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April 11, 1979

To: Potential Dow Witnesses at EPA Hearing

I have enclosed for your information a copy of Dow's Direct Evidence Submission and EPA's witness list. The Hearing Panel's order required us to list exhibits and, therefore, we have tried to list exhibits for many of you even though we did not yet have draft testimony and references from you.

As many of you who have worked before on trials or hearings know, at times developments in hearing preparation suggest the need to limit witnesses or reorient testimony. As you review the enclosed Dow witness list, you will note some areas of overlap. We plan to be in touch with each of you individually in the near future to work out more specifically the areas that you will cover so as to minimize duplication of effort. As you review the enclosed list, many of you will recognize the names of your colleagues and you may have suggestions as to which areas you can best cover. We will welcome any thoughts that you have in that regard.

Unfortunately, the tight time limits that we are operating under will not allow us to coordinate as closely on these matters as we would like. Dow and, we at Kirkland & Ellis, appreciate your willingness to testify, and we will do everything possible to facilitate the preparation of your written and oral testimony with a minimum burden on you.

Sincerely,

L. Mark Wine

LMW:djd

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

In re Emergency Suspension Orders for 2,4,5-T and Silvex	)	FIFRA Docket Nos. 409, 410

THE DOW CHEMICAL COMPANY'S
DIRECT EVIDENCE SUBMISSION

Edward W. Warren
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Counsel for The
Dow Chemical Company

Of Counsel:

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2030 Dow Center
Midland, Michigan 48640

April 10, 1979

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

In re Emergency Suspension Orders for 2,4,5-T and Silvex	)	FIFRA Docket Nos. 409, 410

THE DOW CHEMICAL COMPANY'S
DIRECT EVIDENCE SUBMISSION

Pursuant to the Hearing Panel's order of April 4, 1979, The Dow Chemical Company hereby submits its list of direct evidence, including witnesses and exhibits, and requests for oral direct testimony. In this memorandum we make some general observations concerning the attached witness and exhibit lists and the hearing schedule. Attached as Appendix A to this memorandum is a list of Dow's witnesses and exhibits. Attached as Appendix B is Dow's request for oral direct testimony.

In submitting this list of witnesses and exhibits, Dow makes full disclosure of its present hearing plans to the best of its ability. Those plans necessarily will evolve, and Dow will apprise the Panel of changes in Dow's list of witnesses and exhibits.

One reason that our present plans are tentative is that we still have no idea of the witnesses agency counsel will present. Accordingly, we cannot make final plans concerning our own witnesses.

In addition, agency counsel have raised a number of new allegations in the rebuttal comments filed Wednesday, April 4. The extent of some of these additional claims could not be evaluated until receipt of the supporting reference list and exhibit copies, which were delivered to counsel for Dow on April 6 and 7 respectively. Although we have added some witnesses to our list in response to these new allegations, there may be a need to add additional witnesses as we investigate these claims. On the other hand, Dow anticipates that it may be possible to remove some witnesses from the list, but it expects that most of the listed witnesses will testify.

The tentativeness of our witness list has made the task of listing exhibits even more difficult, and hence our exhibit list is less complete than our list of witnesses. Again, Dow has provided the most complete listing possible at this time. Indeed, because of the press of time, some exhibits have been listed tentatively even though Dow has been unable to confer with the witness regarding exhibits.*/ As a result, some exhibits will be deleted and others added as hearing preparation progresses.

Hearing Time

Dow also wishes to comment on the Panel's allocation of hearing time to the parties.

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*/ Moreover, some exhibits (e.g., Alsea II), will be referred to by more than one witness, but Dow has not repeated such exhibits in all cases.

The Panel has allotted only 22 days of hearing time to be divided among the parties, and has reserved five full days for witnesses that the Panel may wish to call. Dow seriously doubts that the 22 hearing days is sufficient for the parties' presentation of evidence and cross-examination. Dow also believes that five days for the Panel's witnesses is probably much more time than is necessary. Adversary proceedings are based on the assumption that both sides will effectively present evidence necessary for the decisionmaker to arrive at a fully informed, reasonable conclusion. The Panel should not lightly conclude that one or both parties are substantially incapable of fulfilling this responsibility. Instead of allowing a full week of hearing time for its own witnesses, the Panel should, at most, limit itself to two days and should reserve several days for rebuttal testimony.

We calculate that the Panel could hear testimony through Tuesday, June 5 and still reserve adequate time for post-hearing briefing and other actions. This practice could be accomplished in accordance with existing EPA regulations, as follows:*/

Tuesday, June 5	-	Hearing Concludes
Monday, June 11	-	Parties' Proposed Findings, Conclusions and Briefs Filed (40 C.F.R. § 164.121(j)(1)).
Wednesday, June 13	-	Hearing Panel's Recommended Decision Issues (40 C.F.R. § 164.121(j)(2)).

*/ Dow recognizes that this suggested schedule does not precisely follow existing EPA regulations, but it believes that the schedule is workable.

Friday, June 15	-	Panel Submits Recommended Decision and Record to Administrator (40 C.F.R. § 164.121(j)(3)).
Monday, June 18	-	Parties' Briefs to Administrator (40 C.F.R. § 164.121(j)(4)).
Friday, June 22	-	Administrator's Decision Issues (40 C.F.R. § 164.122).

Dow believes it will be exceedingly difficult to schedule all of the necessary testimony, both on direct and cross-examination, in the 22 days allotted by the Panel. Accordingly, Dow suggests that the Panel provide additional hearing days by further restricting the time reserved for its own witnesses and permitting testimony to be concluded on June 5.

Respectfully submitted,

Edward W. Warren
L. Mark Wine
John S. Hahn

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Of Counsel:

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Midland, Michigan 48640

April 10, 1979

APPENDIX A

The Dow Chemical Company's Witness and Exhibit List
For EPA Suspension Hearing on 2,4,5-T and Silvex

Risk Witnesses

1. Norman Akesson, Ph.D.
   P.O. Box 2044
   El Necara, CA 95618

   Dr. Akesson may testify concerning application methods and drift control, including as applicable to Alsea II.

2. R.D. Bovey
   Research Leader, Brush Control
   Research Group
   U.S. Department of Agriculture
   Texam A&M University
   College Station, Texas

   Mr. Bovey, Group Leader of the Assessment Team for range and pasture, may testify concerning the environmental fate of 2,4,5-T and silvex in pasture use.

3. Werner H. Braun
   Dow Chemical, U.S.A.
   1803 Building
   Midland, MI 48640

   Mr. Braun may testify on estimates of exposure of the general population to 2,4,5-T, silvex and TCDD.

Exhibits

Ramsey, J.C., T.L. Lavy and W.H. Braun, "Exposure of Forest Workers to 2,4,5-T: Calculated Dose Levels," Submitted to EPA by Dow Chemical (1979) (ARI R-61).*/

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*/ "ARI R-__" or "B-__" refer to documents already in the Administrative Record Index. "EPA RPAR ___" refers to documents cited by EPA in the April 21, 1978 Rebuttable Presumption Against Registration for 2,4,5-T, 43 Fed. Reg. 17116. "Dow RPAR ___" refers to documents cited in the "Response of Dow Chemical, U.S.A. to Notice of RPAR and Continued Registration of Pesticide Products Containing 2,4,5-T," filed with EPA on August 4, 1978.

Sauerholf, M.W., W.H. Braun, G.E. Blau and P.J. Gehring, "The Dose-Dependent Pharmacokinetic Profile of 2,4,5-T following Intravenous Administration in Rats," Tox. Appl. Pharmacol. 36 at 491-501 (1976).

Young, J.D., J.C. Ramsey and W.H. Braun, "Pharmacokinetics of 2,4,5-T PGBE Ester Applied Dermally to Rats," The Dow Chemical Co. (manuscript in preparation, 1979).

4. Donald Crosby, Ph.D.
Department of Environmental Toxicology
University of California, Davis
Sacramento, CA 95817

Anthony Wong, Ph.D.
California Analytical Laboratories, Inc.
401 North 16th Street
Sacramento, CA 95814

Dr. Crosby and/or Dr. Wong may testify concerning their research showing that TCDD degrades rapidly in sunlight in the presence of hydrogen donors. They may also cover pesticide chemistry and metabolism.

Exhibits

Crosby, D.G., "The Photodecomposition of Pesticides in Water," Adv. Chem. Ser. 111 at 173-88 (1972).

Crosby, D.G., and Ming-Yu Li, "Herbicide Photodecomposition," in Degradation of Herbicides, edited by P.C. Kearny and D.D. Kaufman, Dekker, NY at 321-63 (1969).

Crosby, D.G., and A.S. Wong, "Environmental Degradation of 2,3,7,8-Tetrachlorodibenzo-p-Dioxin (TCDD)," Science 195 at 1337-38 (1977).

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Crosby, D.G., "Conquering the Monster - the Photochemical Destruction of Chlorodioxins," presented at 174th Nat'l ACS Meeting, Chicago (unpublished 1977) (ARI R-80).

Crosby, D.G., "The Environmental Chemistry of Herbicides," Chapter 6 in Pesticide Chemistry in the 20th Century, edited by J.R. Plimmer, ACS Symposium Series 37, Washington, D.C. at 93-108 (1977) (Dow RPAR 94).

Crosby, D.G., and A.S. Wong, "Photochemical Generation of Chlorinated Dioxins," Chemosphere (1976).

Crosby, D.G., K.W. Moilanen and A.S. Wong, "Environmental generation and degradation of dibenzodioxins and dibenzofurans," in Environmental Health Perspectives, Experimental Issue No. 5, at 259, U.S. Dept. of Health, Education and Welfare, Public Health Service, National Institutes of Health, Publication No. (NIH) 74-218 (Sept. 1973).

Plimmer, J.R., U. Klingebeil, D.G. Crosby, and A.S. Wong, "Photochemistry of Dibenzo-p-Dioxins," in Chlorodioxins - Origin and Fate, edited by Etcyl H. Blair, Advances in Chemistry Series No. 120, American Chemical Society, Washington, D.C. (1973).

