National Electrical Manufacturers Association
155 East 44th Street • New York, N.Y. 10017 • 212-682-1500

February 10, 1971

TO THE FOLLOWING SUGGESTED PARTICIPANTS
IN THE PROPOSED ANSI COMMITTEE ON
ASKAREL USED IN ELECTRICAL EQUIPMENT

Messrs: D.E. Allen - Allis-Chalmers
P.G. Benignus - Monsanto
A.O. Hauser - Electrical Utilities Co.
J.F. Kuzela - Sangamo
R.I. Lowe - Dobla Engineering
W.B. Papageorge - Monsanto
E.L. Raab - General Electric
W.C. Reinhardt - Moloney
J.C. Rissinger - Westinghouse
H.R. Rowe - McGraw-Edison

SUBJECT: MEETING NOTICE

Gentlemen:

Confirming my telephone conversation with you gentlemen, a meeting will be held between the hours of 10:00 A.M. - 5:00 P.M., on Tuesday, February 23, 1971, at the O'Hare Inn in Chicago, Ill., in a room to be posted on the bulletin board.

The purpose of the meeting is to review developments since the August 20, 1970 meeting between NEMA and Monsanto representatives and to develop recommendations to ANSI on a suggested program of action, including priorities for various activities, list of organizations to be invited to participate, etc.

As indicated on the telephone, the proposal for the initiation of the ANSI project has just been submitted for final ballot approval by the ANSI Electrical and Electronics Technical Advisory Board (EETAB), which approval is anticipated in about 30 days. Following this, the Secretary will be in a position to contact interested associations and other organizations and, otherwise, initiate the formation of the ANSI Committee.

For the purpose of the discussion at the meeting, reports on the following recent developments will be given.

1. Mr. Benignus will report on work with Enviro and work being done with respect to incinerator equipment with the Rollins-Purle Co.

2. Mr. Raab will report on his attendance at recent IEC meetings on the Askarel problem and later developments within the IEEE and ASTM.

Cont'd- - -

MONS 088403

EXHIBIT A

3. Mr. Papageorge will report on the status of a Massachusetts Bill with respect to PCB's.

For your further information, attached is a list of the chronological steps taken with respect to the initiation of the ANSI Committee and a list of the various associations that ANSI has suggested may be interested in joining this activity.

Sincerely yours,

A. M. Salazar
Executive Secretary
Power Equipment Division

AMS:dk
Att:
CC: J.J. Kark
N. Pisciotta
W.A. McAdams

MONS 088404

EXHIBIT A

CHRONOLOGICAL STEPS WITH RESPECT TO
INITIATION OF AN AMERICAN NATIONAL STANDARDS COMMITTEE ON
ASKAREL USED IN ELECTRICAL EQUIPMENT

1. Mr. R. W. Lewis brought the problem to the attention of the Power Equipment Division's Board of Directors at its June 30, 1970 meeting. The Board appointed the following Committee to prepare recommendations for consideration at the next meeting on September 22, 1970.

W. C. Reinhardt, CHAIRMAN - Moloney
D. E. Allen - Allis-Chalmers
J. F. Kuzela - Sangamo
E. L. Raab - General Electric
J. C. Rissinger - Westinghouse
H. R. Rowe - McGraw-Edison

2. Committee met on August 20, 1970 and prepared the recommendations attached as EXHIBIT "A".

3. EXHIBIT "A" was approved at the September 22, 1970 meeting of the Board.

4. Secretary submitted the proposal for approval at the October 15, 1970 meeting of the NEMA Codes and Standards Committee. A copy of the Secretary's September 28, 1970 memorandum to the C&S Committee is attached as EXHIBIT "B".

5. Proposal submitted to ANSI Headquarters in Mr. J. J. Kark's letter of November 19, 1970, EXHIBIT "C".

6. NEMA proposal reviewed at the December 10, 1971 meeting of the ANSI Executive Standards Board and matter was assigned to the Electrical and Electronics Technical Advisory Board (EETAB), with the Safety Technical Advisory Board (STAB) having secondary jurisdiction.

7. ANSI advised that clarifications with respect to Sponsor(s) and the proposed scope were required for the next step, covered in (8), below. Mr. J. J. Kark provided this information in his letter to ANSI of January 26, 1971, EXHIBIT "D".

8. Submitted on February 5, 1971 for EETAB letter ballot to:

a. Determine the interest of Orgenizations represented on this Board and, simultaneously,

b. Obtain vote on approval to Officially initiate the proposed ANSI Committee.

9. Upon authorization of Mr. W. C. Reinhardt, as Chairman of the NEMA Board Committee, the Secretary distributed copies of EXHIBIT "D" to the suggested list of participants in the ANSI Committee, EXHIBIT "E", and sent a telegram on February 1, 1971, calling a meeting for Tuesday, February 23, 1971.

MONS 088405

EXHIBIT A

10. Upon further review of the lack of possible attendance by the utility, insurance and industrial people listed in EXHIBIT "E" and other recent developments with the Chairman and Messrs. E. L. Raab and P. G. Benignus, the meeting was restricted to the following:

1. Monsanto representatives.

2. Doble Engineering Co., which Organization was orgsnizing another activity on the Askarel problem.

3. NEMA Committee members.

RECOMMENDATIONDS TO THE BOARD OF DIRECTORS
WITH RESPECT TO THE ENVIRONMENTAL PROBLEM
CAUSED BY COMPONENTS OF ASKAREL

Messrs: W. C. Reinhardt - Moloney, CHAIRMAN
D. E. Allan - Allis
J. F. Kuzela - Sangamo
E. L. Raab - General Electric
J. C. Rissinger - Westinghouse
H. R. Rowe - McGraw-Edison

The Committee held a meeting on August 20, 1970, and reviewed the environmental problems caused by components of askarel, pointed out in Mr. R. W. Lewis' letter of July 7, 1970 (EXHIBIT "A"), and unanimously concurred that some industry action must be taken with respect to them.

