EXHIBIT 1

CURRICULUM VITAE

MARK A. MARTENS[PRIVATE]

Past and current fields of expertise

- Experimental toxicology (i.e. analytical and biochemical toxicology, drug, pesticide and chenical metabolism, pharmacokinetics, skin and eye irritation, in-vitro toxicology).
- Hazard and risk assessment of chemicals, food contaminants and pesticides in the workplace, the environment and food and safety evaluation of genetically modified crops.
- Regulatory toxicology (i.e. classification and labelling of dangerous substances and preparations, new and existing products notification, market restrictions, food contact materials registration, pesticide registration).
- Forensic toxicology

Education

Ph.D., University of Ghent (Belgium) school of Pharmacy, 1976.
Certification in haematology (cytology and haemostasis), University of Ghent, 1976.
Certification in clinical chemistry, University of Ghent, 1974.
Certification in industrial pharmacy, University of Ghent, 1973.
Certification in toxicological analysis applied in clinical and forensic toxicology, University of Ghent, 1972.
Certification in toxicological analysis of fytopharmaceutical products, University of Ghent, 1972.
M.S. in pharmacy, University of Ghent, 1972.

Current and past professional memberships

Belgian Society of Pharmaceutical Sciences.
International Pharmacy Federation.
International Association of Forensic Toxicologists (TIAFT).
Flemish Chemical Society (VCV).
European Society of Toxicology (EUROTOX).
Belgian Society of Toxicology (BELTOX).
Belgian Environmental Mutagenesis Society (BEMS).
American Society of Toxicology (full membership since 1995).

Current and previous positions

Toxicology Director, Europe/Africa, Monsanto Technical Centre, Louvain-La-Neuev and Brussels, Belgium (1994-current).
Regulatory toxicology and risk assessment support for the Chemical Group (before the spin off of the chemical business as Solutia) and Agricultural Group businesses and their

operations in the Europe/Africa region. These activities include the gathering (i.e. literature search, Monsanto studies, and commissioning of toxicology studies in contract laboratories), selection and interpretation of health effects data within the European regulatory context and Monsanto internal liability procedures such as SDSs, poisoning assistance and environmental, safety and health risk assessments for products under development, registration and notification in the EU. Important projects were the risk assessment of existing chemical substances for the OECD and for the EU (rubber chemicals and water treatment chemicals), oestrogenicity and exposure assessment research for polymer modifier defence for OSPAR member countries, positioning of cancer classification issues of herbicides and rubber chemicals for the EU and registration defence of Monsanto's pesticides in EU member states and other countries of the Europe/Africa region. Contributions were made to GMO public acceptance by giving presentations and seminars on health safety assessment of GM plants to academia, scientific associations and consumer organisations.

Assistant professor in toxicology, Public Health School, St Louis University, St Louis, MO, USA (1993-1994).
The courses given were inflammatory effects of chemicals on skin and eyes and forensic toxicology.

Manager, product toxicology, corporate toxicology, Monsanto WHQ, St Louis (1993-1994).
Co-ordination of corporate product toxicology research and hazard assessment for the Chemical Group of Monsanto. Product toxicology work was comprised of data gathering on the toxicology of all Monsanto products, identification of data gaps and commissioning and management of toxicology studies, hazard and risk assessment. Important contributions were made to the redesign of the product stewardship organisation of the Chemical Group of Monsanto and the review of the environmental, safety and health assessment process for substances under development. Active toxicology defense of chloroacetanilide herbicides in the EU.

Toxicology manager, corporate toxicology, Monsanto WHQ, St Louis (1992-1993).
This function was occupied during the first part of my assignment at Monsanto WHQ in the USA. Co-ordination of special projects such as the investigation of a possible relationship between arthralgias and exposure to a maleic anhydride catalyst, active toxicology defence of alachlor and acetochlor in Europe and the design of human metabolism studies for non medicine chemicals in the USA.

Toxicology manager, Europe, Monsanto Europe/Africa, Brussels, Belgium (1989-1992).
Regulatory toxicology support for the Chemical and the Agricultural Groups of Monsanto Europe/Africa. The most important activities were toxicology defence of Monsanto products in the EU, SDS composition, labelling and classification of chemicals, internal liability procedures for new products under development, risk assessment and emergency response. An important contribution was made to the EU dangerous substances classification and labelling process through the CEFIC representation at the meetings of the EU working group on classification and labelling.

Head of the department of toxicology, Institute of Hygiene and Epidemiology, Brussels, Belgium (1984-1989).

I founded this department and developed it into a national centre for toxicology advice to the Belgian government and to the EU. The main activities of this department were regulatory toxicology and experimental toxicology. For regulatory toxicology, advice was given on dossiers for the registration of pesticides and pesticide formulations and premarketing notification for all new chemicals put on the EU market via Belgium. The department was actively involved in all EU regulatory development work in the area of dangerous substances and preparations. The experimental work consisted primarily of acute toxicity, in-vitro and in-vivo mutagenicity, skin and eye irritation and in-vitro toxicology. The experimental research was directed toward the validation and development of new testing methods mostly under contract with the EU.
As head of the department I was member of the Dangerous Substances Committee, member of the Registration Committee for Pesticide Formulations and invited expert at the Supreme Health Council, expert to the cabinet of the minister of health for all policy issues regarding dangerous substances and member of the Scientic Advisory Committee for Toxicology and Ecotoxicology of the EU.

Head of the toxicology information centre, Institute of Hygiene and Epidemiology, Brussels (1980-1984).
This department was the growing core for the toxicology department described above. The most important activities were the development of a database for toxicological information on chemicals in collaboration with the EU and the UNEP (IRPTC), the elaboration of data sheets for the EU labelling programmme and the development of computerised expert programmes such as the automatic health hazards labelling system (used by EU as a basis for the development of its own expert programme).

National inspector for the accreditation of clinical biology laboratories, Institute of Hygiene and Epidemiology, Brussels, Belgium (1979-1980).
This function consisted of the further elaboration of the Belgian accreditation system for clinical laboratories and to perform inspections to judge clinical biology laboratories on their quality and compliance with accreditation requirements.

Head of the department of mass spectrometry and drug metabolism, Continental Pharma, Brussels, Belgium (1976-1979).
The identification by GC-MS of intermediate products in chemical synthesis in the discovery of new drugs and the study of the pharmacokinetics and metabolism of new drugs. Studies were performed on rats, mice, rabbits and Rhesus monkeys. As head of the department I was member of the Scientific Council of the company to give advice on the registration strategy of newly developed drugs in the UK, France, Germany, The Netherlands, Italy, Spain and Japan.

Assistant professor in toxicology, school of pharmacy, University of Ghent, Belgium (1972-1976).
Beside the PhD work assistance to the lecturing programmes of forensic, clinical and analytical toxicology to students of the last year M.S pharmacy, industry pharmacy, hospital pharmacy, clinical biology and criminology. I was also responsible for the toxicological analyses to be performed for the emergency unit of the University hospital and for the medical examiner of the district of Ghent.

Resident in the analytical laboratory for intoxication emergencies at night, department of toxicology, University of Ghent, Belgium (1971-1972).
This last year pharmacy student residency work consisted of the analysis of drugs and chemicals in blood, urine and gastric content of intoxicated patients admitted in the university hospital of the state university at Ghent.

International representations
Belgian delegate at the EU for the Directives on the classification of paints and varnishes (1980-1982).
Belgian delegate at the EU for the Directive on the classification of solvents (1980-1983).
Belgian delegate at the EU for the development of the official toxicology testing guidelines (Annex V of the EU Directive on dangerous substances) (1980-1989).
Expert of the EU for the development of the Directive on the classification of dangerous preparations (1982-1988).
Chairman of the Council of the EU meetings on the classification and labelling of dangerous substances and preparations (1987).
Belgian delegate at the EU for the development of the labelling guide (Annex VI of the EU Directive on dangerous substances) (1981-1983).
Belgian delegate at the IPCS meeting for the development of the Environmental Health Criteria documents on tetrachloroethylene, dichloromethane, and epichlorohydrine (1983).
Belgian delegate at the IPCS meeting for the EHC working programme (1984, 1987).
Belgian delegate at the IPCS meeting for the development of the Environmental Health Criteria documents on ethylene oxide and propylene oxide (1985).
Belgian delegate at the Management Committee and the Chemicals Group of OECD, including the high level meeting in 1982 as advisor to the Minister of Health (1981-1984).
Belgian delegate at all the EU meetings on the classification and labelling of dangerous substances (1984-1989).
Belgian delegate at the WHO/EUR meeting on the prioritisation of air pollutants (1984).
Member of the IRPTC working groups for the development of the IRPTC dangerous chemicals database (1985-1986).
Belgian delegate at the OECD working group for the adaptation of test methods in acute toxicology(1986).
Member of the EU working group for the development of alternative test methods for skin irritation (1987-1988).
Belgian delegate at the IPCS steering group for the development of the International Chemical Safety Card (ICSC) system (1986).
Belgian delegate at the EU steering committee for the reactivation of toxicological research in Europe(1987).
Belgian delegate at the OECD meeting on existing chemicals (1987).
Host and rapporteur of the IPCS working group for the ICSC project (1988).
Member of the Scientific Advisory Committee on Toxicology and Ecotoxicology of the EU (1988-1989).
Member of the ECETOC (European chemical industry centre for toxicology and ecotoxicology) task force on skin irritation (1988-1989).
Member of the CEFIC toxicology working group of the plasticizers sector group, ECPI (1989-1997).
Chairman of the ECETOC task force on pharmacokinetics and metabolism (1991-1992).

CEFIC representative at the EU for all the meetings on the classification and labelling of chemicals (1990-1992).
ECETOC representative at the IARC meeting on mechanisms of carcinogenicity (1991).
CEFIC representative at the meeting of the OECD clearing house on harmonisation of classification systems (1992).
Member of the AIHC (USA) working group on the international harmonisation of carcinogenicity risk assessment (1993-1994).
WTR (World Association of the Rubber Chemicals Industry) representative at the EU meetings on classification and labelling of dangerous substances (1994-1997).
CEFIC representative at the EU meetings on the informatics of EUCLID, EU database on hazards of existing chemicals (1995).
Member of the CEFIC working group on the product information aspects (PIA) (1995-1997).
Member of the CEFIC working group on the international harmonisation of classification systems (1995-1997).
Chairman of the CEFIC subgroup on the international harmonisation of classification on the basis of acute toxicity (1995-1997).
Member of the CEFIC subgroup on the international harmonisation of classification on the basis of chronic toxicity, reproductive toxicity and carcinogenicity (1995-1997).
AIHC representative at the IARC monograph meeting on carbon black and nitroaromatics (1995).
Member of the ECETOC task force on reproductive toxicology (1996-1999).
ECPI representative of a CESIO task force to inform OSPAR member states on the progress made in phthalate oestrogenicity research (1996).
Member of the ECETOC task force on endocrine modulation (1997-).
Member of the ECPA toxicology expert group (1998-).
Chairman of the ECPA toxicology subgroup on safety assessment of GM foods and feeds (1999-).

Patents

Patent holder of US patent for the invention of a new medicine no 4,639,468 of 01/27/1987: Derivatives of glycinamide, their preparation and their use.

Publications (full text)

GLC - determination of cantharidin in post-mortem samples.
Martens F., Martens M., Van der Auwera C. and Heyndrickx A.
Bulletin of the International Association of Forensic Toxicologists, 10, 3 (1974).

Toxicological analysis of human biological material after dimethoate poisoning.
Martens, M., Martens F. and Heyndrickx A.
Mededelingen Faculteit van de Landbouwwetenschappen, 39, 2 (1974).

Systematic identification of unknown drugs in powder form by means of U.V.-spectrometry in forensic toxicology.
Martens, M. Martens F., Maenhout P. and Heyndrickx A.
Analytical Chemistry, 47, (3), 458 (1975).

Systematische identificatie van onbekende farmaceutische vormen door middel van hun morfologische kenmerken.

Martens M. Heyndrickx A. en Van Den Broecke O.
Farmaceutisch tijdschrift voor België, 2, 85 (1975).

Analysis of paraquat in aqueous solutions by pyrolysis gaschromatography.
Martens M. and Heyndrickx A.
Journal de pharmacie de Belgique, 5, 444 (1974).

Determination of paraquat in urine by pyrolysis gaschromatography.
Martens M. and Heyndrickx A.
Journal de Pharmacie de Belgique, 5, 449 (1974).

The analysis of paraquat in biological samples by means of combined gaschromatography - mass fragmentography.
Martens M., Van Peteghem C. and Heyndrickx A.
Mededelingen Faculteit Landbouwwetenschappen, 40(2), 1149 (1975).

Determination of pyrithyldione in highly purified post-mortem samples by selective extraction method and GC-analysis on a OV 225-column.
Martens F., Martens M., Demeter J. and Heyndrickyx A.
Journal of Pharmaceutical Sciences, 65, (9), 1393 (1976).

The significance of the RbBr-NFID, equipped with a gate electrode in the analysis of halogenated dithiocarbamate derivatives.
Martens F., Martens M., Soylemezoglu T. and Heyndrickx A.
Journal of Chromatography, 140, 86 (1977).

Analysis of paraquat in 1 ml blood samples by means of GC-NFID.
Martens M., Martens F. and Heyndrickx A.
Clinical Toxicology, Proceeding of the 18th EST-meeting, W.A.
Duncan, ed., Excerpta Medica, Amsterdam, 1977, p. 183.

Toxicologie en behandeling van paraquatintoxicaties.
Martens M. en Heyndrickx A.
Farmaceutisch Tijdschrift voor België 55 (1), 61 (1978).

Mass spectral characterisation of the glucuronic acid conjugate of a metabolite of suloctidil in the Rhesus monkey.
Martens, M., Roncucci R., Simon M. J., Debast K. and Lambelin G.
European Journal of Drug Metabolism and Pharmacokinetics, (4), 223 (1978).

The determination of CP 751 S in rat plasma by means of mass fragmentography.
Martens M., Claeys M., Roncucci R., Roba J., De Leenheer and Roncucci eds., Elsevier Scientific publishing Cy, Amsterdam 1978, p. 379.

Identification of the metabolites of suloctidil in human plasma.
Martens M., Cautreels W., Roncucci R., Debast K. and Lambelin G.
Quantitative Mass Spectrometry in Life Science II, De Leenheer and Roncucci eds., Elsevier Scientific publishing Cy, Amsterdam, 1978, p. 323.

Isolation and identification of the chloroform soluble urinary metabolites of suloctidil in man. Roncucci R., Cautreels W., Martens M., Gillet C., Debast K. and Lambelin G. Recent Developments in Mass Spectrometry in Biochemistry and Medicine, vol. II, A. Frigerio, Plenum Publishing Corp.,New York (1979).

Are stable sulphenic acids possible metabolites of suloctidil?
Cautreels W., Martens M., Roncucci R., Gillet G., Debast K. and Lambelin G.
Recent Developments in Mass Spectrometry in Biochemistry and Medicine, vol. II, A. Frigerio, Plenum Publishing Corp., New York (1979) p. 85.

A computer programme for the labelling of dangerous substances.
Jacobs, G., Martens M. and Hulsen L.
"Safe Use of Solvents", proceedings of the International Symposium on the Safe Use of Solvents, University of Sussex, Brighton, U.K, A. J. Collings and S. G. Luxon eds., Academic Press, London (1982).

Toepassing van een informatiesysteem voor het opstellen van waterkwaliteitsnormen.
Martens M., Aerts J., Jacobs G. en Hulsen L.
Water, (12), 181 (1983).

Accidental Environmental pollution of a residential quarter of Kortrijk by a chromic trioxide aerosol.
Beernaert H., Vandermijnsbrugge F. and Martens M.
Bulletin of Environmental contamination and Toxicology, 33, 163 (1984).

Some thoughts on a possible regulatory approach at EEC level on the classification and labelling of dangerous preparations.
Martens M., Mosselmans G., Fumero S., Jacobs G. and Lafontaine A.
Regulatory Toxicology and Pharmacology 4, 145 (1984).

Simple reversed-phase high performance liquid chromatographic determination of antipyrine in rabbit plasma for pharmacokinetic studies.
De Beer J., Jacobs G. and Martens M.
Journal of Chromatography, Biomedical applications, 307, 475 (1984).

Selecting optimum dosage volumina for eye irritation tests in the rabbit.
Jacobs G., Martens M. and De Beer J.
Ocular and Cutaneous Toxicology, 6 (2), 109 (1987).

Evaluation of the test method for skin irritation as prescribed by OECD and EEC.
Jacobs G. and Martens M.
Ocular and Cutaneous Toxicology, 6, (3), 215 (1987).

Proposal of limit concentrations for skin irritation within the context of a new EEC-Directive on the classification and labelling of preparations.
Jacobs G. and Martens M.
Regulatory Pharmacology and Toxicology, 7. 370 (1987).

Validation of the uridine uptake inhibition assay in cultured human hepatoma cells.
Dierickx P. and Martens M.
Belg. Arch. Soc. Gen. Hyg., Arbeidsgen, en Ger., 44, 470 (1987).

Evaluation of the in-vitro uridine uptake inhibition assay in comparison with the in-vivo eye irritation test as prescribed by the EC.
Jacobs G., Dierickx P and Martens M.
ATLA, 15, 290 (1988).

An objective method for evaluation of in-vivo eye irritation.
Jacobs G. and Martens M.
Food and Chemical Toxicology, 27, (4), 255, (1989).

Enucleated eye test: comparison between ultrasonic and optic pachometer.
Jacobs G and Martens M.
Toxicology In-vitro, 2 (4), (1988).

Mixture risk assessment - A case study of Monsanto experiences.
Nair R., Dudek R., Grothe D., Johannsen F., Lamb I., Martens M., Sherman J. and Stevens, M.
Food and Chemical Toxicology, 34, 1139 (1996).

An evaluation of the carcinogenic potential of the herbicide alachlor to man.
Heydens W., Wilson A., Kier L., Lau H., Thake D. and Martens M.
Human and Experimental Toxicology, 18, 363 (1999).

Human ocular effects from self-reported exposures to Roundup herbicides.
Acquavella J., Weber J., Cullen M., Cruz O., Martens M., Holden L., Riordan S., Thompson M. and Farmer D.
Human and Experimental Toxicology, 18, 479 (1999).

Pneumonitis and herbicide exposure
Goldstein D.A., Johnson G., Farmer D., Martens M.A., Ford J.E. and Cullen M.R.
Chest, 116(4), 1139-40 (1999)

Safety evaluation of genetically modified foods.
Martens M.
Int. Arch. Occup. Environ. Health, 73, Suppl. S14-8 (2000)

An assessment of in vivo estrogenic activity of butyl benzyl phthalate and its principal mammalian metabolites.
Brady A.M., Moffat G.J., Hall M.G., Martens F.K., Martens M.A. and Nair R.
Toxic Substance Mechanisms, 19, 1-24 (2000)

Abstracts of posters or presentations

The toxicological analysis of paraquat in post-mortem samples by means of pyrolysis GC-MS
Martens M.

Proceedings of the international symposium of TIAFT, Ghent, Belgium (1976).

Metabolic fate of suloctidil in Rhesus monkeys and humans.
Roncucci R., Simon M. J., Martens M., Debast K. and Lambelin G.
Proceedings of the Nationaal Congres van het Genootschap voor Farmaceutische Wetenschappen, Wilrijk, Belgium (1977).

The GC-MS-analysis of unchanged suloctidil in plasma and urine.
Martens M. Roncucci R., Debast K. and Lambelin G.
Proceedings of the 4th International Symposium on Mass Spectrometry in Biochemistry and Medicine, Riva del Garda, Italy (1977).

Ex-vivo platelet anti-aggregating activity of suloctidil after I.V.-administration in man.
Roncucci R., Lansen L., Scheen A., Luyckx A. Martens M., Delwaide P., Van Stalle F. and Lambelin G.
Abstract, "5th International Congress on Thromboembolism", Bologna, Italy (1978).

Identification of the water soluble metabolites of suloctidil in Rhesus monkey and in man.
Martens M., Cautreels W., Debast K. and Roncucci R.
Abstract, symposium on conjugation reactions in drug biotransformation, Turku, Finland, A Aitio ed., Elsevier Biomedical Press, Amsterdam (1978).

Quantitative analysis of (±) erythro-1- (thiochroman-6-yl)-2-octyl-amino-1-propanol in human body fluids by capillary GC-MS.
Cautreels W., Martens M., Debast K. and Roncucci R.
Poster, 8th International Mass Spectrometry Conference, Oslo, Norway (1979).

Comparative study of the time course of ex-vivo antiaggregating activity and pharmacokinetic parameters of suloctidil after I.V.-administration in man.
Roncucci R., Lansen J., Scheen A., Luyckx A., Martens M., Delwaide P., Van Stalle, F. and Lambelin, G.
Thrombosis and Haemostasis, 42(91), 473, abstract no 1158, 7th International Congress on Thrombosis and Haemostasis, London (1979).

Korte termijntesten voor de opsporing van mutagene en/of kankerverwekkende eigenschappen van scheikundige stoffen in de Belgische en de Europese wetgeving.
Martens M.
Report of F.G.W.O.-contactgroep, Institute of Pathology, University of Liege (1982).

Evaluation critique de l'essai d'irritation de la peau chez le lapin tel que prescrit par la Directive 79/831/CEE relative à la classification, l'étiquetage et l'emballage des produits dangereux.
Jacobs G. et Martens M.
Poster "Congrès Annuel de Recherche Dermatologique", Brussels, Belgium (1985).

ISOTOX, an information system on toxic chemicals.
Aerts J., Bonnyns E., Jacobs G., Roosels D. and Martens M.
1st International Workshop on Databanks in Occupational Health, Varese, Italy (1986).

Drainage kinetics of sodium fluorescein in the rabbit eye.
Jacobs G., Martens M. and De Beer,J.
"III World Congress of the World Federation of Associations of Clinical Toxicology and Poison Control Centres, Brussels, Belgium (1986).

Management of Information on Toxic Chemicals.
Bonnyns E., Aerts J., Jacobs G., Roosels D. and Martens M.
Proceedings of the MOHI-Conference, Manchester, U.K. (1987).

Accidental chemical injury to the eye: a survey in collaboration with the Belgian ophthalmologists.
Mostin M., Tissot B., Jacobs G. and Martens M.
Proceedings of the 1st scientific meeting of the Belgian Society of Toxicology, Brussels, Belgium (1989).

A comparison of animal skin irritation data with human cutaneous blood flow results.
Castellazzi A., Jacobs G. and Martens M.
Proceedings of the 1st scientific meeting of the Belgian Society of Toxicology, Brussels, Belgium (1989).

Validation of the enucleated eye test against the in vivo eye irritation test in rabbits.
Jacobs G. and Martens M.
Proceedings of the 1st scientific meeting of the Belgian Society of Toxicology, Brussels, Belgium (1989).

Effects of chemicals in the rabbit eye and their interrelationships.
Jacobs G. and Martens M.
Proceedings of the 1st scientific meeting of the Belgian Society of Toxicology, Brussels, Belgium (1989).

Up-and-down method as an alternative to the EC-method for acute toxicity testing.
Bonnyns E., Delcour M.P. and Martens M.
Proceedings of the 1st scientific meeting of the Belgian Society of Toxicology, Brussels, Belgium (1989).

Overview of experimental methods in cutaneous toxicology.
Martens M.
Proceedings of the 3rd meeting of the Belgian Society of Toxicology, Liege, Belgium (1991).

Les études mécanistiques dans l'evaluation toxicologique, l'exemple de l'Alachlore.
Martens M, Wilson A, Li A., Kier L., Heydens W. and Ward D.
Proceedings, French Toxicology Society meeting, Tours, France (1992).

Example of a health risk assessment: The hypothetical compound Clopil.
Martens M.
Proceedings, Risk Assessment Seminar of the American Occupational Health Conference, Atlanta, GA, USA (1993).

Epidemiologic studies of morbidity and mortality among Alachlor manufacturing workers.
Acquavella J., Ireland B., Leet T., Anne M., Farrell T. and Martens M.
Proceedings, XII Joint CIGR, IAAMRH, IUFRO International Symposium on Health and Ergonomic Aspects of Safe Use of Chemicals in Agriculture and Forestry, Kiev, Ukrain (1993).

Comparison of benchmark doses (BMD) with no-observed-adverse-effect levels (NOAELs) and low-observed-adverse-effect levels (LOAELs) for selected subchronic toxicity studies conducted by Monsanto.
Ekuta J., Martens M., Stevens M and Nair R.
Proceedings of the American Society of Toxicology, The Toxicologist, 14(1), 401, abs no 1588 (1994).

Comparison of BMD with NOAEL and LOAEL values derived from subchronic toxicity studies.
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Proceedings of the European Society of Toxicology, Archives of Toxicology, Suppl. 17, 44 (1994).

Chairman of the European Society of Toxicology symposium on bench mark dose (BMD), Basle, Switserland (1994).
Martens M.
Proceedings of the European Society of Toxicology, Archives of Toxicology, Suppl. 17, 35 (1994).

Screening and ranking of health hazards in environmental stewarship programs.
Stevens M., Nair R., Martens M., Kimerle R. and Noble R.
Proceedings of the American Society of Toxicology, The Toxicologist, 15(1), 34, abs no 186 (1995).

Risico-evaluatie van bestrijdingsmiddelen voor de gezondheid van de mens.
Martens M.
Proceedings of the KVIV (Royal Flemmish Engineering Society), Antwerp (1997).

Safety assessment of transgenic foods.
Martens M.
XXXVI European Congress of Toxicology, Aarhus, Denmark (1997)

Saftey assessment of transgenic crops.
Martens M.
Proceedings of the conference on “Efficacy and Safety of Biotechnology Products”, Royal Irish Academy, Dublin, Ireland (1998).

The critical comparison of several approaches of exposure assessment in the risk assessment of pesticide applicators: the example of alachlor.
Martens M., Gustin C. and McKenna R.

Proceedings of the WHO/ILO/IAAMRH conference “Evironmental, occupational health and safety in agriculture on the boundary of two millenia”, Kiev, Ukrain (1998).

Evaluatie van allergene effecten in de praktijk.
Martens M.
Proceedings of the symposium "Biotechnologie en Voedselallergie", Sichting Consument en Biotechnologie en de Nederlandse Voeselallergie Stichting, Amsterdam, The Netherlands (1998)

Lack of developmental/reproductive effects with low concentrations of butyl benzyl phthalate in drinking water in rats.
Nair R., Jekat F., Waalkens-Berendsen D., Eiben R., Barter R. and Martens M.
Proceedings of the American Society of Toxicology meeting, New Orelans, LA, USA (1999)

Lack of effects on male reproductive parameters in rats by perinatal diethylstilboestrol (DES) exposure at maternally toxic levels in drinking water.
Jekat F., Waechter J., Nair R., Breslin W., Waalkens-Berendsen D., Barter R., Dimond S., Butala, J., Cagen S., Joiner R., Martens, M., Shiotsuka R. and Veenstra G.
Proceedings of the American Society of Toxicology meeting, New Orelans, LA, USA (1999)

Philosophy of the hazard assessment of GM foods.
Martens M.A.
Proceedings of the International Symposium : « Human exposure to pesticide residues, natural toxins and GMOs », Brighton, 13 November 2000, p57.

Glyphosate formulations are not genotoxic: mechanistic investigations of published findings
Heydens W.F., Hotz K.J., Farmer D.R., Kier L.D., Martens M.A. and Wilson A.G.E.
Abstract, Proceedings of the American Society of Toxicology, San Francisco, March 2001.

Safety assessment of novel foods and GM foods in particular
Martens, M.A.
Abstract, Proceedings of the annual meeting of the German Environmental Mutagenesis Society (GUM), Karlsruhe, 25-28 September 2001.

Aperçu général des méthodes expérimentales pour la détection de la modulation endocrinienne chez les maamifères
Martens, M.A.
Abstract, 2 ième Jounées Internationales de Toxicologie Hospitalière, Liège, 25-26 October 2001.

[redacted]

EXHIBIT 2

MONSANTO
Food · Health · Hope™

FROM: Stephen G. Rogers – Cereon (2165)
(NAME, LOCATION, PHONE)
[EMBED MSDraw * MERGEFORMAT]
DATE: JANUARY 3, 2002 **CC:** B. D. Vineyard O2B

SUBJECT: Mark Martens Appointment to Fellow
To: Jerry Hjelle
Bill Heydens

The Fellow Program Nominations Promotions Review Committee has reviewed the nomination you have submitted and has recommended the appointment of Dr. Mark Martens to the position of Fellow in the Monsanto Fellow's Program.

We found Mark's key strengths to be:

- Broad toxicology expertise, ingenuity, persuasiveness and external recognition by scientific societies and regulators
- A "hands-on" scientist who develops the strong scientific basis for regulatory decisions and for maintaining key regulatory approvals
- Consistent delivery on key scientific issues which impact/protect Monsanto's bottom line with expected continued major technical contributions

We found that the most important contributions Mark has made to the organization in support of this recommendation to be:

- Co-developed method to use existing tox data to address risks of complex mixtures
- Prepared effective defense of BPP plasticizer such that a European scientist (Richard Scharpe) retracted a research paper shown to be flawed by work by Mark
- Developed the data to gain key EU scientific support that the reported genotoxicity of Roundup herbicide was due to secondary consequences unrelated to glyphosate, thereby preventing adverse effect on Roundup business
- Developed the scientific positioning for MON 13900 safeners
- Key to the European alachlor registration
- Lead the work for Alachlor reclassification

We look forward to Mark's participation and contributions to the Fellow Program in his continued role in Regulatory. His continued expertise and leadership will be critical to resolving regulatory issues for Monsanto's chemistry products in the future. In addition, we hope Mark will take advantage of his position in the Fellow Program to extend his impact to Monsanto's efforts in acceptance of biotechnology products in Europe.

Please feel free to share this information for coaching and to contact me if you have any questions.

Official notification will go by letter to the new Fellow's home next week.

EXHIBIT 3

Message

From: FARMER, DONNA R [AG/1000] [/O=MONSANTO/OU=NA-1000-01/CN=RECIPIENTS/CN=180070]
Sent: 9/10/2001 5:40:14 PM
To: GOLDSTEIN, DANIEL A [AG/1000] [/O=MONSANTO/OU=NA-1000-01/CN=RECIPIENTS/CN=527246]
Subject: FW: Mutagenicity issue in Finland

See note below from Bill Graham - hmhmhmhm he left me off the e-mail, suggested it be a limited number of people and that they have the opinions and the solutions in Europe. True enough until they get in trouble then come to us to bail them out.....another reason my day is not going so well!!!

So if we are not going to use Dr. Parry - then why did Mark insist we develop a relationship with him? Mark was not managing that well and that almost landed us with Parry calling glyphosate genotoxic....so we had to do these additional studies to make him happy and if it had not been for Larry Kier we would be in dog.....

Donna

-----Original Message-----
From: MARTENS, MARK A [AG/5040]
Sent: Monday, September 10, 2001 4:02 AM
To: GRAHAM, WILLIAM [AG/5040]; JORGENSEN, AKSEL [AG/5150]; GARNETT, RICHARD P [AG/5040]; FARMER, DONNA R [AG/1000]
Subject: RE: Mutagenicity issue in Finland

Bill,

The BBA is not aware of our findings of the artefactual outcomes of ip injection. We could meet with authorities and explain. I would rather refer to dr Parry in a conversation with the authorities and not mobilise Parry to resolve an issue directly between us and authorities.

Regards, Mark.

-----Original Message-----
From: GRAHAM, WILLIAM [AG/5040]
Sent: Friday, September 07, 2001 7:11 PM
To: MARTENS, MARK A [AG/5040]; JORGENSEN, AKSEL [AG/5150]; GARNETT, RICHARD P [AG/5040]
Subject: RE: Mutagenicity issue in Finland

One of the problems with email - everyone can start running around looking for solutions.

Can we keep this to a limited number of people as we have the opinions and the solutions in Europe.

Bill

-----Original Message-----
From: FARMER, DONNA R [AG/1000]
Sent: Friday, September 07, 2001 6:28 PM
To: MARTENS, MARK A [AG/5040]; JORGENSEN, AKSEL [AG/5150]; GRAHAM, WILLIAM [AG/5040]; GARNETT, RICHARD P [AG/5040]
Cc: ZETTERSTRAND, MATTIAS [AG/6055]; TOLL, JOHAN [Non-Pharmacia/6055]; HEYDENS, WILLIAM F [AG/1000]
Subject: RE: Mutagenicity issue in Finland

Mark/Aksel,

Once you find out what the authorities concerns are....would/could Dr. Parry interface with the authorities? Or how about the BBA as they did that whole review?

Donna

-----Original Message-----
From: MARTENS, MARK A [AG/5040]
Sent: Friday, September 07, 2001 11:09 AM
To: JORGENSEN, AKSEL [AG/5150]; GRAHAM, WILLIAM [AG/5040]; GARNETT, RICHARD P [AG/5040]
Cc: ZETTERSTRAND, MATTIAS [AG/6055]; TOLL, JOHAN [Non-Pharmacia/6055]; HEYDENS, WILLIAM F [AG/1000]; FARMER, DONNA R [AG/1000]
Subject: RE: Mutagenicity issue in Finland

Dear all,

We know the Italian studies (with MON 35050) from Bolognesi and Peluso. The tests have been conducted with a glyphosate formulation containing a surfactant which is different from the one in "classic" Roundup i.e. alkylsulphate. In these studies there were indications of oxidative damage to liver and kidney DNA after the intraperitoneal injection of mice. We conducted studies in the US where mice were injected with the same formulation (with and without glyphosate) and could demonstrate that the observed effects were not due to glyphosate but to the surfactant in combination with a vehicle (DMSO/olive oil) that caused the precipitation of the surfactant onto the liver and kidney capsules. All these results have been openly discussed with prof. Parry, an authority in the field of mutagenicity in the UK and who fully agrees with us that this finding is an artefactual effect and in no way demonstrates the mutagenicity of glyphosate. We are now preparing a publication to address the issue and I will also explain this in my presentation on the toxicology of surfactants at the Techdays2001 in Brussels.

Regards, Mark.

-----Original Message-----
From: JORGENSEN, AKSEL [AG/5150]
Sent: Friday, September 07, 2001 9:42 AM
To: GRAHAM, WILLIAM [AG/5040]; GARNETT, RICHARD P [AG/5040]; MARTENS, MARK A [AG/5040]
Cc: ZETTERSTRAND, MATTIAS [AG/6055]; TOLL, JOHAN [Non-Pharmacia/6055]
Subject: Mutagenicity issue in Finland

Now the mutagenicity discussion concerning Roundup is running again.
This time it is Finland.
From our Finish distributor, Kemira, I have got following message:

"The most commonly used pesticide Roundup need to be reevaluated. National Product Control Agency for Welfare and Health requires Monsanto more information about possible genotoxic effects. Authorities do not have any possibilities for the own research. According to an Italian study glyphosate is genotoxic. NPCAWH will get more information about this topic from Monsanto. At the end of January 2002 authorities will decide if they will have data enough to evaluate the genotoxic effects of Roundup. In case the poison will be recognized genotoxic, NPCAWH will suggest the ban of the use of Roundup"."

I will secure that we during today (or Monday), are getting the information from the authorities concerning what they want from our side, in order to be able to make their evaluation.
Most probably we have to make a meeting with the relevant people up there in the nearest future.
I will keep you informed.

Aksel

EXHIBIT 4

Message

From: WILSON, ALAN G E [PHR/1000] [/O=MONSANTO/OU=NA-1000-01/CN=RECIPIENTS/CN=101608]
Sent: 9/2/1999 7:34:13 PM
To: FARMER, DONNA R [FND/1000] [/O=MONSANTO/OU=NA-1000-01/CN=RECIPIENTS/CN=180070]
Subject: RE: Comments on Parry write-up

Donna,

If Larry has the time that would be great, but be careful we don't get into another Cantox situation, that could take some time wordsmithing and reaching consensus. I certainly think it would be valuable to resolve points of clarity. Maybe you should invite Perry to St. Louis to get him more familiarized with the complete database. I know they've cut back on your outreach, but if Jerry is serious about this then it will need some priority, since this has drifted on for some time. Good luck, let me know if I can be of help.

Alan

-----Original Message-----
From: FARMER, DONNA R [FND/1000]
Sent: Thursday, September 02, 1999 2:24 PM
To: WILSON, ALAN G E [PHR/1000]
Subject: RE: Comments on Parry write-up

Alan,

One option...I agree we need someone else to interface with Perry...right now the only person I think that can dig us out of this "genotox hole" is the Good Dr. Kier....

other option....I am concerned about leaving Perry out there with this as the final project/his final impressions.....if you remember his first report...he was looking for work for a graduate student (I wonder if this evaluation was his or someone else's?)

Maybe you, Bill, Larry, Steve and I can get together to figure out where and how we go from here...Steve's opinion of the report was pretty clear....he also suggested as an option to drop Perry.

Donna

-----Original Message-----
From: WILSON, ALAN G E [PHR/1000]
Sent: Thursday, September 02, 1999 1:30 PM
To: FARMER, DONNA R [FND/1000]
Subject: RE: Comments on Parry write-up

Donna,

Two options work closely with Parry (i.e. someone other than Mark) or get someone else.

alan

-----Original Message-----
From: FARMER, DONNA R [FND/1000]
Sent: Thursday, September 02, 1999 12:56 PM
To: WILSON, ALAN G E [PHR/1000]
Subject: FW: Comments on Parry write-up

Alan,

FYI,

Donna

-----Original Message-----
From: WRATTEN, STEPHEN J [FND/1000]
Sent: Tuesday, August 31, 1999 5:17 PM
To: MARTENS, MARK A [FND/5045]; FARMER, DONNA R [FND/1000]
Cc: KIER, LARRY D [NCP/1000]; HEYDENS, WILLIAM F [FND/1000]; GRAHAM, WILLIAM [FND/5040]
Subject: Comments on Parry write-up

Mark and Donna

I was somewhat disappointed in the Parry report, not particularly from his conclusions but just the way they're presented. The style and rather casual lack of completeness and preciseness would make it hard to circulate this around to anyone as supporting information. Has he ever worked with industry before on this sort of project?

I will mail the marked-up paper back to you, but some other general comments need to be made:

1. It is odd that the one study by BioAgri is discussed right on the first page in rather extensive detail but none of the others are. I understand that he didn't like this one, but it is still strange to read this way.

2. The whole report could benefit from a couple of introductory paragraphs about what he was asked to do and what he received as far as reports. Did he have all the Monsanto reports as well as the literature articles? Was he asked to compare these, evaluate the methods, explain the differences, identify any faults, or what?

3. Some where the report needs to identify the full citations of each report evaluated and give the full Literature references for the public documents. Also the test material should be clearly identified, ideally by both MON number and brand name if needed, but at least to say which are glyphosate and which are formulations - this is done, sort of, but not as clearly as I'd like. Separate tables would be good.

4. He has an odd way of starting all conclusions with a negative - ie., points 2, 3, and 4 on page 3. Couldn't the sentence structure be modified to be less awkward? When he says "no data were provided..." time and again, it makes it sound as though he was suspicious that there were data but he didn't get them. I know this is not the intent, but it could be cleaned up.