Wong, A.S., and D.G. Crosby, "Decontamination of 2,3,7,8-Tetrachlorodibenzo-p-Dioxin (TCDD) by Photochemical Action," Proceedings of TCDD Workshop at Milan, Italy. Published by Spectum Publications, Inc., Jamaica, N.Y. (October, 1976).

5. Philip D. Darney, M.D.
Director of Reproductive Health
Associate Professor of Obstetrics and Gynecology
University of Oregon School of Medicine
3181 Sam Jackson Road
Portland, Oregon

Dr. Darney may testify on the medical aspects of Alsea II.

6. Fred Decker, Ph.D.
Oregon State University
Atmospheric Sciences Dept.
Ag. Hall - Room 328
Corvallis, OR 97331

Dr. Decker may testify on Alsea and non-Alsea exposure.

7. Thomas Downs, Ph.D.
The University of Texas
Health Science Center at Houston,
School of Public Health
P.O. Box 20186
Houston, TX 77025

Dr. Downs may testify on the statistical aspects of Alsea II.

8. Perry J. Gehring, D.V.M., Ph.D.
Dow Chemical, U.S.A.
1803 Building
Midland, MI 48640

Dr. Gehring, one of the country's foremost toxicologists, may testify on a number of subjects, including Alsea II, animal data regarding carcinogenicity, teratogenicity and fetotoxicity, human metabolism, Seveso, other government reports and investigations, and other subjects.

Exhibits

Allen, J. R., D. A Barsotti, J. P. Van Miller, L. J. Abrahamson and J. J. Lalich, "Morphological Changes in Monkeys Consuming a Diet Containing Low-Levels of 2,3,7,8-Tetrachlorodibenzo-p-Dioxin," Fd. Cosmet. Toxicol. 15 at 401-410 (1977) (ARI R-36).

Australia, National Health and Medical Research Council, "Re-examination of 2,4,5-T" (March 26, 1979).

Australia, Victoria Ministry of Health, "Report of the Consultative Council on Congenital Abnormalities in the Yarram District" (Deptember 26, 1978) (ARI R-37).

Axelson O., L. Sundell, "Herbicide Exposure, Mortality and Tumor Incidence. An epidemiological investigation on Swedish railroad workers." Work-Environ-Hlt 11:21-28, (1974).

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Collins, T. F. X. and C. H. Williams, "Teratogenic Studies with 2,4,5-T and 2,4-D in the Hamster," Bull Environ. Contam. Toxicol. 6(6) at 559-567 (1971) (ARI R-14).

Courtney, K. D. and J. A. Moore, "Teratology Studies with 2,4,5-Trichlorophenoxyacetic Acid and 2,3,7,8-Tetrachlorodibenzo-p-Dixon," Toxicol. Appl. Pharmacol. 20 at 396-403 (1971)(ARI R-2).

Dougherty, W. H., F. Coulston and L. Goldberg, "The Evaluation of the Teratogenic Effects of 2,4,5-Tricholorophenoxyacetic Acid in the Rhesus Monkey," Environ. Qual. & Safety 5 at 89-96 (1976)(Dow RPAR 35).

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EPA, "Report of Assessment of a Field Investigation of Six Year Spontaneous Abortion Rates in Three Oregon Areas in Relation to Forest 2,4,5-T Spray Practices" (February 28, 1979) (ARI R-49) (Alsea II).

Frohbert, H., "Investigations on the Embroyotoxic Effect of 2,4,5-T in NMRI Mice," Naunyn Schmiedeberg's Arch. Pharamacol. 282 at R.22 (abstract)(1974) (Dow RPAR 38).

Gehring, P.J., C.G., Kramer, B.A., Schwetz, J.O., Rose, and V.K. Rowe, "The Fate of 2,4,5-Trichlorophenoxyacetic Acid (2,4,5-T) Following Oral Administration to Man," Toxicol. Appl. Pharmacol. 26 at 352-361 (1973).

Green, H.G., C.J. Nelson, D.W. Gaylor and J.F. Holson, Jr., "Developmental Toxicity of 2,4,5-T: Retrospective Study of the Relationship Between Agricultural Use of 2,4,5-T and Cleft Palate Occurrence in Arkansas," NCTR, HEW (unpublished).

Hall, S. M., "Effects on Pregnant Rats and Their Progeny of Adequate or Low Protein Diets Containing 2,4,5-T or p, p'-DDT," Fed. Proc. 31(2) (1972) (Dow RPAR 40).

Hart, E. R. and M. G. Valerio, "Teratogenic Effects of 2,4,5-T in Mice," Toxicol. Appl. Pharmacol. 22 at 317 (Abstract) (1972) (Dow RPAR 41).

Khera, K. S. and W. P. McKinley, "Pre- and Postnatal Studies on 2,4,5-Trichlorophenoxyacetic Acid, 2,4-Dichlorophenoxyacetic Acid and Their Derivatives in Rats," Toxicol. Appl. Pharmacol. 22 at 14-28 (1972) (ARI R-101).

Khera, K. S. and J. A. Ruddick, "Polychlorodibenzo-p-Dioxins: Perinatal Effects and the Dominant Lethal Test to Wistar Rats," in Chlorodioxins -- Origins and Fate, edited by E. H. Blair, Advances in Chemistry Series, No. 120, Am. Chem. Soc., Washington, D.C. (1973) (ARI R-5).

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McNulty, Wilbur P., "Preliminary Laboratory Results of Spontaneous Abortions in Primates," Letter to Federal Register Section (July 27, 1978) (ARI R-39).

Neubert, D. and I. Dillmann, "Embryotoxic Effects in Mice Treated with 2,4,5-T and TCDD," Arch. Pharmacol. Exp. Pathol. 272 at 243-264 (1972) (ARI R-3).

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Sokolik, I. Yu, "Effect of 2,4,5-T and its Butyl Ester on Embryogenesis of Rats," Bull. Exp. Biol. Med. 76(7) at 831-833 (1973) (ARI R-102).

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Stotzer, H. and A. Niggerschulze, (C. H. Boehringer Sokn Ingelheim am Rhein) private communication (December 10, 1970) (Dow RPAR 42).

Turner, D.J., "The Safety of the Herbicides 2,4-D and 2,4,5-T," Agricultural Research Council Weed Research Organization, London (1977).

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Wilson, J. G., "Abnormalities of Intrauterine Development in Non-Human Primates," Symposium on the Use of Non-Human Primates for Research on Problems of Human Reproduction, Sukhumi, U.S.S.R. (December 13-17, 1971) (Dow RPAR 34).

Wilson, J. G., Chairman, "Report of the Advisory Committee on 2,4,5-T to the Administrator of the Environmental Protection Agency" (submitted May 7, 1971) (EPA RPAR 48).

See also references of Prof. Tuchmann-Duplessis.

9. Milton E. Getzendaner, Ph.D.
Dow Chemical, U.S.A.
9008 Building
Midland, MI 48640

David J. Jensen, Ph.D
Dow Chemical, U.S.A.
9001 Building
Midland, MI 48640

Dr. Getzendaner and/or Dr. Jensen may testify about the environmental fate and presence of 2,4,5-T, silvex and TCDD.

Exhibits

Aitom, J. D. and J. F. Stritzke, "Degradation of Dicamba, Picloram and Four Phenoxy Herbicides in Soil," Weed Sci. 21 at 556-60 (1973).

Bailey, G. W., J. D. Pope and D. R. Cochrane, "The Degradation Kinetics, and Persistence of Silvex Under Impound Conditions." Weed Sci. Soc. Am. Abst. 1968 Meeting at 43.

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Getzendaner, M. E., "A Residue Study of Silvex in Fish Living in Kuron Containing Water," Dow Chemical Co. GH-490 (March 26, 1960).

Jensen, D. J., R. A. Hummel, N. H. Mahle, C. W. Kocher, "A Residue Study on Beef Cattle Consuming 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)," Unpublished. The Dow Chemical Company (1978) (Confidential) (Dow RPAR 7).

Jensen, D. J., R. A. Hummel, H. S. Higgins, L. Lamparski, E. Madrid, "A Residue Study on Sheep Consuming 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)," Unpublished. The Dow Chemical Company (1978) (Confidential) (Dow RPAR 8).

Jensen, D. J., R. A. Hummel, H. S. Higgins, L. Lamparski, E. T. Madrid, "Secretion of TCDD in Milk and Cream Following the Feeding of TCDD to Lactating Dairy Cows," Unpublished. The Dow Chemical Company. (1978) (Confidential) (Dow RPAR 9).

Jensen, D. J., R. A. Hummel, H. S. Higgins, E. Madrid, L. Shadoff, J. Turley, "Analysis for TCDD Residues in Rice Grain from Retail Stores and from Fields Treated with 2,4,5-T," Unpublished. The Dow Chemical Company. (1978) (Confidential) (Dow RPAR 10).

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Whitney, E. W., and E. O. Gangstad, "Silvex Residues in Aquatic Fauna. Aquatic Plant Control Program Technical Report 5 Aquatic-use Pattern for Silvex," U.S. Army Engineer Waterways Expt. Sta., Vicksburg, MS (Oct. 1973).

Wiese, A. F. and R. G. Davis, "Herbicide Movement in Soil with Various Amounts of Water," Weeds 12(2) at 101-2 (1964).

10. Ray Harbison
Department of Pharmacology
Vanderbilt University Medical Center
Nashville, TN 37232

Dr. Harbison may testify on fetotoxicity and teratogenicity.

11. Benjamin Holder, M.D.
Corporate Medical Director
Dow Chemical, U.S.A.
2030 Building
Midland, MI 48640

Dr. Holder may testify on Alsea and the epidemiology of Dow workers and others.

Exhibits

Ott, M.G., B.B. Holder, and R.D. Olson, "A Longevity Survey of Employees Exposed to 2,4,5-T," The Dow Chemical Co. (Confidential) (Dow RPAR 28).

Poland, A.P., D. Smith, G. Metler, and P. Possick, "A Health Survey of Workers in a 2,4-D and 2,4,5-T Plant," Arch. Environ. Health, 22 at 316-327 (1971) (EPA RPAR 93).

12. Cecil B. Jacobson, M.D.
The Reproductive Genetic
Center, Ltd.
8320 Old Court House Road
Suite 503
Vienna, VA 22180

Dr. Jacobson may testify on the reproductive epidemiology of Alsea II.