Key personnel from the Monsanto Company, who were invited to attend the meeting by the Chairman, shared in this view and concurred with the specific recommendations developed at this meeting.

Of considerable concern at the meeting were the following main problems, with respect to measures already taken with respect to this problem:

1. That there are still, unquestionably, a substantial number of users that have not been reached by letters from Monsanto and transformer and capacitor manufacturers and from other publicity sponsored by Monsanto. Means for effectively reaching and educating employees of users of askarel-filled electrical equipment are also essential.

2. That no guidelines are presently foreseen for such important areas as (a) disposal of askarel-soaked waste materials, (b) procedures for unloading and handling askarel and, (c) separation of askarel-soaked waste materials from other wastes.

3. That foreign competitors of Monsanto, which is the sole domestic producer of askarel, must also be taken into account, in order for any program to be truly effective.

RECOMMENDATIONS:

The Committee unanimously recommended that NEMA should join the Monsanto Company in sponsoring the establishment and operation of an American National Standards Committee on Disposal of Askarel Used in Electrical Equipment, with representation from the following groups:

MONS 088407

1. Monsanto and NEMA

CORRECTED ATTACHMENT #1

EXHIBIT A

2. Electric Light and Power
3. IEEE and ASTM
4. Government Power Agencies
5. Industrial Groups, such as General Motors and the Ford Motor Company.
6. Disposal Consultants

It should be the purposes of the American National Stendards Committee to:

1. Develop guides for the use and maintenance of eskarel used in electrical equipment.

2. Develop practical disposal procedures.

3. Provide recommendations to interested International Standards Bodies, such as the IEC and SEGRA.

4. To assume the leadership in the promulgation of guides and procedures and their dissemination among all possible users.

MONS 088408

CORRECTED ATTACHMENT #1

EXHIBIT A

GENERAL ELECTRIC COMPANY

R.W. Lewis
Vice President and Group Executive

July 7, 1970

Mr. A. M. Salazar, Executive Secretary
Power Equipment Division
NEMA
155 East 44th St.
New York, N. Y. 10017

Dear Al:

At the last meeting of the Board of Directors of the Power Equipment Section, I recommended that NEMA take a leadership role in solving the problem of disposition of askarel contaminated materials because it is an industry-wide problem.

The background of this recommendation is that Monsanto, the sole manufacturer of askarels (technically known as polychlorinated biphenyls), notified us, and I presume all other purchsers of askarels, that there was a possibility of environmental contamination due to non-biodegradable materials used in their composition. Monsanto has offered a disposal service for handling scrap liquid askarels but the problem of disposing of askarel soaked materials, such as sawdust, rags, and insulations, has not been solved. It is the latter to which I recommended a NEMA Task Force address itself.

I would appreciate it if you would activate the mechanics for getting such a Task Force appointed as promptly as possible. As I indicated, E. L. Raab, Manager-Chemical and Processes section, Materials and Technology Laboratory, Pittsfield, Massachusetts, would likely be our candidate to serve on the Task Force.

Very truly yours,

R. W. Lewis/S

RWLewis:nt
cc: R. B. Ames
C. J. Meloun

MONS 088409

EXHIBIT "A"

September 28, 1970

MEMORANDUM

TO: H. P. MICHENER

FROM: A. M. SALAZAR

SUBJECT: PROPOSAL THAT NEMA JOIN THE MONSANTO COMPANY IN SPONSORING THE ESTABLISHMENT AND OPERATION OF AN AMERICAN NATIONAL STANDARDS COMMITTEE ON DISPOSAL OF ASKAREL USED IN ELECTRICAL EQUIPMENT

On the recommendations of a Special Committee appointed to investigate problems caused by components of askarel, the Board of Directors unanimously recommended that the C&S Committee should approve the subject. The background and recommended scope for the new Committee is covered in the attached record of developments, so far.

For the C&S Committee's further information, the Monsanto Company reported that the presence of materials identified as polychlorinated biphenyl (PCB) in marine environments was first noted by Professors G. Widmark and S. Jensen of the Institute of Analytical Chemistry, Stockholm, Sweden, and reported in November, 1966. Since then, and with increasing frequency, other investigators have identified PCB in marine and animal life; and its presence has been cited as being harmful to a few specific types of wildlife. In July, 1970, the Food & Drug Administration issued guidelines to its field offices, establishing upper limits of PCB content of 0.2 ppm in milk and 5.0 ppm in food. Milk or food exceeding these limits is subject to confiscation.

The Monsanto Company has already taken steps to limit the availability of askarel to those uses where the fluid is essential and is contained in a closed system, such as is the case for transformers and capacitors. With the cooperation of transformer and capacitor manufacturers, steps have also been taken to alert all known users on the problem and on corrective measures. Monsanto has also instituted a means for disposing of bulk fluids and means for idsposing of askarel-soaked waste materials, coils, insulation scrap, discarded capacitors, etc., are currently being investigated.

Due to the obvious urgency of getting this activity on the way, as soon as possible, your cooperation is requested in submitting this mattsr, by letter ballot, rather than waiting for the Officers' next meeting. Monsanto has agreed to take the lead in this effort on the basis that a NEMA Staff Secretary will serve the Committee.

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EXHIBIT A

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National Electrical Manufacturers Association
155 East 44th Street • New York, N.Y. 10017 • 212 682 1500

November 19, 1970

File: 11.00

Mr. Donald L. Peyton
Managing Director
American National Standards Institute
1430 Broadway
New York, N. Y. 10018

Subject: (Proposed) American National Standards Committee
On Disposal of Askarel Used In Electrical Equipment

Dear Mr. Peyton:

NEMA, upon recommendation by the Board of Directors of the Power Equipment Division, respectfully recommends that subject Proposed Standards Committee be established by the ANSI.