5. Table 1 seems to state repeatedly that "there was no evidence of xxx mutagenicity". It would be more powerful if it said "there was convincing evidence that glyphosate does not act as a xxx mutagen". "no evidence of" is a very weak way of stating a conclusion.

6. He says very little about the literature reports. So little that one almost forgets about them. Can he not provide some critique about their quality and methodology as compared to the Monsanto reports? Are they included in or excluded from the statement in the first paragraph sentence "these studies were performed to a high standard and to OECD recommended guidelines"? In the section entitled "Assessment of the published..." on p. 2, I am hard-pressed to find any assessment. It is almost merely a listing of what everyone already knew from casually reading the abstract.

7. In his conclusions (p. 2), do the "studies evaluated" (line 2) include the literature reports or not? IN other words, is he saying that none of the studies (Monsanto plus literature) had evidence of glyphsoate genotoxic potential, or is he limiting this conclusion to the Monsanto studies?

8. Of course we know there were no data of the type listed in points 2, 3, and 4 on p. 3. We didn't need him to tell us that. The key point is whether the conclusions of Bolognesi, and Rank can be discounted on the basis of the strength and number of studies at hand, or whether their experiments need to be repeated independently to credibly refute the findings. Of course we knew that the latter would be the most convincing approach, but we need him to make any arguments that can be made on the data we have.

Overall, I guess we have his recommendation of studies that could be used to strengthen the database on p. 4. , but that is about it. I do not see that he has stuck his neck out on anything at all controversial, and therefore, there is little value in the write-up as written that could be useful. Hope it didn't cost much. Perhaps this is too harsh, and I don't know what your proposal to him was, but I guess I would expect more than this of a Professor.

Steve

Steve Wratten
694-1582 (voice)
694-4028 (fax)

EXHIBIT 5

Evaluation of the potential genotoxicity of Glyphosate, Glyphosate mixtures and component surfactants

James M. Parry

Centre for Molecular Genetics and Toxicology

School of Biological Sciences

University of Wales Swansea

Swansea SA2 8PP, UK

Introduction

The available data concerning the potential genotoxic activity of glyphosate, glyphosate mixtures and surfactants have been evaluated and the results of the evaluation are presented in Tables 1 to 14. Each of the tables reviews the data for the three groups of chemicals grouped according to the type of test system used to assess potential genotoxicity, the effect produce and reference to the appropriate data set.

Conclusions

Evaluation of the genotoxicity of Glyphosate

I. Bacterial mutagenicity (Table 1)

Two comprehensive studies (Scantox 10.9.91-A, Li and Long 1988) provide no evidence of mutagenic activity for glyphosate in *Salmonella typhimurium*.

One study of differential DNA repair in the *Bacillus subtilis* rec assay gave negative results.

I conclude that there was no evidence that glyphosate is genotoxic in bacteria.

II. *In vitro* cytogenetic assays (Table 3)

(a) Chromosomal aberrations

Two studies in human and bovine lymphocytes report positive results over dose ranges up to 170μM following exposure for 72 hrs in the absence of S9 mix (Lioi *et al* 1998a, 1998b).

One negative study in human lymphocytes over a dose range of up to 562μg/ml in both the presence and absence of S9 mix and at sampling times of up to 48 hrs (Notox 141918).

Note: the Lioi *et al* studies present a combined data set of experiments from 3 separate donors.

One negative study in *Allium cepa* root tips has been reported.

(b) Sister chromatid exchange

Two studies report positive results in human and bovine lymphocytes over dose ranges of up to 170μM following exposure for 72 hrs in the absence of S9 mix (Lioi *et al* 1998a, 1998b).

Evaluation. There is published evidence that glyphosate shows clastogenic activity following 72 hrs exposure of both bovine and human lymphocytes (Lioi *et al* 1998a, 1998b).

In my view there is a need to repeat the studies of Lioi *et al* to a comprehensive protocol to clarify the potential clastogenic activity of glyphosate.

III. Point mutation in cultured mammalian cells (Table 5)

Negative results are reported in both the Tk assay using mouse lymphoma cells (up to 5000µg/ml) and the HGPRT assay using Chinese hamster cells (up to 22500 µg/ml) in both the presence and absence of S9 mix (Scantox 10.9.91-B, Li and Long 1988).

There is no evidence that glyphosate is a point mutagen in cultured mammalian cells.

IV. In vivo chromosome studies in rodents. (Table 6)

a) Rat bone marrow cytogenetics assay

There is one negative study reported in the bone marrow of rats exposed to 1000mg/kg bw (Li and Long 1988),

b) Mouse bone marrow micronucleus assay.

There are two negative studies at concentrations of up to 5000mg/kg bw available for evaluation (Rank *et al* 1993, Scantox 12.9.91) However, in neither study is there substantive evidence of bone marrow toxicity.

There is one positive study at 300mg/kg with multiple dosing, sampled at 24hrs (Bolognesi *et al* 1997). However, this study only involved the use of 4 animals per dose point however bone marrow toxicity was observed.

Evaluation. There are conflicitng results concerning the bone marrow activity of glyphosate which can only be resolved by repeating the Bolognesi *et al* (1997) study.

V Dominant Lethal Study (Table 10)

There is one negative dominant lethal assay involving exposure of male mice of concentration up to 200mg/kg bw (RD 300, SRRS L1147)

Evaluation. There is no evidence that glyphosate is capable of inducing dominant lethal mutations in mouse male germ cells.

VI Miscellaneous Endpoints (Table 8)

a) G6PD activity

Two studies demonstrate increases in G6PD activity (as a marker of a pro-oxidant state) in human and bovine lymphocytes at concentrations of up to 170μM (Lioi *et al* 1998a, 1998b). G6 PD activity was reduced in presence of an antioxidant.

Note : no genetic endpoint was measured in these studies.

b) Induction of 8-OHdG

One study demonstrates the production of 8-OHdG (as a marker of oxidative damage) in the liver of mice exposed to glyphosate (Bolognesi *et al* 1997)

c) Induction of DNA damage measured by alkaline elution

One study demonstrates the production of single strand breaks in liver and kidney of mice following exposure to 300mg/kg bw of glyphosate (Bolognesi *et al* 1997).

d) Induction of DNA adducts measured by ^{32}P post - labelling

One study reports no increase in adducts in the liver and kidneys of mice following exposure to 130 and 270mg/kg of glyphosate (Peluso *et al* 1998)

e) **Hepatocyte DNA repair assay**

One limited study (low concentrations used) reported negative results for its ability of glyphosate to induce repairable DNA assay using rat hepatocytes (Li and Long 1988).

Evaluation. These studies provide some evidence that glyphosate may be capable of inducing oxidative damage under both *in vitro* and *in vivo* conditions

Evaluation of the genotoxicity of Glyphosate mixtures

Bacterial mutagenicity (Table 2)

1) The limited published study (Rank *et al* 1993) showed single dose point increases in mutagenicity of a Glyphosate mixtures in *Salmonella* strains TA98 and TA100.

Four comprehensive studies with glyphosate mixtures of concentration of 31% to 72% (MSL – 11731, MSL – 11729, MSL – 11730, BioAgri G.1.1.050/96) provide no evidence of mutagenic activity in *Salmonella typhimurium.*

Evaluation. In view of the extensive negative data in studies performed to comprehensive protocols I conclude that Glyphosate mixtures are not mutagenic to *Salmonella typhimurium.*.

11) **In vitro cytogenetics (Table 4)**

a) Chromosomal aberrations

There are no available studies involving the analysis of the induction of chromosome aberrations in cultured mammalian cells.

There is one published study in *Allium cepa* root tips reporting positive results (described as being indicative of spindle disturbances) at concentrations greater then 720 µg/ml (Rank *et al* 1993).

b) Sister chromatid exchange

There are two studies reporting positive results in human lymphocytes at concentrations from 100µg/ml to 2500µg/ml (Bolognesi *et al* 1997, Vigfusson and Vysa 1980).

Evaluation. The *in vitro* cytogenetic data for glyphosate mixtures are inadequate for evaluation.

IV ***In vivo* mouse bone marrow micronucleus assay (Table 7)**

There are 5 studies in mouse bone marrow which report negative results for micronucleus induction for various mixtures of glyphosate at concentrations of up to 3400mg/kg bw (Rank *et al* 1993, BioAgri C.1.2-60/96, MSL – 11771, MSL7173, MSL – 1172). However, most of the studies provide only limited evidence of bone marrow toxicity.

There is one positive study of a Roundup mixtures at 450mg/kg bw with multiple dosing and sampled at 24 hrs (Bolognesi *et al* 1997). Bone marrow toxicity was reported in this study but only 3 animals were used per dose point.

Evaluation. Conflicting results concerning the bone marrow activity of glyphosate mixtures can only be resolved by repeating the Bolognisi *et al* (1997) study.

V **Drosophila sex linked recessive lethal mutation assays (Table 11)**

One study provides limited evidence that following larval feeding both Roundup and Pondmaster mixtures produced some positive results in spermatocyte broods (Kale *et al* 1995)

Evaluation. Some limited evidence that Glyphosate mixtures are capable of inducing sex linked recessive mutations in the male germ cells of *Drosophila melanogaster*.

VI **Miscellaneous Endpoints (Table9)**

(a) **Induction of 8-OHdG**

One study demonstrates the production of 8-OHdG (as a marker of oxidative damage) in the liver and kidneys of mice exposed to Roundup mixture (Bolognesi *et al* 1997).

(b) **Induction of DNA damage measured by alkaline elution**

One study demonstrates the production of single strand breaks in the liver and kidney of mice exposed to 300mg/kg bw of Roundup mixture (Bolognesi *et al* 1997)

c) **Induction of DNA adducts measured by ^{32}P post labelling**

One study reports an increase in adducts in the liver and kidneys of mice following exposure to 400, 500 and 600mg/kg bw of Roundup Mixtures (Bolognesi *et al* 1997)

d) **COMET assay**

One study demonstrates the induction of chromosome damage as measures in the COMET assay following exposure of tadpoles to Roundup at concentrations above 27mg/litre (Clements *et al* 1997)

Evaluation. These studies provide some evidence that Roundup mixture produces DNA lesions *in vivo,* probably due to the production of oxidative damage.

Evaluation of the genotoxicity of Surfactants

1) **Bacterial Mutagenicity (Table 12)**

Three comprehensive studies failed to demonstrate any mutagenic activity for the surfactants in bacterial assays (MSL – 10625, MSL – 1538, Hoecht 92.0487).

11) ***In vitro* chromosome aberration assay (Table 13)**

One study failed to demonstrate any significant increase in chromosome aberrations after exposure to Dodigen 4022 at concentrations of up to 6000µg/ml (Hoecht 92.1025).

However, a number of non-significant changes in various parameters were reported. This study should be repeated.

III) **Mouse bone marrow micronucleus assay (Table 14)**

One limited experiment (ML-89-463) produced negative results in mouse bone marrow with MON 0818 at 100mg/kg bw.

Evaluation. The only adequate studies with the surfactants are those involving bacterial mutagenicity assays. There was no evidence that the various surfactants are bacterial mutagens.

Overall Conclusions

1) It is clear from the data provided that with the exception of one limited study (Rank *et al* 1993) there is an extensive range of studies which demonstrate that glyphosate and glyphosate are **not** genotoxic in bacteria.

2) There is published *in vitro* evidence that glyphosate is clastogenic and capable of inducing sister chromatid exchange in both human and bovine lymphocytes (Lioi *et al* 1998a, 1998b).

3) *In vitro* cytogenetic data on glyphosate mixtures are inadequate for evaluation.

4) There are two studies (Scantox 10.9.91, Li and Long 1988) which demonstrate that glyphosate is not a point mutagen in cultured mammalian cells.

5) This is a published study indicating that glyphosate was not clastogenic in rat bone marrow (Li and Long 1988). There are two studies which indicate that glyphosate was not capable of inducing micronuclei in mouse bone marrow (Rank *et al* 1993, Scantox 12.9.99). However, in neither study was there substantive evidence of bone marrow toxicity.

   There is one published study which suggests that glyphosate may be capable of inducing micronuclei in mouse bone marrow when delivered by multiple dosing (Bolognesi *et al* 1997).

6) Five studies report negative results for micronucleus induction in the bone marrow of mice following exposure to glyphosate mixtures. However, these studies provide only limited evidence of bone marrow toxicity. None of the studies were performed to a protocol equivalent to that of Bolognesi *et al* (1997) which gave positive results with glyphosate.

7) There is one dominant lethal study which failed to demonstrate any capacity to induce genotoxicity in mouse male germ cells (RD300, SRRS L1147). However, it should be noted that this is a relatively insensitive methodology.

8) No dominant lethal assay results are available for glyphosate mixtures.

9) No sex-linked recessive lethal assay in *Drosophila* results are available for glyphosate.

10) Following larval feeding, Roundup and Pondmaster mixtures containing glyphosate produced some positive results in spermatocyte broods (Kale *et al* 1995).

11) Glyphosate induced G6PD activity in both bovine and human lymphocytes (Lioi *et al* 1998a, 1998b) and the production of 8-OHdG in mouse liver (Bolognesi *et al* 1997). Both observations indicate that glyphosate may be capable of inducing a pro-oxidant state leading to the formation of the oxidative damage lesion 8-OHdG.

12) A Roundup mixture containing glyphosate was shown to produce 8-OHdG in both the liver and kidneys of mice (Bolognesi *et al* 1997). These observations indicate the Roundup mixture is capable of inducing oxidative damage *in vivo*.

13) Glyphosate failed to induce repairable DNA damage in a limited *in vitro* study in rat hepatocytes (Li and Long 1988).

14) Glyphosate induced single strand breaks *in vivo* in the liver and kidneys of mice (Bolognesi *et al* 1997).

15) Roundup mixture produced single strand breaks *in vivo* in the liver and kidneys of mice (Bolognesi *et al* 1997).

16) Glyphosate mixture but not Glyphosate produced an increase in uncharacterised DNA adducts *in vivo* in the liver and kidneys of mice (Peluso *et al* 1998).

The overall genotoxicity profiles of glyphosate and glyphosate mixtures are illustrated in Figures 1 and 2 respectively.

17) None of the surfactants demonstrated any mutagenic activity in bacteria.

18) There are no adequate data to evaluate the *in vitro* clastogenic activity of surfactants.

19) One limited bone marrow micronucleus assay failed to detect any micronucleus inducing activity with the surfactant MON0818.

Specific evaluation of the genotoxicity of glyphosate

On the basis of the study of Lioi *et al* (1998a and 1998b) I conclude that glyphosate is a potential clastogenic *in vitro*. The study of Bolognesi *et al* (1997) indicates that this clastogenic activity **may** be reproduced *in vivo* in somatic cells. However, the dominant lethal assay (of limited sensitivity) indicates that this genotoxic activity is not reproduced in germ cells. The work of Bolognesi *et al* (1997) and Lioi *et al* (1998a and 1998b) suggests that the genotoxicity observed may be derived from the generation of oxidative damage in the presence of glyphosate.

Specific evaluation of genotoxicity of glyphosate mixtures

In view of the absence of adequate data no evaluation of the clastogenic potential *in vitro* of glyphosate mixtures is possible. In the absence of a micronucleus study to the protocol of that used by Bolognesi *et al* (1997) no adequate assessment of the potential activity of glyphosate mixtures in bone marrow is possible. The available studies do not provide any evidence of genotoxicity in rodent bone marrow. There is some evidence from *Drosophila* to suggest that glyphosate mixtures may have some germ cell activity.

The studies of Bolognesi *et al* (1997) suggests that glyphosate mixtures may be capable of inducing oxidative damage *in vivo*.

Specific evaluation of surfactants

None of the surfactants were capable of inducing mutations in bacteria. No adequate data available to evaluate the *in vitro* or *in vivo* clastogenicity of the surfactants.

Publications utilized in the assessment of the genotoxic activity of glyphosate and glyphosate formulations.

Lioi *et al* (1998a). Genotoxicity and oxidative stress induced by pesticide exposure in bovine lymphocyte cultures *in vitro*. *Mutation Research* **403**, 13-20.

Lioi *et al* (1998b). Cytogenetic damage and the induction of pro-oxidant state in human lymphocytes exposed *in vitro* to glyphosate, vinclazolin, atrazine and DPX-E9636. *Environ. Molec. Mutagenesis* **32**, 39-46.

Rank *et al* (1993). Genotoxicity testing of the herbicide Roundup and its active ingredient glyphosate isopropylamine using the mouse bone marrow micronucleus test, *Salmonella* mutagenicity test and *Allium* anaphase-telophase test. *Mutation Research* **300**, 29-30.

Bolognesi *et al* (1997). Genotoxic activity of glyphosate and its technical formulation Roundup. *J. Agric. Food Chem.* **45**, 1957-1962.

Kale *et al* (1995). Mutagenicity testing of nine herbicides and pesticides currently used in agriculture. *Environ. Molec. Mutagenesis* **25**, 148-153.

Vigfusson and Vyse (1980). The effect of the pesticides, Dexon, Captan and Roundup on sister chromatid exchange in human lymphocytes *in vitro*. *Mutation Research* **79**, 53-57.

Clements *et al* (1997). Genotoxicity of select herbicides in *Ranacates beiana* tadpoles using the alkaline single-cell gel DNA electrophoresis (COMET) assay. *Environ. Molec. Mutagenesis* **29**, 277-288.

Peluso *et al* (1998). ^{32}P-postlabelling detection of DNA adducts in mice treated with the herbicide Roundup. *Environ. Mol. Mutagenesis* **31**, 55-59.

Li and Long (1988). An evaluation of the genotoxic potential of glyphosate. *Fundamental and Applied Toxicology* **10**, 537-546.

Reports utilized in the assessment of the genotoxic activity of glyphosate and glyphosate formulations

1. BioAgri G.1.2-60, Micronucleus study with Glifos.
2. BioAgri G.1.1-050/96, Ames/Salmonella assay of Glifos.
3. Hoecht 92.0487, Bacterial mutagenicity assay of Dodigen 4022.
4. Hoechst 92.1024, Chromosome aberration assay of Dodigen 4022 in V79 cells.
5. ML-89-463, Mouse micronucleus assay of MON 0818
6. MSL-1538, Ames/Salmonella assay of MON 8080
7. MSL-10625, Ames/Salmonella assay with surfactant MON 0818.
8. MSL-11729, Ames/Salmonella assay with Roundup MON 2139.
9. MSL-11730, Ames/Salmonella assay of Rodeo.
10. MSL-11731, Ames/Salmonella assay of Direct of MON 14445.
11. MSL-11771, Mouse micronucleus test with Roundup.
12. MSL-11772, Mouse micronucleus study of Rodeo.
13. Notox 141918, Chromosome aberration study of Glyfosaat *in vitro* in human lymphocytes.
14. MSL-11773, Mouse micronucleus study of Direct.
15. RD 300 SRRSL1147, Dominant Lethal Study of glyphosate in mice.
16. Scantox, 12.9.91 Micronucleus test with glyphosate.
17. Scantox, 10.9.91-B, *In vitro* mammalian cell gene mutation test.

Figure 1

Profile of genotoxicity of Glyphosate

Bacteria	- ve
↓	
In vitro cytogenetics	+ ve
↓	
In vitro point mutation in mammalian cells	- ve
↓	
In vivo clastogenicity	2 – ve 1 + ve
↓	
Male germ cell dominant lethal	- ve
↓	
Drosophila sex-linked recessive lethal	?
↓	
Induction of oxidative damage *in vivo*	+ ve
↓	
Induction of single strand breaks *in vivo*	+ ve
↓	
Induction of DNA adducts *in vivo*	- ve

Figure 2

Profile of Genotoxicity of Glyphosate Mixtures

Bacterial Mutagenicity	- ve
↓	
In vitro cytogenetics	?
↓	
In vitro point mutation in mammalian cells	?
↓	
In vivo clastogenicity	- ve
↓	
Male germ cell dominant lethal	?
↓	
Drosophila sex-linked lethal	limited positive
↓	
Induction of oxidative damage *in vivo*	+ ve
↓	
Induction of single strand breaks *in vivo*	+ ve
↓	
Induction of DNA adducts *in vivo*	+ ve

Table 1

Glyphosate

Endpoint	Effect	Cell type	Reference
Glyphosate (206-Jak-25-1) Point Mutation Induction in Ames test	Negative 310 to 2500µg/plate + S9 mix 160 to 2500µg/plate – S9 mix	Salmonella TA 98 TA 100 TA 1535 TA 1537	Scantox 10.9.91-A
Glyphosate Differential sensitivity rec assay	Negative 20 to 2000µg/test disc	*Bacillus subtilis*	Li and Long (1988)
Point mutation induction in Ames test	Negative 10 to 5000µg/plate + and – S9	**Salmonella** TA 98 TA 100 TA 1535 TA 1537 TA 1538 *E. coli* WP2 hcr	Li and Long (1988)

Table 2

Glyphosate Mixtures

Endpoint	Effect	Cell type	Reference
Roundup Point Mutation Induction in Ames Test	Positive minus S9 mix at 360µg/plate	TA 98	Rank *et al* 1993
	Positive in presence of S9 mix at 720µg/plate **Note:** Single point increases No evidence of dose response	TA 100	Rank *et al* 1993
Direct Mixture (72%) Point mutation induction in Ames test	Negative 15 to 1500µg/plate + S9 5 to 500µg/plate –S9	TA 98 TA 100 TA 1535 TA 1537	MSL-11731
Roundup (31%) Point mutation induction in Ames test	Negative 15 to 1500µg/plate + S9 5 to 500µg/plate – S9	TA 98 TA 100 TA 1535 TA 1537	MSL-11729
Roundup Mixtures			
Rodeo (40%) Point Mutation in Ames test	Negative 50 to 5000µg/plate + and – S9 mix	TA 98 TA 100 TA 1535 TA 1537	MSL-11730
Glifos (41%) Point Mutation in Ames test	Negative 1 to 5000µg/plate + and – S9 mix	TA 97a TA 98 TA 100 TA 1535	BioAgri G.1.1-050/96

Table 3

Glyphosate

Endpoint	Effect	Cell type	Reference
Glyphosate-N-(phosphonomethyl) glycine Chromosome aberrations	Positive 5 to 51µM 72 hrs exposure in absence of S9 mix	Human lymphocytes	Lioi *et al* 1998(a)
Sister chromosome exchange	Positive 5 to 51µM 72 hrs exposure in absence of S9 mix	Human lymphocytes	Lioi *et al* 1998(a)
Chromosome aberrations	Positive 17 to 170µM 72 hrs exposure in absence of S9 mix	Bovine lymphocytes	Lioi *et al* 1998(b)
Sister chromosome exchange	Positive 17 to 170µM 72 hrs exposure in absence of S9 mix	Bovine lymphocytes	Lioi *et al* 1998(b)
Note: Lioi *et al* studies indicate data derived from 3 donors combined.			
Glyfosaat Chromosome aberrations	Negative 33 to 237µg/ml –S9 14hrs 56 to 333µg/ml –S9 48hrs 33 to 562µg/ml +S9 24hrs 100 to 562µg/ml +S9 48 hrs	Human lymphocytes	Notox 141918
Note: Reduction in mitotic index in absence of +S9 mix and at 24 hrs in presence of S9 mix.			
Glyphosate isopropylamine salt Cytogenetic changes	Negative	*Allium cepa* root tips	Rank *et al* (1993)

Table 4

Glyphosate Mixture

Endpoint	Effect	Cell type	Reference
Roundup Sister chromatid exchange	Positive at 100µg/ml 72 hrs exposures	Human lymphocytes	Bolognesi *et al* (1997)
Cytogenetic changes	Positive response at concentrations greater than 720µg/litre Characterised as spindle disturbance	*Allium cepa* root tip	Rank *et al* (1993)
Sister chromatid exchange	Small positive increase at 250 and 2500µg/ml	Human lymphocytes	Vigfusson and Vyse (1980)

Table 5

Glyphosate

Endpoint	Effect	Cell type	Reference
Glyphosate (206-Jak-25-1) Tk mutation induction in mammalian cells	Negative 0.65, 1.3, 2.5, 5.0mg/ml –S9 mix 0.52, 1.0, 2.1, 4.2mg/ml +S9 mix	Mouse lymphoma L5178Y	Scantox 10.9.91-B
Glyphosate HGPRT Mutation induction in mammalian cells	Negative 5 to 22.5mg/ml + and – S9 mix	Chinese hamster	Li and Long (1988)

Table 6

Glyphosate

Endpoint	Effect	Cell type	Reference
Glyphosate isopropylamine salt Micronucleus induction	Negative up to 200mg/kg by i.p. injection Note: only 1 dose point gave reduction in PCE/NCE ratio	Mouse bone marrow	Rank *et al* (1993)
Glyphosate (analar grade) Micronucleus induction	Positive response at 300mg/kg at 24hrs Multiple dosing i.p. injection 4 animals analysed Reduction in PCE/NCE ratio	Mouse bone marrow	Bolognesi *et al* (1997)
Glyphosate (206-Jak-25-1) Micronucleus induction	Negative 5000mg/kg at 24, 48, 72hrs No evidence of bone marrow toxicity	Mouse bone marrow	Scantox 12.9.91
Glyphosate Chromosomal aberrations	Negative 1gm/kg sampled at 6, 12, 24hrs	Rat bone marrow	Li and Long (1988)

Table 7

Glyphosate Mixtures

Endpoint	Effect	Cell type	Reference
Roundup (41%) Micronucleus induction	Negative up to 200mg/kg only sampled at 48hrs	Mouse bone marrow	Rank *et al* (1993)
Roundup Micronucleus induction	Positive response at 450mg/kg Multiple dose 3 animals sampled reduction in PCE/NCE ratio	Mouse bone marrow	Bolognesi *et al* (1997)
Glifos (41%) Micronucleus induction	Negative 68, 137, 206mg/kg i.p. delivered 2 x at 24hr intervals Note: Inadequate study	Mouse bone marrow	BioAgri G.1.2-60/96
Roundup 31% Micronucleus induction	Negative 140, 280, 555mg/kg i.p. injection sampled at 24, 48, 72hrs Note: Limited evidence of bone marrow toxicity One male 268 showed increase in micronuclei	Mouse bone marrow	MSL-11771
Direct (72%) Micronucleus induction	Negative 91, 183, 365mg/kg by i.p. sampled at 24, 48, 72hrs Note: Limited evidence of bone marrow toxicity one female 186 183mg/kg at 48hrs showed an increase	Mouse bone marrow	MSL-11773
Rodeo (40%) Micronucleus induction	Negative 850, 1700, 3400mg/kg by i.p. sampled at 24, 48, 72hrs	Mouse bone marrow	MSL-11772

Table 8

Miscellaneous Endpoints

Glyphosate, N- (phosphonomethyl)glycine

Endpoint	Effect	Cell type	Reference
G6PD activity	Increase in activities 5 to 51μM	Human lymphocytes	Lioi *et al* 1998(a)

Note, increase in G6PD activity reduced by presence of antioxidant N-acetyl cysteine, but not eliminated.

G6PD activity	Increase in activity 17 to 170μM	Bovine Lymphocytes	Lioi *et al* 1998(b)

Note, increase in G6PD activity reduced by presence of antioxidant N-acetyl cysteine, but not eliminated

Glyphosate (Analar Grade)

Induction of 8-OHdG	Increase in 8–OHdG in liver	Mice *In vivo*	Bolognesi *et al* (1997)
Induction of DNA damage measured by alkaline elution	Increase in single-strand breaks in liver and kidney at 4 hrs following 300mg/kg	Mice *In vivo*	Bolognesi *et al* (1997)

Glyphosate isopropylammonium salt.

Induction of DNA adducts measured by ^{32}P post-labelling	Negative no increase in adducts in liver and kidney at 130 and 270mg/kg	Mice *In vivo*	Peluso *et al* (1998)

Table 8 continued

Glyphosate

Hepatocyte DNA repair assay	Negative 12.5ng to 125µg/ml	Rat Hepatocytes	Li and Long (1988)

Note Very low concentrations used, study adds very little value to the analysis of the potential genotoxicity of Glyphosate.

Table 9

Miscellaneous Endpoints

Glyphosate Mixtures

Endpoint	Effect	Cell type	Reference
Roundup (41%) Mon 35050			
Induction of 8-0HdG	Increase in 8–0HdG in Liver and Kidney	Mice *In vivo*	Bolognesi *et al* (1997)
Induction of DNA damage measured by alkaline elution	increase in single-strand breaks in Liver and Kidney at 4hrs following 300mg/kg	Mice *In vivo*	Bolognesi *et al* (1997)
Induction of DNA adducts measured by ^{32}Ppost-labelling Note. Adducts were not characterised	increase in adducts in liver and kidney at 400, 500 and 600mg/kg	Mice *In vivo*	Peluso *et al* (1998)
Roundup			
COMET assay	Positive results observed at concentrations above 27mg/ litre	Tadpoles of *Rana catosbeiana*	Clements *et al* 1997

Table 10

Glyphosate

Endpoint	Effect	Cell type	Reference
Dominant Lethal Study	Negative Small reduction in viable foetuses in week 1 at 800mg/kg, week 3 at 2000mg/kg Increase in late reabsorptions at week 8 at 200mg/kg	Mouse male gametes exposed Effect measured in embryos	RD300 SRRS L1147

Table 11

Glyphosate Mixtures

Endpoint	Effect	Cell type	Reference
Roundup Sex linked recessive lethal mutations	Positive result in Spermatocyte broods At 1µg/ml.	*Drosophila melanogaster* Larval exposure	Kale *et al* (1995)
Pondmaster Sex linked recessive lethal mutations	Positive result in spermatocyte broods at 0.1µg/ml	*Drosophila melanogaster* larval exposure	Kale *et al* (1995)

Table 12

Surfactant

Endpoint	Effect	Cell type	Reference
Surfactant MON 0818			
Point Mutation induction in Ames test	Negatives 1 to 100µg/plate +S9 0.3 to 30µg/plate –S9	**Salmonella** TA 98 TA 100 TA 1535 TA 1537	MSL – 10625
Surfactant MON 8080			
Point Mutation induction in Ames test	Negatives 0.003 t0 3µl /plates + ad – S9 mix	**Salmonella** TA 98 TA 100 TA1535 TA 1537	MSL – 1538
Surfactant Dodigan 4022			
Point Mutation Induction in Ames test	Negatives 4 to 10,000 µg/plats in both presence and absence at S9 Mix	**Salmonella** TA 98 TA 100 TA 1535 TA 1537 TA 1538 *E. coli* WP2uvrA	Hoecht 92.0487

Table 13

Surfactant Dodigen 4022

Endpoint	Effect	Cell type	Reference
In vitro chromosome aberrations	Complex set of results – None significant Concentration range 600 to 6000µg/ml sampled at 7, 18 and 28hrs **Mitotic index minus S9** decreased at 7hrs increased at 18hrs decreased at 28hrs **Mitotic index plus S9** decreased at 7hrs increased at 18hrs no change at 28hrs **Polyploidy minus S9** decreased at 7hrs decreased at 18hrs increased at 28hrs **Polyploidy plus S9** decreased at 7hrs decreased at 18hrs increased at 28hrs **Aberrations minus S9** increased at 7hrs no change at 18hrs increased at 28hrs **Aberrations plus S9** increased at 7hrs no change at 18hrs increased at 28hrs	Chinese hamster V79	Hoecht 92.1024

Note: Experiments are difficult to interpret and should have been repeated.

Table 14

Surfactant MON 0818

Endpoint	Effect	Cell type	Reference
Micronucleus induction Note – limited experiment	Negatives 100mg/kg by I.p. sampled at 24 and 48 hrs No evidence of animal or bone marrow toxiety	Mouse Bone marrow	ML-89-463

Key Issues concerning the potential genotoxicity of glyphosate, glyphosate formulations and surfactants; recommendations for future work.

James M. Parry

Centre for Molecular Genetics and Toxicology
School of Biological Sciences
University of Wales Swansea
Swansea SA2 8PP, UK

Key Questions

1. Is glyphosate an *in vitro* clastogen? Can the positive studies of Lioi *et al* (1998a, 1998b) be reproduced?
2. Is glyphosate an *in vivo* clastogen? Can the positive studies of Bolognesi *et al* (1997) be reproduced?
3. If glyphosate is an *in vitro* and *in vivo* clastogen, what is its mechanism of action and does the mechanism lead to other types of genotoxic activity *in vivo* such as point mutation induction?
4. Does glyphosate produce oxidative damage?
5. Can we explain the reported genotoxic effects of glyphosate on the basis of the induction of oxidative damage?
6. If glyphosate is an *in vivo* genotoxin is its mechanism of action thresholded? Under what conditions of exposure are the antioxidant defences of the cell overwhelmed?
7. Are there differences in the genotoxic activities of glyphosate and glyphosate formulations?
8. Do any of the surfactants contribute to the reported genotoxicity of glyphosate formulations?

Deficiencies in the Data Set

1. No adequate *in vitro* clastogenicity data available for glyphosate formulations.

2. No bone marrow micronucleus study of glyphosate available using multiple dosing and adequate animal numbers.

3. No studies available demonstrating the effects of anti-oxidants upon the induction of genotoxic endpoints by glyphosate.

4. No adequate *in vitro* or *in vivo* clastogenicity data for surfactants used in glyphosate formulations.

Actions Recommended

a) Provide comprehensive *in vitro* cytogenetic data on glyphosate formulations.

b) On the assumption that the reported *in vitro* positive clastogenic data for glyphosate is due to oxidative damage determine the influence of antioxidants. Evaluate the clastogenic activity of glyphosate in the presence and absence of a variety of antioxidant activities. Such a study should also incorporate glyphosate formulations to clarify the validity of reports of differences in activity. I recommend that both a) and b) should be undertaken using the *in vitro* micronucleus assay in human lymphocytes. The *in vitro* micronucleus assay would provide a more cost-effective method for evaluating a large number of experimental variables. same as screen chrom ab

c) Evaluate the induction of oxidative damage *in vivo* and determine the influence of the antioxidant status of the animals. Determine the exposure concentrations of glyphosate which overwhelm the antioxidant status of tissues.

d) Perform an *in vivo* bone marrow micronucleus assay with multiple dosing with adequate numbers of animals to determine whether the work of Bolognesi *et al* (1997) can be reproduced.

e) I am making no recommendation to repeat any of the sister chromatid exchange studies. Chromosomal aberration data will always take priority over SCE data so I

see no point in repeating SCE studies as they involve an endpoint which is poorly defined and doesn't lead to genetic changes.

f) In view of the increasing appreciation of the value of the COMET assay as marker of tissue-specific damage I recommend the consideration of its use in any *in vivo* studies performed. The COMET assay would provide the ability to determine whether damage is produced in a wide range of tissues following glyphosate exposure. Such studies would also indicate whether the COMET positive results for glyphosate formulations in tadpoles (Clements *et al* 1997) are reproduced in mammals. In view of the data on oxidative damage (Bolognesi *et al* 1997) I would recommend COMET assays in the liver and kidney of mice if the oxidative data are confirmed as indicated under c).

g) I do not recommend any transgenic point mutation assay at this time. There is no available evidence that glyphosate is a point mutagen and the relatively low sensitivity of the transgenic assay means that negative results would have little value in the assessment of the hazard and risk of glyphosate exposures.

h) I do not recommend any studies of DNA adduct induction at this time. Such a study would only be of value if the adducts formed were characterised which would require major efforts. If the adducts reported by Peluso *et al* (1998) are the result of oxidative damage they are likely to be of the same type as those produced in the absence of glyphosate exposure by background oxidative damage.

i) Provide comprehensive *in vitro* data on the surfactants.

My overall view is that if the reported genotoxicity of glyphosate and glyphosate formulations can be shown to be due to the production of oxidative damage then a case could be made that any genetic damage would be thresholded. Such genetic damage would only be biologically relevant under conditions of compromised antioxidant status. If such an

oxidative damage mechanism is proved then it may be necessary to consider the possibility of susceptible groups within the human population.

If the genotoxic activity of glyphosate and its formulations is confirmed it would be advisable to determine whether there are exposed individuals and groups within the human population. If such individuals can be identified then the extent of exposure should be determined and their lymphocytes analysed for the presence of chromosome aberrations. In such populations micronucleus studies would probably only be of value in aspleenic individuals.

Comments on Parry Evaluation of
Glyphosate and Glyphosate Formulation Potential Genotoxicity.
Larry Kier
September 18, 1999

There is no summary evaluation in the initial section and no overall conclusions are presented on the genotoxicity of glyphosate or glyphosate formulations.

Although the summary says most studies (i.e. unpublished reports) were conducted according to OECD guidelines, this is clearly not the case for several published studies cited but this is not mentioned in the evaluation.

The depth of analysis of the studies is rather superficial. The analysis of the unpublished reports appears to be much more thorough than analysis of the published reports.

Ames tests--There are numerous published and unpublished negative Ames studies with glyphosate that contradict the reported positive findings of Rank et al. The evaluation doesn't go into any depth on the quality of the Rank et al. data in comparison with the other reports. (e.g., reproducibility or testing at equivalent doses).

Micronucleus--There is no analysis of the possible significance of differences in protocol between Bolognesi et al. and the other negative studies. In particular, what are the implications of multiple dosing (actually 2 doses) compared with a single dose. How many instances of clear positive/negative differences exist for these two protocols?

There is no conclusion about what the data say about glyphosate. The published studies are presented as some evidence of genotoxicity and the reports are presented as giving no evidence.

There is mixing of glyphosate and formulations in the analysis.

What's the significance of one animal showing an increase in micronuclei noted for micronucleus studies of Roundup and Direct? Apparently the conclusion is that these studies are negative, but if that is the case why mention single animal results. Are these considered significant?

There appears to be no evaluation of the significance of different endpoints--e.g. comet in tadpoles, oxidative damage, in vivo vs. in vitro. etc. These are all apparently considered as equivalent in this evaluation.

It's not clear how these data and reports lead to a concern about stability of glyphosate formulations.

WRATTEN, STEPHEN J [FND/1000]

To: MARTENS, MARK A [FND/5045]; FARMER, DONNA R [FND/1000]
Cc: KIER, LARRY D [NCP/1000]; HEYDENS, WILLIAM F [FND/1000]; GRAHAM, WILLIAM [FND/5040]
Subject: Comments on Parry write-up

Mark and Donna

I was somewhat disappointed in the Parry report, not particularly from his conclusions but just the way they're presented. The style and rather casual lack of completeness and preciseness would make it hard to circulate this around to anyone as supporting information. Has he ever worked with industry before on this sort of project?

I will mail the marked-up paper back to you, but some other general comments need to be made:

1. It is odd that the one study by BioAgri is discussed right on the first page in rather extensive detail but none of the others are. I understand that he didn't like this one, but it is still strange to read this way.

2. The whole report could benefit from a couple of introductory paragraphs about what he was asked to do and what he received as far as reports. Did he have all the Monsanto reports as well as the literature articles? Was he asked to compare these, evaluate the methods, explain the differences, identify any faults, or what?