13. Hyland R. Johns
Asplundh
Blair Mill Road
Willow Grove, PA 19090

Mr. Johns may testify on application methods for 2,4,5-T.

14. Richard Jones, Ph.D.
Dept. of Biometrics
University of Colorado
Medical Center
Box 119
4200 E. 9th Avenue
Denver, CO 80262

Dr. Jones may testify about the statistical aspects of the Alsea II study.

Exhibits

See also references of Dr. Lamm.

15. Richard J. Kociba, D.V.M., Ph.D.
Dow Chemical, U.S.A.
1803 Building
Midland, MI 48640

Dr. Kociba may testify concerning the claimed carcinogenicity of 2,4,5-T, silvex and TCDD, including appropriate laboratory protocols and actual test results.

Exhibits

Axelson, O. and L. Sundell, "Herbicide Exposure, Mortality and Tumor Incidence: An Epidemiological Investigation on Swedish Railroad Workers," Arch. Environ. Health. 11 at 21-28 (1974).

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Berry, D.L., T.J. Slaga, J. DiGiovanni, M.R. Juchau, "Studies with Chlorinated Dibenzo-p-Dioxins, Polybrominated Biphenyls and Polychlorinated Biphenyls in a Two-Stage System of Mouse Skin Tumorigenesis: Potent Anti-Carcinogenic Effects," abstract presented at New York Academy of Sciences, Science Week: The Scientific Basis for the Public Control of Environmental Health Hazards (June 21-30, 1978) (ARI R-51).

Bionetics Research Laboratories, "Evaluation of Carcinogenic, Teratogenic and Mutagenic Activities of Selected Pesticides and Industrial Chemicals," Report No. NCI-DCCP-CG-1973-1-1 (August 1968).

DiGiovanni, J., A. Viaje, D.L. Berry, T.J. Slaga, and M.R. Juchau, "Tumor-Initiating Ability of TCDD and Arochlor 1254 in the Two-Stage System of Mouse Skin Carcinogenesis," Environ. Contam. Toxicol. 18(5) at 552-57 (1977) (Dow RPAR 21).

Fears, T.R., R.E. Tasone, and K.C. Chee, "Error Rates for Carcinogenicity Screens," Advisory Center Toxicology, National Cancer Institute, Bethesda, Md. (October 5, 1976) (Dow RPAR 15).

Gart, J.J., Letter to the Editor, Br. J. Cancer 31 at 696-97 (1975).

Gehring, P.J. and J.E. Betso, "Phenoxy Acids: Effects and Fate in Mammals," in Chlorinated Phenoxy Acids and Their Dioxins, Ecological bulletin No. 27 at 122 (1978).

Hardell, L., "Malignant Mesenchymal Tumors and Exposure to Phenoxy Acids -- A Clinical Observations," (abstract, translated from Swedish) Lakartidningen 74 at 2753-54 (1977) (EPA RPAR 108).

Hardell, L., and A. Sandstrom, "Case-Control Study-Malignant Mesenchymal Soft Tissue Tumor and Exposure to Phenoxy Acids or Chlorophenols," (Translated from Swedish) Lakartidningen 75 (40 (1978).

Holmes, P.A., J.H. Rust, W.R. Richter and A.M. Shefner, "Long Term Effects of TCC and HCDD in Mice and Rats," abstract presented at New York Academy of Sciences, Science Week: The Scientific Basis for the Public Control of Environmental Health Hazards (June 21-30, 1978) (ARI R-51).

Innes, J.R.M. et al., "Bioassay of Pesticides and Industrial Chemicals for Tumorigenicity in Mice: A Preliminary Note," J. Nat. Cancer Inst. 47 at 1101-1014 (1969) (ARI R-22).

Kociba, R.J. et al., "Results of a Two-year Chronic Toxicity and Oncogenicity Study of 2,3,7,8-Tetrachlorodibenzo-p-Dioxin in Rats," Toxico and Appl. Pharmac. 46 at 279-303 (1978) (ARI R-30).

Kociba, R.J. et al., "Results of a Two-year Chronic Toxicity and Oncogenic Study of Rats Ingesting Diets Containing 2,4,5-Trichlorophenoxyacetic Acid (2,4,5-T)," in press Fd. Cosmetic. Toxicol. (1979) (confidential) (ARI R-25).

Kociba, R.J., D.J., Keyes, G.C. Jersey, J.J. Ballard, D.A. Dittenber, J.F. Quast, C.E. Wade, C.G. Humiston, and B.A. Schwetz," Results of a Two-Year Study with Hexachlorobutadiene in Rats," Am. Ind. Hyg. Assoc. J. 38 at 589 (1977).

Leuschner, F., et al., Chronic Oral Toxicity of 2,4,5-T in a Reproduction Study Covering Three Generations of Sprague-Dawley Rats," Unpublished data of Celamerck GmbH Co., KG D-6507 Ingelheimam Rhein (May 2, 1978) (Confidential) (Dow RPAR 45).

Moore, J.A., Chairman, et al., "Long-Term Hazards of Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans," Joint NIEHS/IARC Working Group Report, IARC Internal Technical Report No. 78/001 (June 1978) (ARI R-19).

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Muranyi-Kovacs, I., G. Ruadai and J. Imbert, "Bioassay of 2,4,5-Trichlorophenoxyacetic Acid for Carcinogenicity in Mice," Br. J. Cancer, 33 at 626-633 (1976) (ARI R-23).

Muranyi-Kovacs, I., G. Rudali and J. Imbert, "Study on the Carcinogencity of 2,4,5-T in Mice," Abstract of presentation as Fourth Meeting of the European Assoc. Cancer Res. University of Lyon (September 13-15, 1977) (ARI R-24).

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Ott, M.G., B.B. Holder, and R.D. Olson, "A Longevity Survey of Employees Exposed to 2,4,5-T," The Dow Chemical Co. (Confidential) (Dow RPAR 28).

Peto, R., "Guidelines on the Analysis of Tumor Rates and Death Rates in Experimental Animals," Br. J. Cancer 29 at 101 (1974).

Prejean, J.D., J.C. Peckman, A.E. Cosey, D.P. Griswold, E.K. Weisburger and J.H. Weisburger, "Spontaneous Tumors in Sprague-Dawley Rats and Swiss Mice," Cancer Res. 32 at 2768 (1973).

Riihimaki, V., S. Asp. A.M. Seppalainen and S. Hernberg, "Symptomatology, Morbidity and Mortality Experience of Chlorinated Phenoxyacid Herbicide (2,4-D; 2,4,5-T) Spayers in Finland: A Clinical and Epidemiological Study." Working paper from IARC Longterm Hazards of Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans (1978) (ARI R-19).

Sher, S.P. "Mammary Tumors in Control Rats: Literature Tabulation," Toxicol. Appl. Pharmacol. 22 at 562-588. (1972) (Dow RPAR 18).

Spencer, H.W. and W. Woodrow, "TADP Review at University of Wisconsin, TCDD in Rats," EPA Memorandum to D. Reisa and H. Warnick (February 8, 1979) (ARI R-32).

Tung, T.T., "Primary Cancer of the Liver in Vietnam," (translated from French) Chirurgie 99(7) at 427 (July 1973) (ARI R-91).

Van Miller, J.P., J.J. Lalich and J.R. Allen, "Increased Incidence of Neoplasms in Rats Exposed to Low Levels of 2,4,7,8-Tetrachlorodibenzo-p-Dioxin," Chemosphere 9 at 537-544 (1977) (ARI R-31).

World Health Organization, "Environmental Health Criteria for TCDD," IARC, Lyon, France at 42 (1978).

16. Steven H. Lamm, M.D.
Tabershaw Occupational
Medicine Associates
6110 Executive Boulevard
Suite 740
Rockville, MD 20852

Dr. Lamm is an epidemiologist who may testify concerning the epidemiological aspects of Alsea II, and other epidemiology.

Exhibits

Colorado Epidemiologic Pesticide Studies Center, "Forest Spray - Miscarriage Investigation, Alsea, Oregon: Questionnaire and Study Plan," Keefe Deposition Exhibit 5, Draft (November 7, 1978).

Colorado Epidemiologic Pesticide Studies Center, "Protocol for Second Phase of Spontaneous Abortion Study" (October 1978).

Colorado State, "Investigation of Six-Year Spontaneous Abortion Rates in Three Oregon Areas in Relation to 2,4,5-T Spray Areas," Draft (December 15, 1978).

Duncan Deposition 4, Handwritten Table of Spontaneous Abortions, 1972-1977, transmitted to Dr. Duncan (February 1979).

Duncan, R.C., "Exploratory Analysis of Data in and Collected for the Draft Report "Investigation of Six-Year Spontaneous Abortion Rates in Three Oregon Areas in Relation to 2,4,5-T Spray Areas'" (February 1, 1979).

Duncan, R.C., "Further Analysis of Oregon/2,4,5-T Data" (February 8, 1979).

EPA, "Forest Spray-Miscarriage Investigation, Alsea, Oregon: Questionnaire Evaluation and Study Plan" (1978) (ARI R-42) (Alsea I, revised).

EPA, "Report of Assessment of a Field Investigation of Six Year Spontaneous Abortion Rates in Three Oregon Areas in Relation to Forest 2,4,5-T Spray Practices" (February 28, 1979) (ARI R-49) (Alsea II).

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Heath Exhibit 7. "Shopping List" of Barton (EPA) (February 6, 1979).

Keefe-Savage Deposition Exhibit 4, note to Savage re Alsea Study (October 31, 1978).

Keefe-Savage Deposition Exhibit 39, "Request from EPA: Post-Questionnaire: Alsea, Oregon Miscarriage Investigation" (undated).

Watson, M., Letter to John and Debbie Marano (August 15, 1977).

17. Nathan Mantel
George Washington University
Washington, D.C. 20052

Mr. Mantel may testify on the statistical aspects of Alsea II.

Exhibit

Mantel, N., "An Evaluation of the Statistical Methods Used in EPA's 'Report of Assessment of a Field Investigation of Six-Year Spontaneous Abortion Rates in Three Oregon Areas in Relation to Forest 2,4,5-T Spray Practices" (1979).