It is further recommended that NEMA and Monsanto Company be designated as Co-Secretariats of this new ANSI project, with NEMA as the Administrative Secretariat.

These recommendations are concurred in by the Monsanto Company.

The purpose of the Proposed Standards Committee will be to:

1 - Develop guides for the use and maintenance of askarel used in electrical equipment.

2 - Develop practical disposal procedures.

3 - Provide recommendations to interested international standards bodies such as the IEC and CIGRE.

4 - To assume the leadership in the promulgation of guides and procedures, and their dissemination among all possible users.

Representation on the Proposed Standards Committee would be invited from all organizations considered to have substantial concern and would include:

MONS 088411

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Monsanto has also agreed to Chair the Organisation meeting and provide a Chairman for the ANSI Committee, if appointed.

It is recommended that the entire Board Committee listed in the attachment be invited to attend the Organization meeting, at which a smaller NEMA representation could more appropriate be recommended. Mr. E. L. Raab is Chairman of a Working Group of the IEEE Transformers Committee, which is developing Guide information for the care and maintenance of askarel-filled transformers. He is also Chairman of a similar ASTM activity and Mr. W. C. Reinhardt is a member of both of these Groups.

Monsanto and the members of the Board Committee can provide names of people to contact from the following Groups, that either have already been involved in this matter, so far, or would otherwise be the most qualified:

1. Utilities
2. Government Power Agencies
3. Industrial Groups, such as GM and Ford
4. Disposal Consultants

Carbon copies of this memorandum have been sent to Messrs. Reinhardt, Chairman of the Board Committee and P. G. Benignus and W. B. Papageorge of Monsanto, to alert them on the possible need for their help with respect to the above matters.

CC: W.C. Reinhardt
P.G. Benignus
W.B. Papageorge
J.P. Miller
H.N. Muller
B.H. Falk
W.C. Pelster
J.J. Kark

MONS 088412

EXHIBIT A

9.

a) NEMA
b) Monsanto Company
c) Electric Light and Power Group
d) IEEE
e) ASTM
f) Government Power Agencies
g) Industrial Group; e.g. General Motors Corp., Ford Motor Company
h) Disposal Consultants

The Monsanto Company, manufacturer of askarels (technically known as polychlorinated biphenyls), has notified purchasers of askarels that there was a possibility of anvironmental contamination due to non-biodegradable materials used in their composition. The Monsanto Company has already taken steps to limit the availability of askarel to those uses where the fluid is essential and is contained in a closed system, such as is the case for transformers and capacitors. With the cooperation of transformer and capacitor manufacturers, steps have been taken to alert all known users on the problem and on corrective measures. Monsanto has also instituted a means for disposing of bulk fluid,and means are currently being investigated for disposing of askarel-soaked waste materials, coils, insulation, scrap, discarded capacitors, etc.

At a NEMA committee meeting held earlier this year, with key personnel of the Monsanto Company present by invitation, considerable concern was expressed on the following with respect to measures already taken on the askarel problem:

1 - That there are still, unquestionably, a substantial number of users that have not been reached by letters from Monsanto and transformer and capacitor manufacturers and from other publicity sponsored by Monsanto. Means for effectively reaching and educating employees of users of askarel-filled electrical equipment are also essential.

2 - That no guidelines are presently foreseen for such important areas as (a) disposal of askarel-soaked waste materials, (b) procedures for unloading and handling askarel and, (c) separation of askarel-soaked waste materials from other wastes.

3 - That foreign competitors of Monsanto, which is the sole domestic producer of askarel, must also be taken into account, in order for any program to be truly effective.

MONS 088413

//

EXHIBIT

Accordingly, the Monsanto Company and NEMA offer to assume leadership roles in an ANSI project aimed at solving the problem of disposition of askarel contaminated materials, and urge early consideration by ANSI of the recommendations set forth herein.

Very truly yours,

J. J. Kark
Engineering and Safety
Regulations Department

JJK:de

cc: C. A. Parris - SCP
A. M. Salazar - Div. 8
P. G. Benignus - Monsanto Co.
W. B. Papageorge - Monsanto Co.
W. C. Reinhardt - Moloney Electric Co.

National Electrical Manufacturers Association
155 East 44th Street • New York, N.Y. 10017 • 212-682-1500

January 26, 1971

File: 11.00

Mr. Donald L. Peyton
Managing Director
American National Standards Institute
1430 Broadway
New York, N. Y. 10018

Subject: (Proposed) American National Standards Committee On Disposal of Askarel Used In Electrical Equipment

Dear Mr. Peyton:

This is further to my November 19, 1970 letter submitting a NEMA recommendation proposing establishment of subject new American National Standards Committee.

It was originally proposed that NEMA and the Monsanto Company be designated as Co-secretariats with NEMA as the Administrative Secretariat. More recent consideration in that regard by NEMA and the Monsanto Company indicates that no practical necessity exists for Co-secretariats. Therefore, NEMA now proposes that it be designated as sole Secretariat.

At this time, NEMA also wishes to submit for consideration a proposed initial scope for this activity to read as follows:

> "Procedures and guides for the safe use, maintenance and disposal of askarel and askarel-soaked materials used in electrical equipment."

For your information, in anticipation of formal approval of this new ANSI project, NEMA will call an early February 1971 conference of all concerned principals to lay the groundwork, outline a program of action, recommend list of organizations to be invited to participate, etc.

Very truly yours,

J. J. Kark
Engineering and Safety
Regulations Department

JJK:de

cc: C. A. Parris, SCP - M.A.Pisciotta, ANSI
A. M. Salazar, Div. 8
P. G. Benignus, Monsanto Co.
W. B. Papageorge, Monsanto Co.
W. A. McAdams, General Electric Co.
W. C. Reinhardt, Moloney Electric Co.