3. Some where the report needs to identify the full citations of each report evaluated and give the full Literature references for the public documents. Also the test material should be clearly identified, ideally by both MON number and brand name if needed, but at least to say which are glyphosate and which are formulations - this is done, sort of, but not as clearly as I'd like. Separate tables would be good.

4. He has an odd way of starting all conclusions with a negative - ie., points 2, 3, and 4 on page 3. Couldn't the sentence structure be modified to be less awkward? When he says "no data were provided..." time and again, it makes it sound as though he was suspicious that there were data but he didn't get them. I know this is not the intent, but it could be cleaned up.

5. Table 1 seems to state repeatedly that "there was no evidence of xxx mutagenicity". It would be more powerful if it said "there was convincing evidence that glyphosate does not act as a xxx mutagen". "no evidence of" is a very weak way of stating a conclusion.

6. He says very little about the literature reports. So little that one almost forgets about them. Can he not provide some critique about their quality and methodology as compared to the Monsanto reports? Are they included in or excluded from the statement in the first paragraph sentence "these studies were performed to a high standard and to OECD recommended guidelines"? In the section entitled "Assessment of the published..." on p. 2, I am hard-pressed to find any assessment. It is almost merely a listing of what everyone already knew from casually reading the abstract.

7. In his conclusions (p. 2), do the "studies evaluated" (line 2) include the literature reports or not? IN other words, is he saying that none of the studies (Monsanto plus literature) had evidence of glyphsoate genotoxic potential, or is he limiting this conclusion to the Monsanto studies?

8. Of course we know there were no data of the type listed in points 2, 3, and 4 on p. 3. We didn't need him to tell us that. The key point is whether the conclusions of Bolognesi, and Rank can be discounted on the basis of the strength and number of studies at hand, or whether their experiments need to be repeated independently to credibly refute the findings. Of course we knew that the latter would be the most convincing approach, but we need him to make any arguments that can be made on the data we have.

Overall, I guess we have his recommendation of studies that could be used to strengthen the database on p. 4. , but that is about it. I do not see that he has stuck his neck out on anything at all controversial, and therefore, there is little value in the write-up as written that could be useful. Hope it didn't cost much. Perhaps this is too harsh, and I don't know what your proposal to him was, but I guess I would expect more than this of a Professor.

Steve

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Dr Mark A. Martens
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18 August 1999

Dear Mark

You find enclosed my evaluation of the package of studies provided by yourself, which studied the genotoxicity of glyphosate, its various formulations and surfactants. I apologise for the time taken for the evaluation, but as I explained previously, I had a sudden urgent request from UK government to evaluate the genotoxicity of growth promoting hormones used in beef production.

Please let me know if there are any parts of my evaluation and recommendations, which you would like, clarified.

Yours Sincerely

JM

Professor James M. Parry

P.S. as a personal point - I don't really understand why you use contract labs, your "in house" studies are usually better and easier to follow

Tel 01792 295361 Fax 01792 295447

EXHIBIT 6

UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

IN RE: ROUNDUP PRODUCTS LIABILITY LITIGATION	)	MDL No. 2741
THIS DOCUMENT RELATES TO ALL CASES	)	Case No. 16-md-02741-VC

WEDNESDAY, JANUARY 11, 2017

CONFIDENTIAL - SUBJECT TO PROTECTIVE ORDER

- - -

Videotaped deposition of Donna Farmer, Ph.D., Volume I, held at the offices of HUSCH BLACKWELL, L.L.C., 190 Carondelet Plaza, Suite 600, St. Louis, Missouri, commencing at 9:04 a.m., on the above date, before Carrie A. Campbell, Registered Diplomate Reporter, Certified Realtime Reporter, Illinois, California & Texas Certified Shorthand Reporter, Missouri & Kansas Certified Court Reporter.

- - -

GOLKOW TECHNOLOGIES, INC.

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A. It would be our formulations and salespeople.

Q. Who's in charge of formulation?

A. I don't know at this time.

Q. At any time who's been in charge of formulations?

A. William Abraham.

Q. I'm sorry?

A. William Abraham.

Q. Is he still with the company?

A. Yes, he is.

Q. Do you know his title?

A. No, I don't.

Q. All right. You mentioned you weren't required to do cancer studies with Roundup.

Did I hear that correctly?

A. The regulatory agencies have very specific studies, and that is not one of them.

MR. JOHNSTON: Counsel, what number was that last exhibit? I'm sorry.

MR. MILLER: Yes, sir. Hand that back.

(Farmer Exhibit 1-9 marked for identification.)

QUESTIONS BY MR. MILLER:

Q. I want to look at a document that's been prepared by Monsanto that discusses these issues.

Would it be fair to say, Donna Farmer, that surfactants do in fact increase a glyphosate's absorption by the skin?

A. I have no data to support that statement.

Q. All right. Let's look at a Monsanto document about that statement. Okay?

This is Exhibit 1:9, and it was produced from your custodial file. I have a copy for you and counsel.

Ma'am, here you go.

MR. MILLER: Counsel.

MR. JOHNSTON: Thank you.

MR. MILLER: Yes, sir.

QUESTIONS BY MR. MILLER:

Q. Certainly feel free to look at the entire document. I'm going to ask you

about page 9478, just to be fair. I think you're looking at it, where it says "surfactants." That's the only place I intend to ask you about.

Yes, ma'am. I just wanted to make sure you had time to review it first.

So this document discusses what we've just been talking about, surfactants, right?

A. Yes.

Q. And what it tells us is that the upper barrier of the skin is very lipophilic; is that right?

Showing you I'm just an old country lawyer.

What's that mean?

MR. JOHNSTON: Objection. Foundation to this document. It's a draft, and we don't know what this is or whether she had any role in preparing it.

But you can answer if you can.

MR. MILLER: Let's keep the speaking objections down.

MR. JOHNSTON: I can object on

any basis, as long as I'm not suggesting an answer.

My point is we don't have any foundation for this document.

QUESTIONS BY MR. MILLER:

Q. What does lipophilic mean?

A. Lipophilic means that there is fat within that. Fat-loving. Lipophilic means fat-loving. But I -- this is -- I agree, this is a draft.

MR. MILLER: You've just suggested an answer. She just gave the answer you just objected to.

MR. JOHNSTON: I stated a fact, Counsel.

MR. MILLER: Yeah, well, I'm going to call the judge if we do it again.

MR. JOHNSTON: Yeah, well, please do. I think he would be frank with us.

MR. MILLER: I will.

QUESTIONS BY MR. MILLER:

Q. Let's back to work now. Now let me read the document that you provided.

"The natural barrier prevents the hydration of the skin and prevents, for instance, bacteria and other outer microelements from entering the body through the skin."

Did I read that correctly?

MR. JOHNSTON: Objection. Foundation.

QUESTIONS BY MR. MILLER:

Q. You can answer.

A. You read it correctly, but I -- this may have come out of my files, but I didn't write this document. My name is not on this document.

Q. "Glyphosate, on the other hand, is very hydrophilic."

What does hydrophilic mean?

A. It doesn't like fat.

Q. Okay. "So initially a low interaction between glyphosate and human skin is to be expected."

Did I read that correctly?

MR. JOHNSTON: Objection. Foundation.

THE WITNESS: You did read it

correctly, but, again, this is -- there's a piece that's missing of this. This is a proposal, not the results. So it's saying to be expected. This isn't saying it happens. This is all putting forth kind of theories.

And I think if you go to the data, you'll find out that there's very little difference between surfactants and very little glyphosate goes across the skin.

QUESTIONS BY MR. MILLER:

Q. This document produced from your file tells us surfactants are able to increase glyphosate absorption through the skin by six different means. I'm going to read them and ask if I read them correctly.

"1, removal of lipids from the epidermal surface due to surfactant action."

Did I read that correctly?

MR. JOHNSTON: Objection. Foundation.

He's asking you if he read it correctly, not whether it's true or

not.

THE WITNESS: Yeah, you read it correctly.

QUESTIONS BY MR. MILLER:

Q. "2, increase of the hydration state of the skin under closed exposure conditions."

MR. JOHNSTON: Objection. Foundation.

QUESTIONS BY MR. MILLER:

Q. "3, increase of the skin contact spreading water droplets by surfactant action."

MR. JOHNSTON: Objection. Foundation.

QUESTIONS BY MR. MILLER:

Q. And "4, increase of contact time with the skin due to decrease of evaporation of water from the droplets containing surfactant."

5 and 6 -- and then we'll ask you if I read this right, and we'll continue.

"5, increase of subepidermal blood flow due to irritant action of surfactant."

And finally, "6, intraepidural {sic} and subepidermal intercellular water accumulation due to irritant action of the surfactant."

Did I read that correctly?

MR. JOHNSTON: Objection. Foundation.

THE WITNESS: You said "intraepidural," not "epidermal," in the first one.

QUESTIONS BY MR. MILLER:

Q. Well, thank you for that correction.

Now, which of those six ways that the surfactant makes glyphosate more able to get in the skin, which of those six ways do you not agree happen?

A. Again, this is a document that was a proposal to look at dermal absorption studies, so I wasn't involved in putting this together. They have made -- this to me looks like they're making speculations about what might happen.

I think the important piece in this is to go get the studies that resulted

observed adverse effects on health and the environment. Since it is an important objective to use environmentally safe and less toxic products, the polyoxyethylene tallowamine surfactants were replaced at least in some Monsanto products by others."

Was that true? Did you replace some of the Roundup products in Europe and stop using POA there?

A. I think you need to kind of go to the next sentence.

Q. Sure.

A. It fits in with what Mark said, the company, to say: My opinion was this formulation was fine, but the company then stated this decision was mainly based on eye irritation potential and the aquatic toxicity related to the formerly used substances.

We know that poly -- the POEA can be irritating to the eyes. It's reversible and not permanent. And because it is a surfactant, it can have toxicity to aquatic organisms.

Q. And to follow up on this from 1999, just recently Europe has banned POEA in

the near future, right?

MR. JOHNSTON: Objection. Vague.

Go ahead.

THE WITNESS: Based on a political decision, not on a toxicology position.

POEA is still used in the US and in Canada, completely approved and supported.

In my opinion and many other people's, that that was a political decision, not a safety decision.

QUESTIONS BY MR. MILLER:

Q. The answer is, yes, POEA will be off the market in Europe soon?

A. It will be off the market in Europe based on a political decision, not on a safety decision.

Q. Well, let's look at the decision to ban POEA in the European market.

(Farmer Exhibit 1-12 marked for identification.)

QUESTIONS BY MR. MILLER:

Q. We'll mark as Exhibit 1:12 a

is a probable in vivo genotoxin," right?

A. Yes, he does.

Q. And in the next paragraph he says, "Both glyphosate and Roundup induce significant increased DNA strand breaks in mouse liver and kidney," right?

A. Yes, but up above, again, he also talks about the Bolognesi doesn't meet guideline standards. And so, again, this is an intraperitoneal injection. It's only a few animals. And so he's giving us the findings that he sees here.

Q. Okay. Let's go to the next page, 2103. He summarizes in that first full paragraph, "The overall data provided by the four publications provide evidence to support a model that glyphosate is capable of producing genotoxicity both in vivo and in vitro by a mechanism based upon the production of oxidative damage," right?

A. He says that, but, again, I want to remind you that there were some that were negative. And then again, oxidative damage can be due to cytotoxicity.

In many of the studies where we

see these kinds of responses, it's secondary to cytotoxicity, not a primary oxidative response.

Q. He recommended on page 2104, paragraph B at the top there, ma'am, "an assessment of the individual components of Roundup mixture to determine whether there is any components which act synergistically to increase the potential genotoxicity of glyphosate," right?

A. He did, and it was a basis for a study that we actually did.

Q. What study?

A. It was with Heydens, et al.

Q. Can you spell that, please?

A. It was Bill Heydens, H-e-y-d-e-n-s.

Q. Oh, your boss?

A. Uh-huh.

Q. And he did the study?

A. No, there was a group of us. We had some -- because we are not in a laboratory. We worked with some laboratory people to look at this exact question because, again, we did not believe that these

findings were related to a genotoxic effect but secondary to some cytotoxicity.

So we did a study doing an oral route of exposure, which would be more relevant, and we didn't reproduce the same findings. We did an intraperitoneal injection and got the same findings but not an oral one.

MR. MILLER: I'll substitute this. I just wrote on it. I apologize.

QUESTIONS BY MR. MILLER:

Q. All right. Excuse me. What is the date of that study, and was it published?

A. It was a series of studies, so I don't remember exactly when they were, and I think it was in 2008 or '9.

Q. Were they published?

A. It was published in one publication.

Q. Which publication?

A. I don't remember what the journal was.

Q. Were they ever submitted to Dr. Parry?

A. I would believe based on what I see here that we would have had a conversation with Dr. Parry because it appears that that was the foundation for us doing that study.

I don't know what the conversations were with Mark and Dr. Parry, but it was published, so it's out there in the open literature.

Q. So he made these recommendations in 1999, and when did you start these studies?

A. Good question. I don't know. It took -- we didn't -- I don't remember when we started them, but we did do them.

Q. Were they ever repeated by independent scientists?

A. Anyone would be welcome to repeat them if they'd like to.

Q. You did not retain any independent scientists to go repeat these. These were done in-house at Monsanto?

A. We have very qualified scientists that can conduct these studies, and we did those studies. And then we put it

out there in the peer-reviewed literature for people to look and evaluate for their own.

Q. Did you study to reproduce the same results from a peritoneal exposure and not oral?

A. Yes, we did. Because we wanted to say is it -- when we see studies like this, the big thing for us is to ask is it real, and then is it reproducible, and then what does it mean.

So we did the study again, and it was real. We saw the effects.

And then our question was, what happens when you do a more relevant route of exposure, and then what does that look like.

Q. Let's look some more at what Dr. Parry found in -- when requested to look at these issues for Monsanto.

Dr. Parry told you he would conduct these studies, right?

A. I don't remember that conversation.

(Farmer Exhibit 1-24 marked for identification.)

QUESTIONS BY MR. MILLER:

Q. Let's look at it. We'll mark it as Exhibit 1-24, a copy of 1:24.

MR. JOHNSTON: For the record, I guess you've attached the metadata catalog to the back of this. Is that -- you intend to mark that as part of this exhibit or not? You haven't been.

MR. MILLER: No, I don't intend to since we have Bate stamps on them.

QUESTIONS BY MR. MILLER:

Q. All right, ma'am. This is Exhibit 1:24, and it's a document generated by Monsanto eight days after receiving Dr. Parry's first report.

See it says December 10, 1999.

Oh, a long time afterwards. I'm sorry. Excuse me.

So exhibit -- I want to do this accurate.

Exhibit 1:23 is February -- that's right, they do it different in Europe -- February 10, 1999. Okay.

So then quite a few months

later, December 1999, a group meeting occurs concerning these issues, and you are part of that meeting.

Do you see "Donna Farmer" there?

A. It wasn't --

MR. JOHNSTON: Objection. Foundation.

Go ahead.

THE WITNESS: This wasn't the only reason why that meeting was held. This was a subpart of a bigger meeting.

QUESTIONS BY MR. MILLER:

Q. Or nor did I suggest it was.

But it was part of the meeting, fairly?

A. It was one of the subject matters, yes.

Q. Okay. And what we said there was -- let's go to page 2 is really what I want to ask you about.

On page 2 of these meeting notes -- I'm looking at paragraph number 4 of these notes up top and it says, "Some

indication of DNA damage observed in different test systems are due to cytotoxicity properties of the formulation tested than to actual mutagenicity," right?

A. Correct. That's what I've been saying.

Q. Yes, ma'am.

And let's go down three paragraphs. Dr. Parry says he'll do tests for you to see if that's true, but Monsanto doesn't want to let him, right?

MR. JOHNSTON: Objection. Argumentative. Misstates the document. No foundation.

QUESTIONS BY MR. MILLER:

Q. I want to ask you about the exact words in the document in a minute.

Do you recall refusing to let Dr. Parry do the tests that you and Bill Heydens did?

A. Well, these are different studies than -- he's talking about doing in vitro studies, and we did in vivo studies.

Q. You never gave Dr. Parry any material to do testing, right?

A. I don't remember.

Q. Let's look.

"In order to further develop the relationship with Dr. Parry, it was recommended that the surfactant samples be provided to him for testing. However, before sending Dr. Parry any samples, it was recommended that they undergo in-house testing first in similar in vitro screen," right?

A. Yes.

Q. So you never sent Dr. Parry any samples, and he never was able to do any testing; that's true, isn't it?

MR. JOHNSTON: Objection. Foundation. Misstates the document.

Go ahead.

THE WITNESS: That doesn't say that. It just said that we wanted to do them in-house and that you can see the request was made by toxicology to include either me -- and there's nothing in here that says we didn't send anything to Dr. Parry.

QUESTIONS BY MR. MILLER:

Q. I'm asking you a general question, Dr. Farmer. Of all your extensive experience in glyphosate and Roundup, are you sitting here and going to tell us that you sent Dr. Parry samples to do any testing or not?

MR. JOHNSTON: Objection. Asked and answered.

Go ahead.

THE WITNESS: I don't remember. But this document doesn't say that we weren't going to. I don't know.

QUESTIONS BY MR. MILLER:

Q. What the document says, "Before sending Dr. Parry any samples, it was recommended that they undergo in-house testing first in a similar in vitro screen," right?

MR. JOHNSTON: Objection. Asked and answered. Argumentative.

QUESTIONS BY MR. MILLER:

Q. Is that what the document says, ma'am?

MR. JOHNSTON: Objection.

Asked and answered.

QUESTIONS BY MR. MILLER:

Q. You can answer. He's not instructing you not to answer.

A. That's what it said, but, again, he never says that we didn't send him anything.

Q. Who is William Graham?

A. He is a -- with our registration affairs group. He's retired. He was in Europe.

Q. After his first report then, [redacted] being Dr. Parry, and persuade him that glyphosate was not mutagenic, right?

A. I don't remember that conversation. We believe it wasn't genotoxic, and there were a number of other large studies that met regulatory requirements that were out there, and those studies were not standard. So I can believe that we wanted to -- we didn't believe that it was genotoxic or mutagenic.

(Farmer Exhibit 1-25 marked for identification.)

QUESTIONS BY MR. MILLER:

Q. All right. Let's look at Exhibit 1:25, a series of e-mails to you and others about this issue. It's a short, one-pager.

MR. JOHNSTON: Is this 25, did you say?

MR. MILLER: Yes, sir.

MR. JOHNSTON: Thank you.

QUESTIONS BY MR. MILLER:

Q. All right. Ma'am, you see you were sent this e-mail in May of 1999 after his first report, right?

A. Yes.

Q. All right. And what is going on here is William Graham below asked how -- I'm sorry, can we read that? No, excuse me.

What William Graham is asking is how much will it be. The results are now needed to persuade him. Had nothing to do with glyphosate is mutagenic.

That was the goal right after his first report, was to send him more materials and try to convince Dr. Parry that your product is not genotoxic, right?

A. The studies --

Q. Mutagenic, sorry.

A. The studies that Dr. Parry looked at, as we talked about, had some unusual findings associated with them, unusual routes of exposure, they didn't meet guideline standards, and we didn't believe that they represented glyphosate as mutagenic.

And you can see the next sentence says the ECCO Mammalian tox review came out with this conclusion. And over all these years, all the regulatory agencies have looked at those same studies that Dr. Parry looked at, and they've concluded that they don't support glyphosate being genotoxic or mutagenic.

And so we -- again, we were trying to work with Dr. Parry because we didn't believe it was, and we were trying to figure out what information can we give him, because others agreed with us that it's not mutagenic or genotoxic.

MR. MILLER: Move to strike the answer concerning regulatory agencies

as nonresponsive.

QUESTIONS BY MR. MILLER:

Q. Let's look at the e-mail from author Mark Martens right above that.

[redacted]

A. That's what's written there.

Q. Okay. You agreed to not send Dr. Parry any samples, true?

A. I don't remember.

(Farmer Exhibit 1-26 marked for identification.)

QUESTIONS BY MR. MILLER:

Q. Let's refresh your recollection. Exhibit 1-26, an e-mail prepared by you in April of 2000 on this issue. Here we go.

Here, ma'am, is a copy for you and a copy for counsel.

So, ma'am, here we are, still in year 2000. And Donna Farmer, you say -- I want to read this exactly -- "Should I go

ahead and ask Todd to repeat the studies? Or should we use a different assay? I agree we do not send samples to Dr. Parry until we get this sorted out."

Right? Your instructions were not to send Dr. Parry any samples?

MR. JOHNSTON: Objection. Misstates the record.

THE WITNESS: This is until we get it sorted out. So again, if you go to the first e-mails, we're doing not a normal micronucleus study, we're doing a micronu -- it's called micro-micronucleus, so it's a screening study we were looking at, and it looked like we had some conflicting results.

And so that's what I was saying is should we ask Todd to repeat the studies or should we do a different assay. And I'm agreeing to someone that we don't send the samples to Dr. Parry until we get this sorted out.

Again, it doesn't say that we

didn't send them to him. We were just trying to assess what this screening study meant.

QUESTIONS BY MR. MILLER:

Q. The fact is you never did send Dr. Parry any samples, did you?

MR. JOHNSTON: Objection. Asked and answered three times now.

QUESTIONS BY MR. MILLER:

Q. Does this document refresh your recollection in any way that you ever sent your outside expert, Dr. Parry, any samples?

A. I do not remember.

Q. Dr. Parry's first name was Jim, right?

A. I believe it was James or Jim, yes.

Q. James.

He passed away; you're aware of that?

A. I don't know when, but I was aware of that.

Q. I think it was 2010.

Does that sound about right?

A. I don't remember.

Q. Okay. All right. Well, let's ask this: Jim Parry, Dr. Parry, told Monsanto in 1999 that this issue of oxidative stress should be addressed.

Do you remember that?

A. We talked about it in that one document, and that's why we did the subsequent studies with Dr. Heydens, the publication we talked about.

Q. Did you do stress marker responses, stress response marker tests?

A. Similar to the ones that were in those publications.

Q. Did you do clinical biochemistry parameters?

A. I believe we did.

Q. And it's in a peer-reviewed published journal?

A. And there's histopathology as well.

Q. The truth was, ma'am, your boss told you that you weren't going to do the studies that Dr. Parry suggested, right?

A. We did studies, and we did the repeat of the Bolognesi. That's what I

remember doing.

(Farmer Exhibit 1-27 marked for identification.)

QUESTIONS BY MR. MILLER:

Q. Let's look at an e-mail from your boss, William Heydens, to you on this issue, and we're going to mark it as Exhibit 1:27. All right?

All right. Ma'am, this is William Heydens sends this e-mail in September of 1999, right?

A. Yes.

Q. Sends it to you and others, right?

You see your name there, "Donna Farmer"?

A. Yes.

Q. It's regarding the Parry report, isn't it?

A. Yes.

Q. Okay. And he says, "Mark, et al." --

Mark being Mark Martens, right?

A. Yes.

Q. -- "I've read the report and

agree with the comments. There are various things that can be done to improve the report."

So Monsanto wants to change his report and improve it, right?

A. There are comments that -- they provide to his report, and we were going to provide comments back.

Q. "Let's step back and look at what we're really trying to achieve here. We want to find/develop someone who is comfortable with a genotoxic profile of glyphosate/Roundup and who can be influential with regulators and scientific outreach operations when genotox issues arise."

That was the goal, wasn't it?

A. We look for experts to help us in this area to answer questions and give us feedback on what we can do, so, yes, we do look for experts to help us in this area.

Q. Your boss says, "My read is that Parry is not currently such a person, and it would take quite some time and dollar sign, dollar sign, dollar sign studies to get him there. We simply aren't going to do the

studies Parry suggests."

This was marching orders from your boss, wasn't it?

A. Well, that may be what he said then, but we did do the studies. So again, I would have you look at that Heydens publication.

Q. What Mark Martens said about the Parry report, that it simply wasn't suitable for defense of the product.

You're aware of that, right?

A. As we just talked about, we didn't agree with Dr. Parry's interpretation of all the data. We thought it was secondary to cytotoxicity and irrelevant routes of exposure, and we obviously had a disagreement with him.

And, sure, if we have someone who doesn't agree with the way we interpret the data, we're not going to obviously have them out there being spokespeople for us.

Q. In fact, when Monsanto sent Mark Martens over to meet with Parry, he was irritated at Monsanto because of the pressure that was being put on him.

You're aware of that, aren't you?

A. No, I'm not.

(Farmer Exhibit 1-28 marked for identification.)

QUESTIONS BY MR. MILLER:

Q. Let's take a look at it. An e-mail again from William Heydens and others. I got a copy for each of you. Here you go.

All right, ma'am. So here -- what we have here is an e-mail from your boss. He copies William Heydens. It's regarding a meeting with Professor Parry. I believe you're copied, Donna Farmer, on the original message. Mark Martens had gone -- Martens had gone to meet with Dr. Parry after his report, right?

A. It was Mark Martens and Richard Garnett.

Q. And Richard Garnett, that's right.

They stated, "The meeting started off in a tense atmosphere because Parry was irritated by the language used in the mutagenicity section of the Williams, et

al., paper," right?

That's the Gary Williams paper, right?

A. Yes.

But I think if you go back to this one, it's more reflective of what was the minutes of the meeting. "Overall tone of the meeting was positive after negative start because Professor Parry found the tone of the Williams, et al., CANTOX paper to be very dismissive of the other researchers' work and overdefensive in his attitude. The presentation on the results of the MON 3505 study changed the mood because it clarified certain effects found in the Bolognesi and Peluso papers."

So I think that this reflects more about the outcome of the meeting.

Q. The paper that was irritating him, Williams' paper, that's the one that was funded by Monsanto?

A. We worked -- yes, we funded that.

Q. And one cf the results from the meeting with Dr. Parry was "broad

agreement" -- let me show you, "broad agreement that genotoxic results in some studies with surfactants arose due to oxidative damage rather than direct genotoxicity."

So whatever, the broad agreement, oxidative damage, right?

A. Which, again, is precluded by cytotoxic damage first that gets to the oxidative damage.

Q. "Consider supporting studentship to help Professor Parry in research programs on biological significance of oxidative damage."

That was never done, was it?

A. I don't know.

MR. JOHNSTON: We're closing on three hours and lunchtime. Are you near the end of the line or --

MR. MILLER: Give me one second and I'll ask maybe -- we can. If you want to break now, we can break now.

MR. JOHNSTON: Okay.

MR. MILLER: Okay?

MR. JOHNSTON: Sounds good.

VIDEOGRAPHER: We're going off record. The time is 12:28.

(Off the record at 12:28 p.m.)

VIDEOGRAPHER: We're going back on record. The time is 1:17.

QUESTIONS BY MR. MILLER:

Q. Good afternoon, Dr. Farmer.

A. Good afternoon.

Q. You felt like the Dr. Parry report that we were going over before the lunch break put Monsanto in a genotoxicity hole, right?

A. No, we just -- there were other people that had opinion about the genotoxicity of glyphosate. He just had a different opinion, and we just didn't agree with him.

(Farmer Exhibit 1-29 marked for identification.)

QUESTIONS BY MR. MILLER:

Q. Let's just take a look at the documents where you stated Dr. Parry put you in a genotox hole.

Exhibit 1-29. A series of e-mails to and from you concerning Dr. Parry.

Do you remember this line of e-mails?

A. No, I don't.

Q. Okay. Well, here on the beginning of page 1 here, it's an e-mail from you to an Alan Wilson regarding comments on Parry write-up, do you see that, in September of 1999?

A. Yes, and it starts from a e-mail from Steve Wratten and others in the back.

Q. That's right, and we're going to go to that. And we're going to that right now. So let's go to page 596, that e-mail from Steve Wratten.

Who is Steve Wratten?

A. He was the regulatory affairs manager for glyphosate.

Q. And he was disappointed with Dr. Parry's report, this Monsanto employee, Steve Wratten, right?

A. I'm not sure that I see that.

Q. Well, I'll show you, ma'am. First sentence, Steve Wratten's e-mail on page 2, "I was somewhat disappointed in the

Parry report."

Did I read that correctly?

MR. JOHNSTON: Objection. Incomplete.

THE WITNESS: He talked about -- you did read that, but it said not particularly from his conclusions but just the way they were presented.

QUESTIONS BY MR. MILLER:

Q. That's right, ma'am.

And he asked in the last sentence in this first paragraph, "Has he ever worked with industry before on this sort of project," all right?

A. Yes.

Q. So on the next page, Donna Farmer writes on the subject --

MR. JOHNSTON: You mean the page back, 95 -- 595?

QUESTIONS BY MR. MILLER:

Q. The first page, 595, Donna Farmer. "Right now, the" -- "one option, I agree we need someone else to interface with Parry. Right now, the only person I think

that can dig us out of this genotoxic hole is the good Dr. Kier," right?

A. Kier, Dr. Kier.

Q. Kier, yeah.

He's a -- that's Larry Kier, isn't it?

A. Yes, it is.

Q. Consultant that Monsanto has paid more than a few times to work on these issues, right?

A. No. Dr. Kier was a gene tox expert who was retired from Monsanto, and based on his expertise, yes, we have kept him as a consultant.

Q. Right.

But now this clearly refreshes your recollection that you felt Dr. Parry had put you in a genotox hole?

MR. JOHNSTON: Objection. Misstates her testimony. And foundation.

THE WITNESS: I said that, but I think what we talked about, this is from like 1999, and we did a lot of work subsequent to this with -- to

look at Dr. Parry's comments.

We did work with him, and so I think what we're getting at here is that he -- we just had a difference of opinion with him. And we needed to find some different data, and we know that it wasn't genotoxic, and put the information out there. We just disagreed with him.

QUESTIONS BY MR. MILLER:

Q. What does clastogen mean?

A. Again, it refers to structural damage of genetic material.

Q. Okay. And clastogenic means something that can cause this process of clastogen, right?

A. Structural damage, yes.

Q. Okay. So Dr. Parry did a second report for Monsanto on Roundup, right?

A. I don't remember.

(Farmer Exhibit 1-30 marked for identification.)

QUESTIONS BY MR. MILLER:

Q. Let's look at it. Exhibit 1:30 is a report prepared by Dr. Parry entitled

"The evaluation of the potential genotoxicity of glyphosate mixtures and component surfactants."

Here's a copy for you, ma'am, and a --

MR. JOHNSTON: Are you asking a question, or are you making a statement, Counsel?

QUESTIONS BY MR. MILLER:

Q. You can look at the document, and then we'll have some more questions.

MR. JOHNSTON: Well, you haven't established any of those things you just said on the record, Counsel.

QUESTIONS BY MR. MILLER:

Q. Let me know when you're ready, ma'am.

A. Let me take a little bit. This is a pretty big report.

Q. All right. This Exhibit 1-30 was produced to us by Monsanto, and it's a second report entitled "Evaluation of potential genotoxicity of glyphosate, glyphosate mixtures and component

surfactants, James M. Parry."

Same Dr. Parry we've been speaking of?

MR. JOHNSTON: Objection. Compound question.

And you're testifying, Counsel. There's no foundation.

QUESTIONS BY MR. MILLER:

Q. You can answer.

A. Sorry, could you repeat the question?

MR. MILLER: Read the question back.

(Court Reporter read back question.)

THE WITNESS: Yes.

QUESTIONS BY MR. MILLER:

Q. Is this the same James M. Parry we spoke about with the last report, ma'am?

A. Yes.

Q. And so in this report Dr. Parry prepared a table of -- 14 tables of things that he reviewed.

Is that fairly what this is, or what would you explain this on the first page

to be Table 1 through 14?

What do they represent, ma'am?

MR. JOHNSTON: Objection. Foundation.

THE WITNESS: It is tables of what he reviewed.

QUESTIONS BY MR. MILLER:

Q. Okay. Now, let's look then at page 4237, Dr. Parry's report.

And Dr. Parry says, and from his evaluation, "These studies provide some evidence that glyphosate may be capable of inducing oxidative damage under both in vitro and in vivo conditions."

Did I read that correctly?

MR. JOHNSTON: Objection. Foundation.

THE WITNESS: Just given that, I'm not really sure what studies he's -- I want to go back and look and see what he's talking about.

I believe that he's referring to these miscellaneous end points that are in studies that are, again, through intraperitoneal injection, not

according to standard studies.

And then you can see he talks about this other one, that there was no -- there was negative results, but he's talking again about these other studies from the Pelosi and Bolognesi and Lioi that are not standard studies required by regulatory agencies.

And again, we talked about how they can be secondary to in vitro toxicity as well as in vivo toxicity that could cause the oxidative damage, but that's a result of the exposure scenario.

QUESTIONS BY MR. MILLER:

Q. These studies that he reviewed, ma'am, were studies sent to him by Monsanto, true?

A. They were studies in the open literature that we asked him to review.

Q. Yes, ma'am.

A. And again, as we talked about, you have to look at how these studies are conducted. We talked about the intraperitoneal injections, we talked about

that they don't follow standard guidelines, and again, that we didn't agree with his evaluation of the studies.

Q. He was the expert you selected to review these papers, "you" being Monsanto, true?

A. Well, it does happen that we have people that we don't agree with. Experts have different opinions. That's why there are a lot of different experts out there.

Q. Sorry to interrupt you.

Let's look at page 4240, another conclusion of expert Parry after review of these studies.

"Evaluation. These studies provide some evidence that Roundup mixture produces DNA lesions in vivo, probably due to the oxidative damage.'

That was Dr. Parry's conclusion, right?

MR. JOHNSTON: Objection. Foundation.

THE WITNESS: Again, they're referring back to the same studies

we've been talking about that are intraperitoneal injections, which is not a normal route of exposure. And the COMET assay he's talking about is in tadpoles, and those were at levels that were toxic to the tadpoles.

So the results that we're seeing here, again, are secondary. Even though you see oxidative stress, it's secondary to the toxicity that's being observed in these studies.

QUESTIONS BY MR. MILLER:

Q. Let's look at his conclusion on page 4242, Overall Conclusions.

Number 2 is the one that I would like to ask you about. "There is published in vitro evidence that glyphosate is clastogenic and capable of inducing sister chromatid exchange in both human and bovine lymphocytes."

And he cites a public study that proves that, doesn't he?

A. Well, it doesn't --

MR. JOHNSTON: Objection.

Foundation.

THE WITNESS: I disagree with you that it proves that. The conditions of that study, those were the findings, but that is not the basic conclusion of the outcome of glyphosate.

This was another study that wasn't conducted according to guidelines and that had some problems with the conduct of the study, and there are other studies that conflict these results.

QUESTIONS BY MR. MILLER:

Q. He goes on on page 4244 under the specific evaluation of the genotoxicity of glyphosate to tell Monsanto that "on the basis of the study of Lioi, I conclude that glyphosate is a potential clastogenic in vitro."

His conclusion, right?

MR. JOHNSTON: Objection. Foundation.

Go ahead.

THE WITNESS: That's again what he says. But again, remember, this is

in vitro, this is a petri dish experiment, and again, that those cells are sustaining toxicity, meaning -- when we talk about cytotoxicity, it means that the cells are damaged and that the end that you're seeing, this oxidative damage, is then the result of the cells sustaining cytotoxicity and not a direct genotoxic effect.

And you can see here it says even -- there's another assay that indicates it's not reproduced in germ cells.

QUESTIONS BY MR. MILLER:

Q. He says, "Under specific evaluations of genotoxicity of glyphosate mixture that the studies of Bolognesi suggests that glyphosate mixtures may be capable of inducing oxidative damage in vivo."

MR. JOHNSTON: Objection. No foundation.

QUESTIONS BY MR. MILLER:

Q. That was his conclusion, wasn't

it?

MR. JOHNSTON: Same objection.

THE WITNESS: Again, that was the same study where they injected the formulated product directly into the abdomens of the animals. There was direct damage to the organs and to the animal, and the results are secondary to cytotoxicity

QUESTIONS BY MR. MILLER:

Q. He tells us on -- he tells Monsanto in this report at 4266 -- I'm just about done with this report.

But at 4266, Dr. Parry tells us that there is -- this is in F. "In view of the increasing appreciation of the value of COMET assay as a marker of tissue-specific damage, I recommend the consideration of its use in any in vivo studies performed."

Do you see that?

MR. JOHNSTON: Objection. Foundation.

THE WITNESS: I see that's what he says.

QUESTIONS BY MR. MILLER:

Q. And Monsanto never performed a COMET assay on any of its in vivo studies?

A. We have a difference of opinion of the value of the COMET study. There are other studies that are -- the COMET study, you can actually get positive effects if you take blood from people who have been on a treadmill for 30 minutes. So, again, you have to look at the study and what it provides.

And this again, comes back to talking about the oxidative damage with Bolognesi. And again remember, he is talking about doing an assay where -- in talking about looking at the liver and the kidneys where we actually went and did the studies in the whole animals that we shared with you about the Heydens report.

Q. The answer is Monsanto never did COMET assays, true?

A. No, we would not do COMET assays. We do not see it as a really valuable assay.

Q. And this expert who you asked

to review these studies told you, "The COMET assay would provide the ability to determine whether damage is produced in a wide range of tissues following glyphosate exposure."

That's what he said, right?

MR. JOHNSTON: Objection. Foundation.

THE WITNESS: This is an in vitro assay, and instead we always have higher value when you do an in vivo study. So we addressed the same comments in an in vivo study that would be of more value than the COMET assay that, no, we would not conduct.

QUESTIONS BY MR. MILLER:

Q. Dr. Parry goes on to conclude his report on page 4267, "If the genotoxic activity of glyphosate and its formulations is confirmed, it would be advisable to determine whether there are exposed individuals or groups within the human population."

Do you remember receiving that advice from Dr. Parry?

MR. JOHNSTON: Objection. No

foundation.

THE WITNESS: I see it here, but, again, the geno -- there is no genotoxic activity of glyphosate in its formulations. We would disagree with that.

QUESTIONS BY MR. MILLER:

Q. All right. Let's look at -- did you publish Dr. Parry's report?

MR. JOHNSTON: Objection. Vague.

QUESTIONS BY MR. MILLER:

Q. You can answer.

A. No.

Q. Did you submit Dr. Parry's report to the Environmental Protection Agency?

MR. JOHNSTON: Objection. Vague.

THE WITNESS: The Environmental Protection Agency is familiar with all of those studies.

QUESTIONS BY MR. MILLER:

Q. My question was not whether they're familiar with the studies.

Dr. Parry's report, did you submit it to the Environmental Protection Agency?

A. I don't know if it was or not.

MR. JOHNSTON: Vague. Objection.

QUESTIONS BY MR. MILLER:

Q. You thought he was a renowned expert. We looked at that e-mail. Why wouldn't it be important for people to know about the report of this renowned expert on the genotoxic potential of Roundup?

MR. JOHNSTON: Objection. Misstates the testimony.

THE WITNESS: The EPA is fully familiar with all these studies. They can make the determination themselves. This is a report between Dr. Parry and Monsanto. There's nothing in there that the EPA would not have been aware of in terms of the studies.

QUESTIONS BY MR. MILLER:

Q. How did Larry Kier pull you out of the doghouse that Dr. Parry put you in?

MR. JOHNSTON: Objection.