18. Donald Morehouse
Dow Chemical, U.S.A.
834 Building
Midland, MI 48640

Mr. Morehouse may testify generally concerning the production of 2,4,5-T and silvex, with emphasis on the control of TCDD contamination, and may present historical data concerning the amount of TCDD in Dow products. Mr. Morehouse may discuss the current TCDD content of Dow products.

Exhibits

Tables showing TCDD content of Dow products.

19. Michael Newton, Ph.D.
Dept. of Forest Science,
School of Forestry
Oregon State University
Corvallis, OR 97331

Dr. Newton may testify on the conditions affecting potential human exposure in the Alsea area, other aspects of exposure and the fate and behavior of the herbicides in the environment.

Exhibits

Newton, M., "Dermal Exposure of Humans to 2,4,5-T," Submitted to U.S. Environmental Protection Agency in Response to RPAR of 2,4,5-T, Oregon State University, Corvallis (1978).

Newton, M., Project Director, "Silvicultural Chemicals and Protection of Water Quality," Oregon State Univ. School of Forestry, EPA 910/9-77-036 (June 1977).

Newton, M. and L.A. Norris, "Herbicide Residues in Blacktail Deer from Forests Treated with 2,4,5-T and Atrazine," Proc. Western Weed Control Conference, Boise at 32-34 (1968).

Newton, M., "Environmental Impact of 'Agent Orange' Used in Reforestation Tests in Western Oregon," Abstract 144, Meeting of Weed Sci. Soc. Am., Washington, D.C. (1975) (Dow RPAR 99).

Newton, M. and L.A. Norris, "Evaluating Short- and Long-Term Effects of Herbicides on Nontarget Forest and Range Biota," Down to Earth 32(3) at 18-26 (1976).

Newton, M. and S.P. Snyder, "Exposure of Forest Herbivores to TCDD in Areas Sprayed With 2,4,5-T," (unpublished, 1978) (RPAR Rebuttal Comment #2625[30000/26]).

20. Kenneth R. Niswander, M.D.
University of California, Davis
Department of Obstetrics and Gynecology,
School of Medicine
Professional Building
4301 X Street
Sacramento, CA 95817

Dr. Niswander may testify on the medical aspects of the Alsea II study.

Exhibits

See also references of Dr. Lamm.

21. Logan Norris, Ph.D.
Pacific Northwest Forest and
Range Experiment Station
Corvallis, Oregon 97330

Dr. Norris may testify on degradation of 2,4,5-T and TCDD in forests, the uses of herbicides in forests and the activities of the 2,4,5-T Assessment Team.

Exhibits

Norris, L.A., "Chemical Brush Control and Herbicide Residues in the Forest Environment," Symposium Proceedings: Herbicides and Vegetation Management in Forests, Ranges and Noncrop Lands, Oregon State University (1967).

Norris, L.A., "Toxicity of 2,3,7,8-Tetrachlorodibenzo-p-dioxin in Aquatic Organisms," Environ. Health Perspectives 5 at 177-86 (1973).

Norris, L.A., "Degradation of Herbicides on the Forest Floor," in Tree Growth and Forest Soils, edited by C.T. Youngberg and C.B. Davey, Oregon State University Press (1970).

Norris, L.A., "Chemical Brush Control: Assessing the Hazard," J. of Forestry 69(10) at 715-20 (1971).

Norris, L.A., "Physiological and Biochemical Bases of Herbicide Selectivity," Herbicides and Vegetation Management Symposium Proceedings, University of Oregon at 52-59 (1967).

Norris, L.A. and J. Pierovich, "Thermal Conversion of 2,4,5-T to TCDD: Analysis of the Problem," in Final Environmental Statement - Vegetation Management with Herbicides, USDA Forest Service Pacific Northwest Region, USDA-FS-R6-FES (Adm) 75-18 (revised) (1977) (Dow RPAR 150).

Tarrant, R.F. and L.A. Norris, "Residues of Herbicides and Diesel Oil Carriers in Forest Waters: A Review," reprinted from Symposium Proceedings: Herbicides and Vegetation Management in Forests, Ranges and Noncrop Lands, Oregon State University (1967).

U.S.F.S., "Vegetation Management With Herbicides," Volume I of Final Environmental Impact Statement for Pacific Northwest Region (1978).

22. Colin N. Park, Ph.D.
Dow Chemical, U.S.A.
1707 Building
Midland, MI 48640

Dr. Park may testify concerning biostatistical aspects of Alsea II and carcinogenic risk estimation.

Exhibits

Albert, R.E., et al., "Rationale Developed by the EPA for the Assessment of Carcinogenic Risks," J. Natl. Cancer Inst. 58(5) at 1537-1541 (1977).

Cornfield, J., "Carcinogenic Risk Estimation," Science, 198 at 693-699 (1977).

Kociba, R. J., D. G. Keyes, J. E. Beyer, R. M. Carreon, C. E. Wade, D. A. Dittenber, R. P. Kalnins, L. E. Frauson, C. N. Park, S. D. Barnard, R. A. Hummel and C. G. Humiston, "Results of a Two Year Chronic Toxicity and Oncogenicity Study of 2,3,7,8-Tetrachlorodibenzo-p-Dioxin in Rats," Toxicol. Appl. Pharm., 46 at 279-303 (1978) (ARI R-30).

Mantel, N. and W. R. Bryan, "Safety Testing of Carcinogenic Agents," J. Nat. Cancer. Inst., 27 at 455-470 (1961).

Rall, D. P., "Difficulties in Extrapolating the Results of Toxicity Studies in Laboratory Animals to Man," Environm. Res., 2 at 360-367 (1969).

Ramsey, J. C., T. L. Lavy and W. H. Braun, "Exposure of Forest Workers to 2,4,5-T: Calculated Dose Levels," Submitted to EPA as part of Dow's response to RPAR Proceedings (1979) (ARI R-61).

Ramsey, J. C., C. N. Park, M. G. Ott and P. J. Gehring, "Carcinogenic Risk Assessment: Ethylene Dibromide," Toxicol. Appl. Pharmacol., (In Press).

23. John C. Ramsey, Ph.D.
Dow Chemical, U.S.A.
1803 Building
Midland, MI 48640

Dr. Ramsey may testify about the pharmacokinetics of 2,4,5-T and silvex and human exposure.

Exhibits

Gehring, P. J., C. G. Kramer, B. A. Schwetz, J. Q. Rose and V. K. Rowe, "The Fate of 2,4,5-Trichlorophenoxyacetic Acid (2,4,5-T) Following Oral Administration to Man," Toxicol. Appl. Pharmacol. 26 at 352-361 (1973) (EPA RPAR 74).

Kociba, R. J. et al., "Results of a Two-Year Chronic Toxicity and Oncogenicity Study of 2,3,7,8-Tetrachlorodibenzo-p-Dioxin (TCDD) in Rats," Toxicol. and Applied Pharm. 46 at 279-303 (1978) (ARI R-30).

Lavy, T. L., "Realistic Evaluation of Human Exposure from Application of 2,4,5-T Sprays," Submitted to U.S. Environmental Protection Agency in Response to the Rebuttable Presumption Against Registration of 2,4,5-T, The Dow Company, Midland, Michigan (1978).

Newton, M., "Dermal Exposure of Humans to 2,4,5-T," Submitted to U.S. Environmental Protection Agency in Response to the Rebuttable Presumption Against Registration of 2,4,5-T, Oregon State University, Corvallis (1978).

Piper, W. N., J. A. Rose, M. L. Leng and P. J. Gehring, "The Fate of 2,4,5-Trichlorophenoxyacetic Acid (2,4,5-T) Following Oral Administration to Rats and Dogs," Toxicol. Appl. Pharmacol. 26 at 339-351 (1973).

Ramsey, J. C., T. L. Lavy and W. H. Braun, "Exposure of Forest Workers to 2,4,5-T: Calculated Dose Levels," submitted to U.S. Environmental Protection Agency in Response to the Rebuttable Presumption Against Registration of 2,4,5-T, The Dow Chemical Company, Midland, Michigan (1979) (ARI R-61).

Sauerhoff, M. W., W. H. Braun, G. E. Blau and P. J. Gehring, "The Dose-Dependent Pharmacokinetic Profile of Silvex Following Intravenous Administration to Rats," J. Toxicol. Environm. Health 2 at 605-608 (1976).

Sauerhoff, M. W., M. B. Chenoweth, R. J. Karbowski, W. H. Braun, J. C. Ramsey, P. J. Gehring and G. E. Blau, "Fate of Silvex Following Oral Administration to Humans," J. Toxicol. Environm. Health 3 at 941-952 (1976).

Young, J. D., J. C. Ramsey and W. H. Braun, "Pharmacokinetics of 2,4,5-T PGBE Ester Applied Dermally to Rats," The Dow Chemical Company, Midland, Michigan, Manuscript in preparation (1979).

24. Bernard A. Schwetz, D.V.M., Ph.D.
Dow Chemical, U.S.A.
1803 Building
Midland, MI 48640

Dr. Schwetz may testify concerning the general principles of and specific animal data concerning teratogenicity and fetotoxicity of 2,4,5-T, silvex and TCDD.

Exhibits

Allen, J. R., D. A. Barsotti, J. P. Van Miller, L. J. Abrahamson and J. J. Lalich, "Morphological Changes in Monkeys Consuming a Diet Containing Low-levels of 2,3,7,8-Tetrachlorodibenzo-p-Dioxin," Food Cosmet. Toxicol. 15 at 401-410 (1977) (ARI R-36).

Beck, F. and J. B. Lloyd, "An Investigation of the Relationship Between Fetal Death and Fetal Malformations," J. Anat. 97 at 555-564 (1963).

Chamberlain, J. G. and M. E. Goldyne, "Intra-amniotic Injections of Pyridine Nucleotides or Adenosine Triphosphate as Countertherapy for 6-Aminonicotinamide (6-AN) Teratogenesis." Teratology 3 at 11-16 (1970).

Collins, T. F. X. and C. H. Williams, "Teratogenic Studies with 2,4,5-T and 2,4-D in the Hamster," Bull. Environ. Contam. Toxicol. 6 at 559-567 (1971) (ARI R-14).