MONS 088415

EXHIBIT A

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PCB Pollution
Proposed ANSI Committee
Suggested Composition

11/18/70

Jack Scaggs
Commonwealth Edison
1319 So. 1st Ave.
Maywood, Ill.

Jack Scaggs

R. I. Lowe, Pres.
Doble Engineering Co.
P.O. Box 105
Belmont, Mass.

L. E. Smith
TVA
916 Ednez Bldg.
Chattanooga, Tenn. 37401

R. H. Kershaw
Consolidated Edison
4 Irving Place
New York, New York

D. A. Gillies
Bonneville Power
P.O. Box 491
Vancouver, Washington

Howard B. Margolis
American Electric Power
Service Corp
2 Broadway
NYC, NY 10004
212-422-4800

A.O. Hauser
Electrical Utilities Co
2427 St. Vincent Ave
La Salle, Ill. 6130
(815) 223-1732

Frank Doran - Chf. Elec. Eng.
Ford Motor Co.
Assembly Plants Division
17,000 Oakwood - Allen Park
Detroit, Michigan
LO 5-7000, Ex. 324

Geo. F. Langohr - Elec. Eng.
Johns Manville - Research & Eng. Center
P.O. Box 159
Manville, N. J. (201) Randolph 2-9000

Bureau of Reclamation
Building 67, Denver Federal Center
Denver, Colorado 80225
John E. Skuderna, Chf. Maintenance Eng. Branch (303) 233-3611
Fred Geyer

Mutual Boiler & Machinery Ins. Co.
225 Wyman St.
Waltham 54, Mass.
W.A. Weddendorf, Mgr. Tech. Service

MONS 088416

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EXHIBIT 1

Factory Insurance Assoc.
85 Woodland Ave.
Hartford, Conn.
Mr. Geo. Wade

A. M. Salazar
NEMA
155 E. 44th St.
New York, New York 10017
(212) 682-1500

W. C. Reinhardt
Moloney Electric
5390 Bircher Blvd.
St. Louis, Mo.
(314) EV 3-3300

E. L. Raab
General Electric
Transformer Div.
100 Woodlawn Ave.
Pittsfield, Mass.
(413) 443-3511

J. F. Kuzela
Sangamo Electric
1301 N. Illinois St.
Springfield, Ill.
(217) 544-6411

J. C. Rissinger
Westinghouse Electric
469 Sharpsville Ave.
Sharon, Pa.
(412) 981-1611

H. R. Rowe
Mc Graw E dison
2700 So. Ninth St.
South Milwaukee, Wisc.
(414) 762-1200

D. E. Allen
Allis Chalmers
Columbus & Preble Ave. N.W.
Pittsburgh, Pa.
(412) 322-4400

W. B. Papageorge
Monsanto Co.
800 N. Lindbergh
St. Louis, Mo. 63166
(314) OX 4-4051

MONS 088417

EXHIBIT A

P. G. Benignus
Monsanto Co.
800 N. Lindbergh
St. Louis, Mo. 63166
(314) Ox 4-2513

SUGGESTED LIST OF NATIONAL GROUPS AND GOVERNMENT AGENCIES
THAT MAY BE INTERESTED IN PARTICIPATING IN THE
PROPOSED ANSI COMMITTEE ON ASKAREL
USED IN ELECTRICAL EQUIPMENT

AFL-CIO
Air Transport Association
American Industrial Hygiene Association
American Institute of Chemical Engineers
American Insurance Association
American Medical Association
American Mutual Insurance Alliance
American Petroleum Institute
American Society for Testing and Materials
Association of American Railroads
Automobile Manufacturers Association Inc.
Electric Light and Power Groups (EEI & AEIC)
Government Groups
- Corps of Engineers
- Environmental Protection Agency
- General Services Administration
- HEW Public Health Service - FDA
- Department of Interior
  - Bonneville Power Agency
  - Bureau of Reclamation
  - Water Resrouces Scientific Information Center
- National Bureau of Standards
- Tennessee Valley Authority
- Rural Electrification Administration

International Association for Pollution Control
Institute of Electrical and Electronic Engineers
Insulated Power Cable Engineers Association
Manufacturing Chemists Association
National Fire Protection Association
Underwriter Laboratories
Water Pollution Control Federation

MONS 088419

EXHIBIT

State of Massachusetts

HOUSE . . . . . NO. 3635

By Mr. Aldas of Acton, petition of John A. S. McGlennon for legislation to prohibit the discharge of any chemical solution containing poly-chlorinated biphenyls into the environment. Natural Resources and Agriculture.

The Commonwealth of Massachusetts

In the Year One Thousand Nine Hundred and Seventy-One.

AN ACT PROHIBITING THE DISCHARGE OF ANY CHEMICAL SOLUTION CONTAINING POLY-CHLORINATED BI-PHENYLS INTO THE ENVIRONMENT.

Be it enacted by the Senate and House of Representatives in General Court assembled, and by the authority of the same, as follows:

Chapter 94D of the General Laws is hereby amended by inserting after section 21C the following section: –

Section 21D. Whoever discharges into the environment any chemical solution containing poly-chlorinated bi-phenyls shall, for a first offense, be punished by a fine of not less than fifty nor more than two hundred dollars; and, for a second or subsequent offense, by a fine of not less than two hundred nor more than one thousand dollars or by imprisonment for not more than ninety days, or both.

MONS 088420

EXHIBIT B

Subject: CIGRE
STUDY COMMITTEE NO. 15
WORKING GROUP WG/02
"ASKARELS"

Pittsfield, Mass.
May 5, 1970

Mr. E. H. Reynolds
BICC Central Research & Engineering Division
38 Wood Lane, London W12, England

Dear Josh:

This is a somewhat belated reply to your letter dated March 16 concerning the agenda items for your forthcoming working group meeting. The third paragraph of your letter evidences some interest over the increasing concern with reference to waste askarel, its disposal and that of askarel containing electrical equipment.