Misstates the record. No foundation.

THE WITNESS: I don't know.

(Farmer Exhibit 1-31 marked for identification.)

QUESTIONS BY MR. MILLER:

Q. Let's take a look. Exhibit 1-31 is an e-mail from you to Daniel Goldstein concerning, among other things, Dr. Parry.

All right. Ma'am, this is an e-mail produced in request of production of documents from Monsanto. You see it's from you at the top there, Donna Farmer, September 2001, right, ma'am?

A. Yes.

Q. "So if we are not going to use Dr. Parry, then why did Mark insist on developing a relationship with him?"

MR. JOHNSTON: Objection. You read that wrong.

QUESTIONS BY MR. MILLER:

Q. Let me read it again. "So if we are not going to use Dr. Parry, then why did Mark insist we develop a relationship with him? Mark was not managing that well

and almost landed us with Parry calling glyphosate genotoxic...so we had to do these additional studies to make him happy. And if it had not been for Larry Kier, we would be in the dog..."

Dog what?

A. Probably doghouse, but -- it's Larry Kier. But I think what I want to do is go back to this page with Mark. And what we talked about early on is that we didn't agree with Dr. Parry's conclusions about the Bolognesi and Peluso studies, and with Dr. Kier's help, because he is an expert in gene tox as well, was able to help us to do the studies that we talked about in vivo.

And as you can see here, it says that we did these studies. "We conducted studies in the US where mice were injected with the same formulation, with or without glyphosate, and could demonstrate the observed effects were not due to the glyphosate but to the surfactant in combination with the vehicle that caused the precipitation of the surfactant onto the liver and kidney capsules, and that then

created this toxic effect on those organs. All of these results have been openly discussed with Professor Parry, an authority in the field of mutagenicity in the UK, who fully agrees with us that this finding is an artifactual effect and in no way demonstrates the mutagenicity of glyphosate. We are now preparing a publication to address the issues."

And so I think when I'm talking about this, it was through Larry's help that we were able to provide Dr. Parry with all the information he was able to look at, that he had questions about, that we generated extra data for him to change his conclusion of those studies.

Q. William Graham, in the e-mail below, you asked, "Can we keep this" -- I'm sorry, let me read it right.

William Graham says, "Can we keep this to a limited number of people, as we have the opinions and the solutions in Europe?"

MR. JOHNSTON: Is there a question?

Q. Who would we talk to in quality assurance to ask more questions about this?

A. I don't know right now who that would be.

Q. Who's in charge of quality assurance?

A. I think you could probably go to our -- I think it might be -- I don't know who's in charge of quality assurance.

Q. Can you name anybody who works in quality assurance?

A. There would be a woman named Lisa Flagg.

Q. Flag, F-l-a-g?

A. F-l-a-g-g.

Q. Okay. Thank you.

All right. Australia wasn't the only country to point out potential issues with the NNG, true?

MR. JOHNSTON: Objection.

Vague.

THE WITNESS: I don't remember.

QUESTIONS BY MR. MILLER:

Q. Do you remember in 2004 Canada raising concerns about Roundup glyphosate

right?

A. That's what it says.

Q. Evidence in animals, "sufficient" is what it says, right?

A. That's what it says.

Q. And for mechanistic evidence, it says "genotoxicity and oxidative stress," right?

A. That's what it says.

Q. And it classifies the product life to say it is a 2A, right?

And I know you disagree.

A. I do disagree.

Q. Okay. I understand.

A. And again, all five of them came out to be 2A and 2B carcinogens.

Q. Well, 2B, can you agree with me that possibly carcinogenic is not as strong a case as probably carcinogenic?

Can we agree on that?

A. Again, that's their determination, but, again, I wouldn't agree with glyphosate being a 2A carcinogen.

Q. I understand.

Dr. Parry told you about the

oxidative stress issue back in 1999, right?

A. Yes, and we talked about studies that we did to address that. And since 1999, a lot has been learned about oxidative stress and its relationship to cytotoxicity versus a genotoxic response.

Q. Let's spend a little time looking at this and then we'll move on.

It says, "Glyphosate has been detected in air during spraying, in water, and in food."

Do you agree with that?

MR. JOHNSTON: What page are you on, Counsel?

MR. MILLER: I'm sorry, page 491, the bottom left side.

THE WITNESS: I would agree with that, but I think it's important to point out that when it says it's detected in air, if you go back and you look at the study, they were sampling near where they were spraying. So they were getting through spray droplets that exposure.

We have applications on water.

EXHIBIT 7

Message

From: HEYDENS, WILLIAM F [FND/1000] [/O=MONSANTO/OU=NA-1000-01/CN=RECIPIENTS/CN=230737]
Sent: 9/16/1999 6:18:36 PM
To: MARTENS, MARK A [FND/5045] [/O=MONSANTO/OU=EA-5040-01/CN=RECIPIENTS/CN=21606]; 'KIER, LARRY D [NCP/1000]' [/O=MONSANTO/OU=GLB-STL/CN=LEGACY ADDRESSES/CN=33322]; 'FARMER, DONNA R [FND/1000]' [/O=MONSANTO/OU=GLB-STL/CN=LEGACY ADDRESSES/CN=180070]
CC: 'HEYDENS, WILLIAM F [FND/1000]' [/O=MONSANTO/OU=GLB-STL/CN=LEGACY ADDRESSES/CN=230737]
Subject: RE: Parry report

Mark, All,

I have read the report and agree with the comments - there are various things that can be done to improve the report.

However, let's step back and look at what we are really trying to achieve here. We want to find/develop someone who is comfortable with the genetox profile of glyphosate/Roundup and who can be influential with regulators and Scientific Outreach operations when genetox. issues arise. My read is that Parry is not currently such a person, and it would take quite some time and $$$/studies to get him there. We simply aren't going to do the studies Parry suggests. Mark, do you think Parry can become a strong advocate without doing this work Parry? If not, we should ***seriously*** start looking for one or more other individuals to work with. Even if we think we can eventually bring Parry around closer to where we need him, we should be currently looking for a second/back-up genetox. supporter. We have not made much progress and are currently very vulnerable in this area. We have time to fix that, but only if we make this a high priority now.

Bill

-----Original Message-----
From: MARTENS, MARK A [FND/5045]
Sent: Thursday, September 16, 1999 2:02 AM
To: KIER, LARRY D [NCP/1000]; FARMER, DONNA R [FND/1000]
Cc: HEYDENS, WILLIAM F [FND/1000]
Subject: Parry report
Importance: High

Larry and Donna,

I would like to get some feedback to Jim Parry on his report. I sent you my comments but didn't get a reaction. Can I get your opinions and then have a discussion on the action to take?

Regards, Mark

EXHIBIT 8

Message

From: HEYDENS, WILLIAM F [FND/1000] [/O=MONSANTO/OU=NA-1000-01/CN=RECIPIENTS/CN=230737]
Sent: 4/10/2001 6:09:25 PM
To: JACOBS, ERIK [AG/5040] [erik.jacobs@monsanto.com]; MARTENS, MARK A [AG/5040] [mark.a.martens@monsanto.com]; MCKENNA, RUTH M [AG/5040] [ruth.m.mckenna@monsanto.com]; VAN BOSSUYT, ALFRED [AG/5035] [alfred.van.bossuyt@monsanto.com]
Subject: RE: Propachlor sample request

All,

Please don't do anything until we discuss this. Data generated by academics has always been a major concern for us in the defense of our products.

As Ruth inquired below, what is the EU Aneuploidy project and why is Propachlor a candidate? We need to understand what Prof. Parry wants to do (including protocol details, etc.), how it compares to standard genetic toxicology testing done for regulatory purposes, and consider the ramifications of a positive response on European and US registrations.

Bill

-----Original Message-----
From: JACOBS, ERIK [AG/5040]
Sent: Tuesday, April 10, 2001 11:18 AM
To: MARTENS, MARK A [AG/5040]; MCKENNA, RUTH M [AG/5040]; VAN BOSSUYT, ALFRED [AG/5035]
Cc: HEYDENS, WILLIAM F [FND/1000]
Subject: RE: Propachlor sample request

Mark I'll get this one out of the way. Fred can you prepare this sample request please, but please wait with sending till I've written a short covering letter to it which I will send to you first.

Mark would prof Parry need a 100g as you mentioned earlier or only 10 g?

THanks,

Erik

-----Original Message-----
From: MARTENS, MARK A [AG/5040]
Sent: dinsdag 10 april 2001 18:05
To: MCKENNA, RUTH M [AG/5040]; JACOBS, ERIK [AG/5040]
Cc: HEYDENS, WILLIAM F [FND/1000]
Subject: RE: Propachlor sample request

Ruth,

The advantages we can get from this are:
- there is a way to be informed about the results,
- we can deliver the sample as it is produced by us and hence don't have to cope with impure sample coming from elsewhere,
- we can keep prof Parry happy which will make him a good proponent of glyphosate.
If scientists decide to test chemicals we cannot stop them anyway, therefore, it is better to be informed on what they are doing and that they use samples of which we know the composition.

So please can you do the necessary to ship a 10.0 g sample to prof Parry together with the MSDS and the spec sheet.

Regards, Mark.

-----Original Message-----
From: MCKENNA, RUTH M [AG/5040]

Sent: Thursday, March 15, 2001 1:25 PM
To: MARTENS, MARK A [AG/5040]
Cc: JACOBS, ERIK [AG/5040]
Subject: RE: Propachlor sample request

Mark,
I also have no big issues but I think there are some other steps before sending material:
i) more info on EU Aneuploidy project and why Propachlor is even a candidate
ii you should inform the US colleagues (Bill,Joel and Chuck.
iii) do you want to send a summary of existing gentox and
iv) request to see protocol and to be kept informed of results.

What do you think

Ruth

-----Original Message-----
From: MARTENS, MARK A [AG/5040]
Sent: 15 March 2001 11:44
To: MCKENNA, RUTH M [AG/5040]
Cc: JACOBS, ERIK [AG/5040]
Subject: Propachlor sample request
Importance: High

Ruth,

Please find herewith a request from Prof Parry (mutagenicity expert of UK to obtain a sample of propachlor to do some aneuploidy testing. This shouldn't constitute a problem. Could you arrange for the shipment of say 100 g to Prof. Parry?

Regards, Mark.

-----Original Message-----
From: Parry J.M. [mailto:J.M.Parry@swansea.ac.uk]
Sent: Wednesday, March 14, 2001 6:57 PM
To: MARTENS, MARK A [AG/5040]
Subject: RE: NOT GLYPHOSATE

DEAR MARK
I WOULD BE GRATEFUL IF YOU COULD HELP ME OBTAIN A SAMPLE OF A HERBICIDE CALLED
PROPACHLOR ,2-CHLORO-N-ISOPROPYL ACETANILIDE FOR WHICH I UNDERSTAND MONSANTO HOLD THE ORIGINAL PATENT.
MY COLLEGUES IN THE EU ANEUPLOIDY PROJECT WISH TO EVALUATE THE POTENTIAL OF PROPACHLOR TO INDUCE ANEUPLOIDY IN CULTURED MAMMALIAN CELLS.IT IS ONE OF A GROUP OF HERBICIDES THAT WILL BE EVALUATED IN THE PROJECT.
BEST WISHES JIM
-----Original Message-----
From: MARTENS, MARK A [AG/5040] [mailto:mark.a.martens@monsanto.com]
Sent: 27 February 2001 15:17 PM
To: 'Jim Parry'
Subject: BBA evaluation of the mutagenicity of glyphosate

Dear Jim,

First of all thank you for receiving us in your office and the interesting discussions on oxidative toxicity. Please find herewith the evaluation that the German authorities (BBA) made of the glyphosate mutagenicity data that were submitted by all companies putting glyphosate on the market in the EU. This evaluation should be considered as confidential.

<<BBAmutass.doc>>

As soon as the text for our SOT poster is final we will send it to you.

Regards, Mark.

EXHIBIT 9

CONFIDENTIAL-DRAFT

Clustering glyphosate formulations with regard to the testing for dermal uptake

~~Ir.~~ C. Gustin[1] , Mark Martens [2] & C. Bates[1]

Monsanto, St.-Louis[1] ,Monsanto Brussels[2]

Julyne 2001

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1. Scope

Operator exposure assessments are part of an ANNEX III dossier, supporting the registration of a pesticide formulation in member states of the European Union. In this assessment default model settings, data assumptions and scenario's can be used (Tier 1 assessment) or more scenario specific and product/formulation-related data can be selected in order to refine the assessments and ~~turn~~ make the risk evaluation more realistic.
One of the product specific parameters that can make a big difference in the exposure assessment is the dermal uptake factor, ~~this~~ which is the fraction of the amount of active ingredient on the skin surface that is absorbed by the skin tissue. The current European default value for dermal uptake (~~this is~~ when product specific data is missing) is 10% of the actual exposure ~~(the exposure that reached the~~ to uncovered skin~~)~~ but future predictive models (EUROPOEM) could have a more conservative approach (100% of the actual exposure).When th~~e~~is new predictive models ~~will b~~ are implemented (2002), formulation specific dermal data will be key for a successful risk evaluation.

Glyphosate has a whole series of different formulations. The differences between those formulations are ~~for instance~~ based on:

- the different salt types used to formulate the active ingredient, ~~based on~~
- the use of different surfactants ~~and~~
- the ~~quantitative~~ active ingredient/surfactant ratio
- the concentrations of active ingredient and surfactants

~~or could be based on~~ the presence or absence of other inert ingredients such as anti-foam agents.

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Until today Monsanto has conducted ~~only~~ formulation specific dermal uptake research only on the formulation Roundup (MON 2139). It is clear that because the compositional differences the dermal uptake data for Roundup can't be extrapolated as such towards the wide range of formulations ~~because ……??~~. Every ingredient in a formulation can have a specific influence of dermal uptake. Scientific experimental evidence is necessary.

Ideally all of the different glyphosate formulations would have to be tested for dermal uptake. It is possible though, by focusing on the key parameters affecting dermal uptake, to compare and group (cluster) the formulations according to their expected behavior on the skin. For each formulation-cluster it will be possible to identify a representative formulation. This formulation could be tested for dermal uptake and the results could then be extrapolated to the other formulations in the same cluster.

Key to this approach is a correct identification of the formulation parameters that will impact the dermal uptake. For the purpose of this exercise we will have to focus on the data that's available in the supporting formulation specific data packages.

Which formulations are to be considered?

The formulations to be clustered are the formulations that will be subject to the European re-registration procedure in 2003 and by consequence have to be supported by an ANNEX III dossier. Existing formulations that will not be supported anymore or that will be supported by a third party are not considered.

Key parameters to be considered when grouping formulations ?

Please note that the description of the key parameters is based on the data that's available from the dossiers. This available data will be the basis for the clustering exercise.

Salt type, Dissociation constant (pKa),

Glyphosate acid exists as a zwitterionic species in a solid state (state 1a) is an acid with and has a relative low a water solubility in water (Sw) aroun (1.2 at 25 C)d 12 g/liter. This solubility is too lowhigh for formulating the active ingredient into a n emulsifiable concentrate (EC)suspendableoluble liquid (SL) but too highlow for a suspension concentrate (SC). For this reason glyphosate is (in most casesformulations), formulated as a salt. The formulations of interest in this exercise allow to distinguish four three salt types: an isopropylamine salt (IPA), a sodium salt, and an ammonium salt and a potassium salt of glyphosate. The majority of these formulations are is formulated as an IPA salt.

Once the formulation is diluted in water, the salt will dissociate immediately into the free acid (free acid state). As glyphosate consists of an amino group a carboxilic acid group and a phosphonic acid group, the dissociation of the free acid state of glyphosate happens in 3 sequential phases each characterized by a pKa value. In a first phase the carboxylic acid group will dissociate into a mono-anion (pK1 = 2.27). In a next step the mono-anion form shifts into the dianion form by dissociation of the phosphonic acid group (PK2 = 5.57). When the amino-group of the dianion form dissociates (pK3 = 10.25) the trianion

form is established. Each dissociation step is characterized by an equilibrium between the two forms and this equilibrium is pH driven. At physiological pH-values the dianion form (dissociated carboxylic and phosphonic acid group) is prevalent. ~~An equilibrium will be established between the dissociated and the non-dissociated form, with a clear shift to the dissociated form.~~

~~Also in the formulation an equilibrium exists between the dissociated and the non-dissociated form with here a clear shift to the non-dissociated form.~~ Common amine surfactants (see further) will further neutralize the glyphosate acid.

The dissociation state of glyphosate influences its behavior on the skin. For instance zwitterions penetrate the skin more readily than any other form of glyphosate.

Using a simplistic approach, the degree of dissociation is driven by the concentration, the pH ~~in the~~ and the dissociation constant (pKa).

Therefore a first basis to group the glyphosate formulations could be the salt type and pH. The same salt type of glyphosate in any formulation will ~~have~~lead to the same dissociation behavior if the same ?? surfactants are used (see further) and under comparable pH conditions.

Surfactants

The upper barrier of the skin (epidermis) is very lipophilic. This natural barrier prevents dehydration of the skin and prevents for instance bacteria and other outer micro-elements from entering the body through the skin. Glyphosate on the other hand is very hydrophilic so initially a low interaction between glyphosate and human skin is to be expected. Surfactants are able to increase glyphosate absorption through the skin by (1) removal of lipids (sebum) from the epidermal surface due to surfactant action, (2) increase of the hydration state of the skin (under closed exposure conditions), (3) increase of skin contact (spreading of water droplets by surfactant action), (4) increase of contact time with the skin due to decrease of evaporation of water from the droplets containing surfactant (surfactant monolayer at surface of droplets slows down passage to vapour phase,(5) increase of sub epidermal blood flow due to irritant action of surfactant, (6) intra-epidermal and sub epidermal intercellular water accumulation due to the irritant action of the surfactant ~~In order to have an interaction between the skin and glyphosate (1) the surface properties of the skin have to be modified (2) a contact area between glyphosate and the skin has to be established, the larger this contact area the more intense the contact and the higher the potential influx of glyphosate (3) the transfer of glyphosate in the skin will be facilitated if glyphosate is in a solubilized stage (advective transport). The longer glyphosate stays solubilized the more intense the contact with the skin.~~

~~All this elements can be influenced by surfactants. Surfactants will interact with the lipophilic skin surface and will thus alter the properties of the epidermis. This interaction~~

~~can consist in delipidization of the epidermis, the surfactant~~solvent ~~may be absorbed by the skin, altering it's properties or the surfactant could just irritate the skin.~~
~~The surface tension of droplets enriched with surfactants will be altered in a way that the contact angle between the droplet and the skin will decrease (wetting surface will increase compared to a normal water droplet).The increased contact area creates more potential for interaction between glyphosate and the skin (higher potential influx).~~
~~Surfactants will change the vapor pressure of mixtures in a way that evaporation of the droplet can be slowed down .As a result a longer interaction between the droplet and the skin is established with a higher/longer potential for glyphosate to interact with the skin.~~

~~All these properties of surfactants lead to a second basis for clustering: the surfactant type.~~ Formulations based on a same surfactant type ~~(and certainly when the~~ surfactant/ glyphosate ratio ~~in the formulation is in the same range)~~ will have a comparable interaction and contact with the skin. The second bases for clustering becomes a combination of the surfactant type, the surfactant load, the surfactant/glyphosate ratio and the glyphosate load in the formulation.

Anti-foams

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~~(Effect of anti-foam[22])~~ Sometimes an anti-foam agent is added to the formulation. Some ~~A~~anti-foams ~~foams are in general~~are tensio active agents others are not (e.g. polysiloxanes) ~~so they have also a~~but in general adding an anti-foam should not have an influence on the over all surface tension of the formulation and the spray liquid. Their concentration is in general much lower than the concentration of the surfactants. ~~Therefore when an anti-foam is added the formulation should be treated in a separate cluster.~~

Pelargonic acid

Sometimes pelargonic acid is added as a symptomology enhancer.

The addition of pelargonic acid in concentrations greater than that of the surfactant may play a role in glyphosate skin penetration. Since the formulations have been neutralised the pelargonic acid is likely to be present (otherwise not soluble) as the IPA salt which in fact is a soap.

Formulations containing pelargonic acid are clustered separately. ~~When grouping the formulations on this basis and adding the previous clustering criteria (salt type, pKa) formulation groups with an identical pH-range (as far as data is available) are obtained as well.~~

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The results based on these limited criteria are shown in table 1.

~~**Table 1 :Glyphosate formulation clusters based on salt type, pKa, surfactant type and pH**~~

[EMBED Excel.Sheet.5]

EXHIBIT 10

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EXHIBIT 10

This document is to remain under seal pursuant to PTO #15, ECF No. 186

EXHIBIT 11

Message

From: CUNNINGHAM, MICHAEL J [AG/5125] [/O=MONSANTO/OU=NA-5125-01/CN=RECIPIENTS/CN=13642]
Sent: 9/23/2004 1:12:45 PM
To: Sean Kirby [kirby@ProspectusAssociates.com]; FARMER, DONNA R [AG/1000]; JORDAN, TRISH L [AG/5125] [trish.l.jordan@monsanto.com]; 'Fairbrother, Jill' [Jill.Fairbrother@Scotts.com]
CC: MAKI, ROY F [AG/5125]; CARR, KATHERINE H [AG/1000]
Subject: FW: Vision Risks

Hi,

This came to me via JD Irving.

Donna, do we have the counter argument for the N-nitro angle.

I remember seeing one somewhere.

Michael

-----Original Message-----
From: Brunsdon, Blake [mailto:brunsdon.blake@jdirving.com]
Sent: Thursday, September 23, 2004 9:08 AM
To: Mike Cunningham (michael.j.cunningham@monsanto.com)
Subject: Vision Risks

FYI...

- Blake Brunsdon

-----Original Message-----
From: sust-mar-digest-owner@chebucto.ns.ca
[mailto:sust-mar-digest-owner@chebucto.ns.ca]
Sent: Wednesday, September 22, 2004 9:12 PM
To: sust-mar-digest@chebucto.ns.ca
Subject: sust-mar-digest V1 #206

sust-mar-digest Wednesday, September 22 2004 Volume 01 : Number 206

In this week's Sustainable Maritimes (sust-mar) Digest:
sust-mar: Correction on risks of using Vision
sust-mar: Invitation to Join
sust-mar: Release of Greenpeace book, Halifax north end
sust-mar: Internship Position with ACIC
sust-mar: Sable Island: Uncertain Future?
sust-mar: Thursday Sept 23 - National Wilderness Advocates to meet in Halifax
sust-mar: Walk to School Week Oct. 4-8
sust-mar: job opportunity with Sierra Youth Coalition
***

Date: Fri, 10 Sep 2004 07:03:11 -0300
From: "Don Black" <dblack@chebucto.ns.ca>
Subject: sust-mar: Correction on risks of using Vision

Tip: Your message to SUST-MAR must be html-free. So, BEFORE you hit SEND, please go to your "Format" pull-down menu and select "Plain text." Thanks!

Dear Friends

I would like to correct a mistaken impression that might have been created by my previous note.

When I said: "It is absurd to speak of the "safety" of spreading chemicals in the environment when we have literally no idea what new compounds they may form with other chemicals they encounter, nor of the damage those new compounds may cause", I was thinking in the broadest sense.

In fact, scientists do know something about some specific compounds of glyphosate (the known active ingredient in Vision).

"The problem with glyphosate...is that it combines readily with nitrites, found in normal human saliva, to form an N-nitroso compound called N-nitrosoglyphosate. Although that particular compound has not been tested as a cancer-causing agent, over 75% of all other N-nitroso compounds so tested have been shown to cause cancer by way of tumour formation." (Dr. Ruth Shearer, consultant in genetic toxicology, quoted in the Chronicle Herald, 4 Aug 84).

And in its latest review of the scientific literature on glyphosate (1995), Health Canada notes that "Some concern has been expressed over the possibility that glyphosate could react with nitrite in the diet to form N-nitrosophosphonomethyl glycine (NPMG), a putative carcinogen."

So the federal government, through its labelling process, is applying the precautionary principle. It would be contrary to federal law to spray Vision on people (or waterways), because the intent of the labelling process is to absolutely minimize contact between the chemicals and humans, animals or fish.

How could such contact happen? What I saw in 1984 was field workers being unconcerned with personal contact or spillage of Roundup (Vision at a lower concentration), and people being sprayed, as if to demonstrate the government assertion of the time that the product was "safe".

I saw provincial regulations so written that helicoptors were permitted to continue spraying for up to half an hour after wind speeds were known to exceed maximum allowable levels, which in turn allowed drift of the chemicals on neighbouring lands, the workers, and the observer group, which included DNR employees.

I saw totally inadequate signage to warn people that the spray had taken place, or that the chemical would remain active for up to two weeks on berries the community was accustomed to picking in the clearcut.

I saw inadequate buffer areas around streams that were increased through public pressure, then violated by the drift, and no account taken of the machine tracks and erosion that would allow the active chemical, well-bonded to clay soils, to be carried downstream into neighbouring properties, wells and waterways in any heavy rainfall for weeks following the spraying.

In other words, following the Monsanto marketing strategy of falsely claiming the "safety" of these chemicals, our government of-the-day was directly increasing the risk to the health of humans and other forms of life. Again, the trust necessary for responsible government evaporates when government promotes an industry agenda over sound precautionary public health policy.

Thanks to everyone who responded to my first note on this. Anne Rogal points out that Stora now much more than just a "Swedish" corporation. Its head office is in Helsinki, Finland, its international office in London, U.K. with head office functions in Stockholm, Sweden.

More to come. Cheers.

Don Black
Bluedoor.chebucto.net

Date: Sun, 5 Sep 2004 09:19:52 -0400
From: "William Myers" <Wmyers@alternatives.org>
Subject: sust-mar: Invitation to Join

Tip: Your message to SUST-MAR must be html-free. So, BEFORE you hit SEND, please go to your "Format" pull-down menu and select "Plain text." Thanks!

Alternatives Federal Credit Union is pleased to invite you to join our ongoing email discussion listserve on Community Development Banking.

Since 1994, this list has served practitioners including Community Development Credit Unions, CD Banks, CDCs, CD Loan Funds, and non-profits involved in support. The discussions have ranged from the practical (construction, mortgage, and small business lending; job opportunities, conferences, fundraising) to legislative (CRA, HMDA, and CDFI) to the cutting edge (micro-loan funds, peer lending, local currency, targeting social impact).

"The best Community Development Banking resource in Cyberspace."

CommunityDevelopmentBanking-L is an active, free, ongoing email resource of Cornell Community and Rural Development Institute and Alternatives Federal Credit Union.

You may subscribe at our web subscription address,
HTTP://www.alternatives.org/cdblist.htm You'll get a welcome message with
list rules and instructions. Then you'll start getting EMail postings from the list.

ARCHIVES are stored at http://www.lightlink.com/cdb-l/

Please refer any questions to
Bill Myers, List Moderator
WMyers@alternatives.org

- ---
<html>[This E-mail scanned for viruses 09/05/2004 09:19:39]</html>

Did a friend forward this to you? Join sust-mar yourself!
Just send 'subscribe sust-mar' to mailto:majordomo@chebucto.ca

---

Date: Fri, 17 Sep 2004 09:53:04 -0300 (ADT)
From: Martin Willison <willison@dal.ca>
Subject: sust-mar: Release of Greenpeace book, Halifax north end

Tip: Your message to SUST-MAR must be html-free. So, BEFORE you hit SEND, please go to your "Format" pull-down menu and select "Plain text." Thanks!

This message is in MIME format. The first part should be readable text,
while the remaining parts are likely unreadable without MIME-aware tools.
Send mail to mime@docserver.cac.washington.edu for more info.

- ---2119368396-613127408-1095425584=:174544
Content-Type: TEXT/PLAIN; CHARSET=iso-8859-1
Content-ID: <Pine.A41.3.95.1040917094601.174544G@is.dal.ca>

From: Michael T. Hamm

Join Bookmark and Raincoast Books for an evening with Rex Weyler, author of the newly published work "Greenpeace: How a Group of Ecologists, Journalists and Visionaries Changed the World."

Wednesday, 6th October, 7:30 p.m.

Halifax North Public Library
2285 Gottigen Street
Halifax, Nova Scotia
490-5723

For further information, please contact Bookmark at the phone number or email address listed below.

Bookmark II
5686 Spring Garden Road
Halifax, Nova Scotia

B3J 1H5
Phn/Fax: (902) 423-0419
E-mail: bookmark@hfx.eastlink.ca

- ---2119368396-613127408-1095425584=:174544--

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Date: Fri, 17 Sep 2004 15:38:08 -0300
From: Jennifer Sloot <info@acic-caci.org>
Subject: sust-mar: Internship Position with ACIC

Tip: Your message to SUST-MAR must be html-free. So, BEFORE you hit SEND, please go to your "Format" pull-down menu and select "Plain text." Thanks!

Through a partnership with the NGO Coalition for the Environment, the Atlantic Council for International Cooperation (ACIC) would like to fill an internship position, which focuses climate change and the environment.

The Atlantic Council for International Cooperation is a unique coalition of Atlantic Canadian organizations working on international development and cooperation issues, working together to achieve sustainable global development in a peaceful and healthy environment, with social justice, human dignity, and participation for all.

ACIC supports its members in development and developmental education through collective leadership, networking, information, training and coordination, and represents their interests when dealing with government and others. With your organization, we now have 40 members, including national organizations and grassroots organizations from across the Atlantic Provinces.

ACIC has been working with NGOCE over the past two years in building its capacity, through an exchange of tools and experience including administrative tools, human resource management techniques, and public engagement tools and resources.

NGOCE is coalition of organizations in Calabar, Cross River State, Nigeria, that has a mandate to develop and support projects that counteract the threat to the biological and cultural diversity and natural resources that sustain the environment while advocating for the sustainable use and equitable distribution of benefits to the people who depend on these resources.

Project Description:
NGOCE and ACIC are partnering to provide each other with tools for increasing their capacity to serve their coalition members. The young professional will assist with transferring knowledge, skills, and tools between NGOCE and ACIC to improve the environmental education services of both organizations.

Job description

Canadian component:

The young professional will be involved with all aspects of the daily operations of the Atlantic Council for International Cooperation (ACIC),
including:

- -Assisting in coordinating a Climate Change public engagement event;
- -Conducting research into climate change and energy efficiency;
- -Promoting ACIC workshops and activities through the media;
- -Networking with members to encourage participation in ACIC's projects;
- -Newsletter editing and layout (Special Climate Change Edition); and,
- -Professional development workshop organization.

Overseas component:

The young professional will transfer skills learned at ACIC and through their educational training to assist NGOCE build its membership base and environmental services:

- -Working with NGOCE's members in environmental education and building awareness;
- -Networking with members to assess avenues in which information can be exchanged;
- -Facilitating partnership development of member organizations;
- -Conducting research into environmental issues, including bush-meat trade and baseline work on renewable energy potentials in communities; and,
- -Newsletter editing and layout.

Qualifications:

CIDA requires the intern:
- -Be aged 30 or under;
- -Be a Canadian citizen or landed immigrant able to work in Canada;
- -Be currently under or unemployed;
- -Have not previously worked outside Canada in a paid, career-related position;
- -Be a graduate of a college or university; and,
- -Have not previously participated in another Internship Program funded by the Government of Canada's Youth Employment Strategy (YES).

The ideal candidate will have:
- -Familiarity with ACIC's and NGOCE's goals and programs;
- -Interest in international cooperation and sustainable development;
- -Experience in organizational management and coordination;
- -Proven skills in project management;
- -Ability to prioritize and effectively handle many demands;
- -Proven computer skills including MS Word, MS Publisher, MS Access, e-mail, internet, and spreadsheet development, all within a PC environment;
- -Attention to detail;
- -Flexibility in work projects;
- -Ability to take initiative;
- -Excellent communication skills, both oral and written;
- -Must be available to travel and work on a few evenings and week-ends;
- -Previous travel or overseas study experience, especially in Africa, would be an asset;
- -Flexibility in work and living environments; and,
- -Fluency in English and French would be a strong asset.

For further information, please see www.acic-caci.org

APPLICATIONS DUE BY: 5:00 pm Friday, September 24, 2004

Applicants should electronically provide a covering letter, highlighting their qualifications for this position, along with a resume and 3 references.

Please send resumes to:
Jennifer Sloot

Atlantic Council for International Cooperation

Email: info@acic-caci.org

We thank all candidates for their application. Unfortunately, only those under consideration will be contacted.

WE'VE MOVED!
Atlantic Council for International Cooperation /
Conseil atlantique pour la coopération internationale
PO Box 27025, 5595 Fenwick Street
Halifax, NS/N.-É. Canada, B3H 4M8
Tel/Tél: (902) 431-2311 Fax/Téléc: (902) 431-2311
E-mail/Courriel: info@acic-caci.org
http://www.acic-caci.org

Date: Sun, 19 Sep 2004 16:45:02 -0300 (ADT)
From: Mark Butler <ar427@chebucto.ns.ca>
Subject: sust-mar: Sable Island: Uncertain Future?

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Sable Island: Uncertain Future?

Who's looking after Sable Island? Zoe Lucas, biologist, will be giving a slide presentation on Sable Island and the important role that the Island's Station and staff play in the conservation of this utterly unique place. A panel discussion focusing on the uncertain future of the Station will follow Zoe's presentation. The event is taking place in the Sobey Building, Saint Mary's University on October 5 from 7-9. Mark it in your calendar. Brought to you by the Environmental Studies Program, Saint Mary's University, The Green Horse Society, and the Ecology Action Centre. For more information on Sable Island check out www.greenhorsesociety.com or call the Ecology Action Centre at 902-429-2202 (Mark Butler)

- ----- End forwarded message -----

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Date: Mon, 20 Sep 2004 15:50:05 -0300
From: Karen Potter <coordinator@cpawsns.org>
Subject: sust-mar: Thursday Sept 23 - National Wilderness Advocates to meet in Halifax

Tip: Your message to SUST-MAR must be html-free. So, BEFORE you hit SEND, please go to your "Format" pull-down menu and select "Plain text." Thanks!

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CPAWS-NS invites the public to join us on Thursday September 23 for the National AGM of the Canadian Parks and Wilderness Society (CPAWS). CPAWS-NS is proud to host members and staff from eleven chapters, nationwide, for the first gathering of CPAWS on the east coast. This is a great opportunity to hear from influential conservation leaders and wilderness advocates from coast to coast to coast!

Thursday, September 23, 2004
Weldon Law Building, Room 105
Dalhousie University
6061 University Avenue

6:30 pm AGM
Please join us to hear from our leading conservationists, including Harvey Locke!

7:30 pm Guest Speaker Dr. Jon Lien
Dr. Lien is an Honorary Research Professor in the Biopsychology Programme and the Ocean Sciences Centre at Memorial University of Newfoundland. Currently he Chairs the Minister's Advisory Council on Oceans for the Department of Fisheries and Oceans. He is a past member of the Fisheries Resources Conservation Council in Canada.

For over twenty years he has led the Whale Research Group at Memorial University of Newfoundland that works closely with the Department of Fisheries and Oceans in managing cetaceans in the region. He was responsible for the Entrapment Assistance Programme that operated throughout the Province and helped both the animals and the fishermen with by-catch problems. Currently his research involves evaluation of the impact of whale watching on both animals and people, and estimating fecundity in populations of several species of cetaceans.

Dr. Lien will be discussing how ocean conservation is linked with community survival.

8:30 pm Reception
Following Dr. Lien's talk, CPAWS-NS is hosting a reception to allow for an opportunity to mingle with our guests from across the country

All are welcome. Hope to see you there!

For more information, visit www.cpawsns.org phone 446-4155

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Just send 'subscribe sust-mar' to mailto:majordomo@chebucto.ca

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Date: Tue, 21 Sep 2004 14:59:51 -0300
From: Janet Barlow <asrts@ecologyaction.ca>
Subject: sust-mar: Walk to School Week Oct. 4-8

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WALK TO SCHOOL WEEK: OCTOBER 4 TO 8

Lace up your sneakers for Walk to School Week from October 4 to 8! Join millions of students, teachers, parents and community members around the world as they walk for the environment, health, physical activity and safety. Register at www.goforgreen.ca/asrts, asrts@ecologyaction.ca or (902) 442-5055.

- -30-

For more information, contact Janet Barlow at:

Active & Safe Routes to School
c/o Ecology Action Centre
1568 Argyle Street, Suite 31
Halifax, NS B3J 2B3
Tel: (902) 442-5055
Fax: (902) 422-6410
asrts@ecologyaction.ca
www.ecologyaction.ca

International Walk to School Week is a component of Active & Safe Routes to School, which encourages the use of active modes of transportation to and from school, such as walking or cycling. It is a national Go for Green program coordinated in Nova Scotia by the Ecology Action Centre in partnership with the Nova Scotia Office of Health Promotion, Sport and Recreation Division.

Did a friend forward this to you? Join sust-mar yourself!
Just send 'subscribe sust-mar' to mailto:majordomo@chebucto.ca

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Date: Wed, 15 Sep 2004 12:25:24 -0300
From: "Emily McMillan" <emilym@sierraclub.ca>
Subject: sust-mar: job opportunity with Sierra Youth Coalition

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JOB OPPORTUNITY

Regional Project Coordinator OPPORTUNITIES
Sustainable Campuses
Sierra Youth Coalition EMPLOYMENT

- --PLEASE CIRCULATE--

Job Classification: Student Positions
Late September 2004 to April 2005 part-time
Position Title: Atlantic Regional Coordinator,
Sustainable Campuses
Application Deadline: September 20th, 2004
Wage: $12.50/hour

The Sierra Youth Coalition is looking to hire a Regional Coordinator for the Atlantic provinces. This individual will be integral in spreading the tremendous successes of the Greening the Ivory Towers project. The ideal candidate is a motivated, inspired and knowledgeable student, has been active in the sustainable campuses movement, and has previous experience with SYC programs. As this is a demanding project with huge rewards it is desired that successful applicants not have a full/heavy course load.

Project Overview:

The Sustainable Campuses project is currently one of SYC's main focus areas. The project seeks to inspire, inform, train, and support Canadian students in the pursuit of social and environmental change through their campus. The Sustainable Campuses project aims to promote a systematic approach to change in campus practices. It promotes students' efforts to work within the systems of their educational institutions in order to create permanent, institutionalized mechanisms to ensure sustainability.

In 2003, the Sierra Youth Coalition launched an innovative project to assist students, faculty and administration in increasing the sustainability of Canadian post-secondary institutions through improved

understanding of their ecological, economical and social impacts. That is the goal of Greening the Ivory Towers: Academia to Action.

This project uses Canada's first academically developed Campus Sustainability Assessment Framework (CSAF) to assist universities in accurately understanding their socio-economic and environmental impacts. The CSAF was designed to offer support, resources and assistance in developing solutions that address overarching structural problems in society, as well as striving to facilitate institutional and lifestyle changes.