Courtney, K. D., "Mouse Teratology Studies with Chlorodibenzo-p-Dioxins," Bull. Environ. Contam. Toxicol. 16 at 674-681 (1976) (ARI R-10).

Courtney, K. D., "Prenatal Effects of Herbicides; Evaluation by the Prenatal Development Index," Arch. Environ. Contam. Toxicol. 6 at 33-46 (1977) (ARI R-6).

Courtney, K. D. and J. A. Moore, "Teratology Studies with 2,4,5-Trichlorophenoxyacetic Acid and 2,3,7,8-Tetrachlorodibenzo-p-Dioxin," Toxicol. Appl. Pharmacol. 20 at 396-403 (1971) (ARI R-2).

Dougherty, W. H., F. Coulston, and L. Golberg, "The Evaluation of the Teratogenic Effects of 2,4,5-Trichlorophenoxyacetic Acid in the Rhesus Monkey," Environ. Qual. and Safety 5 at 89-96 (1976) (Dow RPAR 35).

Gebhardt, D.O.E., "The Embryolethal and Teratogenic Effects of Cyclophosphamide on Mouse Embryos," Teratology 3 at 273-278 (1970).

Khera, K. S. and J. A. Ruddick, "Polychlorodibenzo-p-Dioxins; Perinatal Effects and the Dominant Lethal Test to Wistar Rats," in Chlorodioxins - Origin and Fate, edited by E. H Blair, Advances in Chemistry Series, No. 120. Am. Chem. Soc., Washington, D.C. (1973) (ARI R-5).

McNulty, Wilbur P., "Preliminary Laboratory Results of Spontaneous Abortions in Primates," Letter to Federal Register Section, (July 27, 1978) (ARI R-39).

Murphy, M. L., "A Comparison of the Teratogenic Effects of Five Polyfunctional Alkylating Agents on the Rat Fetus," Pediatrics 23 at 231-244 (1959).

Murray, F. J., F. A. Smith, K. D. Nitschke, C. G. Humiston, R. J. Kociba and B. A. Schwetz, "Three-Generation Reproduction Study in Rats Ingesting 2,3,7,8-Tetrachlorodibenzo-p-Dioxin," Toxicol. Appl. Pharmacol. 41 at 200-201 (1977) (ARI R-8).

Neubert, D. and I. Dillmann, "Embryotoxic Effects in Mice Treated with 2,4,5-Trichlorophenoxyacetic Acid and 2,4,3,8-Tetrachlorodibenzo-p-Dioxin," Arch. Pharmakol. Exp. Pathol. 272 at 243-264 (1972) (ARI R-3).

Schantz, S. L., D. A. Barsotti and J. R. Allen, "Toxicological Effects Produced in Non-Human Primates Chronologically Exposed to Fifty Parts Per Trillion 2,3,7,8-Tetrachlorodibenzo-p-Dioxin (TCDD)," Abstract of Paper presented at the Eighteenth Annual Meeting of the Society of Toxicology, New Orleans (March 11-15, 1979) (ARI R-9).

Smith, F. A., B. A. Schwetz and K. D. Nitschke, "Teratogenicity of 2,3,7,8-Tetrachlorodibenzo-p-Dioxin in CF-1 Mice," Toxicol. Appl. Pharmacol. 38 at 517-523 (1976) (ARI R-7).

Sparschu, G. L., F. L. Dunn and V. K. Rowe, "Study of the Teratogenicity of 2,3,7,8-Tetrachlorodibenzo-p-Dioxin in the Rat," Fd. Cosmet. Toxicol. 9 at 405-412 (1971) (ARI R-4).

Thompson, D. J., R. J. Streibig, C. G. Gerbig and J. L. Emerson, "Teratology and Postnatal Studies in Rats Treated with Silvex," A Dow Chemical Company Report (1972) (Confidential) (ARI R-117).

Thompson, D. J., J. L. Emerson, R. J. Streibig, and C. G. Gerbig, "Teratology and Postnatal Studies in Rats Treated Orally with SILVEX-PGBE," A Dow Chemical Company Report (1972).

Wilson, J. G., "Abnormalities of Intrauterine Development in Non-Human Primates," Symposium on the Use of Non-Human Primates for Research on Problems of Human Reproduction. Sukhumi, USSR, 13-17, December, 1971, at 261-292 (1971) (Dow RPAR 34).

Wilson, J. G., "Current Status of Teratology," in Handbook of Teratology, Vol. 1, edited by Wilson, J. G. and C. F. Fraser, Academic Press, New York, N.Y., at 47-74 (1977).

Young, Alvin, et al., "The Toxicology, Environmental Fate, and Human Risk of Herbicide Orange and It's Associated Dioxin," USAF Report OEHL TR-78-92 (1978) (ARI B-68).

25. Louis Shadoff, Ph.D.
Dow Chemical, U.S.A.
574 Building
Midland, MI 48640

Dr. Shadoff may testify on the analytical methodology for detection of low amounts of TCDD in environmental samples and efforts to determine the presence of TCDD in the environment.

Exhibits

Dow Chemical, "Review of Residue, Surveillance and Environmental Fate Studies of TCDD," Appendix II to Dow Chemical 2,4,5-T RPAR Response (August 4, 1978).

Dow Chemical Co., "The Trace Chemistries of Fire -- A Source of and Routes for the Entry of Chlorinated Dioxins in the Environment," Report of the Chlorinated Dioxin Task (November 15, 1978).

Hummel, R.A., "Clean-Up Techniques for the Determination of Parts per Trillion Residue Levels of TCDD," J. Agric. Food Chem. 25 at 1049-53 (1977).

Kocher, C.W., et al., "A Search for the Presence of TCDD in Beef Fat," Bull. of Environ. Contam. & Toxicol. 19 at 229-36 (1978).

Shadoff, L.A., et al., "A Search for TCDD in an Environment Exposed Annually to 2,4,5-T Ester Herbicides," Bull. of Environ. Contam. & Toxicol. 18(4) at 478-85 (1977).

Shadoff, L.A. and R.A. Hummel, "The Determination of TCDD in Biological Extracts by Gas Chromatography Mass Spectrometry," Biomedical Mass Spectrometry 5(1) at 7-13 (1978).

See also references of Dr. Young.

26. Professor H. Tuchmann-Duplessis
Faculty of Medicine Paris
University Rene Descartes
Laboratory of Embryologie
45 Rue Des Saints-Peres
75270 Paris, France

Professor Tuchmann-Duplessis may testify on Seveso, fetotoxicity and teratogenicity.

Exhibits

Bisanti, L., et al., "Experience of the Accident of Seveso," from the Proceedings of the 6th European Teratology Society Conference, pub. by Akademiai Kiado, Budapest (1979).

Homberger, E., G. Reggiani, J. Sambeth and H. Wipf, "The Seveso Accident: Its Nature, Extent and Consequences," Givaudan Research Co., Ltd. (unpublished).

Morganti, G., Coordinator, et al., "Cytogenic Investigations in Individuals Exposed to the Toxic Action of TCDD: Performed in the Context of the Agreement Between the Lombardy Region and the Institutes of General Biology of the Faculties of Medicine and Surgery of the Universities of Milan and Pavia" (unpublished 1979).

Pocchiani, F., "Accidental TCDD Contamination in Seveso (Italy): Epidemiological Aspects," Working Paper from Joint NIEHS/IARC Working Group Report on "Long-Term Hazards of Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans" (June 1978) (ARI R-19).

Reggiani, G., Letter to Douglas M. Costle (EPA) re Emergency Suspensions of 3,5,5-T and Silvex (March 30, 1979).

Reggiani, G., "Medical Problems Raised by the TCDD Contamination in Seveso, Italy," Arch. Toxical. 40 at 161-188 (1978) (unpublished paper is ARI R-86).

Reggiani, G., "The Estimation of the TCDD Toxic Potential in the Light of the Seveso Accident," Paper presented at the 20th Congress of the European Society of Toxicology, Berlin (West) (June 25-28, 1978).

Rehder, H., L. Sanchioni, F. Cefis and A. Gropp, "Pathological-Embryological Investigations in Cases of Abortion Related to the Seveso Accident," Schweizerische Medizinische Wochenschrift 108 at 1617-1625 (1978).

Tenchini, M.L., et al., "Approaches to Examination of Genetic Damage After a Major Hazard in Chemical Industry: Preliminary Cytogenic Findings on TCDD-Exposed Subjects After Seveso Accident," from Expert Conference on Genetic Damage Caused by Environmental Factors, Oslo (11-13 May 1977).

Tuchmann-Duplessis, H., "Embryo Problems Posed by the Seveso Accident," (Translated from French) Le Concurs Medical, 44 (1977) (ARI R-84).

Tuchmann-Duplessis, H., "Pollution of the Environment and Offspring Apropos of the Accident of Seveso" (translated from French), Medicine et Hygiene 36 at 1758-66 (1978).

27. Philip G. Watanabe, Ph.D.
Dow Chemical, U.S.A.
1803 Building
Midland, MI 48640

Dr. Watanabe may testify on general carcinogenicity and the mutagenicity of 2,4,5-T, TCDD and silvex.

Exhibits

Andersen, K.J., E.G. Leighty, M.G. Takahashi, "Evaluation of Herbicides for Possible Mutagenic Properties," J. Agr. Food Chem. 20 at 649-656 (1972).

Buselmaier, V.W., G. Rohrborn, G.P. Propping, "Mutagenitats-unter-suchungen mit pestizider im Host-mediated Assay und mit dem dominanten letaltest an der maus," Biol. Zbl. 91 at 311-325 (1972).

Davring, L., and K. Hultgren, "Cytogenetic Effects on in vivo Bone-Marrow Cells of Mus musculus Induced By a Commercial 2,4,5-T Ester Product," Hereditas 85 at 123-134 (1977).

Ercegovich, C.D., and K.A. Rashid, "Mutagenesis in Mutant Strains of Salmonella typhimurium By Pesticides," presented at 174th Amer. Chem. Soc. Ntl. Meeting, August 30, 1977 (unpublished 1977).

Fahrig, R., "Comparative Mutagenicity Studies With Pesticides," IARC (International Agency for Research on Cancer) Scientific Publications 10 at 161-181 (1974).