This subject is rightly one for consideration by your group. As a basis for your group's discussion, I am attaching two items which have recently become available generally in the United States; (1) a copy of a letter received by aroclor purchasers from the Monsanto Company dated February 18, and (2) a copy of a recent statement incorporated in the minutes of the IEEE Transformers Committee on April 15, 1970.

In addition to the above, I'm sure you are aware of the activities of IEC Subcommittee 10B from the issued minutes.

Best wishes.

Very truly yours,

E. L. Raab, Manager
Chemical & Processes Section

ELR:ml

Attc. (2)

MONS 088421

EXHIBIT C

International Electrotechnical Commission
Technical Committee No. 10; Liquid and Gaseous Dielectrics
Subcommittee 10B: Insulating Liquids Other Than Hydrocarbon Oils

Meetings of October 12-14, 1970 in Brussels

Agenda - Item 5 - To review current concern with the finding of polychlorinated biphenyls in some environments and what action should be taken in recommending precautions in the application, processing and effluent disposal of askarels to prevent them becoming environmental contaminations.

Minutes of October 1970 Meeting of SC 10B

The Chairman briefly discussed the current concern with the finding of polychlorinated diphenyla in some environments and what action should be taken in recommending precautions in the application, processing and effluent disposal of askarels to prevent them from becoming environmental contaminations. Copies of IEEE and ASTM documents on this subject were circulated by the U.S. Delegation. A French Delegate circulated copies of a publication from Prodelac (French producer of askarels). The Subcommittee recommended that appropriate statements should appear in the Part I askarel document on "General Considerations" and in Part IV, the "Maintenance Guide", when drafts of these documents are prepared.

Minutes of TC 10: Liquid and Gaseous Dielectrics - October 17, 1970

Problem of pollution by askarels - Subcommittee 10B had discussed the problem caused by chlorinated diphenyls and the precautions to be taken to prevent such pollution. Various documents (IEEE, ASTM, Prodelac) had been circulated. It had been recommended that individual considerations should be mentioned in the drafts to be prepared for unused askarels (Part One: General Considerations and Part Four: Maintenance Guide)

Agenda - Subcommittee 10B - For Meeting of June 12-14, 1971

Item 7 - To discuss any further developments on the problem of environmental pollution by askarels.

MONS 088422

EXHIBIT "D"

LECTURE GIVEN BY MR. A. JAY OF THE PYRALENE CO. AT A UNIVERSITY IN SWITZERLAND IN 1972

P.C.B. - USES IN ASKAREL FOR ELECTRICAL INDUSTRY

The name Askarel from the Greek "which does not burn", covers various dielectric fluids based on chlorinated diphenyls.

These liquids are at the present moment very largely used by the heavy electrical industry in the manufacture of transformer and capacitors.

We will now study the compounds and mixtures used in one and the other of these applications giving some details of their use.

We will finish this lecture by studying to what degree the heavy electrical industries may contribute to the chlorinated diphenyl pollution of the natural environment.

I - Use of chlorinated diphenyls in the capacitors -

The chlorinated diphenyls are use as impregnating liquids for capacitors made of paper or plastic film. Their role consists in replacing the air in the porosity of the windings.

For this application, the trichlorodiphenyl is used mainly and this product contains on average three atoms of chlorine substituted on each molecule of diphenyl.

The chlorinated diphenyls were first used in nineteen thirty in the United States and now appear irreplaceable for this application.

MONS 088423

EXHIBIT E

In effect, no other polar liquid having similar or neighbouring properties has yet been discovered to this time.

The capacitors are located either in square boxes of welded steel or in round or oval cans in aluminium.

In any case, the container must be water-tight, without which the humidity would penetrate into the apparatus and cause it to fail in use.

On the inside, the windings in paper, plastic film and aluminium are squeezed one against the other this taking up almost all of the space available.

After impregnation and filling of the rest of the empty space by the impregnating fluid, the water-tightness of the apparatus is effected by soldering.

2- Use of chlorinated diphenyls for transformers -

In this case, the Askarels are used as dielectric and cooling fluids.

The winding and the magnetic circuits of the transformers are in effect completely immerged in a water-tight tank.

In this instance, the main caracteristic of the Askarel is its property of non-flammability.

An Askarel transformer will not burn, nor explode in the case of an internal short circuit.

To this effect, mixtures of chlorinated diphenyls and chlorinated benzenes are employed. The mixture the most used being a blend of trichlorobenzenes (forty per cent) and hexa-chlorinated diphenyls sixty percent).

Contrary to the chlorinated diphenyls for capacitors, for which the technical performance are such that they are the only fluid used, the Askarels used in transformers compete in the same market with mineral oils. Economical and safety reasons guide the choice of the end-user.

Every time that it is necessary to set up a transformer in a public place (departmental store, theatre, cinema, etc..),in other words, when the fire risk must be contained, the choice nearly always falls on Askarel.

The Askarel transformer is likewise chosen when the end-user does not wish to be obliged to periodically verify the state of the dielectric fluid, as is the case for mineral oil transformers.

In effect, the Askarels used for transformers, like those for capacitors, are caracterized by a high chemical stability.

Contained in water-tight metallic recipients, Askarels will last as long as the transformer.

Accidents caused by short-circuits in the interior of the transformer are the exception, an exception which we will talk about in a few minutes.

It should be interesting for the present conference to discuss the use of Askarel in Sweden.

To the best of our knowledge the only dielectric market is the capacitor market.

Sweden possesses, as you probably already know, one of the biggest constructors of power capacitors in Europe : Liljeholmens Kabel Fabrik.

Like the other manufacturers of capacitors in the world, this company uses trichlorodiphenyl, which Prodelec supplies under the name of Pyrelene 1499.

As far as we know, the use of Askarel for transformers in Sweden is low.