Responsibilities:

1) To work closely with a minimum of 3 campuses at implementing the Greening the Ivory Towers project;
2) To recruit volunteers to help oversee the project on each campus;
3) To train campus community members of conducting audits, setting processes and strategic planning;
4) Outreach to participants within and outside the current Sustainable Campuses Network;
5) Report regularly to National Coordinator and participate consistently on Regional Coordinator calls;
6) Network with regional groups as a representative of the Sierra Youth Coalition;
7) Attend Regional Coordinator Training in Ottawa between Aug. 29th - Sept. 2nd;
8) Attend the Sierra Youth Coalition Sustainable Campuses Conference between Sep. 30th - Oct. 3rd.

Preferred Qualifications:
Ø Possess knowledge of campus sustainability initiatives and the Sierra Youth Coalitions programs;
Ø Bilingual (french/english) will be required in some regions;
Ø Strong writing and research skills;
Ø Ability work in flexible work environment;
Ø Ability to work independently but also as part of a team;
Ø Ability to learn quickly;
Ø Strong organizational and project coordination skills;

For more information please view the Sierra Youth Coalition website: www.syc-cjs.org/gitp

IT IS PREFERRED THAT CANDIDATES SEND THEIR CV, COVER LETTER AND A SHORT WRITING SAMPLE ELECTRONICALLY! (to help save paper) Put Sustainable Campuses CV in the subject area and email to fernando@syc-cjs.org

Suite 412 - 1 Nicholas Street, Ottawa, Ontario, K1N 7B7
(613) 241-1615, 1-888-790-7393; FAX: (613) 241-2292

SYC is an equal opportunity employer and encourages applications from members of minority groups.

Emily McMillan
Director, Sierra Club of Canada - Atlantic Canada Chapter
1657 Barrington St., Suite 502
Halifax, NS, B3J 2A1
emilym@sierraclub.ca
Phone: 902-444-3113
Fax: 902-444-3116
www.sierraclub.ca/atlantic

One Earth...One Chance
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EXHIBIT 12

United States
Environmental Protection
Agency

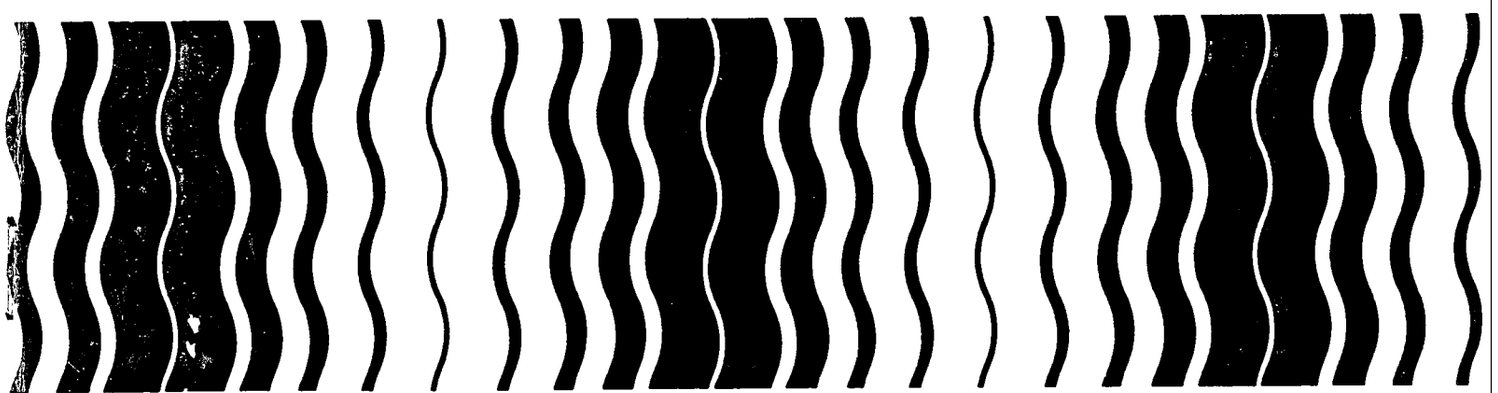
Office of
Pesticides and Toxic Substances
Washington DC 20460

June 1986

Pesticides

EPA

Guidance for the Reregistration of Pesticide Products Containing Glyphosate as the Active Ingredient



These studies are not adequate to fulfill Guideline requirements (§158.135 85-1), therefore repeat studies are required.

N-Nitroso-Glyphosate

The Agency has determined that technical glyphosate contains N-nitroso-glyphosate (NNG) as a contaminant at levels of 0.1 ppm or less. The Agency has determined that oncogenicity testing of nitroso contaminants will normally be required only in those cases in which the level of nitroso compounds exceeds 1.0 ppm (see "Pesticide Contaminated with N-nitroso Compounds, proposed policy 45 FR 42854 (June 25, 1980)"). Therefore, although a chronic feeding study in rats was reviewed and found unacceptable, no additional studies are requested at this time.

Acute oral toxicity data for NNG place it in Toxicity Category III. Other acute toxicity data for NNG are not available.

Chronic toxicity studies on NNG in the dog and rat were conducted at IBT. After a raw data audit, both studies were judged to be "supplementary" (not adequate to fulfill guideline requirements). Both studies were then evaluated for scientific acceptability, and the rat study was invalid due to dosing of the control groups with an excessive amount of NaCl which resulted in high mortality of control animals. The dog study remained classified "supplementary" due to the lack of supporting raw data as identified in the raw data audit validation report. The only apparent treatment-related findings in the dog study were an increase in absolute and relative kidney weights and in blood glucose in high-dose (30 mg/kg/day) females. The NOEL for this apparent effect was 10 mg/kg/day.

A 90-day subchronic oral toxicity study with NNG was conducted in the rat. The principal effect of treatment was a dose-related decrease in survival, food consumption, and body weight gain. A NOEL was not established in this study since these effects were noted at the lowest dose tested, 3000 mg/kg/day. The study was classified as "supplementary" data due to inadequate reporting of clinical signs and necropsy data, and inadequate identification of the test material.

A rat metabolism study conducted with NNG demonstrated that NNG is rapidly absorbed and excreted, with the kidneys the preferential route of elimination. These findings are in direct contrast with the results of the metabolism studies with glyphosate, which found that absorption from the gut

was poor and the majority of excretion occurred in the feces due to unabsorbed radiolabel. Tissue residues after five consecutive doses were minimal, as no tissue contained more than 1.5 ppm of radiolabel.

No acceptable studies for mutagenic or reproductive effects are available at present for NNG.

Because the amount of N-nitroglyphosate is less than 1.0 ppm no additional toxicology data are required; therefore, none of the above studies are to be repeated or required.

Plant Metabolite--Aminomethylphosphonic Acid

The Agency has determined that the metabolite aminomethylphosphonic acid (AMPA) is formed on plants in amounts that can range as high as 28 percent of the total residue on the plant. Since the extent of glyphosate metabolism was not adequately addressed in the rat metabolism study, the possibility exists that the AMPA metabolite could pose a hazard to humans that was not evaluated by testing the parent compound glyphosate. If an acceptable rat metabolism study is submitted which demonstrates significant conversion of glyphosate to AMPA in animals, additional studies on this metabolite may be not necessary, since the toxicity of AMPA will have been assessed by chronic feeding studies with the parent compound glyphosate.

Acute oral toxicity and primary skin irritation data place AMPA in Toxicity Category IV. The primary eye irritation study demonstrated that AMPA was slightly irritating to the eye, corresponding to Toxicity Category III.

A 90-day subchronic feeding study was submitted that demonstrated irritation of the urinary bladder in rats treated with 1200 mg/kg/day, the lowest effect level (LEL) in this study. This irritation was manifested in the form of hyperplasia of the cells lining the bladder, and was noted with increased incidence and severity at the highest dose tested, 4800 mg/kg/day. Epithelial hyperplasia of the renal pelvis was also noted in high-dose rats. The NOEL for this effect was 400 mg/kg/day, and the study was classified as Core-Minimum.

A rat metabolism study demonstrated that AMPA is rapidly excreted as the parent compound. No evidence for bioaccumulation was noted in this study, which was classified as Supplementary data because the number of animals studied was not reported, only males were studied, and the effects of a minimally toxic dose and repeated nontoxic doses on excretion, metabolism, and accumulation were not assessed.

EXHIBIT 13

Monsanto

In master file

FROM (NAME—LOCATION—PHONE) Dept. of Medicine & Environmental Health — T.J. Long, G2WD 4-8851

DATE : December 26, 1984

SUBJECT : CP 76100: Lifetime Carcinogenicity Study in Mice

REFERENCE : IR-77-223

TO : *R.W. Street C2SC

CC. E.E. Debus, C2SC
V.C. Espenschied
T.W. Fuhremann
R.L. Harness, C2NA
L.A. Suba, C2SC
Toxdata

Ct25AM

file Pendulf Metabolite

The accompanying report has been reviewed and accepted. A quality assurance review was performed by International Research and Development Corporation. A summary of the methods and results and an evaluation of the conclusions presented in this report are summarized below.

METHODS

CP 76100 was administered by gavage as an aqueous solution of the sodium salt to Charles River CD®-1 mice daily for 104 weeks. Dosing was at a constant volume of 10 ml/kg at dosage levels of 50, 150, and 500 mg/kg/day. Seventy male and 70 female mice were dosed at each level. A control group of 70 mice of each sex received a solution of NaCl (5.0 mg Na+/ml) at the same dosing volume. The concentration of sodium in the control dosing solution was selected to equal that received by the high dose group.

The mice were observed daily for mortality and overt signs of toxicity. A detailed physical examination of each animal was performed weekly. Individual body weights and food consumption measurements were recorded weekly for the first 14 weeks and biweekly thereafter. The following hematological parameters were measured for 10 mice/sex/group at 12 and 24 months: hematocrit, hemoglobin concentration, erythrocyte count, total and differential leukocyte counts, platelet count, and reticulocyte count.

Complete postmortem examinations were performed on all animals dying spontaneously, sacrificed in extremis, or sacrificed at the twelve month interim and 24-month terminal sacrifice periods. The following tissues were examined microscopically: adrenals, brain, eyes and Harderian glands, gall bladder, heart, esophagus, stomach, duodenum, jejunum, ileum, large intestine, kidneys, urinary

*received report

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bladder, prostate, testes with epididymides, ovaries, cervix uteri, liver, lung and mainstem bronchi, lymph nodes, mammary gland, salivary glands, sciatic nerve, pancreas, pituitary, skin, spinal cord, spleen, thymus, trachea, thyroid/parathyroid, sternum (bone marrow), and other tissues with lesions. In addition, 10 animals/sex/group were examined microscopically as follows: 3 coronal sections through the head which included the nasal cavity, paranasal sinuses, tongue, oral cavity, nasopharynx, and middle ear.

Tumor incidences were statistically analyzed by the testing laboratory employing life table methods and Chi-square analysis to assess differences between control and treated groups. Analysis for the presence of a linear trend was performed both with and without adjustment for time of death (life table method). In addition, Monsanto analyzed the data for differences between group incidences by the Fisher Exact test and for the presence of a linear trend by the Cochran-Armitage test.

RESULTS

During the first twelve months of the study, mortality was higher in treated male mice as compared to controls (See Table 1). Percent mortality was 4.3, 7.1, 14.3, and 11.4% for the control, low, mid, and high dose level males respectively. For the remainder of the study, mortality was similar for control and treated males. At study termination, survival for mid- and high-dose males was 6 and 10 percent less than control, respectively. For female mice, survival was similar for all groups throughout the study. At study termination, survival in high dose females was 5% lower than controls. Body weight and food consumption were similar for control and treated mice throughout the study. Although occasional differences were statistically significant, no consistent differences were observed. No treatment-related changes were observed in appearance or behavior.

There were no test material related effects observed in the hematological data for either sex at either of the sampling periods. Occasional differences were observed between control and treated groups. However, due to large variability, lack of dose-response, and the absence of appropriate similar findings in both sexes, none of these differences were considered to be treatment related. There were no compound-related macroscopic or microscopic changes observed during necropsy or during

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microscopic examination. All changes observed were considered to be spontaneous or incidental in nature and commonly encountered lesions for mice of this age, sex, and strain.

There were several statistically significant differences for adjusted trend of life table data for some tumors among males. This included percent animals with tumors, harderian gland adenoma, liver hemangioma and malignant lymphocytic lymphoma. These differences were considered to have resulted from and reflected the pattern of earlier deaths in the high dose animals. This resulted in earlier discovery of clinically silent tumors or the recording of non life-threatening tumors when death occurred early for other reasons. The only statistically significant differences in unadjusted trend in any group of tumors or individual tumors among males were for malignant lymphocytic lymphoma and liver hemagioma. When analyzed by the Cochran-Armitage test (Table 2), no linear trend was observed for lymphocytic lymphoma. Also, the combined incidence for histiocytic plus lymphocytic lymphomas observed for high dose males in this study (7%) falls within the historical control range of this laboratory (0-15%) for malignant lymphomas. In addition, the incidence of lymphocytic lymphomas in treated female mice was significantly less than in control females (Table 2). There was a statistically significant trend (Cochran-Armitage) for liver hemangioma. However, since both benign and malignant tumors of blood vessels are not unusual tumors in mice, the low incidence observed in this study (2/70 males) was not considered to be indicative of a treatment-related effect. The testing laboratory's historical control range for this tumor in male CD-1 mice is 0-2.0%.

Similarly, for female mice there were several significant differences for adjusted trend of life table data. These included alveolar bronchiolar carcinoma, malignant lymphocytic lymphoma, malignant histiocytic lymphoma and ovarian adenoma. For alveolar bronchiolar, carcinoma there was no statistically significant trend for unadjusted data or when analyzed by the Cochran-Armitage test (Table 2). In addition, the high dose incidence (6%) was lower than the mean historical control incidence (7.2%) for the testing laboratory. The unadjusted trend was statistically significant for histiocytic and for lymphocytic lymphomas. However, the trend for lymphocytic lymphomas was negative and was, therefore, not an adverse treatment effect. The trend for histiocytic lymphoma was not statistically

significant however for male mice when analyzed by the Cochran-Armitage test (Table 2). Also, in high-dose males the incidence of histiocytic lymphomas was less than in the concurrent control group. The combined incidences of these two tumors in female mice at the high dose level (17%) was less than that for concurrent controls (23%) and was within the testing laboratory's historical control range (3.3-27.0%) for malignant lymphomas. The incidence of ovarian adenomas in the high dose group (4%) was well within the laboratory's historical control range (0-18%). Additionally, no statistically significant trend was observed for unadjusted data or when analyzed by the Cochran-Armitage test (Table 2). Finally, none of the tumor incidences observed in female mice were elevated when compared to control incidences by the Fisher Exact test.

In summary, none of the tumors observed in this study were considered to be the result of treatment with CP 76100.

CONCLUSIONS

Treatment of male and female mice with CP 76100 by gavage at dosages of 50, 150, and 500 mg/kg/day elicited no treatment-related changes in appearance, behavior, body weight, food consumption, hematological parameters, or macroscopic and microscopic pathology. Mortality was increased in treated male mice during the first twelve months of treatment. For the remainder of the study, mortality was similar for control and treated males. Mortality for control and treated female mice was similar throughout the study.

Under the conditions of this study, CP 76100 was not considered to be carcinogenic in mice at dosages up to and including 500 mg/kg/day.

Timothy J. Long

Timothy J. Long, PhD
Senior Product Toxicologist
Monsanto Company
Department of Medicine and
Environmental Health

/jb

Table 1. Mortality

Dosage-(mg/kg/day)		Cumulative Mortality (%)* Months: 12	18	24
0	male	4.3	14.3	32.8
	female	5.8	13.0	39.1
50	male	7.1	12.8	32.8
	female	8.7	13.0	42.0
150	male	14.3	21.4	38.6
	female	7.1	14.3	42.8
500	male	11.4	21.4	42.8
	female	7.1	15.7	44.3

*Figures do not include animals sacrificed at the 12-month interim and 24-month terminal sacrifices.

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Table 2. Incidence of Neoplastic Lesions

Dosage (mg/kg/day)	% Incidence 0	50	150	500	Linear[1] Trend
Animals with Tumors (%)					
Male	40	50	47	51	No
Female	52	55	48	50	No
Total Animals with Benign Tumors					
Male	21	36*	33	29	No
Female	26	23	22	28	No
Total Animals with Malignant Tumors					
Male	23	26	20	29	No
Female	36	39	34	26	No
Harderian Gland Adenoma					
Male	6	9	7	13	No
Female	4	6	7	4	No
Liver Hemangioma					
Male	0	0	0	3	Yes
Female	0	0	0	0	No
Liver Adenoma					
Male	3	9	6	7	No
Female	3	2	0	1	No
Liver Total Tumors					
Male	21	26	16	29	No
Female	17	20	17	13	No
Alveolar Bronchiolar Carcinoma					
Male	1	3	3	1	No
Female	1	1	4	6	No
Lung Total Tumors					
Male	21	26	27	18	No
Female	20	28	26	24	No

MCE 0329817

Dosage (mg/kg/day)	0	50	150	500	Linear[1] Trend
Lymphoreticular lymphoma-lymphocytic					
Male	0	6	3	7*	No
Female	20	16	7*	7*	Yes
Lyphoreticular lymphoma-histiocytic					
Male	3	4	4	0	No
Female	3	1	7	10	Yes
Ovarian Adenoma					
Female	0	1	4	4	No

*Statistically different from controls ($p \leq 0.05$) by Fisher Exact Test

[1]Cochran-Armitage test for linear trend ($p \leq 0.05$).

Monsanto

DEPARTMENT OF MEDICINE & ENVIRONMENTAL HEALTH

Monsanto Company
800 N. Lindbergh Boulevard
St. Louis, Missouri 63167
Phone: (314) 694-1000

November 9, 1984

Dale E. Johnson, PhD
International Research and
Development Corporation
500 Main Street
Mattawan, Michigan 49071

RE: Lifetime Carcinogenicity Study with CP 76100 in Mice (IR-77-223)

Dear Dale,

As a follow-up to our telephone conversation several weeks ago, I want to reemphasize the need to finalize this report before the end of 1984. Back as early as June, 1984 this report was supposed to have been in final form, but several issues still remain unresolved. In particular, the following items were pointed out to you in our last conversation:

1) Pages 15 and 16 (Vol. 1) - In the mortality tables, the reported mortality for high dose males and mid dose females for the 12-24 month period do not agree with the numbers reported for this period in Table 1, pgs. 25-30.

2) Several discrepancies between statements in sections 3a and 3b (Vol. 1, pg. 19) and data in Appendix I (trend and homogeneity analyses).

3) Page 20 (Vol. 1) - The entire first paragraph, beginning with line 3 (..."This falls within the range...") has numerous transpositions and does not make sense as written.

4) Table 13 (Vol. 1, page 142) - The total number of female control mice with neoplasia (reported as 35) does not agree with the number reported in Appendix G (36).

Please address these issues so that we can get a final report issued within the month. If you still have further questions, please call me. As this report has been long, long overdue for completion, I'm sure we would all like to see it completed immediately.

Sincerely,

Timothy J. Long

Timothy J. Long, PhD
Senior Product Toxicologist

MCE 0329819

bcc: T.W. Fuhremann
F.R. Johannsen

dli

Monsanto DEPT. OF MEDICINE AND ENVIRONMENTAL HEALTH

TRIP REPORT No. _____

BY: T.J. Long SECTION: Toxicology

TRIP DATE: 5/24-25/84 SHEET 1 OF 1

LOCATION VISITED

International Research & Development Corporation (IRDC)
Mattawan, Michigan

IN ATTENDANCE

Dale Johnson
Barry Benson - (IRDC)
Ward Ritter
QA Staff

T. Long
C. Russell
M. Chatel - (Monsanto)
S. Haag
A. Uelner

PURPOSE

To finalize the long overdue report on the lifetime carcinogenicity study in mice with CP 76100, tour the laboratory facilities and familiarize myself with IRDC data packages.

REPORT SUMMARY & CONCLUSIONS

Following an extensive audit of the lifetime carcinogenicity study with CP 76100 in mice (IR-77-223) by Monsanto's quality assurance unit, numerous errors were detected in the pathology data package. This meeting was intended to resolve these issues and finalize the report. Although most of our concerns had adequately been addressed, several minor issues will require resolution by the pathologist. In the next several weeks a final draft report will be submitted to staff toxicology for final approval. It appeared that a good deal of effort had been extended by IRDC staff to resolve all issues of concern.

Discussions with Dale Johnson and the manager of acute studies were held to assess IRDC's ability to run acute toxicity and irritation screens (ODES), DOT skin corrosivity tests and skin sensitization studies with guinea pigs. The acute toxicity testing facilities were also toured. IRDC appears to be well equipped and staffed to give us reliable data and quite rapid report turn around time. Copies of generic protocols for our review will be forthcoming.

REPORT DISTRIBUTION

T.W. Fuhremann
F.R. Johannsen
G.J. Levinskas
A.F. Uelner
R.W. Street

MCE 0329820

T.J.L. 6/4/84
PREPARED BY DATE
T.J. Long

Monsanto DEPT. OF MEDICINE AND ENVIRONMENTAL HEALTH

TRIP REPORT No. _____

BY: F.R. Johannsen SECTION: Toxicology

TRIP DATE: April 14-15, 1982 PAGE 1 OF _____

LOCATION VISITED

International Research & Development Corp.
Mattawan, Michigan

IN ATTENDANCE

James L. Schardein (IRDC)
Fred R. Johannsen

PURPOSE

See Report Summary & Conclusions

REPORT SUMMARY & CONCLUSIONS

1. A draft report of study IR-81-229, rat teratology study with DMAC, was reviewed as was some raw data on fetal malformations. The final report will be issued in the next 2 weeks following final Q.A. review.

2. An incomplete draft of the 2-generation rat reproduction study (IR-79-358) with Maleic Anhydride was reviewed. Histopathology compilation was, as yet, incomplete. A final draft report will be issued about July 30, 1982 for this study. In lieu of what appears to have been more histopathology done on this study than indicated by protocol or protocol amendment, it is suggested that R.D. Short follow up on final cost projections with IRDC upon receipt of the final draft report. Plans should be made to review raw data from this study at the next scheduled visit at IRDC.

3. The following are scheduled dates of issuance of final drafts for each of the following studies:

   a. Lifetime chronic mouse study with CP 76100 (IR-77-223)

      Histopath finished - Oct. 1982
      Draft report - Feb. 1983

REPORT DISTRIBUTION

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P.H. Hobson
G.J. Levinskas
D.P. McFadden
R.B. Oleson
J.H. Senger
R.D. Short
A.F. Uelner

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G-4077

F.R.J. PREPARED BY

4/21/82 DATE

b. 21-day rabbit dermal with MON 2139 (IR-80-009)

Final report - April 30, 1982

c. 21-day rabbit dermal with AVADEX® BW (IR-81-316)

Draft report - June 15, 1982

d. Rat teratology with MON 4606 (IR-81-344)

Draft report - May 28, 1982

e. Rat reproduction study with MON 097 (IR-80-053)

F_o interim report - May 14, 1982
F_o audited report - Aug. 3, 1982

f. Rat teratology with Propachlor (IR-81-264)

Draft report - June 15, 1982

/dlj

Monsanto

MAR 18 1982

FROM (NAME—LOCATION—PHONE) Dept. of Medicine & Environmental Health S.M. Haag-G2WC

DATE : March 16, 1982

SUBJECT : Dosing Solution Analysis for IRD 77-223 - Lifetime Carcinogenicity Study in Mice with CP 76100

REFERENCE :

TO : S. Dubelman - U2C

cc: T. W. Fuhremann - G2WD
F. B. Oleson - G2WD
D. B. Sharp - U2E

File

Findings from the DMEH Quality Assurance review of the analytical data package for IRD 77-223 have been previously summarized in memos dated November 5, 1980 and February 10, 1982.

The deficiencies noted are not of sufficient magnitude to preclude confirmation that animals were dosed as specified in the protocol and the technical aspects of the analysis appear to be correct, with ample QC samples to validate methodology. We do not know, however, what impact the deficiencies cited would have on the conclusions reached in a regulatory agency audit.

S. M. Haag

cac

MCE 0329823

IN - 10 (REV. 8/77)

Monsanto

FROM (NAME LOCATION PHONE) Dept. of Medicine & Environmental Health R. C. Dirks - G2WD, 4-8818

DATE: March 15, 1982

SUBJECT: Diet Analysis--Lifetime Toxicity Study in Mice with CP 76100

REFERENCE: IR-77-223; MAPC Job/Project #7163, Report #MSL-1893

TO *R. W. Street - C2SL

cc: E. E. Debus - C2SC
T. W. Fuhremann - G2WD
E. C. Spurrier - C2NA
Toxdata

The accompanying report contains the results of the stability and dosing solution analyses of the sodium salt of N-Nitrosoglyphosate (CP 76100) for the referenced study. Analyses were performed by the Research Division of Monsanto Agricultural Products Company (MAPC). A review of the data and an evaluation of the conclusions presented in this report are summarized below.

Methods

The test material, CP 76100, was supplied to International Research and Development Corporation by MAPC in the appropriate concentrations (5, 15, and 50 mg/ml) for dosing the test groups. Before submission, accuracy of the test concentrations were verified by MAPC-Research. To ensure that correct dosage levels were maintained, samples of the CP 76100 test solutions were assayed periodically by MAPC-Research throughout the study.

Results

Results of the test solution analyses showed that N-Nitrosoglyphosate (CP 76100) remained stable in all three test concentrations for the duration of the study. The average amount of CP 76100 found in all test solutions was 98.8, 93.7, and 116.9% of target concentrations for weeks 1-3, 52-54, and 103-105, respectively.

Conclusion

On the basis of these studies, it is concluded that the target concentrations of CP 76100 were accurately prepared and the test solutions were stable for the duration of the study. Therefore, assuming adequate dosing procedures, each animal received a dose of test material within ±10% of the target dose throughout the study.

Richard C. Dirks

Richard C. Dirks

/cld

MCE 0329824

*Receives report

IN-10M (REV. 2/78)

Monsanto

TR-77-223 (Dist. Analysis)

MAPC Research - St. Louis
(CO./DIV./DEPT./LOCATION)

Final REPORT
(TYPE OF REPORT)

REPORT NO.: MSL-1893

JOB/PROJECT NO.: 7163

DATE: October 20, 1981

TITLE: ANALYSIS OF DIET SOLUTIONS IN THE CP 76100 LIFE-TIME TOXICITY STUDY IN MICE CONDUCTED BY INTERNATIONAL RESEARCH AND DEVELOPMENT CORP., MATTAWAN, MICHIGAN

AUTHORS: C. M. Lottman

WORK DONE BY: C. M. Lottman

GROUP LEADER: S. Dubelman

ABSTRACT: A CP76100, life-time toxicity study in mice was conducted by International Research and Development Corp., Mattawan, Michigan (401-075). Analysis of a representative number of samples of diet solutions shows that CP76100 was stable throughout the duration of the study and that the concentrations of diet solutions actually received by the test animals corresponded closely to protocol. Control diet solutions were found to contain less than <0.01 mg/ml of CP76100 the sensitivity of our method. All samples were analyzed by high pressure liquid chromatography with a post-column Griess reaction detection system.

MCE 0329825

REPT. NO.: MSL-1893 COPY NO.: 15

AUTHORS: C. M. Lottman

TITLE: ANALYSIS OF DIET SOLUTIONS IN THE CP76100 LIFE-TIME TOXICITY STUDY IN MICE CONDUCTED BY INTERNATIONAL RESEARCH AND DEVELOPMENT CORP., MATTAWAN, MICHIGAN

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TABLE OF CONTENTS

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I. INTRODUCTION

Chemical assays of diet preparations used in animal toxicity studies are required to confirm that pesticide levels being administered to test animals actually correspond to proposed concentrations throughout the term of the study.

A life-time study in mice with CP76100, the sodium salt of N-nitrosoglyphosate (N-nitroso-N-phosphonomethylglycine), was conducted by International Research and Development Corp. Test solutions of CP76100 were supplied by MAPC in appropriate concentrations for dosing the test groups. The administration of test solutions was carried out by IRDC. Samples of the CP76100 test solutions were assayed periodically throughout the study by MAPC-Research.

II. CONCLUSIONS

HPLC analysis of the diet solutions demonstrate that CP76100, the sodium salt of N-nitrosoglyphosate, was stable throughout the duration of the study and that test solutions were on an average of 102.4% of proposed levels.

III. MATERIALS AND METHODS

A. Sampling

Once a week, IRDC removed aliquots from CP76100 control, 5.0 mg/ml, 15.0 mg/ml, and 50.0 mg/ml test solutions and sent them to MAPC for analysis.

B. Analysis

The test solutions were analyzed by diluting samples to give a concentration between 3-4 micrograms per milliliter and injecting 40 microliters into a high pressure liquid chromatograph fitted with a post-column Griess reactor and a UV detector (546 nm).

Peak heights of samples were measured by electronic integration and compared via computer to a calibration curve made from appropriate standards of CP76976. (N-Nitrosoglyphosate, free acid)

HPLC data were corrected to give CP76100 equivalents and the concentration of original solutions were

calculated using the appropriate dilution factors. Controls were injected without dilution. Results for controls were < 0.01 milligrams per milliliter, the sensitivity of our method.

Details of the method are presented in Appendix A.

IV. RESULTS AND DISCUSSION

Assay results for the CP76100 diet solutions are presented in Table I. Samples from the control level (NaCl 5.0 mg/ml) were free of CP76100 (<0.01 mg/ml).

Samples from the 50 mg/kg/day level averaged 102.6% of expected, 150 mg/kg/day level averaged 102.7% of expected, and 500 mg/kg/day level averaged 101.8% of expected.

Results for stock solutions are summarized in Table II. Stock solutions averaged 99.1% of expected.

These results indicate that the CP76100 diet solutions were stable throughout the term of the toxicity study and that correct dose levels were maintained.

Table I

CP76100 DIET MONITORING PROGRAM

LIFE-TIME TOXICITY STUDY IN MICE

IRDC 401-075

Week No.	Date	Test Level Analyzed mg/kg/day	Dose Level Analyzed mg/ml	Found mg/ml Control	Found mg/ml Dosing Sample	% of Planned Concentration Found
1	8/2/79	50.0	5.0	<0.01	4.8	96.0
4	8/23/79	"	"	"	5.2	104.0
7	9/13/79	"	"	"	4.5	90.0
8	9/20/79	"	"	"	4.7	94.0
11	10/11/79	"	"	"	5.1	102.0
14	11/1/79	"	"	"	5.0	100.0
17	11/22/79	"	"	"	4.97	99.4
20	12/13/79	"	"	"	5.0	100.0
23	1/3/80	"	"	"	4.9	98.0
26	1/24/80	"	"	"	5.1	102.0
29	2/14/80	"	"	"	5.1	102.0
32	3/6/80	"	"	"	5.0	100.0
36	4/3/80	"	"	"	4.7	94.0
39	4/24/80	"	"	"	5.2	104.0
42	5/15/80	"	"	"	5.2	104.0
48	6/26/80	"	"	"	5.2	104.0
51	7/17/80	"	"	"	5.3	106.0
54	8/7/80	"	"	"	4.75	95.0
57	8/28/80	"	"	"	4.75	95.0
60	9/18/80	"	"	"	4.82	96.4
63	10/9/80	"	"	"	5.4	108.0
66	10/30/80	"	"	"	5.2	104.0
69	11/20/80	"	"	"	5.1	102.0
72	12/11/80	"	"	"	5.2	104.0
75	1/1/81	"	"	"	5.3	106.0
78	1/22/81	"	"	"	4.9	98.0
81	2/12/81	"	"	"	5.1	102.0
84	3/5/81	"	"	"	4.9	98.0
87	3/26/81	"	"	"	5.2	104.0
90	4/16/81	"	"	"	5.0	100.0
93	5/7/81	"	"	"	5.3	106.0
96	5/28/81	"	"	"	5.8	116.0
99	6/18/81	"	"	"	5.8	116.0
102	7/9/81	"	"	"	6.0	120.0
105	7/30/81	"	"	"	6.0	120.0
				Average	5.13	102.6%

Table I (continued)

CP76100 DIET MONITORING PROGRAM

LIFE-TIME TOXICITY STUDY IN MICE

IRDC 401-075

Week No.	Date	Test Level Analyzed mg/kg/day	Dose Level Analyzed mg/ml	Found mg/ml Control	Found mg/ml Dosing Sample	% of Planned Concentration Found
2	8/9/79	150.0	15.0	<0.01	14.95	99.7
5	8/30/79	"	"	"	15.10	100.7
9	9/27/79	"	"	"	14.5	96.7
12	10/18/79	"	"	"	15.1	100.7
15	11/8/79	"	"	"	15.3	102.0
18	11/29/79	"	"	"	14.95	99.7
21	12/20/79	"	"	"	14.0	93.3
24	1/10/80	"	"	"	15.0	100.0
27	1/31/80	"	"	"	15.3	102.0
30	2/21/80	"	"	"	15.8	105.3
33	3/13/80	"	"	"	14.9	99.3
34	3/20/80	"	"	"	14.5	96.7
37	4/10/80	"	"	"	16.8	112.0
40	5/1/80	"	"	"	15.1	100.7
43	5/22/80	"	"	"	14.8	98.7
46	6/12/80	"	"	"	16.1	107.3
49	7/3/80	"	"	"	14.9	99.3
52	7/24/80	"	"	"	14.4	96.0
55	8/14/80	"	"	"	16.0	107.0
61	9/25/80	"	"	"	15.5	103.3
64	10/16/80	"	"	"	15.8	105.3
67	11/6/80	"	"	"	15.8	105.3
70	11/27/80	"	"	"	15.4	102.7
73	12/18/80	"	"	"	15.4	102.7
76	1/8/81	"	"	"	14.5	96.7
79	1/29/81	"	"	"	15.2	101.3
82	2/19/81	"	"	"	15.1	100.7
85	3/12/81	"	"	"	14.8	98.7
88	4/2/81	"	"	"	15.1	100.7
91	4/23/81	"	"	"	15.1	100.7
94	5/14/81	"	"	"	16.4	109.3
97	6/4/81	"	"	"	17.6	117.3
100	6/25/81	"	"	"	18.0	120.0
103	7/16/81	"	"	"	17.7	118.0
				Average	15.4	102.7%

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Table I (continued)

CP76100 DIET MONITORING PROGRAM

LIFE-TIME TOXICITY STUDY IN MICE

IRDC 401-075

Week No.	Date	Test Level Analyzed mg/kg/day	Dose Level Analyzed mg/ml	Found mg/ml Control	Found mg/ml Dosing Sample	% of Planned Concentration Found
3	8/16/79	500.0	50.0	<0.01	50.4	100.8
6	9/6/79	"	"	"	46.7	93.4
10	10/4/79	"	"	"	50.1	100.2
13	10/25/79	"	"	"	48.3	96.6
16	11/15/79	"	"	"	49.5	99.0
19	12/6/79	"	"	"	48.9	97.8
22	12/27/79	"	"	"	49.2	98.4
25	1/17/80	"	"	"	50.3	100.6
28	2/7/80	"	"	"	51.0	102.0
31	2/28/80	"	"	"	49.4	98.8
35	3/27/80	"	"	"	49.1	98.2
38	4/17/80	"	"	"	50.3	100.6
41	5/8/80	"	"	"	51.5	103.0
44	5/29/80	"	"	"	53.0	106.0
47	6/19/80	"	"	"	54.3	108.6
50	7/10/80	"	"	"	52.8	105.6
53	7/31/80	"	"	"	45.0	90.0
55	8/14/80	"	"	"	52.7	105.0
56	8/21/80	"	"	"	46.7	93.4
59	9/11/80	"	"	"	48.3	96.7
62	10/2/80	"	"	"	51.2	102.4
65	10/23/80	"	"	"	53.1	106.2
68	11/13/80	"	"	"	50.6	101.2
71	12/4/80	"	"	"	50.9	101.8
74	12/25/80	"	"	"	53.0	106.0
77	1/15/81	"	"	"	46.9	93.8
80	2/5/81	"	"	"	52.4	104.8
83	2/26/81	"	"	"	51.0	102.0
86	3/19/81	"	"	"	48.5	97.0
89	4/9/81	"	"	"	51.0	102.0
92	4/30/81	"	"	"	52.2	104.4
95	5/21/81	"	"	"	53.4	106.8
98	6/4/81	"	"	"	56.3	112.6
101	7/2/81	"	"	"	57.6	115.2
104	7/23/81	"	"	"	56.4	112.8
				Average	50.9	101.8%

Table II

SUMMARY OF ANALYSES OF CP76100 STOCK SOLUTIONS

LIFE-TIME TOXICITY STUDY IN MICE

IRDC 401-075

Date	Lot No.	CP76100 mg/ml	Assay mg/ml	% Expected
7/24/79	1496821	0	0	
9/25/79	"	0	0	
3/20/79	"	0	0	
5/27/80	"	0	0	
11/10/80	"	0	0	
3/18/81	1949010			
7/24/79	1496821	5.0	4.7	94.0
9/25/79	"	"	4.6	92.0
3/20/79	"	"	4.95	99.0
5/27/80	"	"	5.1	102.0
11/10/80	"	"	5.1	102.0
3/18/81	1949010	"	5.2	104.0
		Average	4.94	98.8%
7/24/79	1496821	15.0	13.8	92.0
9/25/79	"	"	14.1	94.0
3/30/79	"	"	15.1	101.0
5/27/80	"	"	15.3	102.0
11/10/80	"	"	15.4	102.7
3/18/81	1949010	"	15.2	101.0
		Average	14.8	98.7%
7/24/79	1496821	50.0	47.9	95.8
9/25/79	"	"	49.4	98.8
3/30/79	"	"	47.8	95.6
5/27/80	"	"	51.9	103.8
11/10/80	"	"	51.4	102.8
3/18/81	1949010	"	51.4	102.8
		Average	49.96	99.9%

V. APPENDIX A

Analytical Method With Typical Chromatograms

ANALYTICAL METHOD FOR CP76100 IN TOXICOLOGY DIET SOLUTIONS

SCOPE

The analytical procedure given determines levels of CP76100 (sodium salt of N-nitrosoglyphosate) in aqueous solutions used for dosing animals in toxicology studies.

SUMMARY

The analytical method described is for the chemical assay of solutions of CP76100 used in toxicology studies. The procedure consists of diluting a sample of diet solution to give an appropriate concentration for assay by high pressure liquid chromatography with post-column Griess Reaction and detection by UV absorption.

SENSITIVITY

0.25 microgram per ml.

APPARATUS AND EQUIPMENT

Volumetric flasks and pipettes in the usual range of sizes.

Gelman Acrodisc disposable filter assembly 0.45 µm pore size.

Filter paper, 47 mm diameter 0.22 µm, Millipore Cat. No. GSWP04700.

REAGENTS

A. Analytical Standards

Weigh and dissolve 0.1000 g of N-nitrosoglyphosate (CP76976) in 1000 ml of filtered deionized water. This concentrate contains 100 micrograms of CP76976 per milliliter. Subsequent dilutions of this concentrate are made as follows:

Milliliters Concentrate	Standard Dilution	Concentration Micrograms per ml
1.0	100.0	1.0
2.0	100.0	2.0
3.0	100.0	3.0
5.0	100.0	5.0

HPLC standard solutions and dilutions are made with deionized water filtered through a 0.22 µ filter.