Green, S., "Cytogenetic Evaluation of Several Dioxins in the Rat" (draft - unpublished).

Hussain, S., L. Ehrenberg, G. Lofroth, and T. Gejvall, "Mutagenic Effects of TCDD on Bacterial Systems," Ambio 1(1) at 32-33 (1972).

Jenssen, D., L. Renberg, "Distribution and Cytogenetic Test of 2,4-D and 2,4,5-T Phenoxyacetic Acids in Mouse Blood Tissues," Chem. Biol. Interact. 14 at 29-299 (1976).

Johnson, J.E., "The Public Health Implications of Widespread Use of the Phenoxy Herbicides and Picloram," Bioscience 21(17) at 899-905 (1971).

Kilian, D.J., M.C. Benge, R.V. Johnston, E.B. Whorton, Jr., "Cytogenetic Studies of Personnel Who Manufacture 2,4,5-T," New York Academy of Sciences Workshop on Occupational Monitoring and Genetic Hazards (March 28-29, 1975).

Majumdar, S.K., and J.K. Golia, "Mutation Test of 2,4,5-Trichlorophenoxyacetic Acid on Drosophila melanogaster," Can. J. Genet. Cytol. 16 at 465-466 (1974).

Majumdar, S.K., and R.C. Hall, "Cytogenetic Effects of 2,4,5-T on in vivo Bone Marrow Cells of Mongolian Gerbils," J. Hered. 64 at 213-216 (1973).

Rasmuson, B., H. Svahlin, "Mutagenicity Tests of 2,4-Dichlorophenoxyacetic Acid and 2,4,5-Trichlorophenoxyacetic Acid in Genetically Stable and Unstable Strains of Drosophila melanogaster," Ecol. Bull. 27 at 190-192 (1978).

Rohrborn, G., P.J. Goldman, J. Fleig, "Chromosomenuntersuchungen von Patienten Nach TCDD-Intoxikation," Mut. Res. (in press) (1978).

Siebert, D., E. Lemperle, "Genetic Effects of Herbicides: Induction of Mitotic Gene Conversion in Saccharomyces cerevisiae," Mutation Research 22 at 111-120 (1974).

Shirasu, Y., M. Moriya, K. Kato, A. Furunashi, T. Kada, "Mutagenicity Screening of Pesticides in the Microbial System," Mutation Research 40 at 19-30 (1976).

Vogel, E., J.L.R. Chandler, "Mutagenicity Testing of Cyclamate and Some Pesticides on Drosophila melanogaster," Experientia 30 at 621-623 (1974).

28. James M. Witt, Ph.D.
Professor, Department of Ag. Chemistry
Oregon State University
Corvallis, Oregon 97330

Dr. Witt may testify on the exposure analysis in the Assessment Team Report.

29. Alvin Young, Ph.D.*/
5226 Prince Valiant Drive
San Antonio, TX 78218

Dr. Young may testify on environmental presence and fate, describing his biodegradation work at Eglin AFB, Florida.

Exhibits

Young, A.L., "Ecological Studies on a Herbicide Equipment Test Area (TA C-52A) Elgin AFB Reservation, Florida," Tech. Rep. AFATL-TR-74-12, Air Force Armament Laboratory, Eglin Air Force Base, Florida (1974).

Young, A.L., P.J. Lehn and M.F. Mettee, "Absence of TCDD Toxicity in an Aquatic Ecosystem," Weed Sci. Soc. Am. Mut. Abstr. 107 at 46 (1976).

Young, A.L., C.E. Thalken and W.E. Ward, "Studies of the Ecological Impact of Repetitive Aerial Applications of Herbicides on the Ecosystem of Test Area C-52A, Elgin AFB, Florida," Tech. Rpt. AFATL-TR-74-12, Air Force Armament Laboratory, Eglin AFB, Fla., and Department of Chemistry and Biological Sciences, USAF Academy, Colorado (1975).

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*/ Dr. Young's appearance is dependent upon approval by his Air Force superiors.

Young, A.L., C.E. Thalken, E.L. Arnold, J.M. Cupello and L.G. Cockerham, "Fate of TCDD in the Environment: Summary and Decontamination Recommendations," USAFA-TR-76-18, Department of Chemistry and Biological Sciences, USAF Academy, Colorado (1976).

Young, A.L., et al., "The Toxicology, Environmental Fate and Human Risk of Herbicide Orange and Its Associated Dioxin," USAF Rpt OEHL TR-78-92 (1978) (ARI B-68).

Young, A.L. "Chlorinated Dibenzo-p-Dioxins," Chapter 5 in Science of 2,4,5-T and Related Phenoxy Herbicides, edited by R.W. Bovey and A.L. Young, Wiley Inter Science, in press (1979).

Benefit Witnesses

1. Dr. William C. Bramble
Professor Emeritus of Forestry and
Natural Resources
Purdue University
West Lafayette, Indiana

Dr. Bramble, a contributor to the Assessment Report, may testify concerning the ecological effects of use of 2,4,5-T and silvex for right-of-way maintenance.

Exhibits

Arner, D.H., "Experimental Plantings on Powerline Rights-of-Way and Woodland Roads," Trans. N. Amer. Wildlife Conf. 16 at 331-338 (1951).

Arner, D.H., "Utility Line Rights-of-Way Management," Trans. N. Amer. Wildlife Conf. 31 at 259-268 (1966).

Asplundh Environmental Services (AES), "Environmental and Economic Aspects of Contemporaneous Electric Transmission Right-of-Way Management Techniques," Vol. 1, 2, & 3 (1977).

Asplundh Environmental Services (AES), "Benefit Analysis: Use of 2,4,5-T for Vegetation Management on Rights-of-Way" (1978).

Bramble, W.C. and W.R. Byrnes, "Impact of Herbicides Upon Game Food and Cover on a Utility Right-of-Way," Purdue U. Res. Bull. No. 918 (1974).

Bramble, W.C., "Songbirds of the Right-of-Way," Ind. Veg. Man. 6(3) at 12-14.

Bramble, W.C., "A Program for Wildlife Management on Transmission Rights-of-Way of the Niagara-Mohawk Power Corporation," Syracuse, N.Y. (unpublished).

Carey Arboretum, "Southern Tier Environmental and Management Plan (Wildlife)," Millbrook, N.Y. (1974).

Carvell, K.L. and P.A. Johnston, "Environmental Effects of Rights-of-Way Management on Forested Ecosystems," EPRI Final Report (1978).

Cloninger, R.A., J.S. Garton, and P.M. Cumbie, "The Occurrence of Nongame Wildlife in Piedmont Transmission Corridor Rights-of-Way," Duke Power Co., Charlotte, N.C. (1976).

Johnston, P.A. and W.C. Bramble, "Vegetation Distribution Associated With Right-of-Way Habitats in New York," Manuscript in draft form for publication (1979).

Michael, E.D., C.R. Ferris, and E.C. Haverlack, "Effects of Highway Rights-of-Way on Bird Populations," Nat'l Symp. on Environ. Cncerns in Rights-of-Way Management, Miss. State U. (1976).

Savidge, J.A., "Wildlife in a Herbicide-Treated Jeffrey Pine Plantation in Eastern California," Jour. For. 76(8) at 476-478 (1978).

Smith, E.R., "A Preliminary Study of Vegetation on North Carolina Piedmont and Mountain Power Transmission Line Rights-of-Way," U. North Carolina M.S. thesis (1959).

USDA-States-EPA 2,4,5-T RPAR assessment Team, "The Biologic and Economic Assessment of 2,4,5-T," Chap. 3 (1979).

2. Dr. Boysie Day
Professor of Plant Pathology
University of California
Berkeley, California 94720

Dr. Day, a member of the Assessment Team, may testify concerning the benefits of using 2,4,5-T and silvex.

3. Dr. O. Hale Fletchall
Professor of Agronomy
University of Missouri
Columbia, Missouri

Dr. Fletchall may testify concerning the benefits of using 2,4,5-T and silvex on pasture.

4. Carl Hendrickson
Senior Analyst
Market Opinion Research
Detroit, Michigan

Mr. Hendrickson may testify concerning the economic effects of suspension of 2,4,5-T and silvex for right-of-way use.

5. Dennis Holewinski
Manager
Asplundh Environmental Services
Blair Mill Road
Willow Grove, PA 19090

Mr. Holewinski may testify concerning the economic effects of suspension of 2,4,5-T and silvex for right-of-way use.

Exhibit

Asplundh Environmental Services, "Benefit Analysis: Use of 2,4,5-T for Vegetation Management on Rights-of-Way," Asplundh Environmental Services, Willow Grove, Pa. (1978).

6. Garlyn O. Hoffman
Range Brush and Weed Control Specialist
Texas A&M University
College Station, Texas

Mr. Hoffman, a member of the Assessment Team, may testify concerning the benefits of 2,4,5-T and silvex use on pasture, and the economic effects of suspension.

Exhibits

Hoffman, G.O. and R.L. Gary, "Results of Agricultural Demonstrations, Erath County," Tex. Agr. Ext. Serv. (1968).

Hoffman, G.O. and D.P. Polk, "Acres of Woody Plants on Rangeland and Pastureland," Tex. Agr. Ext. Serv. and SCS (1978).

Hoffman, G.O. and D.B. Polk, "Survey of States Where 2,4,5-T is Used for Woody Plant Control," Tex. Agr. Ext. Serv. and USDA-SCS (1978).

7. Harvey A. Holt
Assoc. Professor of Forestry and
Natural Resources
Purdue University
West Lafayette, Indiana

Dr. Holt, Group Leader of the Assessment Team for rights-of-way, may testify concerning the benefits of 2,4,5-T and silvex for right-of-way maintenance.

8. Dayton L. Klingman
Chief, Weed Research Laboratory
USDA
Beltsville, Maryland

Mr. Klingman, a co-leader of the Assessment Team, will testify concerning the benefits of 2,4,5-T and silvex, particularly for commercial and ornamental turf uses.

9. B. Ted Kuntz
Research Economist
U.S. Department of Agriculture
Corvallis, Oregon 97330

Mr. Kuntz, Economic Assessment Leader of the Assessment Team, may testify concerning the economic losses from suspension of 2,4,5-T and silvex.