We have seen that the main part of the Swedish consumption of Askarel concerns trichlorinated diphenyls.

This statement might be found surprising when one considers that it is especially the penta, hexa, and hepta chlorinated diphenyls which have been found in Sweden's natural surrounding.

At this point, it is advisable to recall that this lecture is limited to the dielectric applications of chlorinated diphenyls because Prodelec is only concerned with these applications.

EXHIBIT E

The fact that the trichlorinated diphenyls are not found in the natural environment may be explained as follows :

- they are exclusively used by the capacitor industry and hence hermetically closed from outside contact.

The dielectrical quality necessitates on the part of the manufacturer very special treatment and cares. The Askarels are, therefore, expensive products and any losses, if there are any, are always reduced to a bare minimum for obvious economical reasons.

Last of all, they are used by a small number of very large companies, having -and this is particularly true for Sweden - a very pronounced sense of their moral responsability concerning pollution, as you will be able to notice shortly.

This being said, we must consider if it is possible to eliminate any pollution due to the use of chlorinated diphenyls in the electrical industry.

This leads us to look out for and to fix the possible sources of pollution.

1°- Case of transformers :

The manufacturer delivers the main part of its Askarel production for transformers to a very limited number of end-users. The deliveries are made mainly by road tankers or rail tankers which are used only for the transportation of Askarels.

...

EXHIBIT E

The contamination risks by impurities, which are likely to spoil the dielectric qualities of the Askarel, force the manufacturer to use closed tankers for his deliveries, these tankers never being used to transport any other material. Because of this, there is no systematic pollution risk due to packing or transport.

For those small quantities delivered in drums, the high fluidity of the product greatly limits any traces that may rest on the inside of the drums.

During the manufacture of the transformer, there is no loss whatsoever.

Let us now examine the case of those transformers, which after working for some time, have for various reasons broken down.

The Askarel is contaminated by the decomposition products resulting from an electric arc : carbon and hydrochloric acid. It cannot be reused without regeneration before hand.

It is important to note that regenerating treatment is nearly always possible.

Without having exactly the same characteristics as a new material, the regenerated Askarel for transformers offers the same garanties for use.

The only case for which regeneration is impossible is that when an Askarel is accidentally contaminated by mineral oil.

In effect, mineral oil cannot be separated from Askarels. Bearing in mind that a litter of transformer Askarel is generally speaking five times more expensive than mineral oil, the owner of a transformer has obviously every economic interest to obtain, either from the manufacturer, or from a specialized company, the reclamation of his contaminated Askarel.

For this reason, we have regenerated marge quantities of Pyralene for transformers in our factory.

The small fraction left unclaimed id burnt in our factory in a plant specially adapted for the disposal of liquid wadte by combustion.

For this purpose, the Askarels are mixted with other liquid flammable wastes in such a way that the mixture has a calorific value greater than five thousand Kilocalories per Kilo - this value being determined previously in the laboratory. The temperature of the mixture of the combustion gases is raised up to eight hundred degrees centigrade. We have verified that these gases do not contain any trace of chlorinated diphenyls. But on the other hand, they do contain hydrochloric acid, the product of decomposition by pyrolysis.

The combustion gases are washed and then neutralized. In conclusion, for the case of Askarels in transformers, the end-users are pushed for technical and economical reasons to avoid any form of disposal of this material in the environment.

2°- Case of the capacitor industry :

It is useful to remember that this industry has, on first sight, no responsability for the pollution presently observed, since the trichlorodiphenyl which it uses, is not found in nature.

Nethertheless, some trichlorinated diphenyls, even limited to small quantities, might be dumped in the environment if certain measures and precautions are not taken.

The pollution risks begin with the delivery which is still carried out quite often by non-returnable drums. Only the biggest end-users, like Liljeholmens in Sweden, are supplied with containers.

These containers are used for this purpose over and over again between the producing factory and that of the end user. This form of transport in container should become more general in future.

This should be all the more easy, since the contamination risks of the dielectric fluid from the inside walls of packing are eliminated in this way.

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EXHIBIT E

Then we have to consider the waste when the capacitor itself is made.

The recipients containing the windings are filled under vacuum, either individually by way of an appropriate canalization, or by immersion of the apparatus in the impregnant.

During this operation the Askarel has, however, lost some of its dielectric properties. It must, therefore, either be returned to the Askarel manufacturer for reclaiming, as some of our customers do, or be regenerated at the factory by circulation of the Askarel in columns containing adsorbing earth. Periodically, the packing of these columns must be changed. The capacitor manufacturer then has to dispose of this earth, wetted with trichlorinated diphenyls.

At the present time, this is generally carried out by dry-tipping. Although this solution is not probably the best, it is, however, more efficient than, it would appear due to the very low solubility or trichlorinated diphenyls in water.

As a last possible source of pollution, we have those capacitors which breakdown either in the factory during the dielectric testing or during their working period.

These capacitors must be opened, the little amount of free impregnating fluid that they contain, collected and stored in drums to be returned for destruction at the producing factory.

Liljeholmens does this by returning to us at his own cost the waste material from the impregnating fluid and pays for the destruction of that which cannot be reclaimed.

This practice can and must be generalised in the years to come, bearing in mind the limited number of producers.

As far as the elements left from the brokendown capacitors are concerned, they may be ripped apart by a special machine and burnt in a rotating kiln, adapted to burn solid wastes. Such kilns can likewise be used to destroy the adsorbing earth, thus offering a definite solution to this problem.

We have now seen that the chlorinated diphenyls used by the electrical industry are contained in closed systems and that the losses, during the manufacturing and use cycles, have always been low in the past and can still be reduced in the future to insignificant values.

Last of all, since the discovery of highly-chlorinated diphenyls in the environment, the companies in question are organizing themselves in such a way that, the part which cannot be regenerated is systematically destroyed by pyrolysis.

