period. Should a small amount of MCS-681 be left in the system after flushing, we assure you that it will be compatible with Therminol 55 or 66 used as final fill.

Literature on MCS-681 is enclosed. Please call me at (314) 694-2514 should you have questions about this material.

Return of Used Fluids

We ask that you contact one of our Heat Transfer Specialists, (314) 694-2514, when you are ready to return used FR or flush fluid to insure proper disposal of the fluid.

We will pay freight and incineration costs through June, 1972 only on:
- Therminol FR fluids.
- Therminol 55, 66 or MCS-681 used as flush fluid.
- Combustible organic flush fluid when replacement heating fluid is a Therminol product.

In the event you are not converting to a Monsanto product and are using a non-Monsanto flush fluid, we do offer a high temperature incineration service for proper disposal of FR contaminated materials. We will charge you the freight and 3¢/pound incineration cost on the weight of returned flush fluid less the weight of Therminol FR determined by analysis.

We encourage you to use return drums that meet DOT 17E Specification (55 gallon drums, 18 gauge minimum, 2 bung head; 5 gallon drums, 24 gauge minimum) to prevent leakage. The outside of the return drums of Therminol FR and flush fluid should be free of fluid material.

Enclosed are pre-addressed labels marked "disposal only" for drums of used FR and flushing fluid. You will need to clearly indicate the drum contents on each label.

SAFETY & TOXICITY

I have enclosed the safety and toxicity data currently available on Therminols 55 and 66 per your request.

Concerning hazardous Therminol 55 and 66 degradation products, while we have no test data our medical department is not aware of any materials produced by normal fluid degradation that would be injurious to a person's health.

As you will see from the OSHA Data Sheets, we also do not have TLV data on either fluid. At present Monsanto has no plans to generate this data nor has OSHA requested TLV data as yet.

TOXICITY / FDA

Just a note to include up to date toxicity information on Therminol 66 heat transfer fluid as a candidate for your offshore platforms. With the advent of possible FDA action to prevent the spread of PCBs we urge that your Therminol FR systems be converted as soon as possible. Again we suggest that the systems be drained, flushed with a light solvent or Therminol 55 prior to refill with a non-PCB material. We will absorb both the return freight and the disposal cost for both the used Therminol FR as well as the flushing material.

As shown in the toxicity statement Therminol 66 is considered to be practically non-toxic by ingestion in single doses and by single dermal applications based on feeding studies to albino rats and skin tests with albino rabbits.

Limited studies indicate that Therminol 66 undergoes primary biodegradation and that it would not be a persistent aquatic pollutant if small amounts inadvertently entered waterways. Previous studies indicate that "...less than 25% of the fish (trout fry) died within 48 hours in Therminol 66 suspensions containing 100 mg/liter or less...".

Additional studies are now under way regarding both toxicity and biodegradation tests on both Therminol 66 and Therminol 55.

Dear Mr.

In answer to your request of March 2, 1972 for safety and health data on our Therminol® 55 heat transfer fluid, I have enclosed a copy of form No. OSHA-20, Material Safety Data Sheet for this product. I have also enclosed a copy of a toxicity statement for Therminol 55. [illegible]

I hope this data supplies the information you need for your file. If you have any additional questions, please contact me at (314) [illegible] 694-2514. [illegible] have a sheet similar to the U. S. Department of Labor's form [illegible]-4, this will be acceptable.

Sincerely,

MONS 058212

FDA COMPLIANCE

Concerning compliance with this proposed rule of the Food and Drug Administration relating to PCB's which was published in the Federal Register on March 18, 1972, your company may wish to take the following actions:

1. Analyze the replacement heat transfer fluid in a converted system for residual PCB's.
2. Monitor the product from that system, at least on a short-term basis, for PCB contamination.
3. Follow good housekeeping practices in the plant to prevent fluid leakage from the heat transfer system.

I have enclosed a list of private laboratories qualified to analyze various substances for PCB's. This is a token listing of analytical laboratories and is not intended to exclude other equally capable organizations.

We wish to point out that the proposed FDA regulations are presently vague in the following two important areas:

1. The acceptable residual PCB level in a converted system is not clearly defined.
2. The definition of a harmless/non-deleterious replacement fluid for a PCB fluid is not clear.

Individual companies must, for the present at least, analyze their particular situation and arrive at acceptable solutions on these two matters without assistance from specific governmental guidelines.

MONS 058213