10. Robert A. Nosse
Director of Forestry Practices
Ohio Edison Co.
Akron, Ohio

Mr. Nosse may testify concerning the benefits of using 2,4,5-T and silvex for maintenance of electric utility rights-of-way.

11. Clark Row
Principal Research Economist
U.S. Forest Service
Washington, D.C.

Mr. Row, a contributor to the Assessment Report, may testify concerning the economic effects of suspending 2,4,5-T and silvex for forestry use.

12. Steven K. Shapiro
Management Analysis Center, Inc.
Washington, D.C.

Mr. Shapiro, an economic consultant for the National Forest Products Association, may testify concerning the economic effects of suspending 2,4,5-T and silvex for forestry use.

13. Gene Smith
Rolla, Missouri

Mr. Smith will testify concerning application techniques and benefits of 2,4,5-T.

14. Ronald E. Stewart
Research Silviculturist
U.S. Forest Service
Washington, D.C.

Mr. Stewart, the Group Leader for forestry of the Assessment Team, may testify concerning the benefits of 2,4,5-T use in forestry, and the effects of suspension of 2,4,5-T for forestry use.

Exhibits

Stewart, R.E., "Budbreak Sprays for Site Preparation and Release From Six Coastal Brush Species," USDA For. Serv. Res. Pap. PNW-176, Pac. Northwest For. and Range Exp. Stn. Portland, Oregon (1974).

Stewart, R.E., "Site Preparation," in B.D. Cleary, R.D. Greaves, and R.K. Hermann (eds.), at 100-129 Oregon State University, Corvallis (1978).

15. Michael Towns
Cave City, Arkansas

Mr. Towns, who farms in the Ozark Mountains, may testify concerning the benefits of using 2,4,5-T to reclaim overgrown pasture.

16. Ruffin VanBossuyt, Jr.
System Arborist
New England Power Service Co.
Westborough, Massachusetts

Mr. VanBossuyt may testify concerning the benefits of using 2,4,5-T and silvex for maintenance of electric utility rights-of-way.

17. Clay Williams
Director of Marketing, Agricultural Products
Dow Chemical, U.S.A.
9008 Building
Midland, MI 48640

Mr. Williams may testify concerning the benefits of and alternatives to 2,4,5-T and silvex.

18. Dr. John D. Walstad
Weyerhauser Company
Springfield, Oregon

Dr. Walstad may testify concerning the benefits of 2,4,5-T and silvex use in forestry and the effects of suspending the forestry use of 2,4,5-T.

Exhibit

Walstad, J.D., "Weed Control For Better Southern Pine Management," Weyerhaeuser For. Pap. No. 15. South. For. Res. Center, Hot Springs, Ark. (1976).

19. Noel Yoho
International Paper Co.
Mobile, Alabama

Mr. Yoho may testify concerning the benefits of 2,4,5-T use in forestry, alternatives to use of 2,4,5-T, and forest workers' exposure to 2,4,5-T.

Other Exhibits*/

Blum, Barbara, Telegraphic Message to Michelle Howard (California Wool Growers Association), undated.

Blum, Barbara, Transcript of Press Conference on 2,4,5-T and Silvex Suspensions (March 1, 1979).

USDA, "Extension of Certain 'No Residue' and 'Zero Tolerance' Registrations Beyond December 31, 1967," PR Notice 68-1 (January 8, 1968).

USDA, "Extension of Certain 'No Residue' and 'Zero Tolerance' Registrations Beyond December 31, 1967," PR Notice 68-2 (January 10, 1968).

USDA, "Extension of Certain 'No Residue' and 'Zero Tolerance' Registrations Beyond December 31, 1967," PR Notice 68-9 (April 24, 1968).

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*/ Dow intends to ask agency counsel for stipulation on these documents as it does not intend to present a witness who will submit them. See also 40 C.F.R. § 164.82(e) (official notice).

USDA, "Extension of Certain 'No Residue' and 'Zero Tolerance' Registrations Beyond December 31, 1968," PR Notice 69-1 (January 10, 1969).

USDA, "Extension of Certain 'No Residue' and 'Zero Tolerance' Registrations Beyond December 31, 1968," PR Notice 69-2 (January 16, 1969).

USDA, "Extension of Certain 'No Residue' and 'Zero Tolerance' Registrations Beyond December 31, 1968," PR Notice 69-3 (January 31, 1969).

USDA, "Data Needs for Certain Compounds," PR Notice 70-8 (March 10, 1970).

USDA, "Extension of Certain 'No Residue' and 'Zero Tolerance' Registrations Beyond December 31, 1968," PR Notice 70-10 (April 9, 1970).

USDA, "Suspension of 2,4,5-T Products Bearing Certain Directions for Use," PR Notice 70-13 (May 1, 1979).

USDA, "Presence of Chlorodioxin Contaminants in Economic Poisons," PR Notice 70-22 (September 28, 1979).

36 Fed. Reg. 14777 (Aug 11, 1971), "2,4,5-T: Determination and Order."

38 Fed. Reg. 19859 (July 24, 1973), "2,4,5-T: Intent to Hold Hearing, and 2,4,5-T: Statement of Issues."

39 Fed. Reg. 24049 (June 24, 1974), "2,4,5-T and Herbicides Potentially Containing TCDD: Withdrawal of Cancellation and Withdrawal of Intent to Hold Hearings."

APPENDIX B

THE DOW CHEMICAL COMPANY'S REQUEST FOR ORAL TESTIMONY

Pursuant to the Panel's April 4, 1979, Order, Dow hereby requests the opportunity to present oral testimony with regard to the witnesses listed on its witness list. As Dow has explained previously, it is entitled to oral direct testimony as a matter of right under the Administrative Procedure Act and EPA's own hearing regulations. See Dow Procedural Memo (March 21) at 1-2; Dow Reply Memo (March 29) at 6. Moreover, the presentation of oral direct testimony will assist the Panel in understanding the evidence and will help to develop a more readable and understandable record.

With regard to each of the witnesses, unless future developments make it impossible*/ written statements will be supplied which will contain in detail the witnesses' statements. Because witness statements have not been prepared, Dow is unable to forego oral testimony from many of its prospective witnesses. Nor can Dow predict confidently the amount of time needed for oral testimony. Nevertheless, Dow has responded with a good faith effort to comply with the

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*/ For example, it may be impossible to secure a written statement from Dr. Tuchmann-Duplesis of Paris because of the difficulties with communications between the United States and France.

Hearing Panel's request. Dow anticipates that as written statements are developed, our requests will be more refined. Dow may be able to forego oral direct testimony altogether from some witnesses, and more or less time may be needed for other witnesses.

For each witness, Dow's oral direct testimony will be designed to explain, summarize, highlight and review written and documentary evidence, or, if necessary, make corrections in prepared statements. Of course, there may also be an occasional need to submit additional supplemental information not included in the written testimony for good cause.

In many instances the oral direct testimony will be helpful in relating a particular witness' views to those presented by another witness previously, but not included in the written statement. For example, witnesses in the same general subject area will have a need to refer to another witness's comments as forming part of the information on which the later witness is to testify. Because of the short time available and the fact that witnesses are all over the country, it simply will not be possible to coordinate the written statements of various related witnesses.

With this background in mind, Dow makes the following requests for oral direct testimony.

I. Risk

1. Norman Akesson - one-half hour.

2. R. W. Bovey - one-half hour.

3. Werner H. Braun - one-half hour.

4. Donald Crosby and/or Anthony Wong - one hour.

5. Fred Decker - one-half hour.

6. Thomas Downs - one-half hour.

7. Perry J. Gehring - two hours.

8. Milton Getzendaner and/or David Jensen - one hour.

9. Ray Harbison - one hour.

10. Benjamin Holder - one-half hour.

11. Cecil B. Jacobson - one-half hour.

12. Hyland R. Johns - one-half hour.

13. Richard Jones - one-half hour.

14. Richard Kociba - one-half hour.

15. Steven H. Lamm - one hour.

16. Nathan Mantel - forty-five minutes.

17. Donald Morehouse - fifteen minutes.

18. Michael Newton - forty-five minutes.

19. Kenneth R. Niswander - forty-five minutes.

20. Logan Norris - one hour

21. Colin Park - one-half hour.

22. John Ramsey - forty-five minutes.

23. Bernard A. Schwetz - one hour fifteen minutes.

24. Louis Shadoff - forty-five minutes.

25. H. Tuchmann-Duplessis - two hours.*/

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*/ Professor Tuchmann-Duplessis is one of the leading teratologists in the world and has written extensively on the

(footnote continued on next page)

26. Philip G. Wantanabe - one-half hour.

27. James M. Witt - forty-five minutes.

28. Alvin Young - one hour.

II. Benefit

1. William C. Bramble - one-half hour.

2. Boysie Day - two hours.

3. O. Hale Fletchall - one-half hour.

4. Carl Hendrickson - one-half hour.

5. Dennis Holewinski - one-half hour each.

6. Garlyn O. Hoffman - forty-five minutes.

7. Harvey A. Holt - one-half hour.

8. Dayton L. Klingman - one-half hour.

9. B. Ted Kuntz - one hour.

10. Robert A. Nosse - one-half hour.

11. Clark Row - one-half hour

12. Steven K. Shapiro - one-half hour.

13. Eugene Smith - fifteen minutes.

14. Ronald E. Stewart - one-half hour.

15. Michael Towns - written only

16. Ruffin Van Bossuyt, Jr. - one-half hour.

(footnote continued from previous page)

Seveso incident. Because of his busy schedule and the difficulties of communicating with France, it may be impossible to present any written statement prior to his appearance. Therefore, Dow is asking for time sufficient to present his direct testimony entirely orally.

17. Clay Williams - one-half hour.

18. John D. Walstad - one-half hour.

19. Noel Yoho - one-half hour.

The above represents a total of approximately 32 ½ hours, 20 ½ for risk and 12 for benefit oral direct testimony.

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that copies of the foregoing The Dow Chemical Company's Direct Evidence Submission were hand delivered or mailed Express Mail, Federal Express or Special Delivery prepaid on April 10, 1979, to the persons on the attached list.