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EXHIBIT

April 15, 1970

The new questionnaire authorized by the Transformers Committee was approved in its final form for circulation. This questionnaire will attempt to update information in the appendix of the oil guide on user maintenance practices. Hopefully a new revision of the oil guide will incorporate a new, more modern appendix and the necessary information in Section III being prepared by Al Locke.

A subcommittee letter ballot was held on "Specifications For New, Unused Transformer Type Askarels". A number of negative votes were obtained pointing out certain deficiencies and required editorial changes. These will be made and a new ballot taken.

The Insulating Fluids Subcommittee spent considerable time discussing some recent evidence indicating that certain askarel types might become environmental contaminants if handled carelessly. As a result of this discussion and in view of the increasing public concern with all matters concerned with environmental matters, the Insulating Fluids Subcommittee requests that the following statement be recorded in the minutes.

> "We (the Insulating Fluids Subcommittee of the IEEE Transformers Committee) feel that the users of electrical equipment containing askarel should be aware of a notification received by the manufacturers of such apparatus from the Monsanto Company. This notification was dated February 18, 1970 and evidenced some concern that certain askarel types might become environmental contaminants if handled carelessly. In part, the Monsanto letter states:
>
> 'Recently several newspaper and magazine articles have been published indicating that Polychlorinated Biphenyls (PCB's) have been discovered at some points in some marine, aquatic and wildlife environments. The quantities detected are said to be in the parts per million and parts per billion category.
>
> 'It is claimed that the PCB's found strongly resemble chlorinated biphenyls containing 54% and 60% chlorine by weight. Products which are sold by Monsanto under the trade names of Aroclor 1254 and 1260 do contain chlorinated biphenyls.
>
> 'As your supplier of Aroclor 1254 and 1260 and formulated products containing 1254, we wish to alert you to the potential problem of environmental contamination as referred to in the newspaper and magazine articles.
>
> 'We feel that all possible care should be taken in the application, processing and effluent disposal of these products to prevent them becoming environmental contaminants.
>
> ' As a user of askarel-filled electrical equipment, we feel that in the unusual event of leaks or equipment repair necessitating replacement of the fluid, that all possible care should be taken to prevent these products from finding their way into the waterways.' "

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(1) EXHIBIT F

Mr. Raab commented that the Monsanto products under discussion are not only used in making askarel, but are also sold for many other applications such as heat transfer agents, plasticizers, green paints, etc. Therefore the Monsanto Company intends to withdraw the product from applications which are uncontrollable.

Mr. Alexander asked how askarel should be disposed of when it reaches the end of its useful life. Mr. Raab explained that a tentative arrangement has been made with the Monsanto Company for them to store the askarel at the users' expense until it can be destroyed at 1100°C in a stainless steel incinerator using scrubbers. The tentative fee is 3 cents per pound plus shipping charges to be paid for by the user.

Mr. Margolis asked what the harmful effects were. Mr. Raab indicated an answer would be extremely complicated but briefly it affected the biological chain similarly to persistent insecticides (DDT, etc.) As a result species of birds and fishes are mortally affected. At this time it is not thought to have danger to human life.

3.5 Audible Sound Subcommittee - E.H.Wendt

Mr. Wendt reported that this subcommittee met at 9:00 A.M. on Tuesday, April 14, 1970 at the Motel.

Eleven members were present or represented and seven guests.

The guests were:

R.H.Hollister	Westinghouse, South Boston, Va.
M.J.Maier	New Orleans Public Service
L.J.Savio	Con Edison, New York
N.J.Melton	Duke Power Co., Charlotte, N.C.
R.A.Olson	Long Island Lighting Co., Hicksville, N.Y.
L.W.Long	Duke Power Co., Charlotte, N.C.
A.E.Stevens	Standard Transformer Co., Warren, Ohio.

The minutes of the Toronto Meeting were accepted as written.

The main item on the agenda was discussion of "Audible Sound Levels and Tests, Proposed Changes to C57.21 ANSI Terminology and Test Code for Shunt Reactors". This was presented by Mr. Specht, Chairman of the Working Group on Technical Investigations.

The first part of the discussion centered on a table of sound levels based on transformers of equivalent size with the thought that the sound level of reactors would be about 8 decibels higher than the equivalent size transformer. It was finally the consensus of the subcommittee that enough reference data had not been established to assign definite levels for reactors. It was also questioned whether ANSI would be agreeable to the establishment of sound levels for reactors.

The method of measurement was discussed at considerable length. It was agreed that more distinction should be given to dry type and oil filled reactors.

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old; (2) for a comprehensive paper to be given at the 1971 Electrical Insulation Conference with subsequent issuance either as a CP or transactions IEEE paper. The Subcommittee also feels an obligation to issue some kind of report to those participating in the industry survey. This could be covered by a paper at the proposed 1971 Electrical Insulation Conference (co-sponsored by NEMA and IEEE) Mr. Hetherington said this procedure was acceptable.

A third draft of Section III, "Evaluation of Oil for Use in Filling Apparatus at the Installation Site and After Filling Such Apparatus" of the "Guide for Acceptance and Maintenance of Insulating Oil in Equipment" as submitted by A.H.Locke was thoroughly reviewed by the subcommittee and a number of changes recommended. It is hoped that a fourth draft will be acceptable for a letter ballot of the Subcommittee. Coordination with the West Coast Subcommittee is being obtained through L.A.Kenoyer, who is a member of both groups."

Mr. Raab noted the last Guide was issued in 1969 and that Headquarters would probably not be able to include this new work for several years in a new appendix. Mr. Raab feels that this is an important subject since it deals with receiving, handling, processing and hold periods after field filling. He suggested an interim report should be issued so as to get it into users hands. Mr. Hetherington stated this was the proper procedure and should be followed.