CP76976 solutions will decompose when exposed to UV light; therefore, precautions should be taken to avoid exposure to light such as storing in amber bottles under refrigeration.

PROCEDURE

Aliquots of CP76100 diet solutions are diluted appropriately to produce an analytical sample of 3 to 4 µg/ml concentration. A portion of this sample is filtered through a Gelman Acrodisc disposable filter assembly (0.45 µm pore size).

HPLC GRIESS POST COLUMN REACTOR SYSTEM

N-nitrosoglyphosate (CP76976) may be analyzed by using a high pressure liquid chromatograph interfaced with a detector specific for those compounds which hydrolyze in dilute acid to give nitrite. The detector is based on the use of the Griess reagent and the components needed for the construction of this detection system are outlined below. A general schematic and flow diagram is presented in Figure 1 while subsequent Figures 2-4 present detailed assembly diagrams for the areas labeled A, B and C in Figure 1. Several general comments concerned with the assembly and maintenance of this detection system are also presented.

A. Equipment and Supplies

Waters 6000A pump

Waters U6K injector (for manual injection) or Varian 8500 autosampler.

Waters Model 440 absorption detector fitted with a 546 nm filter.

Spectrum 1021 Filter Amplifier

MCE 0329836

Technicon Proportioning pump I.

Technicon heating bath (105-A-101-01, 37° C) modified by placing heating element under control of a Therm-O-Watch model L7-600.

Pump tube (Technicon 116-0549P03) 0.05 ml/min - Orange/Blue - one required.

Pump tube (Technicon 116-0549P06) 0.23 ml/min - Orange/White - three required.

Pump tube (Technicon 116-0549P08) 0.42 ml/min - Orange/Orange - two required.

Pump tube (Technicon 116-0549P11) 1.00 ml/min - Grey/Grey - one required - several extra pieces are useful for sleeving 1/16" teflon and stainless steel tubing.

Cactus "HS" Connector (Technicon 116-0207-05) - one required.

"A10" Connector (Technicon 116-B034-01) - two required.

"PT4" Connector (Technicon 116-B038-01) - one required.

Mixing Coils (Technicon 116-0127-04) - two required.

Heating Bath Coil [Technicon 105-1128-02 (inner) or 105-1123-02 (outer)] - one required.

C3 Debubbler (Technicon 116-0202P03) - one required.

Pulse Suppressor (Technicon 116-B044P02) - two required.

N5 Nipples (Technicon 116-0002P01) - seven required.

N8 Nipples (Technicon 116-0003P01) - thirteen required.

N13 Nipples (Technicon 116-0061P01) - two required.

Tubing, Acid Flex (Technicon 116-0529P02) - two feet- used for sleeving all bath exit connections.

Tubing, Polyethylene (Technicon 116-0454-01) - two feet - used for sleeving all glass/glass and all glass/N5 connections.

Tubing weights (Technicon 116-0454-01).

Tubing, Tygon 1/6" i.d. x 1/8" o.d. - enough for reagent lines from bottles to pump tube connections.

Tubing, Teflon - 3 mm i.d. x 1/16" o.d. - six feet - for cooling bath.

Beaker (2 liter) filled with water to serve as a cooling bath.

Glass tubing.

B. Reagents

Brij 35, 6% Solution (Fisher CS-285-2 diluted 1-5).

Hydrobromic Acid, 24% Solution (Mallinckrodt 0410 diluted 1-2).

Methanol LC grade.

Potassium dihydrogen phosphate. HPLC grade.

Phosphoric Acid, concentrated. HPLC grade.

N-1-napthylethylene diamine dihydrochloride (NED) (Fisher Scientific N-30), 0.1% solution in distilled water.

Sulfanilamide (Aldrich S652-5), 1% solution in 10% HCl.

Technicon Wetting Agent (Technicon T21-0332) - 1 ml/liter.

C. Buffer Solution Preparation

Prepare 0.07 M potassium dihydrogen phosphate (KH_2PO_4) by dissolving 38.1 g in four liters of 17.5% (v/v) methanol/deionized water. This solution is allowed to cool to room temperature and then is adjusted to pH 2.2 with concentrated phosphoric acid. Normal HPLC degassing procedures are followed as the solution is filtered through an 0.22 µm millipore filter.

D. HPLC Conditions

Column:	Partisil SAX, 25 cm x 4.6 mm i.d.
Column Temperature:	Ambient
Buffer Flow Rate:	1.5 ml/min
Pressure:	∿1500 psi

MCE 0329838

E. General Comments

During the construction of all sleeved glass/glass and glass/N5 nipple connections the glass should be moistened with 2 drops of cyclohexanone to insure a good seal. Every effort should be made to have the pieces which are being connected to be butted together.

After the system has been constructed all lines should be conditioned by pumping an 0.01% Technicon wetting solution through them for 4-6 hours followed by a distilled water rinse for an equal period of time.

When starting turn all pumps and the detector on for 30 minutes prior to use. If an air bubble becomes trapped in the detector cell it can be removed by disconnecting the line from the cell to the AAI pump and alternately drawing and forcing liquid through the cell with a syringe containing water until the bubble is removed. Distilled water or a dilute Brij solution should be pumped through the detector system for 30 minutes prior to turning the autoanalyzer pump off. It is advised that all pump tubes be replaced at one week intervals.

F. Quantitation

Sample quantitation is based on the relative peak height or peak area of the sample to standard peak heights or areas across the range of expected sample concentrations.

G. Reference

Singer, G.M.; Singer, S.S. and Schmidt, D.G.; J. Chromatogr., 133 (1977) 59-66.

CALCULATIONS

Quantitation of analytical samples is done by interpolation from a standard calibration curve of peak area or peak height versus CP76976 concentration in micrograms per milliliter.

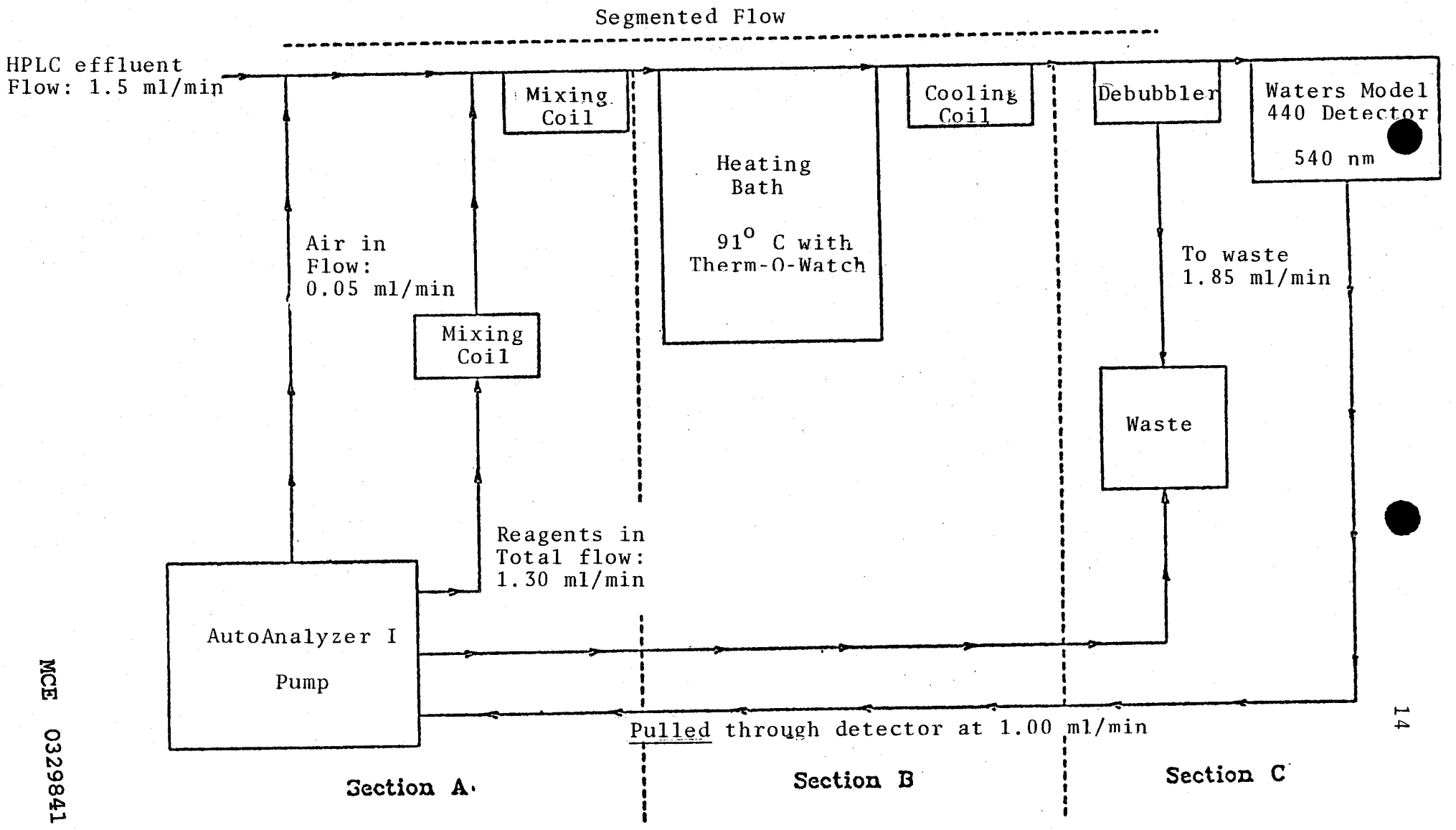
Because the HPLC standards are made of CP76976 (M.W. 198.08) and the diet solutions contain CP76100 (M.W. 220.07), the sodium salt of CP76976, HPLC data must be corrected to give the equivalent CP76100 concentrations. Thus,

CP76976 conc. x 1.111 = CP76100 conc.

When HPLC data are converted to CP76100 equivalents, the concentration of the original CP76100 diet solution is calculated by multiplication by the appropriate dilution factor.

Figure 1

GENERAL N-NITROSO DETECTOR SCHEMATIC



MCE 0329841

14

MCE 0329842

Figure 2

Detailed Section A of General Schematic (Manifold to Heater)

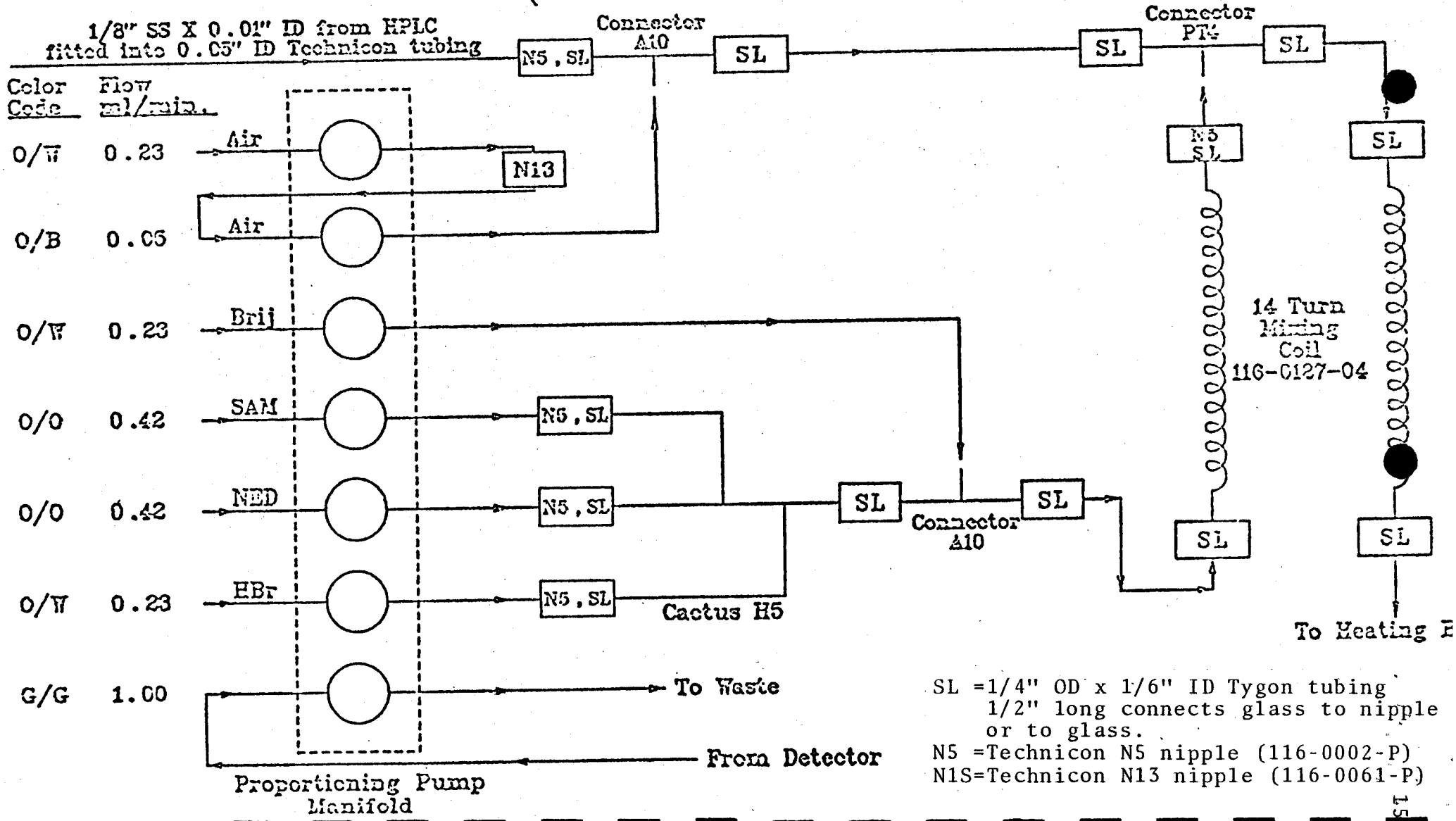
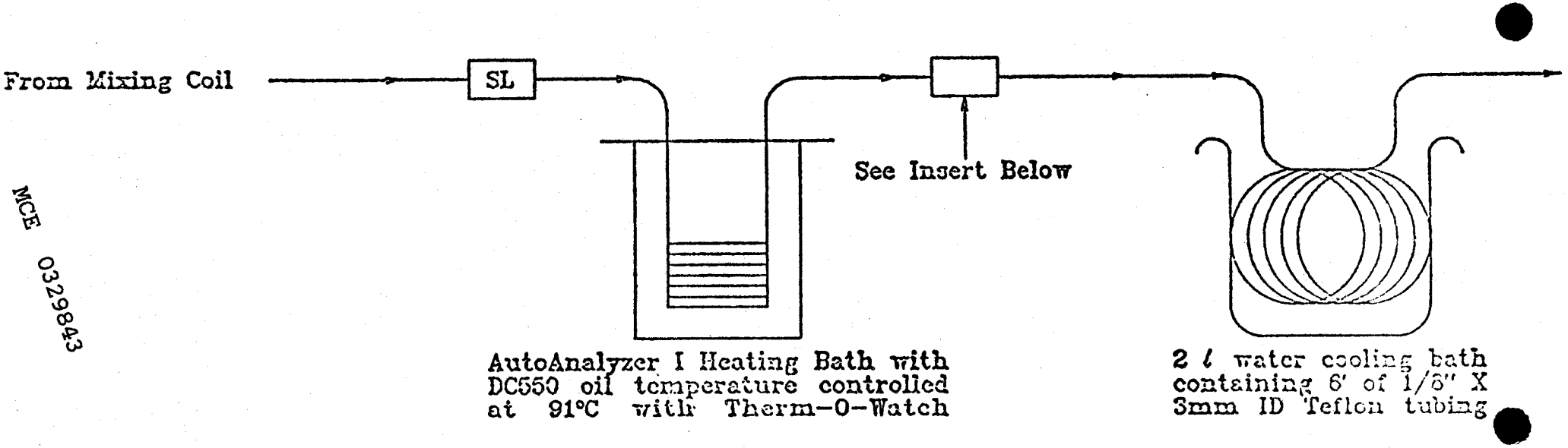
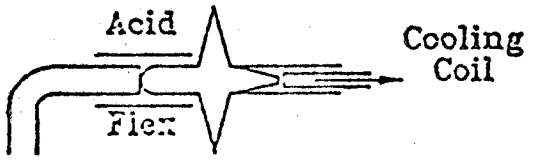


Figure 3

Detailed Section B of General Schematic (Heating and Cooling Area)



MCE 0329843



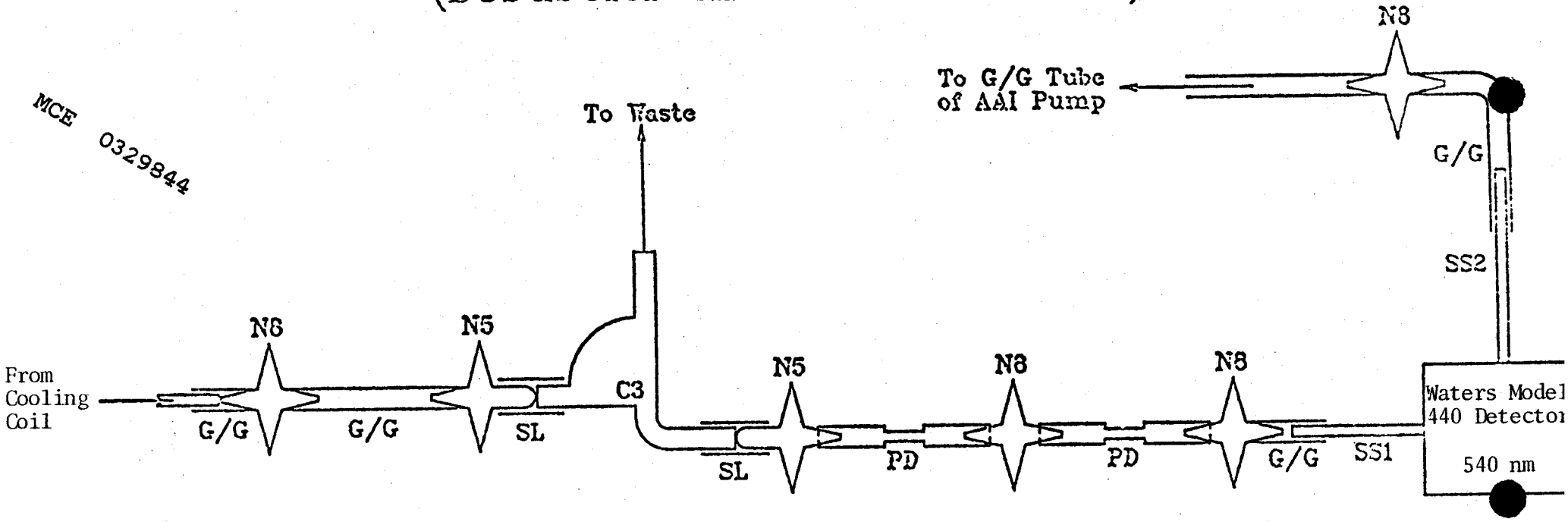
3/4" sleeve of acid flex tubing with N5 nipple to 2" of 0.051 ID (G/G) Technicon pump tube sleeved to 1/8" X 3 mm ID Teflon tubing.

SL=1/4" OD X 1/8" ID Tygon tubing 1/2" long connects glass to nipple or to glass.

16.

Figure 4

Detailed Section C of General Schematic (Debubbler and Detector Areas)

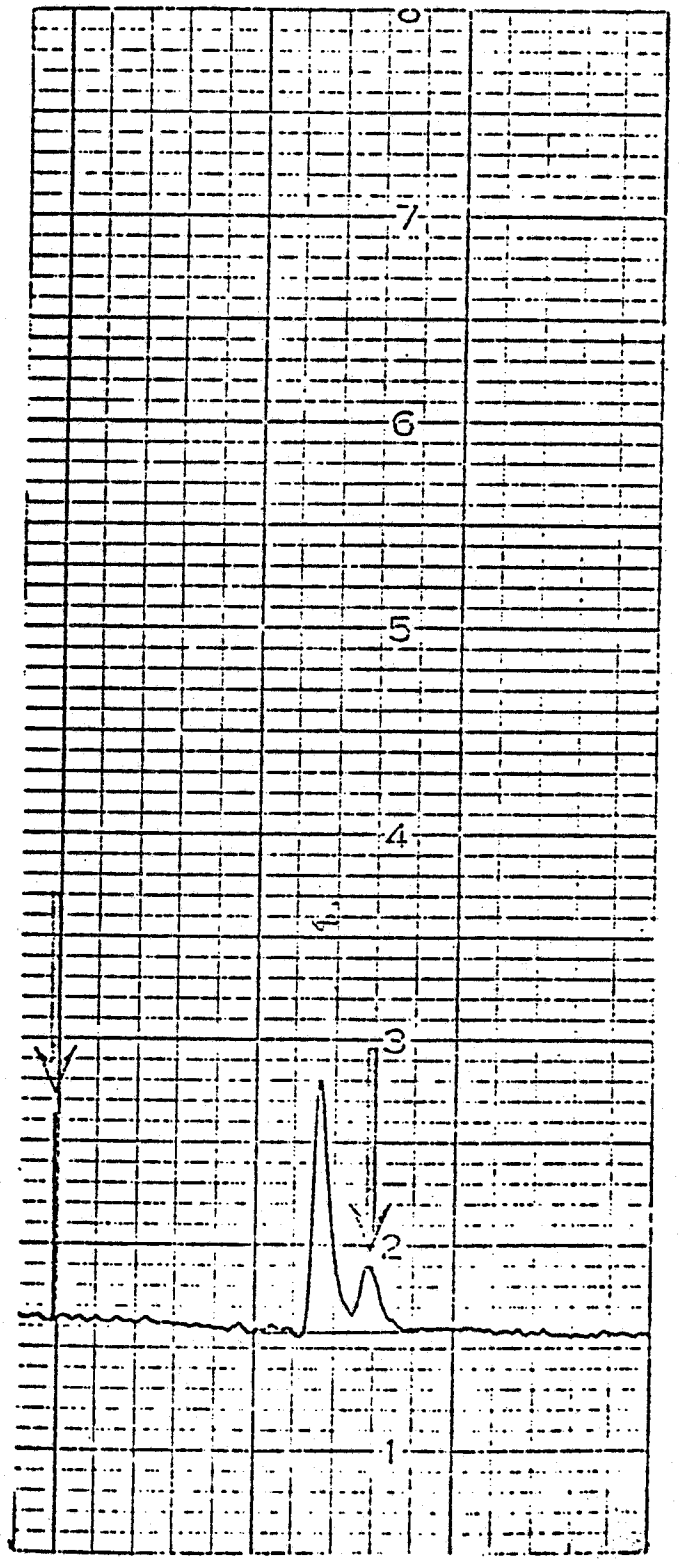


C3 = Technicon C3 debubbler (116-0202P03)
G/G = Technicon 0.05" id tubing
N5 = Technicon N5 nipple (116-0002-P01)
N8 = Technicon N8 nipple (116-0003-P01)
PD = Technicon pulse suppressor (116-B044-P02)
SL = 1/4" OD x 1/8" ID Tygon tubing
1/2" long connects glass to glass
SS1 = 1/8" x 0.01" ID x 2" long SS
tubing for detector cell entry line
SS2 = 1/8" x 0.02" ID x 6" long SS
tubing for detector cell exit line

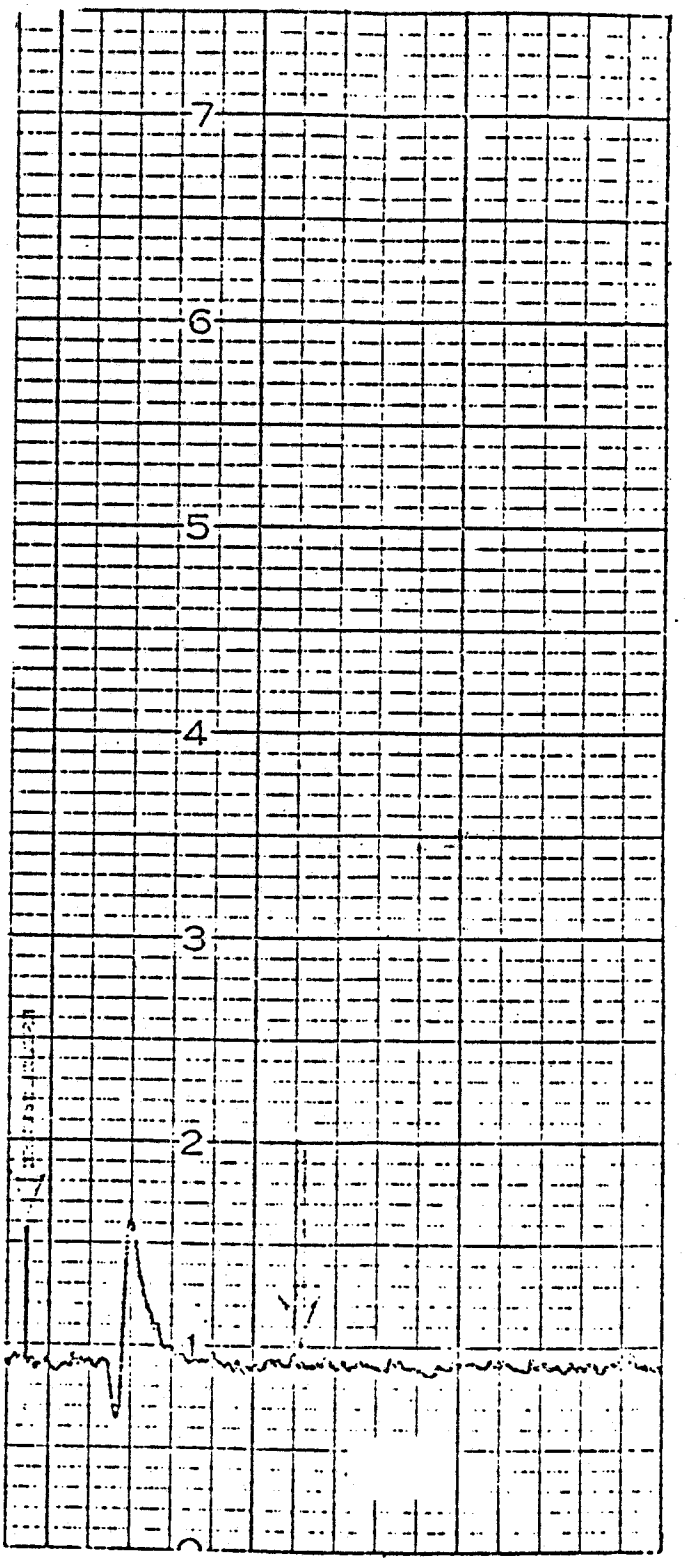
17.

CP76100 DIET MONITOR

0.25 µg/ml Std.

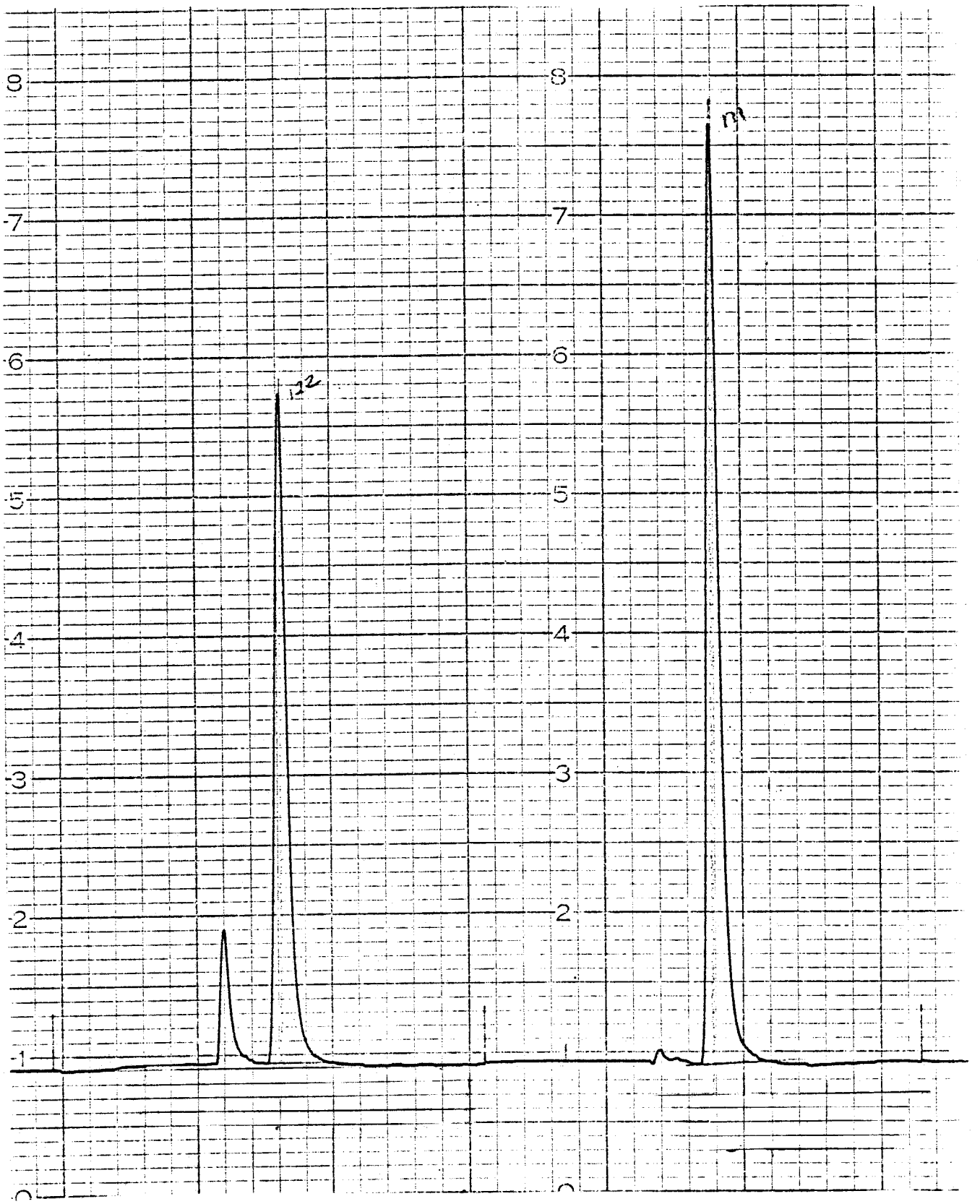


Control
Diet Solution



MCE 0329845

CP76100 DIET MONITOR



15.0 mg/ml

5.0 standard

MCE 0329846

VI. APPENDIX B

All analytical data on CP76100 can be found in Monsanto notebooks 1503401 and 1889301.

VII. APPENDIX C

Project Cost Estimate

CML 3 man-months

pg

EXHIBIT 14

Message

From: FARMER, DONNA R [AG/1000] [/o=Monsanto/ou=NA-1000-01/cn=Recipients/cn=180070]
on behalf of FARMER, DONNA R [AG/1000]
Sent: 7/31/2015 5:33:46 PM
To: 'John Acquavella' [acquajohn@gmail.com]
Subject: RE: a question
Attachments: NNG overview.docx

Sorry

From: FARMER, DONNA R [AG/1000]
Sent: Friday, July 31, 2015 12:32 PM
To: 'John Acquavella'
Subject: RE: a question

John,

Attached is a summary written by Steve Wratten.

Yes it is nitrosable … N-Nitroso-Glyphosate (NNG) is an impurity that arises via reaction of glyphosate with nitrosating agents during or after manufacture.

While we have no evidence to say it is a carcinogen (see attached) what we rely on globally is this:

"regulatory risk assessment (USEPA) has determined that even potent nitrosamine carcinogens would not be expected to create risk concerns if present in pesticides at levels of 1 ppm or lower. Therefore, as a general policy standard, regulators globally have accepted that nitrosamine impurities are unavoidable in some amine-based pesticides, and that they do not require special testing or risk assessment if the levels are at 1 ppm or lower. Monsanto therefore prefers to carefully control against NNG formation rather than to engage in scientific debate around its biological activity."

So in addition to this being our spec…when we went to get an FAO spec it was included:

http://www.fao.org/fileadmin/templates/agphome/documents/Pests_Pesticides/Specs/glypho01.pdf

Donna

From: John Acquavella [mailto:acquajohn@gmail.com]
Sent: Friday, July 31, 2015 11:56 AM
To: FARMER, DONNA R [AG/1000]
Subject: a question

Donna:

I am reviewing the Lee et al. paper for my subgroup meeting. It did not find any association for glyphosate and cancer. However, the paper had some text that struck me as speculative:

Of the 16 insecticides, four were nitrosatable (carbaryl, carbofuran, famphur, nicotine), whereas 10 of the 14 herbicides were nitrosatable (2,4,5-T, 2,4-D as dialkylamine salts, which are the source of nitrosamine contamination, atrazine, cyanazine, dicamba, EPTC, glyphosate, metolachlor, propachlor, trifluralin). Only five of the nitrosatable derivatives of the herbicides (2,4,5-T, 2,4-D, EPTC, glyphosate, trifluralin), but all four nitrosatable derivatives of the insecticides had evidence or were judged to be likely to be animal carcinogens

I guess the authors have a theory about nitrosatable derivatives of pesticides being the carcinogenic moiety. Is glyphosate really nitrosatable and is the related derivative judged likely to be an animal carcinogen as they say?

Regards,

John

EXHIBIT 15

This document is to remain under seal pursuant to PTO #15, ECF No. 186

EXHIBIT 16

Message

From: MACINNES, ALISON [AG/1000] [/O=MONSANTO/OU=NA-1000-01/CN=RECIPIENTS/CN=AAMACI]
Sent: 5/19/2014 7:01:07 PM
To: KOCH, JOHN D [AG/1630] [/O=MONSANTO/OU=NA-1630-01/cn=Recipients/cn=147620]; ADAMS, STEPHEN A [AG/1000] [/O=MONSANTO/OU=NA-1000-01/cn=Recipients/cn=113797]
CC: MENGEL, WAYNE A [AG/1630] [/O=MONSANTO/OU=NA-1630-01/cn=Recipients/cn=66837]; ADAMS, STEPHEN A [AG/1000] [/O=MONSANTO/OU=NA-1000-01/cn=Recipients/cn=113797]; FLAGG, LISA M [AG/1000] [/O=MONSANTO/OU=NA-1000-01/cn=Recipients/cn=551087]; WINTERTON, GAGE [AG/1000] [/O=MONSANTO/OU=NA-1560-01/cn=Recipients/cn=131293]
Subject: RE: MEA Salt scavenger to keep NNG low and plant test

John,

Steve can make a better comment around the regulatory aspect of this question. As for the chemical questions I have some comments. We know that both sodium sulfite and ascorbic acid work when added as an ingredient to the premix formulation in controlling NNG. Sodium sulfite is not on the approved inerts list for food use. Steve is working to try and get this approval but it's not going to be a quick process. Ascorbic acid is approved for food use but we are having problems with the stability of the formulation – in particular the color of the final formulation. It should be green but the ascorbic acid is turning it brown on standing at RT in a couple of days. We are going to try other potential scavenger such as urea, phenol and sodium thiosulfate which are registered for food use. That testing will be completed in the next couple of months.

I also have a concern around adding sodium sulfite to the MEA salt. In talking to Andy Dyszlewski he said the sodium sulfite is only stable at neutral pH. In an acidic solution it starts to convert into sodium sulfate which does not control NNG. We are doing testing right now to see how long it survives in the MEA glyphosate but those results will also not be available for at least another 2 weeks. We are completing so much work around NNG that there is a real backlog in the number of samples we can run through the analytical system. The MEA glyphosate solutions made with the 85% MEA are taking priority over the other samples so that we can qualify a supplier for the plant test. I don't know that we will have all of the NNG data on the other samples in time to make a decision for the plant test in June.

Thanks,

Alison

From: KOCH, JOHN D [AG/1630]
Sent: Thursday, May 15, 2014 7:31 AM
To: MACINNES, ALISON [AG/1000]; ADAMS, STEPHEN A [AG/1000]
Cc: MENGEL, WAYNE A [AG/1630]; ADAMS, STEPHEN A [AG/1000]; FLAGG, LISA M [AG/1000]; WINTERTON, GAGE

[AG/1000]
Subject: MEA Salt scavenger to keep NNG low and plant test

Alison and Steve,

After we do our testing of all the MEA supplier we should have good a idea if we need scavenger addition to the MEA salt.

If we find out we have to add it to the salt then I want to incorporate this into the June plant test to make sure it works on the salt before we go railcar volumes of MEA.

The questions I have to make this happen are the following:

1 – If we go with sodium sulfite will we have regulatory approve by June to allow us to add this material? How long does this process take?

If not the sulfite then will we add the oxalic acid and maybe later switch? What kind of timing are we talking about to get permission to add either of these two materials?

2 – Do we know much of the sodium sulfite or oxalic acid needs to added to the salt and when do it need added (before, during or after the reaction step)?

3 – I need supplier information for both these materials so I can get SDS. Wayne – If you have this could you send it to me.

Thanks, John

EXHIBIT 17

Message

From: ROOSE, BART [AG/5035] [/O=MONSANTO/OU=EA-5035-01/CN=RECIPIENTS/CN=93643]
Sent: 2/13/2016 6:06:31 PM
To: KLOPF, GARY J [AG/1000] [/O=MONSANTO/OU=NA-1000-01/cn=Recipients/cn=162545]; GARNETT, RICHARD P [AG/5040] [/O=MONSANTO/OU=EA-5041-01/cn=Recipients/cn=107838]
CC: FLAGG, LISA M [AG/1000] [/O=MONSANTO/OU=NA-1000-01/cn=Recipients/cn=551087]; LEI, PENG [AG/1000] [/O=MONSANTO/OU=NA-1000-01/cn=Recipients/cn=812920]; MANNION, RHONDA M [AG/1000] [/O=MONSANTO/OU=NA-1000-01/cn=Recipients/cn=226139]; VERWAEST, KIM [AG/5035] [/O=MONSANTO/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=KVERW]
Subject: RE: PPCR: EMEA, 20160208, MON 76952 (SuperZanussi), NNG and formaldehyde testing before and after aging

All,

I talked to Kim to understand current practice:

We do real ageing (under GLP) at Gembloux, but they cannot measure NNG under GLP

This aged sample is then send to STL for GLP NNG data (we know initial NNG results from Antwerp lab, but that is not GLP)

If we cannot wait for real aged data, and we need accelerated ageing data

My comment is to be prudent and take into account the chemistry of the formulation ingredients.

p.e.: The Zanussi amineoxide ingredient can be more sensitive to heat, so prudence is needed

I would suggest we agree in writing that 'bad results' of NNG due to accelerated ageing can be caused by the heat level and is therefore not representative for 'normal ageing'.