L. Mark Wine

Mr. G. K. Frith, President
Tobacco States Chemical Co., Inc.
P.O. Box 12046
Lexington, Kentucky 40580

Mr. Everett Mealman
PBI Gordon Corporation
300 South 3rd
Kansas City, Kansas 66118

Mr. Houston Gervais, President
Louisiana Pesticide Applicators Association
Baton Rouge, Louisiana 70803

Mr. Larry R. Hodges
Amchem Products, Inc.
Ambler, Pennsylvania 19002

Gene R. Currie, Esquire
Box 423 West 6th Avenue
Shenandoah, Iowa 51601
Counsel for MFA Oil Company
Land-O-Lakes, Inc. &
Imperial, Inc.

Mr. Roger A. Shores, President
Bartels and Shores Chemical Co.
1400 St. Louis Avenue
Kansas City, Missouri 64101

Anthony P. Brown, Esquire
Pillsbury, Madison & Sutro
P.O. Box 7880
San Francisco, California 94120
Counsel for Chevron Chemical Co.

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Steptoe & Johnson
1250 Connecticut Avenue, N.W.
Washington, D.C. 20036
Counsel for Chevron Chemical Co.

Shrikant V. Kulkarni, Ph.D.
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Vertac Technical Center
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Kampmann, Church, Burns & Clark
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WEGRO, Division of
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Grand Rapids, Ohio 43522

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Heritage House Products Corp.
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Palmetto, Florida 33561

Mr. Frank B. Stewart, Vice-
President
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Aldo Blasio, President
Farmingdale Garden Labs, Inc.
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Farmingdale, New York 11735

Jerome R. Schindler, Esquire
Smith-Douglass Division,
Borden Chemical
Borden, Inc.
180 E. Broad Street
Columbus, Ohio 43215

APR 11 1979
10:40 a.m.

RESPONDENT ENVIRONMENTAL PROTECTION AGENCY'S STATEMENT OF DIRECT EVIDENCE

Pursuant to the Hearing Panel's Notice and Order dated April 4, 1979, respondent Environmental Protection Agency submits its list of witnesses who will present direct written evidence at the hearings.

A. General Discussion

Respondent intends to present its direct case by written evidence. This information may be presented either by sworn adoptions of the suspension order and/or rebuttal comments or by sworn witness statements developed for use in this proceeding. A particular witness may present direct evidence by either or both such formats.

To the extent possible, the Office of General Counsel intends to present its entire direct case through the submission of written materials. Therefore, our witness list does not include time limits for oral testimony. However, the Hearing Panel indicated it would be "sympathetic" to the use of oral direct testimony for the limited purposes of correcting mistakes in written statements and to add information which could not have reasonably been incorporated into the written statement when it was prepared. (March 30, 1979 Prehearing Conference transcript at 64). While the Office of General Counsel does not presently anticipate the need to present oral direct evidence, we reserve the right to request the panel's permission to present oral direct testimony, should such a need arise at a later time.

The desire to save time during the expedited suspension hearing was an important factor in the Administrator's decision to structure the hearing procedures to minimize the use of direct oral testimony. We agree with the Hearing Panel that "every effort should be made to limit direct testimony to allow for more time for cross-examination in particular" (March 30, 1979, Prehearing Conference at 65). Respondent recommends that in allocating time between respondent and the registrants, the Hearing Panel should treat time allowed a party for oral direct testimony as a set-off against the time allowed that party for oral cross-examination.

Respondent plans to present the witnesses whose names and subject areas are listed below. This list represents our very best estimate at this time. It may become necessary for respondent to supplement or prune this list in a limited fashion when we know more about the registrants' defenses. Dow Chemical Company and the other registrants who intend to be active participants at the hearing have been less precise than respondent in revealing their overall approach and specifying underlying factual support during the preliminary exchange of written information. The exchange of written material which is comprised of the suspension orders, the registrants counterstatements, and the Agency's rebuttal comments - is designed to identify genuine disputes of material fact which must be ventilated at the hearing. We trust that the registrants' description of proposed direct evidence will to some extent serve to clarify the nature of the registrants' case.

B. Witness List

Dr. Roy Albert, Chairman, Carcinogen Assessment Group
Environmental Protection Agency

Dr. Albert will testify concerning the carcinogenic potentials of 2,4,5-T and TCDD, including general principles, appropriate protocols and the Agency's specific assessments.

Dr. K. Diane Courtney, Pesticides and Toxic Substances Effects Laboratory, Environmental Protection Agency

Dr. Courtney will testify concerning the fetotoxicity and teratogenicity of 2,4,5-T, silvex and TCDD, including general principles and specific animal data. Dr. Courtney's testimony will also include general concepts of reproductive risk assessment, such as the determination and significance of no-effect levels and threshold effect levels.

Dr. Henry Spencer, Office of Pesticide Programs,
Environmental Protection Agency

Dr. Spencer is a toxicologist who will testify concerning the Agency's analysis of the fetotoxicity and teratogenicity of 2,4,5-T, silvex and TCDD.

Dr. James R. Allen, University of Wisconsin Medical School, Department of Pathology and Regional Primate Research Center, Madison, Wisconsin

Dr. Allen will testify concerning the toxicity of TCDD in the rhesus monkey, with particular emphasis on adverse reproductive effects.

Dr. George Streisinger, Biologist, University of Oregon

Dr. Streisinger will discuss the relationship between data showing that TCDD, 2,4,5-T and/or silvex have toxic effects in test animals and the risk to humans resulting from the uses of these chemicals.

Dr. Arthur Galston, Biologist, Yale University

Dr. Galston will discuss the relationship between data showing that TCDD, 2,4,5-T and/or silvex have toxic effects in test animals and the risk to humans resulting from the uses of these chemicals.

Dr. Matthew Meselson, Biologist, Harvard University

Dr. Meselson will discuss the relationship between data showing that TCDD, 2,4,5-T and/or silvex have toxic effects in test animals and the risk to humans resulting from the uses of these chemicals.

Dr. Robert C. Duncan, Statistician University of Miami

Dr. Duncan will discuss the Alsea Study and the statistical analyses of data developed through the Alsea Study. Dr. Duncan performed the statistical analyses of data generated through the Alsea Study.

Dr. John Davies, Epidemiologist, University of Miami

Mr. Davies will discuss the meaning and importance of the Alsea Study.

Donald Marlowe, Biologist
Environmental Protection Agency

Mr. Marlowe will describe EPA's investigation of incidents in which the use of 2,4,5-T or silvex has led to human and/or environmental exposure to these chemicals.

Dr. Bernard Smale, Plant Pathologist
Environmental Protection Agency

Dr. Smale, will describe EPA's investigation of incidents in which the use of 2,4,5-T or silvex has led to spray drift with resulting human and/or environmental exposure to these chemicals.

Thomas Ellwanger, Plant Physiologist
Environmental Protection Agency

Mr. Ellwanger will describe spray drift as a factor leading to human and environmental exposure to 2,4,5-T and/or silvex.

Dr. David Severn, Chemist
Environmental Protection Agency

Dr. Severn will discuss the environmental stability of 2,4,5-T, silvex and TCDD.

Ann Barton, Statistician, Environmental Protection Agency

Ms. Barton will discuss the statistical analyses of the data generated through the Alsea Study.

Dr. Jack Griffith, Epidemiologist, Environmental Protection Agency

Dr. Griffith will discuss the design and conduct of the Alsea Study

Dr. Thomas Keefe, Colorado State University

Dr. Keefe, a member of the EPA contract laboratory for the Alsea Study, will discuss the design and conduct of the Alsea Study.

Mr. Charles Poole, Epidemiologist, Environmental Proctection Agency

Mr. Poole will discuss data and studies relating exposure to 2,4,5-T, silvex and/or TCDD to adverse reproductive effects in humans. Exhibits in the Record. */

Dr. Eldon Savage, Colorado State University

Dr. Savage, a member of the EPA contract laboratory for the Alsea Study , will discuss the design and conduct of the Alsea Study.

*/ Pursuant to revision, Mr. Poole will also testify concerning Seveso, Vietnam and other incidents of known exposure to TCDD.

Dr. Arnold Aspelin, Chief, Economic Analysis Branch, Environmental Protection Agency

Dr. Aspelin will testify about the economic benefits of 2,4,5-T and silvex and the economic impact of the suspension of the contested uses of these compounds. His direct statement will incorporate the entire benefits discussions of the 2,4,5-T and Silvex Decision and Order Documents. His exhibits will include all of the materials cited in the benefits sections of the decision and order documents which constitute the record in this proceeding.

Dr. Dudley Mattson, Economic Analysis Branch, Environment Protection Agency

Dr. Mattson will discuss the forestry uses of 2,4,5-T and silvex. He will also analyze and comment upon the data of Mr. Horowitz and other relating to the efficacy of 2,4,5-T and silvex treatments in forestry.

Mr. Howard Horowitz

Mr. Horowitz will present data relating to the use patterns and efficacy of 2,4,5-T in forestry.

John Anderson, Biologist
Bureau of Land Management (Dept. of Interior)

Mr. Anderson will discuss studies on the deposition of silvex in water under ordinary use conditions.

Jeff Cameron, Biologist
Bureau of Land Management (Dept. of Interiior)

Mr. Cameron will discuss studies on the deposition of silvex in water under ordinary use conditions.

Dr. Frederick Kutz, Chemist
Environmental Protection Agency

Dr. Kutz will describe methods and studies relating to monitoring for 2,4,5-T, silvex and TCDD in environmental samples and human tissue samples.

Mr. Edwin Johnson, Deputy Administrator for Pesticide Program, Environment Protection Agency

Mr. Johnson will present an analysis of the risks and benefits of continued use of 2,4,5-T and silvex. His testimony will place the various benefits and risk issues into context and present an analytical framework for conducting a balancing of these issues.

The order used in listing these witnesses is not necessarily the order respondent will follow in presenting these witnesses at the hearing.

Respectfully submitted,

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Deputy Associate General Counsel
Environmental Protection Agency

April 10, 1979

CERTIFICATE OF SERVICE

I hereby certify that copies of the foregoing "Respondent Environmental Protection Agency's Statement of Direct Evidence" were hand-delivered or mailed express postage paid, on April 10, 1979, to the following persons:

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April 10, 1979