Mr. H.Fischer asked about coordination with the West Coast Subcommittee. Mr. Raab stated that there was coordination. His Subcommittee is dealing with oil characteristics vs the mechanics of filling in the field now covered by the West Coast Subcommittee. Len Kenoyer is on both Subcommittees and can coordinate the activities.

"Considerable progress has been made in a proposed guide for "Detection and Determination of Generated Gases in Oil-Immersed Transformers and their Relation to the Serviceability of the Equipment". A second draft of the "Introduction" section covering general information, objectives, etc. was revised slightly and now appears acceptable. A complete bibliography section has been accepted. It is expected that the other four sections covering (1) the calibration and use of field instruments for detecting and estimating the amount of combustible gases in gas blankets or gas collection devices; (2) the procedures for obtaining samples of gas and gases dissolved in oil for laboratory analysis; (3) laboratory methods for analyzing the gas from gas blankets and gases dissolved in the oil; (4) the interpretation of gas analysis results in terms of transformer serviceability will be ready prior to our next meeting so that a first draft of this guide can be assembled for circulation to the Subcommittee members.

Considerable discussion took place covering developments since our April, 1970 meeting on the Askarel environmental situation. Contrary to rumors the Monsanto Co., the sole U.S. supplier of Aroclors used to formulate Askarels, will continue to supply these materials to the eletrical industry. Monsanto will, however, discontinue by the end of 1970, the sale of Aroclors for application as plasticizers, heat transfer agents, hydraulic fluids and other

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EXHIBIT G

Non-electrical applications. Of interest, is that NEMA is working with ANSI to form an ANSI Committee consisting of electrical equipment manufacturers, the MonsantoCo., capacitor and transformer utility and industrial users, governmental agencies and commercial disposal companies. In part, the charge to this committee will be to (a) disseminate appropriate information to manufacturers and users of Askarel and Askarel-filled electrical equipment; (b) to attempt to influence other world-wide organizations such as IEC and CIGRE to adopt similar practices to those being instituted in the U.S.; (c) to develop or cause to be developed suitable disposal procedures for scrap Askarel and Askarel impregnated insulation, etc; and (d) to issue a recommended practice for the handling of Askarel, Askarel-filled equipment, scrap Askarel, failed equipment, etc. so that the Askarel will not become an contaminant."

Following Mr. Raab's report, Mr. Margolis asked if Monsanto is phasing out Askerals. Mr. Raab's answer was, "no". He clarified Monsanto's position which is to continue to supply electrical insulating fluids but the Electrical Industry must police the usage and make a safe disposal of waste fluids and Askarel soaked insulation. Arrangements can be made with Monsanto on a fee basis to dispose of waste Askarels. There is still the problem of disposing with insulating materials impregnated with Askarels. N.E.M.A. recommends that this problem should be referred to a select A.N.S.I. Committee composed of representatives from N.E.M.A., Monsanto, and one or more major industrial users, one or more utility companies, one or more commercial disposal companies and one or more major Governmental Utilities. This is in the process of formation at the present time. Major objectives will be dissemination of information, to bring international pressure for control, to formulate proper disposal and to issue a guide on proper practices to be followed.

Mr. Leo Savio asked if the bibliography on Gas Detection was now available. Mr. Raab said he will try to respond to individual requests for this information. Mr. Dind has done a beautiful job in organizing the bibliography.

Mr. Bellaschi asked if gas analyses can give an interpretation of the electrical trouble. Mr. Raab said it is not yet that exact a science but will now give indication of places to look for the electrical insulation problem. It will not tell how much damage has been done.

Mr. Honey asked that the Subcommittee see if hot spots generated during factory heat run tests could be detected by gas analyses. Mr. Hetherington directed the request to Bob Veitch, whose Task Force is working on the problem. Mr. Veitch said the Task Force is recommending that analyses be performed on oil before, during, and following a heat run. This will detect serious difficulty. The report has been issued to Mr. McMillen and it will require more work following comments by the Subcommittee.

Mr. Raab's report was concluded at 10:30 AM and Mr. Hetherington adjourned the meeting for a 15 minute coffee and stretch break.

Note: Additional papers are attached to the minutes from the Insulating Fluids Seminar held in New Orleans. Mr. Raab's paper was distributed with the last minutes.

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EXHIBIT G

MINUTES #33
Sept 11, 1970

307. Subcommittee B requested the following action for Committee D-27.

a) A D-27 letter ballot to approve the inclusion of a type E transformer askarel in A.S.T.M. D-2283.

b) It was requested that the following statement from Monsanto Chemical Company be printed in the D-27 minutes:

We (the members of Section II - D27.02.02 being concerned with askarels) feel that the members of Subcommittee B and Committee D-27 should be aware of a notification from the Monsanto Company received by the manufacturers of electrical apparatus using askarels. This notification was dated February 18, 1970 and evidenced some concern that certain askarel types might become environmental contaminants if handled carelessly. In part, the Monsanto letter states:-

"Recently several newspaper and magazine articles have been published indicating that Polychlorinated Biphenyls (PCB's) have been discovered at some points in some marine, acquatic and wildlife environments. The quantities detected are said to be in the parts per million and parts per billion category.

"It is claimed that the PCB's found strongly resemble chlorinated biphenyls containing 54% and 60% chlorine by weight. Products which are sold by Monsanto under the trade names of Aroclor 1254 and 1260 do contain chlorinated biphenyls.

"As your supplier of Aroclor 1254 and 1260 and formulated products containing 1254, we wish to alert you to the potential problem of environmental contamination as referred to in the newspaper and magazine articles.

"We feel that all possible care should be taken in the application, processing and effluent disposal of these products to prevent them becoming environmental contaminants."

As a manufacturer or user of askarel-filled electrical equipment, we feel that in the unusual event of leaks or equipment repair necessitating replacement of the fluid, that all possible care should be taken to prevent these products from finding their way into the environment.

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E. L. Raab

June 19, 1970

EXHIBIT H