We need to get a chance for a reanalysis at lower temperature, in other words the result is not final, not binding

If we cannot do this as a general statement, we need to rely on chemistry evaluation to assess the risk upfront

Regards, Bart

From: KLOPF, GARY J [AG/1000]
Sent: vrijdag 12 februari 2016 19:19
To: GARNETT, RICHARD P [AG/5040]; ROOSE, BART [AG/5035]

Cc: FLAGG, LISA M [AG/1000]; LEI, PENG [AG/1000]; MANNION, RHONDA M [AG/1000]
Subject: RE: PPCR: EMEA, 20160208, MON 76952 (SuperZanussi), NNG and formaldehyde testing before and after aging

Richard, Bart –

I agree with your comments on temperature selection. If I'm remembering correctly, doesn't this harken back to what was done with the current Zanussi formulation (MON 79351)? If so, can the same protocol be followed for any work done in this case (and then utilize whatever justification was developed then)?

Gary (314-694-8784)

From: GARNETT, RICHARD P [AG/5040]
Sent: Wednesday, February 10, 2016 5:55 AM
To: FLAGG, LISA M [AG/1000]; ROOSE, BART [AG/5035]; KLOPF, GARY J [AG/1000]; LEI, PENG [AG/1000]
Subject: RE: PPCR: EMEA, 20160208, MON 76952 (SuperZanussi), NNG and formaldehyde testing before and after aging

Bart and all,

This is not a unique request. Recall that we undertook storage stability on representative liquid and dry products to address similar questions from a small number of member states during the registration and re-registration processes post Annex I inclusion. This was derived from the old FAO spec (2001/2)

.5.2 Stability at elevated temperature (MT 46.3)

After storage at 54 + 2oC for 14 days, the average determined Glyphosate content must not be lower than 95 % relative to the determined content found before storage and the product shall continue to comply with .3.3.1, 3.3.2 and .4.1.

where .3.3.1 and .3.3.2 are formaldehyde and NNG respectively. [the new FAO spec does not reference impurities after storage but as you know there are so many mistakes currently being corrected that, perhaps, countries tend to ignore it?]

As far as I can see, the EU legislation has never specified a requirement for measuring impurities after storage but it is a logical request, particularly given the FAO spec.

So, I think we need to address the point but don't want to do this for all formulations in the re-registration. It may be possible to argue that the study on MON 78294 is adequate to address other soluble concentrates. If a new study is needed, then I agree with Bart's proposal on using the lowest allowable temperature (30C for 18 weeks or 35 for 12 weeks if time is critical).

I will not be in Brussels office until 22 Feb, so will engage Wibke by phone and email if we can agree a recommendation to her and the analytics team. Lisa, can you bring up with Brianna before "the horse has bolted" please.

regards

Richard

From: FLAGG, LISA M [AG/1000]
Sent: Tuesday, February 09, 2016 23:05
To: ROOSE, BART [AG/5035]; GARNETT, RICHARD P [AG/5040]; KLOPF, GARY J [AG/1000]; LEI, PENG [AG/1000]
Subject: RE: PPCR: EMEA, 20160208, MON 76952 (SuperZanussi), NNG and formaldehyde testing before and after aging

I'm looping in Gary and Peng – are there other considerations to take into account with this request (see email string re: SuperZanussi in EU)

Lisa Flagg

Global Product Quality Lead, Crop Protection

Office: 314-694-1717

Mobile: 314-856-3810

From: ROOSE, BART [AG/5035]
Sent: Monday, February 08, 2016 11:04 AM
To: GARNETT, RICHARD P [AG/5040]; FLAGG, LISA M [AG/1000]
Subject: RE: PPCR: EMEA, 20160208, MON 76952 (SuperZanussi), NNG and formaldehyde testing before and after aging

Richard, thanks for forward

The first time I see this

- Request for method validation for NNG and FORMALDEHYDE
- Relevant impurities after ageing ?????
    - is this in FAO manual? I cannot remember having seen this
    - **I ask for caution for NNG**: the higher the temperature, the more chance you have minor decomposition (ppb level) maybe creating NNG
    - To avoid false elevated levels, ageing effect on NNG should be done at the lowest possible temp (not 2 weeks 54°C, more weeks at lower temp)
    - **I would push back on this test because NNG formation during ageing should not be done with forced (accelerated) ageing**

Regards, Bart

From: GARNETT, RICHARD P [AG/5040]
Sent: maandag 8 februari 2016 13:38
To: FLAGG, LISA M [AG/1000]; ROOSE, BART [AG/5035]
Subject: FW: PPCR: EMEA, 20160208, MON 76952 (SuperZanussi), NNG and formaldehyde testing before and after aging

FYI

From: MEYER, WIBKE [AG/5040]
Sent: Monday, February 08, 2016 12:16
To: WHITE, BRIANNA [AG/1005]
Cc: KAEMPFE, TERRY A [AG/1000]; HAY, JANELL D [AG/1000]; BRADDOCK, PHILIP K [AG/1000]; GARNETT, RICHARD P [AG/5040]; LAMITOLA, STEPHEN [AG/1000]; GOLEY, JEAN C [AG/1005]; HOLLAND, ELAINE M [AG/1000]; GUSTIN, CHRISTOPHE [AG/5040]; MIDGLEY, BRIAN [AG/5040]; MANNION, RHONDA M [AG/1000]; VERWAEST, KIM [AG/5035]
Subject: PPCR: EMEA, 20160208, MON 76952 (SuperZanussi), NNG and formaldehyde testing before and after aging

Dear Brianna,

For the submission of MON 79652 (SuperZanussi) in the EU we have to provide data on the content of relevant impurities of the formulation, before and after storage. All studies must be GLP.

MON 76952 samples can be provided from Antwerp. I copy Kim for the arrangement of samples.

#	Item	Requestor's Input
1	**Who** are the teams that need to respond to this request?	Product Chemistry
2	**What** product(s) does this request support and for what agency, region and/or business unit	MON 76952 Submission in all member states of the EU For North: Denmark For Central: UK For South: France
3	**When** is the target deadline for the response and identify the implications if the deadline cannot be met	Target deadline for validate methods and accelerated aging: end August 2016 Tier 2 summaries target date: end October 2016 Implications of not meeting the deadline: Late submission, reputation damage with authorities and ultimately late launch of product
4	**What** is being asked for and what should the final work product be (e.g GLP study, white paper, email responses, publications)	• Validated method for NNG and formaldehyde in MON 76952 (GLP) • Accelerated aging study (14 d at 54 °C) + content of NNG and formaldehyde before and after aging (GLP) • storage stability study at ambient temperature in commercial packaging + content of NNG and formaldehyde before and after 1 and 2 years

		ageing (GLP) • Tier 2 summaries for inclusion in the dossier
5	*Please note if additional outside spend may be needed- comment on the progress towards budget approval and addition to forecast*	

If you have questions please let me know.

Thanks.

Kind regards,

Wibke

Dr. Wibke Meyer

Regulatory Affairs Specialist EMEA | Monsanto Europe N.V. | Tervurenlaan 270-272, 1150 Brussels, Belgium | Phone: +32 2 776 76 29 | mobile: +32 473 17 77 54 | Email: wibke.meyer@monsanto.com

EXHIBIT 18

Message

From: JENKINS, DANIEL J [AG/1920] [/O=MONSANTO/OU=NA-1000-01/CN=RECIPIENTS/CN=813004]
Sent: 5/9/2014 2:10:26 PM
To: AHLERS, ERIN M [AG/1000] [/O=MONSANTO/OU=NA-1630-01/cn=Recipients/cn=172788]
Subject: RE: sodium sulfite/what is the resolution of this?

Got it, let me know...

Dan Jenkins
U.S. Agency Lead

Regulatory Affairs
Monsanto Company
1300 I St., NW
Suite 450 East
Washington, DC 20005

Office: 202-383-2851

Cell: 571-732-6575

From: AHLERS, ERIN M [AG/1000]
Sent: Friday, May 09, 2014 10:01 AM
To: JENKINS, DANIEL J [AG/1920]
Subject: FW: sodium sulfite/what is the resolution of this?

Not to tattle, but you asked for real-time feedback.

I spoke with Erik on Wednesday and specifically ask that he NOT talk to the agency until he had a chance to discuss with Steve and collectively come up with a reasonable way to approach/state the issue/need without stirring up any unnecessary concern. The note Thursday appears to have been sent without that happening (Steve has not talked directly to Erik on the phone).

I haven't had a chance to discuss with Erik, but if it happened in the manner that I think it did, I am very disappointed. Hope to talk to Erik about this today.

From: ADAMS, STEPHEN A [AG/1000]
Sent: Thursday, May 08, 2014 4:41 PM
To: JANUS, ERIK [AG/1920]
Cc: AHLERS, ERIN M [AG/1000]
Subject: RE: sodium sulfite/what is the resolution of this?

Erik –

If you talk to Kerry, I wouldn't push the NNG issue too hard – don't want to draw attention to the toxicity of our product, but the idea of removing nitrates that could be transformed into nitroso compounds should be of interest to EPA.

Technology is anxious and needs to know how to proceed as quickly as possible, so as you hear anything, please pass it over the fence.

Thanks!

Steve

From: JANUS, ERIK [AG/1920]
Sent: Thursday, May 08, 2014 2:41 PM
To: ADAMS, STEPHEN A [AG/1000]
Cc: AHLERS, ERIN M [AG/1000]
Subject: RE: sodium sulfite/what is the resolution of this?

Steve,

Thanks for this add'l info. I have a note into Kerry Liefer following up on our last conversation and outlining some of the new info you present below. I did indeed use your highlighted points, not verbatim, but used. Apologies for the delay,

but I needed to go back and review the registration review documents he pointed me towards when we last spoke. These were of no help and I'm not sure why he pointed me towards them as they don't address issues with using a sulfite inert and don't address the FDA process. I hope to get an answer from him in the next few days.

Thanks, I'll be in touch,

- Erik

From: ADAMS, STEPHEN A [AG/1000]
Sent: Tuesday, May 06, 2014 3:34 PM
To: JANUS, ERIK [AG/1920]
Cc: AHLERS, ERIN M [AG/1000]
Subject: RE: sodium sulfite/what is the resolution of this?

Erik –

To follow up on our conversation the other day at our Team meeting, the Petition Monsanto filed asking EPA to grant an exemption from the requirement of a tolerance for sodium sulfite is still open/pending; however, EPA is not too anxious to grant such an exemption while FDA is reviewing the safety of sodium sulfite to humans.

The fact is that having sodium sulfite available for use in pesticides labeled for food-use PRIOR TO HARVEST would be of tremendous value to Monsanto to control nitrate levels in formulations containing the ethanolamine salt form of Glyphosate, which can be converted into N-nitroso-glyphosate (NNG), an impurity of toxicological significance with an upper concentration limit of 1 ppm in Glyphosate products. Do you think there is any way that we could successfully negotiate with EPA to allow the addition of sodium sulfite at a maximum concentration of 0.2% by weight of the total formulation? We don't need much!

Would you be willing to discuss this proposal with EPA? Of course, I would be happy to write up an argument that we could submit to support our request.

There are a couple of points that I would highlight:

1. Sodium sulfite (as far as I can tell) is still listed at 21 CFR 582.3798 as being generally recognized as safe when used in accordance with good manufacturing or feeding practices, except that it is not used in meats or in food consumed as a source of vitamin B1.

2. If we were to add sodium sulfite to our concentrated formulation at 0.2% by weight, it would roughly only represent a concentration of around 0.004% or so in the diluted spray solution (44 fl ounces applied in 20 gallons of water per acre, as an example) applied to the growing crop. By the time you consider exactly how much of that actually gets on the food commodity it is incredibly infinitesimal.

3. The use of low levels of sodium sulfite to ensure low levels of NNG, an impurity of known toxicological significance, is well worth the risk.

4. We are NOT asking that sodium sulfite be allowed in formulations labeled for application POST-HARVEST, only prior to harvest. Therefore, sodium sulfite would not be applied in any pesticide formulation that is applied directly to the raw agricultural commodity or processed food product.

Like I said, this use of sodium sulfite is of considerable importance right now to Monsanto's Roundup Xtend products. I think it is worth us trying a little harder to get this use out of EPA, if at all possible. The only other option we currently have to consider is the use of ascorbic acid that greatly increases the cost of goods of these crop protection products.

Let me know what you think and, if you agree, how you would like to approach EPA with this.

Thanks,

Steve

From: ADAMS, STEPHEN A [AG/1000]
Sent: Thursday, April 10, 2014 12:18 PM
To: JANUS, ERIK [AG/1920]
Subject: RE: sodium sulfite/what is the resolution of this?

Here is the cover letter that went with the Petition for reinstatement of an exemption from the requirement of a tolerance for sodium sulfite. There was also a 2-volume set of administrative documents and tox summaries intended to

support the Petition. I can't find any correspondence in our Reg Affairs Library from EPA providing any evaluation of our Petition, so not sure where it ended up or how it got to where it is today – nowhere.

The data volumes are too big to send via email, but I can place them in my public folder on Finch and send you a link, if you want to look at them. I think at this point it would be just as well to find out what EPA did with our Petition and why they did not grant the exemption from the requirement of a tolerance.

Steve

From: JANUS, ERIK [AG/1920]
Sent: Thursday, April 10, 2014 11:46 AM
To: ADAMS, STEPHEN A [AG/1000]
Subject: sodium sulfite/what is the resolution of this?

PP 7E7261. (EPA-HQ-OPP-2008-0043). Monsanto Company, 1300 "I" St., NW. Suite 450 East, Washington, DC 20005, proposes to amend 40 CFR 180 by establishing an exemption from the requirement of a tolerance for residues of sodium sulfite in or on any food or feed commodity when used as an inert ingredient in a pesticide product with the following limitations: Not to exceed 0.8% by weight in the formulated product. For use only in formulated products containing the active ingredient glyphosate and applied only to growing crops. Because this petition is a request for an exemption from the requirement of a tolerance, no analytical method is required. Contact: Karen Samek, telephone number: (703) 347-8825; e-mail address: *samek.karen@epa.gov*.

https://www.federalregister.gov/articles/2008/02/06/E8-2172/notice-of-filing-of-pesticide-petitions-for-residues-of-pesticide-chemicals-in-or-on-various

Erik R. Janus

US Agency Lead, Chemistry

Monsanto Company

1300 I Street NW

Washington DC 20005

tel: (202) 383 2866

bb: (202) 297 3849

erik.janus@monsanto.com

EXHIBIT 19

This document is to remain under seal pursuant to PTO #15, ECF No. 186

EXHIBIT 20

Message

From: ADAMS, STEPHEN A [AG/1000] [/O=MONSANTO/OU=NA-1000-01/CN=RECIPIENTS/CN=113797]
Sent: 6/11/2010 9:11:01 PM
To: HAUPFEAR, ERIC A [AG/1000] [eric.a.haupfear@monsanto.com]; HEYDENS, WILLIAM F [AG/1000] [william.f.heydens@monsanto.com]
Subject: RE: Question...

yeah, that's what I think... Bill forgot to hit the alt key! ... w ppm? what the heck?

Other than that, 1,4-dioxane was once included on the FAO specification with a limit of 1 ppm, but since this is an impurity in the ethoxylated surfactants and not in the glyphosate manufacturing process itself, the specification was later dropped from the FAO specification. The 1 ppm limit in the formulation was retained by Monsanto as a specification managed via the raw material specification since it was considered to be reasonably attainable and a level that was considered to be below any health risk level. However, it is my understanding that the Monsanto CSWG had later increased the level of 1,4-dioxane up to 10 ppm in final formulated products.

So, to answer your question, I believe that there is a Monsanto self-imposed spec for 1,4-dioxane in the final formulation that is managed by the surfactant specs. I believe that spec is now 10 ppm, but we might want to confirm that value with Erin or Donna Farmer, both of whom are not in today.

The other thing is that we have to be very careful before we go slinging mud about 1,4-dioxane in Chinese glyphosate in public, because whether it is 1 ppm or 10 ppm, we most likely have it on our products too, and the general public does not understand the difference between 1 ppm and a bucket full...if there is a chemical that is considered to be a cancer-causing, it don't matter how much is in there, just that it is in there!

Steve

-----Original Message-----
From: HAUPFEAR, ERIC A [AG/1000]
Sent: Friday, June 11, 2010 1:57 PM
To: HEYDENS, WILLIAM F [AG/1000]; ADAMS, STEPHEN A [AG/1000]
Subject: RE: Question...

Thanks Bill...in your note, I assume you meant "1" not "w" ppm? (you didn't hold onto that "alt" key long enough on your blackberry)

Steve: anything to add?

Thanks!
E

-----Original Message-----
From: HEYDENS, WILLIAM F [AG/1000]
Sent: Friday, June 11, 2010 12:58 PM
To: HAUPFEAR, ERIC A [AG/1000]; ADAMS, STEPHEN A [AG/1000]
Subject: Re: Question...

Eric,

A long time ago we self-imposed a w ppm spec on the surfactant, if I recall correctly. I don't think we ever changed it.

I am out office until next Wed, but you can check with Steve Adams in the meantime.

Sent from my BlackBerry Wireless Handheld

----- Original Message -----
From: HAUPFEAR, ERIC A [AG/1000]
To: HEYDENS, WILLIAM F [AG/1000]
Sent: Thu Jun 10 12:30:40 2010
Subject: Question...

Hi Bill…what do you know about any "spec" we might have on 1,4-dioxane on our glyphosate formulations? (Is there a spec on the formulation or on the surfactant raw materials)??

We have seen some 1,4-dioxane in some of the Chinese samples…still trying to nail down our quantification…but wanted to see how those levels compare to what we might spec our product at.

Thanks!
E

EXHIBIT 21

Message

From: ADAMS, STEPHEN A [AG/1000] [/O=MONSANTO/OU=NA-1000-01/CN=RECIPIENTS/CN=113797]
Sent: 6/11/2010 9:11:01 PM
To: HAUPFEAR, ERIC A [AG/1000] [eric.a.haupfear@monsanto.com]; HEYDENS, WILLIAM F [AG/1000] [william.f.heydens@monsanto.com]
Subject: RE: Question...

yeah, that's what I think... Bill forgot to hit the alt key! ... w ppm? what the heck?

Other than that, 1,4-dioxane was once included on the FAO specification with a limit of 1 ppm, but since this is an impurity in the ethoxylated surfactants and not in the glyphosate manufacturing process itself, the specification was later dropped from the FAO specification. The 1 ppm limit in the formulation was retained by Monsanto as a specification managed via the raw material specification since it was considered to be reasonably attainable and a level that was considered to be below any health risk level. However, it is my understanding that the Monsanto CSWG had later increased the level of 1,4-dioxane up to 10 ppm in final formulated products.

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Steve

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Sent: Friday, June 11, 2010 1:57 PM
To: HEYDENS, WILLIAM F [AG/1000]; ADAMS, STEPHEN A [AG/1000]
Subject: RE: Question...

Thanks Bill...in your note, I assume you meant "1" not "w" ppm? (you didn't hold onto that "alt" key long enough on your blackberry)

Steve: anything to add?

Thanks!
E

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Sent: Friday, June 11, 2010 12:58 PM
To: HAUPFEAR, ERIC A [AG/1000]; ADAMS, STEPHEN A [AG/1000]
Subject: Re: Question...

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A long time ago we self-imposed a w ppm spec on the surfactant, if I recall correctly. I don't think we ever changed it.

I am out office until next Wed, but you can check with Steve Adams in the meantime.

Sent from my BlackBerry Wireless Handheld

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To: HEYDENS, WILLIAM F [AG/1000]
Sent: Thu Jun 10 12:30:40 2010
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We have seen some 1,4-dioxane in some of the Chinese samples…still trying to nail down our quantification…but wanted to see how those levels compare to what we might spec our product at.

Thanks!
E

EXHIBIT 22

Message

From: WRIGHT, DANIEL R [AG/1000] [/O=MONSANTO/OU=NA-1000-01/CN=RECIPIENTS/CN=179096]
Sent: 3/29/2013 4:52:04 PM
To: FARMER, DONNA R [AG/1000] [/O=MONSANTO/OU=NA-1000-01/CN=RECIPIENTS/CN=180070]; PETERS, DAVID W [AG/1000] [/O=MONSANTO/OU=NA-1000-01/CN=RECIPIENTS/CN=177914]; AHLERS, ERIN M [AG/1000] [/O=MONSANTO/OU=NA-1630-01/CN=RECIPIENTS/CN=172788]
CC: REAVIS, PAULA FLUKE [AG-Contractor/1000] [/O=MONSANTO/OU=NA-1000-01/CN=RECIPIENTS/CN=PFREAV]; ADAMS, STEPHEN A [AG/1000] [/O=MONSANTO/OU=NA-1000-01/CN=RECIPIENTS/CN=113797]; KLOPF, GARY J [AG/1000] [/O=MONSANTO/OU=NA-1000-01/CN=RECIPIENTS/CN=162545]; DYSZLEWSKI, ANDREW D [AG/1000] [/O=MONSANTO/OU=NA-1000-01/CN=RECIPIENTS/CN=102676]
Subject: RE: C-6330 surfactant question
Attachments: RE: C-6330 surfactant question

Donna,

I have not approached Huntsman. Since I am not directly involved in the use of any of their products at this time, it would be best if the people that have more direct conversations with them make that contact.

My assumption is that Andy Dyszlewski and/or Gary Klopf or someone in purchasing would approach Huntsman.

Just fyi, the new SDS is attached for C-6330.

Dan

From: FARMER, DONNA R [AG/1000]
Sent: Friday, March 29, 2013 11:47 AM
To: PETERS, DAVID W [AG/1000]; WRIGHT, DANIEL R [AG/1000]; AHLERS, ERIN M [AG/1000]
Cc: REAVIS, PAULA FLUKE [AG-Contractor/1000]; ADAMS, STEPHEN A [AG/1000]
Subject: RE: C-6330 surfactant question

Good work-thanks Dan. Just to clarify Dan you have also approached Huntsman and we are waiting to hear back?

Sent with Good (www.good.com)

-----Original Message-----
From: PETERS, DAVID W [AG/1000]
Sent: Thursday, March 28, 2013 05:49 PM Central Standard Time
To: WRIGHT, DANIEL R [AG/1000]; AHLERS, ERIN M [AG/1000]

Cc: REAVIS, PAULA FLUKE [AG-Contractor/1000]; FARMER, DONNA R [AG/1000]
Subject: RE: C-6330 surfactant question

Dan,

Thanks for the update. We will remove the Prop65 statement from the two L&G formulations that are pending based on the e-mail. Please forward a copy of the SDS when you receive it.

Erin,

One down and one to go! We will need something from Huntsman of a Safe Harbor conclusion on the on the AGM-550.

Best regards,

Dave

From: WRIGHT, DANIEL R [AG/1000]
Sent: Thursday, March 28, 2013 5:42 PM
To: PETERS, DAVID W [AG/1000]; AHLERS, ERIN M [AG/1000]
Subject: Fw: C-6330 surfactant question

FYI

From: Pope, David [mailto:David.Pope@akzonobel.com]
Sent: Thursday, March 28, 2013 05:24 PM
To: WRIGHT, DANIEL R [AG/1000]
Subject: RE: C-6330 surfactant question

Hello Dan,

Good news. Our regulatory group has decided that we are able to remove the EO amount from our MSDS. As soon as the updated MSDS is available I will send you a copy.

Best regards,

David Pope

(913) 339-8923

From: WRIGHT, DANIEL R (AG/1000) [mailto:daniel.r.wright@monsanto.com]
Sent: Wednesday, March 27, 2013 3:19 PM
To: Pope, David
Subject: RE: C-6330 surfactant question

David,

Any update on this?

Dan Wright

From: Pope, David [mailto:David.Pope@akzonobel.com]
Sent: Monday, March 25, 2013 12:56 PM
To: WRIGHT, DANIEL R [AG/1000]
Cc: KLOPF, GARY J [AG/1000]; PETERS, DAVID W [AG/1000]; Solarski, S. (Steve); HERMAN, GREGORY R [AG/1000]
Subject: RE: C-6330 surfactant question

Hi Dan,

We are checking to see if we can update our MSDS. I should have an answer soon.

Thanks,

David Pope

(913) 339-8923

From: WRIGHT, DANIEL R (AG/1000) [mailto:daniel.r.wright@monsanto.com]
Sent: Wednesday, March 20, 2013 3:04 PM
To: Pope, David
Cc: KLOPF, GARY J (AG/1000); PETERS, DAVID W (AG/1000); Solarski, S. (Steve); HERMAN, GREGORY R (AG/1000)
Subject: RE: C-6330 surfactant question

Attached is a copy of the SDS we currently have on file. Perhaps this is an old SDS?

Dan

From: WRIGHT, DANIEL R [AG/1000]
Sent: Wednesday, March 20, 2013 3:03 PM
To: Pope, David
Cc: KLOPF, GARY J [AG/1000]; PETERS, DAVID W [AG/1000]; Solarski, S. (Steve); HERMAN, GREGORY R [AG/1000]
Subject: C-6330 surfactant question

David,

Monsanto uses the C-6330 surfactant in a number of our Lawn and Garden products. On the SDS for the product, it shows that the surfactant contains <0.001% ethylene oxide.

We have received a communication from our ESH staff that this will cause an issue for us in California by requiring us to show a Prop. 65 warning on our product labels if we continue to use this surfactant.

Is this level of EO an actual value that is measured or is this a value that is shown just to cover the possibility that there may be some free EO in the product?

If it is not an actual measured value is there some way that this can be removed from the SDS?

I recall in the past with Flomo TD20A that this product was steam stripped which removed both any residual dioxane and free EO. If Akzo-Nobel cnnot simply remove the ethylene oxide amount from the SDS, would it be possible to steam strip this product?

Please call me to discuss.

Regards,

Dan Wright

Monsanto Company

314-694-5778

This email has been scanned for Viruses and Spam. For more information
please contact your local Business Unit Information Security representative.

EXHIBIT 23

Message

From: KOCH, MICHAEL S [AG/1000] [/O=MONSANTO/OU=NA-1000-01/CN=RECIPIENTS/CN=MSKOCH]
Sent: 9/10/2014 10:48:36 PM
To: SHERMAN, JAMES [AG/1000] [/O=MONSANTO/OU=NA-1000-01/cn=Recipients/cn=JJSHER2]
CC: HEYDENS, WILLIAM F [AG/1000] [/O=MONSANTO/OU=NA-1000-01/cn=Recipients/cn=230737]
Subject: Tier 2 feedback
Attachments: Rat Carc Tier II MSK.docx; Rat combined chronic-carc example.pdf; 18-month mouse example.pdf; Mouse Carc Tier II MSK.docx; 1-year Dog Waiver Draft Final for Canada Review MSK.docx

Hi Jim,

Please find attached my feedback on the Tier 2s you've sent me recently. Overall, I think they look good. My main concern is that they are too long, but this is a pretty common challenge. In conversations with Kimberly on her Tier 2s she shared Summary examples from Joel on Acetochlor studies (4-5 pages per study summary). Many of the same types of studies were summarized and I have attached the examples for the rat and mouse chronic/carc studies as a guide on how to condense the information currently in your documents. Based on yesterday's email it looks like you've adopted some of these techniques for the Materials and Methods section, but I think we can shorten them further so we have concise, impactful documents. I imagine we can get them to 6 pages or less.

I have also reviewed the dog waiver from a fatal flaw perspective. I'd say it is also in good shape, but I would like to pressure test some of the arguments in the document from a consistency perspective. Accordingly, my comments focus on that aspect.

Please let me know if you have any questions or concerns about my feedback on any of these documents.

Thanks,

Mike

EXHIBIT 24

This document is to remain under seal pursuant to PTO #15, ECF No. 186

EXHIBIT 25

Message

From: GRANETO, MATTHEW J [AG/1000] [/O=MONSANTO/OU=NA-1000-01/CN=RECIPIENTS/CN=MJGRAN]
Sent: 4/4/2013 6:11:08 PM
To: KRONENBERG, JOEL M [AG/1000] [/O=MONSANTO/OU=NA-1000-01/CN=RECIPIENTS/CN=501517]
Subject: APA inert study list
Attachments: APA submission.pdf

Joel,

The attached is a list of what was submitted in our last inert submission.

-Matt

From: LEMKE, SHAWNA LIN [AG/1000]
Sent: Thursday, April 04, 2013 12:57 PM
To: KRONENBERG, JOEL M [AG/1000]; GRANETO, MATTHEW J [AG/1000]
Cc: KAEMPFE, TERRY A [AG/1000]
Subject: RE: Monoethanolamine

Thanks, Joel.

[redacted]

From: KRONENBERG, JOEL M [AG/1000]
Sent: Tuesday, April 02, 2013 5:14 PM
To: GRANETO, MATTHEW J [AG/1000]; LEMKE, SHAWNA LIN [AG/1000]
Subject: Monoethanolamine

Current EPA guidance states that "inert ingredients do not have a required data set" (EPA, 2012) and that discussion with EPA should occur before submission. However, a 1987 Fed Reg notice states that the following mammalian tox studies are typically needed for a food-use inert:

- 90-day rat & dog
- 21/28-day dermal
- rat teratology

- genetox battery

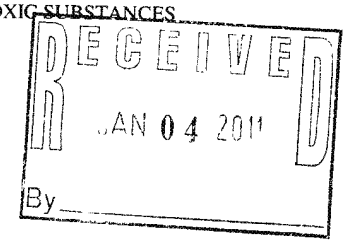
[redacted]

Joel

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

December 22, 2010

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES



RUSSELL P. SCHNEIDER
MONSANTO COMPANY
MONSANTO COMPANY
1300 I STREET, NW, SUITE 450 EAST
WASHINGTON, DC 20005-

Report of Analysis for Compliance with PR Notice 86-5

Thank you for your submittal of 10-DEC-10. Our staff has completed a preliminary analysis of the material. The results are provided as follows:

Your submittal was found to be in full compliance with the standards for submission of data contained in PR Notice 86-5. A copy of your bibliography is enclosed, annotated with Master Record ID's (MRIDs) assigned to each document submitted. Please use these numbers in all future references to these documents. Thank you for your cooperation. If you have any questions concerning this data submission, please raise them with the cognizant Product Manager, to whom the data have been released.

INERT9

TRANSMITTAL DOCUMENT

SUBMITTED BY

Monsanto Company
800 N. Lindbergh Blvd. (C3NA)
St. Louis, MO 63167

REGULATORY ACTION IN SUPPPORT OF WHICH THE PACKAGE IS SUBMITTED

RD 1726 Inert Ingredient: Petition Proposing an Exemption from the Requirement of a Tolerance for Residues of Alkyl Amidodimethylpropyl Amine (AADPA) Surfactants in or on Raw Agricultural Products and Food Products

DATA GUIDELINES

Included on Data List Below

TRANSMITTAL DATE

September 13, 2010

SUBMISSION NUMBER

R.D. 1726, 20 Volumes, and (10 Toxicology Summaries of Parent Studies)

CD contains 3 zip files: 1 Cover Letter for 3 Zip Files (RD 1726, RD 1727, RD 1728)

1. RD 1726 Inert Ingredient: Proposal for Exemption from Tolerance, (MON 51803)
2. RD 1727 Application for New Registration, M1727 Herbicide, Glyphosate (MON 76186)
3. RD 1728 Application for New Registration, M1728 Herbicide, Glyphosate (MON 76337)

Volume No.	EPA Form No.	MRID No.	EPA REG. NO.	Administrative Materials
1		48117100		RD 1726 Transmittal Document
				RDs1726.1727.1728.CoverLetter (1 cover letter for 3 zip files)
				RD1726.TolerancePetition
				RD1726.NoticeofFiling (WORD file)
	8570-1			RD 1726 8570-1 Application
	8570-34			RD 1726 8570-34 Data Citation
	8570-35			RD 1726 8570-35 Internal Data Matrix
	8570-35			RD 1726 8570-35 Public Data Matrix
				E-PRISM RD1726.xml

INERT9

SUBMITTED DATA

Volume No.	Study Number	MRID No.	Author	Guideline	Title
2	MSL0022823	48117101	Probst, Donald A.	830 Series	RD 1726 Substance Characterization for MON 51803, a Surfactant to be used in Glyphosate Formulations
3	MSL0022503	48117102	Walsh, Kevin	835.1230	RD 1726 Adsorption/Desorption of [^{14}C] MON 51803 in Five Soils
4	MSL0022504	48117103	Grommes, Shannon; DiFrancesco Dale	835.2120	RD 1726 Hydrolysis of [^{14}C] MON 51803 in pH 4, pH 7 and pH 9 Buffered Water
5	MSL0022505	48117104	Herczog, Kimberly J.S.	835.4100	RD 1726 Rate of Degradation of [^{14}C] MON 51803 in Three Soils Under Aerobic Conditions
6	WL-2009-143	48117105	Minderhout, Tui; Kendall, Timothy Z.; Krueger, Henry O.	850.1010	RD 1726 A 48-Hour Static Acute Toxicity Test with the Cladoceran *(Daphnia magna)*
7	WL-2009-142	48117106	Minderhout, Tui; Kendall, Timothy Z.; Krueger, Henry O.	850.1075	RD 1726 A 96-Hour Static Acute Toxicity Test with the Rainbow Trout *(Oncorhynchus mykiss)*
8	WL-2009-146	48117107	Hubbard, Patrick M.; Beavers, Joann B.	850.2100	RD 1726 MON 51803: An Acute Oral Toxicity Study with the Northern Bobwhite
9	WL-2009-145	48117108	Hubbard, Patrick M.; Martin, Kathy H.; Beavers, Joann B.	850.2200	RD 1726 MON 51803: A Dietary LC50 Study with the Northern Bobwhite
10	WL-2009-144	48117109	Cartee, Tara L.; Kendall, Timothy Z.; Krueger, Henry O.; Porch, John R.	850.5400	RD 1726 MON 51803: A 96-Hour Toxicitiy Test with the Freshwater Alga *(Pseudokirchneriella subcapitata)*
11	EPS-08-495	48117110	Oley, S. Dana	870.1100	RD 1726 Acute Oral Toxicity Up and Down Procedure in Rats
12	EPS-08-496	48117111	Oley, S. Dana	870.1200	RD 1726 Acute Dermal Toxicity Study in Rats
13	EPS-08-497	48117112	Oley, S. Dana	870.2400	RD 1726 Primary Eye Irritation Study in Rabbits
14	EPS-08-498	48117113	Oley, S. Dana	870.2500	RD 1726 Primary Skin Irritation Study in Rabbits
15	EPS-08-499	48117114	Oley, S. Dana	870.2600	RD 1726 Dermal Sensitization Study in Guinea Pigs (Buehler Method)
16	WI-09-067	48117115	Haas, Matthew C.	870.3050	RD 1726 A 28-Day Oral (Dietary) Dose Range Finding Study in Rats with MON 51803
17	WI-09-120	48117116	Edwards, Tammye L.	870.3100 870.3650	RD 1726 90-Day/Reproductive and Developmental Toxicity Screening Study of MON 51803 in Rats
18	WI-09-206	48117117	Edwards, Tammye L.	870.3700	RD 1726 An Oral (Gavage) Range-Finding Prenatal Developmental Toxicity Study of MON 51803 in Rats
19	CV-09-081	48117118	Farabaugh, Christopher S.	870.5100	RD 1726 Bacterial Reverse Mutation Assay with a Confirmatory Assay
20	CV-09-082	48117119	Xu, Yong	870.5395	RD 1726 *In Vivo* Mouse Bone Marrow Micronucleus Assay

INERT9

STUDY CITED (Previous Submission by Akzo Nobel Technology & Engineering)

Volume No.	Study Number	MRID No.	Author	Guideline	Title
N/A	T09040 C	48205701	Van, Ginkel C.	835.3110	BIODEGRADABILITY OF AMIDES, C5-9, N-[3-(DIMETHYLAMINO-)PROPYL] (CAS 1044764-00-2) IN THE CLOSED BOTTLE TEST

10 TOXICOLOGY SUMMARIES of Parent Studies (10 WORD documents) (Same MRID Nos. as Parent Studies):

Volume No.	Study Number	MRID No.	Author	Guideline	Title
N/A	EPS-08-495	48117110	Kaempfe, Terry A.	870.1100	RD 1726 Summary: Acute Oral Toxicity Up and Down Procedure in Rats
N/A	EPS-08-496	48117111	Kaempfe, Terry A.	870.1200	RD 1726 Summary: Acute Dermal Toxicity Study in Rats
N/A	EPS-08-497	48117112	Kaempfe, Terry A.	870.2400	RD 1726 Summary: Primary Eye Irritation Study in Rabbits
N/A	EPS-08-498	48117113	Kaempfe, Terry A.	870.2500	RD 1726 Summary: Primary Skin Irritation Study in Rabbits
N/A	EPS-08-499	48117114	Kaempfe, Terry A.	870.2600	RD 1726 Summary: Dermal Sensitization Study in Guinea Pigs (Buehler Method)
N/A	WI-09-067	48117115	Hodge-Bell, Kimberly C.	870.3050	RD 1726 Summary: A 28-Day Oral (Dietary) Dose Range Finding Study in Rats with MON 51803
N/A	WI-09-120	48117116	Hodge-Bell, Kimberly C.	870.3100 870.3650	RD 1726 Summary: 90-Day/Reproductive and Developmental Toxicity Screening Study of MON 51803 in Rats
N/A	WI-09-206	48117117	Hodge-Bell, Kimberly C.	870.3700	RD 1726 Summary: An Oral (Gavage) Range-Finding Prenatal Developmental Toxicity Study of MON 51803 in Rats
N/A	CV-09-081	48117118	Hodge-Bell, Kimberly C.	870.5100	RD 1726 Summary: Bacterial Reverse Mutation Assay with a Confirmatory Assay
N/A	CV-09-082	48117119	Hodge-Bell, Kimberly C.	870.5395	RD 1726 Summary: *In Vivo* Mouse Bone Marrow Micronucleus Assay

COMPANY OFFICIAL:

Stephen A. Adams
Registration Manager
(314)694-9035

COMPANY NAME: Monsanto Company

ADDITIONAL COMPANY CONTACT: Russ Schneider, Ph.D. Russ Schneider, Ph.D.
Senior Director of US Regulatory Affairs and Public Policy
(202) 383-2866

INERT9

MONSANTO

November 17, 2010

Electronic Submission

Document Processing Desk (REGFEE) (E-SUB) (PETN)(APPL)
U.S. Environmental Protection Agency
Office of Pesticide Programs (7504P)
Room S-4900, One Potomac Yard (South Building)
2777 South Crystal Drive
Arlington, VA 22202

Attention: Dr. P. V. Shah, Branch Chief, Inert Ingredient Assessment Branch, Registration Division
Mr. James Tompkins, PM Team 25, Registration Division

Subject: **Monsanto Company Petition Proposing an Exemption from the Requirement of a Tolerance for Residues of Alkyl Amidodimethylpropyl Amine (AADPA) Surfactants in or on Raw Agricultural Products and Food Products;**
Request for Registration of Two End Use Products (M1727 Herbicide, EPA File Symbol 524-xxxxx and M1728 Herbicide, EPA File Symbol 524-xxxxx);
PRIA Category R 311 / R 311.2: New product; requires approval of new food-use inert

Dear Dr. Shah and Mr. Tompkins:

With this letter and attachments, Monsanto is requesting the establishment of an exemption from the requirement of a tolerance for a new inert and to allow the use of this inert in pesticide end use products intended for food uses. In association with the petition requesting the establishment of this tolerance exemption, Monsanto is also requesting registration of two end use products formulated with this new inert.

New Inert Tolerance Exemption Petition
Monsanto is submitting a petition for an exemption from the requirement of tolerance pursuant to section 408(d) (1) of the Federal Food, Drug, and Cosmetic Act under 40 CFR §180.910 [Amended], a, c, j (pre- and post-harvest uses) for the surfactants referred to under the general descriptor of C_3-C_{12} Alkyl Amidodimethylpropyl Amines (AADPAs).

Monsanto is supporting herein two Alkyl Amidodimethylpropyl Amine (AADPA) surfactants in the petition for a tolerance exemption:

CAS RN 1044764-00-2, Amides C5-C9, N-3-[(dimethylamino) propyl],
CAS RN 1044764-06-8, Amides C6-C12, N-3-[(dimethylamino) propyl]

A representative test compound, MON 51803, comprised of the C_5 – C_9 amides (CAS RN 1044764-00-2) was used to produce testing data to support this petition.

INERT9

AADPA surfactants are amides synthesized by reacting the dibasic (tertiary and primary) amine, dimethylaminopropylamine (DMAPA), with a mixture of linear saturated carboxylic acids of C_3-C_{12} carbon chain length. The two AADPA surfactants cited above are within the range of the carbon chain length of the proposed descriptor, and they demonstrate similar physicochemical properties and proposed mammalian metabolism.

By way of this petition, Monsanto is providing a 20-volume, comprehensive proprietary data package of toxicological testing (acute, repeat dose, genotoxicity and mutagenicity) and environmental safety studies (wildlife toxicology and environmental fate) for the representative test compound MON 51803 (CAS RN 1044764-00-2). This proprietary information and additional publicly available data (chemical identity, physical chemical calculations and mammalian metabolism), are intended to support a tolerance exemption for the AADPA surfactants when used as inert ingredients in pesticide formulations for 40 CFR §180.910 pre and post harvest uses. Monsanto asserts that the information provided herein is sufficient for EPA to conduct a FQPA safety assessment according to the criteria published in FR Notice Volume 71, No. 153, and that it demonstrates that the profile of the proposed new inert meets the current Office of Pesticide criteria for establishing the requested tolerance exemption.

End-Use Product Applications

As previously noted, in association with our petition requesting a tolerance exemption for the inert, we are requesting registration of two glyphosate end use products—M1727 Herbicide and M1728 Herbicide. Included in this submission are product chemistry and acute toxicology studies for each of these products. Please note that the glyphosate use pattern included in the labeling is identical to that already approved for similar Monsanto end use products containing glyphosate; therefore, the review of this submission can be accomplished within the Registration Division.

It should be noted that the eye irritation study submitted to support the registration of M1727 Herbicide was conducted on MON 76501 while the other acute toxicity, skin irritation and dermal sensitization studies were conducted on a different test substance, MON 76186. The compositions of MON 76501 and MON 76186 are greater than 99% identical, with the only difference being the presence of the two minor agents listed on the Confidential Statement of Formula (CSF) for M1787 Herbicide in MON 76186 that are not in MON 76501. Monsanto asserts that the presence or lack of these two components in such minor quantities would make no difference in the results of the eye irritation study and that the study supports the registration of M1787 Herbicide as defined on the CSF.

The Master Labels being submitted for consideration with these two registrations are identical and nearly identical to the Master Label accepted by the Agency for EPA Reg. No. 524-539 on September 20, 2010, with a few notable differences:

1. Directions for Use, page 13: While we feel that it is important to inform users of this product where to find supplemental labeling that may be necessary for the proper use of this product, we also realize that not all supplemental labeling is approved by the State Pesticide Lead Agency for use in all states, therefore, we have added the following statement to that affect: "Not all supplemental labeling is registered for use in all states. Check with the agency responsible for pesticide regulation in your State, your

Authorized Monsanto Retailer or a Monsanto Company Representative before using this product in accordance with any supplemental labeling."

2. Section 9.2, page 30: Added TripleFLEX herbicide to the list of tank-mix products for preplant, at-planting or preemergence application in corn. The active ingredients in this product (acetochlor, flumetsulam and clopyralid) were already listed on the Master Label for EPA Reg. No. 524-539.
3. Section 9.3, page 32: Added Warrant herbicide to the list of tank-mix products for preplant, at-planting or preemergence application in cotton. Acetochlor and flumioxazin were also added to the active ingredient list of this section.
4. Section 9.8, page 37: Added Authority XL herbicide to the list of tank-mix products for preplant, at-planting or preemergence application in soybean. The active ingredients in this product (sulfentrazone and chlorimuron-ethyl) were already listed on the Master Label for EPA Reg. No. 524-539.
5. Section 9.10.5, page 41: The voluntary 3-day restriction between application and planting eggplant, ground cherry, pepper (all), and tomatillo was extended to cover all fruiting vegetable crops listed in this section. Experience in the field has shown that this is the best practice for all fruiting vegetable crops, not just for the four previously listed.
6. Section 12.4, page 61: As in Section 9.2, added TripleFLEX herbicide to the list of tank-mix products for preplant, at-planting or preemergence application in corn. TripleFLEX and Warrant herbicides were also added to the list of tank-mix products for in-crop (postemergence) application.
7. Section 12.5, page 63: As in Section 9.3, added Warrant herbicide to the list of tank-mix products for preplant, at-planting or preemergence application in cotton.
8. Section 12.6, page 66: As in Section 9.3, added Warrant herbicide to the list of tank-mix products for preplant, at-planting or preemergence application in cotton.
9. Section 12.7, page 68: As in Section 9.8, added Authority XL herbicide to the list of tank-mix products for preplant, at-planting or preemergence application in soybean.
10. Section 12.8, page 70: As in Section 9.8, added Authority XL herbicide to the list of tank-mix products for preplant, at-planting or preemergence application in soybean.

For each end-use pesticide there is one Basic Formulation described on the Confidential Statement of Formula (CSF), EPA form 8570-4, and two Alternative Formulations designated A and B. Alternative Formulation A is identical to the Basic Formulation, except with two production facilities listed in box 2. It is our understanding that, according to EPA Policy, the Basic Formulation can only have one producing establishment listed; hence the creation of this Alternative Formulation. For both pesticide products, 99% of the composition of Alternative Formulation B is identical to the Basic Formulation, with only a minor adjustment in one or two components. It would not be expected that these minor adjustments in the formulation would significantly alter the acute toxicity findings or product chemistry endpoints reported here, and therefore, we assert that the data submitted herein support these Alternative Formulations as well.

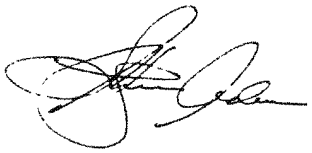
Attachments

The following are included in the EPA portion of the electronic submission in association with the petition for the tolerance exemption for the new food use inert request and for the registration of two new end use products:

- Petition for an exemption from the requirement of a tolerance for all agricultural commodities for CAS RN 1044764-00-2, Amides C5-C9, N-3-[(dimethylamino) propyl], MON 51803 and CAS RN 1044764-06-8, Amides C6-C12, N-3-[(dimethylamino) propyl] under 40 CFR §180.910.
- EPA Form 8570-1 Application for Pesticide Registration, EPA Form 8570-4 Confidential Statement of Formula, and proposed labeling for M1727 Herbicide and M1728 Herbicide, the two end use products for which we are seeking registration.
- Copy of proof of the PRIA payments. Following the guidance communicated by OPP for primary : secondary registration applications, the PRIA fee for the first end use product registration request under category R 311 (New product; requires approval of new food-use inert; applicant-initiated; excludes approval of safeners) is $17,133,, while the second end-use product PRIA fee is $4,800. (R311.2 - Primary Application for new registration; includes submission of required data). EPA Form 8570-34 and 8570-35, Certification with Respect to Citation of Data and Data Matrix for glyphosate and its salts and for the studies supporting the new inert ingredient. Please note that separate data matrices are being provided for the proposed new food use inert and for the two end use products for which we are seeking registration.
- Three (3) transmittal documents—one for the 20 volumes being submitted to support the tolerance exemption request, one for the 8 volumes supporting the registration of M1727 Herbicide, and one for the 8 volumes supporting the registration of M1728 Herbicide.

If you should have any questions regarding this proposed new food inert or our requests to register two new end-use products, please contact me at 314.694.9035 or 314.452.2782, or by electronic mail at stephen.a.adams@monsanto.com , or Dr. Russell P. Schneider at 202.383.2866.

Sincerely,



Stephen A. Adams
Registration Manager, Glyphosate

CD & Cover Letter enclosed (e:prism submission)

EXHIBIT 26

Message

From: SALTMIRAS, DAVID A [AG/1000] [/O=MONSANTO/OU=NA-1000-01/CN=RECIPIENTS/CN=DASALT]
Sent: 11/14/2014 1:01:50 PM
To: DRIESSENS, SARAH [AG/5040] [/O=MONSANTO/OU=EA-5041-01/cn=Recipients/cn=SSDRIE]
CC: HODGE-BELL, KIMBERLY C [AG/1000] [/O=MONSANTO/OU=NA-1000-01/cn=Recipients/cn=KCHODG]; MIDGLEY, BRIAN [AG/5040] [/O=MONSANTO/OU=EA-5035-01/cn=Recipients/cn=94169]; VERWAEST, KIM [AG/5035] [/O=MONSANTO/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=KVERW]; VON MEREY, GEORG [AG/5040] [/O=MONSANTO/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=GVONM]; WEBB, ELIZABETH G [AG/1000] [/O=MONSANTO/OU=NA-1000-01/cn=Recipients/cn=EGWEBB]; REDING, MARIE ANNE [AG/5040] [/O=MONSANTO/OU=EA-5041-01/cn=Recipients/cn=21058]; WRIGHT, DANIEL R [AG/1000] [/O=MONSANTO/OU=NA-1000-01/cn=Recipients/cn=179096]; KOCH, MICHAEL S [AG/1000] [/O=MONSANTO/OU=NA-1000-01/cn=Recipients/cn=MSKOCH]
Subject: Re: Summary of our call on dermal absorption studies

Sarah,

Thank you for the clarification on which formulation you are moving forward. Kimberly will monitored the dermal absorption study. Please confirm which other tox studies you will need and and timelines with Elizabeth.

Thanks,

David

Sent from my iPhone

On Nov 14, 2014, at 2:30 AM, "DRIESSENS, SARAH [AG/5040]" <sarah.driessens@monsanto.com> wrote:

All,
We just made the decision on which formulation to go for, for our L&G future EU fast action gel.
It will be MON 76904, containing 1% glyphosate and 1% Pelgargonic acid.
Therefore from now, all studies which will be initiated from now, please do them with MON 76904.
There is no value to do any testing with MON 76903, this formulation will not be used in US neither. In addion South American countries like Argentina/Brazil, do not accept any bridging from other formulations, neither if they are worst case.
As tox testings were already done with MON 76903, we can use these in the dossier and argue this is a similar/worst case formulation, which will be accepted in EU.
Georg, can you keep me updated on when tests will start. Please make sure we do all the studies according to the new data requirements, as submission is forecasted end 2015, early 2016.
Thanks

Let me know if you have more questions.

Kind regards
Sarah

From: HODGE-BELL, KIMBERLY C [AG/1000]
Sent: Thursday, November 13, 2014 10:59 PM
To: MIDGLEY, BRIAN [AG/5040]; VERWAEST, KIM [AG/5035]
Cc: DRIESSENS, SARAH [AG/5040]
Subject: RE: Summary of our call on dermal absorption studies

Below are answers to your questions and clarification for the studies

1. <!--[if !supportLists]--><!--[endif]-->DTL needs a GLP Certificate of Analysis for the test substance (glyphosate).
2. <!--[if !supportLists]--><!--[endif]-->Due to the timelines, please also send the formulation components for (at least) MON 76829. This will avoid a delay in the study if any issues arise trying to incorporate glyphosate into the gel.
3. <!--[if !supportLists]--><!--[endif]-->Please send the 5g of glyphosate and 5g of pelargonic acid as separate samples (not as one sample e.g., 5 g of MON XXXX + 5 g Pelargonic acid).
4. <!--[if !supportLists]--><!--[endif]--><u>**Q: Sarah and/or Brian**</u> have there been a decision on which formulation (MON 76903 or MON 76904) will be tested? If not, please let me know when you anticipate a decision will be made. Also, please keep in mind that if this study is delayed, we will potentially lose the slot at the lab thus delaying receipt of the final report.

Best regards,
Kimberly
(314) 694-8244 Phone
(314) 694-5071 Fax
<image001.jpg>

From: MIDGLEY, BRIAN [AG/5040]
Sent: Thursday, November 13, 2014 10:37 AM
To: VERWAEST, KIM [AG/5035]; HODGE-BELL, KIMBERLY C [AG/1000]
Cc: DRIESSENS, SARAH [AG/5040]
Subject: FW: Summary of our call on dermal absorption studies

Kim, as you may know a series of dermal penetration studies is about to start at DTL in the UK and they will need quite a few samples.
Can you please organize/request the shipment to DTL: here is the list of requirements (see also message below):

MON 76829 – hi-load gel:

- <!--[if !supportLists]--><!--[endif]-->50 ml of blank formulation - contains all of the formulation ingredients except the test substance (**Q: I'm not sure what kind of gel will form without the MON 78623**)
- <!--[if !supportLists]--><!--[endif]-->5 g of MON 78623
- <!--[if !supportLists]--><!--[endif]-->If blank formulation is not feasible then 50 ml or g of each formulation component

MON 79346 – Picante:

- <!--[if !supportLists]--><!--[endif]-->50 ml of blank formulation - contains all of the formulation ingredients except the test substance (**Q: <u>Sarah</u> does this means <u>no</u> glyphosate and <u>no</u> pelargonic acid?**)
- <!--[if !supportLists]--><!--[endif]-->5 g of MON 0139 + 5 g Pelargonic acid

- <!--[if !supportLists]--><!--[endif]-->If blank formulation is not feasible then 50 ml or g of each formulation component

MON 79632 – 360 Cayenne:

- <!--[if !supportLists]--><!--[endif]-->50 ml of blank formulation - contains all of the formulation ingredients except the test substance
- <!--[if !supportLists]--><!--[endif]-->5 g of MON 78623
- <!--[if !supportLists]--><!--[endif]-->If blank formulation is not feasible then 50 ml or g of each formulation component

MON 76258 – Roundup gel (with Kathon biocide):

- <!--[if !supportLists]--><!--[endif]-->50 ml of blank formulation - contains all of the formulation ingredients except the test substance (**Q: I'm not sure what kind of gel will form without the MON 0139**)
- <!--[if !supportLists]--><!--[endif]-->5 g of MON 0139
- <!--[if !supportLists]--><!--[endif]-->If blank formulation is not feasible then 50 ml or g of each formulation component

MON 76903 or MON 76904 – fast acting gel: **(Q: Sarah, please indicate which product + supply composition)**

- <!--[if !supportLists]--><!--[endif]-->50 ml of blank formulation - contains all of the formulation ingredients except the test substance (**Q: Sarah does this means no glyphosate and no pelargonic acid?**)
- <!--[if !supportLists]--><!--[endif]-->5 g of MON 0139 + 5 g Pelargonic acid (**I'm assuming it's based on MON 0139**)
- <!--[if !supportLists]--><!--[endif]-->If blank formulation is not feasible then 50 ml or g of each formulation component

All samples need the following information

- <!--[if !supportLists]--><!--[endif]-->Storage requirements
- <!--[if !supportLists]--><!--[endif]-->Recipe + instructions to make the FP (from blank + active as well as from scratch using all components)
- <!--[if !supportLists]--><!--[endif]-->CoA with expiry date (**Q: Kimberley can you confirm that this needs to be a GLP CoA, it looks to me like a non-GLP CoA would be ok**)

The attachment states on page 14 "Please note that it is a requirement of GLP that each test substance and reference substance should be appropriately identified (and signed/dated) with: name; batch number; purity; composition; concentration; expiry date and storage conditions. Please use the name that is to appear in the study report. Alternative names and reference numbers should be avoided."

Let's discuss if this is not clear.
Brian.

From: HODGE-BELL, KIMBERLY C [AG/1000]
Sent: Thursday, November 06, 2014 12:24 AM
To: MIDGLEY, BRIAN [AG/5040]; DRIESSENS, SARAH [AG/5040]; REDING, MARIE ANNE [AG/5040]
Cc: WEBB, ELIZABETH G [AG/1000]; SALTMIRAS, DAVID A [AG/1000]; FLUZIN, AUDREY [AG/5040]; VERWAEST, KIM [AG/5035]
Subject: RE: Summary of our call on dermal absorption studies

Brian,

Below is a standard list of requirements from DTL for **each** sample (see page 9 in the attachment):

- <!--[if !supportLists]--><!--[endif]-->50ml of blank material. This contains all the components of the concentrate formulation(s) in the correct proportions except the test substance.
- <!--[if !supportLists]--><!--[endif]-->5g of unlabelled test substance
- <!--[if !supportLists]--><!--[endif]-->50ml sample of each of these components (if no blank material available).
- <!--[if !supportLists]--><!--[endif]-->Storage requirements including whether the test material should be stored below a particular temperature or at ambient laboratory temperature.
- <!--[if !supportLists]--><!--[endif]-->Certificate of Analysis for the test substance
- <!--[if !supportLists]--><!--[endif]-->Details of the 'recipe' detailing mixing instructions, including any specific processes, including if they need heating at any stage etc.
- <!--[if !supportLists]--><!--[endif]-->Details of any required dilutions of the test substance (note: large dilutions may compromise detection limits due to the inability to incorporate sufficient radioactivity into the dose applied.)
- <!--[if !supportLists]--><!--[endif]-->It is a GLP requirement that the expiry (or reanalysis) date and the storage conditions are documented on the test substance container. This will only be required for unlabelled active ingredients and ready to use or reference formulations.

Also, please see pages 14-17 for the instructions to ship materials to DTL.

Best regards,
Kimberly
(314) 694-8244 Phone
(314) 694-5071 Fax
<image001.jpg>

From: MIDGLEY, BRIAN [AG/5040]
Sent: Tuesday, November 04, 2014 10:48 AM
To: HODGE-BELL, KIMBERLY C [AG/1000]; DRIESSENS, SARAH [AG/5040]; REDING, MARIE ANNE [AG/5040]
Cc: WEBB, ELIZABETH G [AG/1000]; SALTMIRAS, DAVID A [AG/1000]; FLUZIN, AUDREY [AG/5040]; VERWAEST, KIM [AG/5035]
Subject: RE: Summary of our call on dermal absorption studies

Kimberly, Sarah, as discussed last week – we can ship formulation and ingredient samples to DTL but we need to get clear on sample sizes. Do we already have an idea of what quantities DTL requires? In previous trials we shipped 1g to 100g depending on what the samples was – but we worked this out with DTL.
For each formulation below I think we need to send:

- <!--[if !supportLists]--><!--[endif]-->Sample of each formulation ingredient
- <!--[if !supportLists]--><!--[endif]-->Sample of a blank formulation (with active substance missing)
- <!--[if !supportLists]--><!--[endif]-->Sample of the formulation – does this need a GLP COA?

Re the GLP COA – this can take some time and needs to be set up ASAP. The COA may arrive after the start of the study. Can we already prioritize the products below to get things moving? Or do we have some time?

Best regards, Brian.

From: DRIESSENS, SARAH [AG/5040]
Sent: Friday, October 31, 2014 3:52 PM

To: MIDGLEY, BRIAN [AG/5040]; HODGE-BELL, KIMBERLY C [AG/1000]; REDING, MARIE ANNE [AG/5040]
Cc: WEBB, ELIZABETH G [AG/1000]; SALTMIRAS, DAVID A [AG/1000]; FLUZIN, AUDREY [AG/5040]
Subject: RE: Summary of our call on dermal absorption studies

Thanks, Brian,

For MON 76258 we just need to make sure we do the test with the new Biocide. We are in the process of applying a minor change to biocide Kathon, Since we are not 100% sure this will be accepted I suggest you first start with the other formulations, in the next 2-3 months we will have a better view on this
So the Priority list become
MON 76829 – hi-load gel ASAP request from authorities
MON 79346 – Picante for post annex I renewal
MON 79632 – 360 Cayenne for post annex I renewal
MON 76258 – Roundup gel (minor change biocide ongoing, make sure we do the test with the correct biocide) for post annex I renewal
MON 76903 or MON 76904 for new submission end 2015

Kind regards Sarah

From: MIDGLEY, BRIAN [AG/5040]
Sent: Tuesday, October 28, 2014 6:54 PM
To: HODGE-BELL, KIMBERLY C [AG/1000]; DRIESSENS, SARAH [AG/5040]; REDING, MARIE ANNE [AG/5040]
Cc: WEBB, ELIZABETH G [AG/1000]; SALTMIRAS, DAVID A [AG/1000]
Subject: RE: Summary of our call on dermal absorption studies

Kimberly, sorry for the delay please find attached composition sheets for:

MON 76829 – hi-load gel
MON 76258 – Roundup gel
MON 79346 – Picante
MON 79632 – 360 Cayenne
I think you also need the composition of MON 79603 – but I don't have this.

Sarah, did I miss any others?

Best regards, Brian.

From: HODGE-BELL, KIMBERLY C [AG/1000]
Sent: Monday, October 27, 2014 10:07 PM
To: MIDGLEY, BRIAN [AG/5040]; DRIESSENS, SARAH [AG/5040]; REDING, MARIE ANNE [AG/5040]
Cc: WEBB, ELIZABETH G [AG/1000]; SALTMIRAS, DAVID A [AG/1000]
Subject: RE: Summary of our call on dermal absorption studies

Hello Brian,

As you may already know, I am the St. Louis point of contact for the dermal absorption studies. Today, we received the signed authorization letter from DTL and we are now ready to start working with them on protocols and study details. Please let me know the status of the full composition of the formulation and organizing the shipment for all samples (including glyphosate acid) per the actions items from Sarah's email below.

Best regards,
Kimberly

Kimberly Hodge-Bell, PhD, DABT
Senior Toxicologist
<image001.jpg>
Monsanto Company
800 North Lindbergh Boulevard
Mailcode - O2B
St. Louis, MO 63167
(314) 694-8244 Phone
(314) 694-5071 Fax

From: DRIESSENS, SARAH [AG/5040]
Sent: Friday, October 10, 2014 2:24 AM
To: WEBB, ELIZABETH G [AG/1000]; RATLIFF, PAUL G [AG/1000]; MIDGLEY, BRIAN [AG/5040]; HODGE-BELL, KIMBERLY C [AG/1000]; SALTMIRAS, DAVID A [AG/1000]; WRIGHT, DANIEL R [AG/1000]
Cc: REDING, MARIE ANNE [AG/5040]
Subject: RE: Summary of our call on dermal absorption studies

All,
First of all, thank you for your presence at the call. Let me summarize on what we decided and the next steps forward:

Background:
A Dermal absorption study for high load gel is needed because of a pending request from 2 authorities (UK, Denmark) in a zonal evaluation process in EU. If we use the default value we do not pass the risk assessment.

Status L&G products and composition
-MON 76829 contains 72 g/L glyphosate K salt. Registration in EU, Australia, South Africa of MON 76829 is expected in Dec 2015. Launch therefore is foreseen in FY2017.
-MON 76903 or MON 76904 (to be decided based on field trial results) submission foreseen Dec 2015 in EU, South Africa, Australia. Contains 2 actives: glyphoate 7,5 g ae /L IPA salt and Pelargonic acid (resp. 13.6 and 9,1 g ae/L). Launch after FY2018
-MON 76258 is the commercial gel in EU, Australia, contains 7,2 g ae/L IPA salt
- MON 79346 is the commercial RTU it contains 7,2 g ae/L glyphosate IPA salt and 20,4 g ae/L Pelargonic acid (pure). MON 79346 represents a worst case for our main RTU in EU MON 76610 (7,2 g ae/L glyphosate IPA salt and 10,2 g ae/L Pelargonic acid (pure))
MON 79632 is an Ag formulation. 360 g ae/L glyhosate K salt.

What and when:

It was decided that we would do the study with the formulation for which a zonal dossier was submitted in EU: **MON 76829**.
A minor change of MON 76829 to MON 76886 will be submitted to authorities after receiving registration of MON 76829.
Dermal absorption studies with other formulations (MON 76258, MON 79632 MON 79346 and MON 76903 or MON 76904) needed for post annex I renewal dossiers will be done later on but before Feb 2015.

A draft report of the dermal absorption with MON 76829 will be available in March 15, a final report in April 15. This will be communicated to the authorities.

Next steps, actions
-Elisabeth needs to discuss protocol and study details (gel specifics) with Brian and the lab, (Next week)
-Brian to organize shipment via Antwerp for all samples except fast action gel (MON 76903 or MON 76904) (in the coming weeks)
- Brian to send the around the full compositions of the formulations which will be tested
-Sarah to let the team know, which fast action gel based on field trial results: MON 76903 or MON 76904 will be used for submission in EU, Australia and South Africa and therefore which formulation should be tested (before mid December). -Afterwards sample shipment of MON 76903 or MON 76904 should be organized from US or from Antwerp if by then Antwerp still has access to the new polymer.

Let me know if I need to add something.

Thanks Sarah

From: RATLIFF, PAUL G [AG/1000]
Sent: Thursday, October 09, 2014 5:05 PM
To: DRIESSENS, SARAH [AG/5040]
Subject: Summary

Sarah,
Who would be best to summarize the activity we discussed this morning? I would like to know:

- <!--[if !supportLists]--><!--[endif]-->Mon number
- <!--[if !supportLists]--><!--[endif]-->Study to be conducted
- <!--[if !supportLists]--><!--[endif]-->Timing of the study (start and finish)
- <!--[if !supportLists]--><!--[endif]-->Launch timing of formula

Is that something you could put together?

Paul

EXHIBIT 27

This document is to remain under seal pursuant to PTO #15, ECF No. 186

EXHIBIT 28

Message

From: GARNETT, RICHARD P [AG/5040] [/O=MONSANTO/OU=EA-5040-01/CN=RECIPIENTS/CN=107838]
Sent: 9/23/2002 11:27:37 AM
To: COCKBURN, ANDREW [AG/8050] [/O=MONSANTO/OU=EA-8050-01/cn=Recipients/cn=590682]; TENCALLA, FRANCESCA [AG/5040] [/O=MONSANTO/OU=EA-5040-01/CN=RECIPIENTS/CN=169392]; COYETTE, BRIGITTE [AG/5040] [/O=MONSANTO/OU=EA-5040-01/CN=RECIPIENTS/CN=94966]; REDING, MARIE ANNE [AG/5040] [/O=MONSANTO/OU=EA-5040-01/CN=RECIPIENTS/CN=21058]; MARTENS, MARK A [AG/5040] [/O=MONSANTO/OU=EA-5040-01/CN=RECIPIENTS/CN=21606]; BROECKAERT, FABRICE [AG/5040] [/O=MONSANTO/OU=EA-5040-01/CN=RECIPIENTS/CN=591489]; MEREGALLI, GIOVANNA [AG/5040] [/O=MONSANTO/OU=EA-5040-01/CN=RECIPIENTS/CN=609597]
Subject: RE: Issues handling for glyphosate

-----Original Message-----
From: GARNETT, RICHARD P [AG/5040]
Sent: 23 September 2002 10:45
To: COCKBURN, ANDREW [AG/8050]; TENCALLA, FRANCESCA [AG/5040]; COYETTE, BRIGITTE [AG/5040]; REDING, MARIE ANNE [AG/5040]; MARTENS, MARK A [AG/5040]; BROECKAERT, FABRICE [AG/5040]; MEREGALLI, GIOVANNA [AG/5040]
Subject: Issues handling for glyphosate

Herewith a summary of our meeting on 28 August (with apologies for the delay). Please review and send me your comments and amendments so that it can be circulated more widely. Thanks to everyone for their enthusiastic contributions.
regards richard

Background
There was a view that "issues" could be better handled. This had been highlighted by the French team with regard to the handling of the sea urchin paper in spring 2002.

Discussion
- there was some discussion on the sea urchin case. General agreement was that, in the end, it had been resolved satisfactorily but that, particularly in the early days, we had suffered because no-one had "picked up" the issue and driven the response.
- it was proposed that the Biotech FTO model could improve the process
  - reactive: one central coordinator to whom issues are sent and who organises the response (allocates to an expert, or creates a team, or "kills" the issue immediately
  - create position statements and simple journalistic issues summaries available on an intranet site; monthly output.
  - proactive: planned "outreach" to key influence groups and people
- most of the discussion was about improving the procedure

Actions
- RG was proposed as coordinator and filter for glyphosate issues in Europe, with Brigitte Coyette as back up and support.
  - formalise the issues handling process (which is largely in place but ad hoc)
  - create named, cross-functional team of experts and responsibilities.
  - inform countries and request they send in issues as they occur.
  - follow up with 3 questions for countries: current issues, future issues, key NGO activities
- Highlight what already exists (ACTION: RG and team)
  - PSAS intranet site has details of responses to past issues (many of which repeat themselves)
  - poisons advice web site being developed
  - publicise existing "outreach" work (Pelfrene, Parry, Doll, EUROTOX, etc)
  - European Glyphosate Association (EGA) activities: Independent Expert Group (environmental impact);
- Initiate new outreach (ACTION: team and countries)
  - utilise the Saldman team in France?
  - GM replace FT on the UIPP ecotox group

- FB participate in French toxicology society
- EGA: further development into tox. and other issues?
- RG/team explore and prioritise other opportunities

- Formalise issues handling at country level (again largely in place but needs formalising)

EXHIBIT 29

Message

From: GARNETT, RICHARD P [AG/5040] [/O=MONSANTO/OU=EA-5041-01/CN=RECIPIENTS/CN=107838]
Sent: 11/7/2008 5:36:14 PM
To: GOLDSTEIN, DANIEL A [AG/1000] [/O=MONSANTO/OU=NA-1000-01/cn=Recipients/cn=527246]; SALTMIRAS, DAVID A [AG/1000] [/O=MONSANTO/OU=NA-1000-01/cn=Recipients/cn=DASALT]; MANNION, RHONDA M [AG/1000] [/O=MONSANTO/OU=NA-1000-01/cn=Recipients/cn=226139]; OPHOFF, HOLGER [AG/5278] [/O=MONSANTO/OU=EA-5278-01/cn=Recipients/cn=548564]
Subject: tallow amine situation in Germany - tox issues

All,
I have been very remiss in not meeting a promise to Holger to set up a conf call to address this issue during this week. Can we do it next week please? Late afternoon/early evening on Monday/Tuesday (after 17.30 BE time) or Wednesday (after 18.00) would work for me.

To respond to the allegations from the BVL/BfR we suggest 4 areas of preparation:

1. Continue to try to get clarity on the incident of lung lesions in a forest worker
2. Epidemiology: summarise the data on exposures to tallow amine containing glyphosate products. As far as we are aware there are no incidents of lung lesions similar to that alleged in Germany
3. Toxicology: counter the allegation on synergistic effects of tallow amine with glyphosate
4. Protective equipment: in countries where we have drift spraying recommendations for Roundup, respiratory protection is required. This is not new. We can add this to the label in Germany if there are uses which require it. Ironically, we believe that the product involved may be from Cheminova, in which case there is no hazard warning on the label, unlike the irritant label for Roundup classic.

The goals are:

1. Protect tallow amine formulations
2. Protect formulations containing other surfactants, particularly etheramines which the BVL/BfR are already expressing some concern over
3. Regulation on the basis of risk as required by the legislation

Thanks and regards
Richard

EXHIBIT 30

UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

IN RE: ROUNDUP PRODUCTS LIABILITY LITIGATION	)	MDL No. 2741
THIS DOCUMENT RELATES TO ALL CASES	)	Case No. 16-md-02741-VC

TUESDAY, JANUARY 31, 2017

CONFIDENTIAL - SUBJECT TO PROTECTIVE ORDER

- - -

Videotaped deposition of David A. Saltmiras, Ph.D., held at the offices of HUSCH BLACKWELL, L.L.C., 190 Carondelet Plaza, Suite 600, St. Louis, Missouri, commencing at 9:03 a.m., on the above date, before Carrie A. Campbell, Registered Diplomate Reporter, Certified Realtime Reporter, Illinois, California & Texas Certified Shorthand Reporter, Missouri & Kansas Certified Court Reporter.

- - -

GOLKOW TECHNOLOGIES, INC.

877.370.3377 ph | 917.591.5672 fax

deps@golkow.com

highlighted.

Q. Okay. Let's move on.

Dr. Saltmiras, you described dermal tracking through the kidneys.

Does that mean that you use urine biomarkers to measure it?

A. Dermal absorption does not occur through the kidney. I'm sorry.

Could you ask a question you're trying to get the answer to perhaps?

Q. Okay. I'll read from the record. "Any glyphosate that is absorbed through the skin is excreted extremely rapidly as its filtered through the kidney and urinated out."

Is that your position -- I mean, is that correct? Is that how you just testified, or would you like to correct that?

A. No, that's perfectly accurate as to what I had said. It is just the question was unclear to me the way you had posed it.

Q. Okay. But actually the -- you're aware that it's more appropriate to measure -- the excretion is significantly

more in the feces than in the urine for dermal absorption of Roundup, right?

MR. COPLE: Objection. Lacks foundation.

THE WITNESS: There is no scientific basis for saying that glyphosate absorbed through the skin is found in the feces. That's utter nonsense. I don't know where you're coming up with this.

(Saltmiras Exhibit 5-25 marked for identification.)

QUESTIONS BY MR. LITZENBURG:

Q. Well, sir, let's see what David Saltmiras said at the beginning of his tenure at Monsanto instead of in this deposition room with me.

MR. COPLE: Argumentative. Object to counsel's prefatory remarks.

QUESTIONS BY MR. LITZENBURG:

Q. 25. Copy for counsel.

And if you need time to review it, let me know and we'll go off the record.

A. Yes, I will need time to review it because it's several pages long --

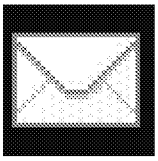
EXHIBIT 31

Message

From: GUSTIN, CHRISTOPHE [AG/5040] [/O=MONSANTO/OU=EA-5041-01/CN=RECIPIENTS/CN=83930]
Sent: 11/12/2008 9:08:45 AM
To: KRONENBERG, JOEL M [AG/1000] [/O=MONSANTO/OU=NA-1000-01/CN=RECIPIENTS/CN=501517]; FARMER, DONNA R [AG/1000] [/O=MONSANTO/OU=NA-1000-01/CN=RECIPIENTS/CN=180070]; BLEEKE, MARIAN S [AG/1000] [/O=MONSANTO/OU=NA-1000-01/CN=RECIPIENTS/CN=198145]; SALTMIRAS, DAVID A [AG/1000] [/O=MONSANTO/OU=NA-1000-01/CN=RECIPIENTS/CN=DASALT]; GARNETT, RICHARD P [AG/5040] [/O=MONSANTO/OU=EA-5041-01/CN=RECIPIENTS/CN=107838]
CC: KURTZWEIL, MITCHELL L [AG/1000] [/O=MONSANTO/OU=NA-1000-01/CN=RECIPIENTS/CN=9788]
Subject: RE: Pk recovery Wester et al
Attachments: Comparison of Gly Monkey Studies.xls

Joel,

Monsanto is a company with recurring discussions (which is good!)... You will remember that we discussed this in length with a lot of people before we initiated the Spanish OPEX study...(please see attached). The outcome was that (1) other animal data confirmed the Wester findings (2) such a study would be too risky (potential for finding another mammalian metabolite) and (3) we would wait for the evaluation of Spain.



Looking forward to this discussion on the 24th of November. I also recall that David has asked 2 external pharmacologists for an opinion on the Wester Study. Would that opinion be available by that time?

Kind regards,
Christophe

From: KRONENBERG, JOEL M [AG/1000]
Sent: Monday, November 10, 2008 3:21 PM
To: GARNETT, RICHARD P [AG/5040]; SALTMIRAS, DAVID A [AG/1000]; GUSTIN, CHRISTOPHE [AG/5040]; FARMER, DONNA R [AG/1000]; BLEEKE, MARIAN S [AG/1000]
Subject: RE: Pk recovery Wester et al

To fully address this issue would likely require a repeat of the monkey dermal and intravenous studies. We no longer own the custom designed monkey chairs that prevented exfoliated abdominal skin from contaminating the excreta. Additionally, it is not clear whether similar chairs are used anymore by any researcher or if they would even be allowed. Thus, conducting a new series of monkey studies may not be easy nor inexpensive. Furthermore, it is not clear to me that such a study is necessary and would be totally without risk. Should we arrange a conference call to discuss this?

Joel

-----Original Message-----
From: GARNETT, RICHARD P [AG/5040]

Sent: Monday, November 10, 2008 4:07 AM
To: SALTMIRAS, DAVID A [AG/1000]; GUSTIN, CHRISTOPHE [AG/5040]; FARMER, DONNA R [AG/1000]
Cc: KRONENBERG, JOEL M [AG/1000]
Subject: RE: Pk recovery Wester et al

Dear team,
To me all this discussion continues to show that we still need solid data for ADME arising from dermal exposure.

- Our dermal absorption end point is based on the literature and, as I recall, we failed to get the original data to support the results.
- The movement of glyphosate in the blood flow from dermal contact is different to that through oral or intravenous exposure. The little data we have suggests that the excretion is significantly more through the faeces than the urine.
- Dermal exposure is the greatest risk of exposure for operators. Therefore, we need to be secure on the ADME of such exposure.
- The WHO and EU reviews focus on the IV and oral but not the dermal.

My position is therefore unchanged. We need to address this properly in the Annex II dossier and therefore should be considering a study.
Regards
Richard

From: SALTMIRAS, DAVID A [AG/1000]
Sent: 06 November 2008 20:25
To: GUSTIN, CHRISTOPHE [AG/5040]; FARMER, DONNA R [AG/1000]; COSTA, JAIME [AG/5158]
Cc: KRONENBERG, JOEL M [AG/1000]; GARNETT, RICHARD P [AG/5040]
Subject: RE: Pk recovery Wester et al

Christophe,

Yes. I'll put together a draft position document & circulate (hopefully tomorrow).

Donna – thanks for your input!

David

David Saltmiras, Ph.D., D.A.B.T.
Toxicology Manager
Regulatory Product Safety Center
Monsanto
ph (314) 694-8856

From: GUSTIN, CHRISTOPHE [AG/5040]
Sent: Thursday, November 06, 2008 11:34 AM
To: FARMER, DONNA R [AG/1000]; SALTMIRAS, DAVID A [AG/1000]; COSTA, JAIME [AG/5158]
Cc: KRONENBERG, JOEL M [AG/1000]; GARNETT, RICHARD P [AG/5040]
Subject: RE: Pk recovery Wester et al

Dear Donna,

This evaluation from the WHO submission really puts things in the correct perspective and is exactly what we needed. Thanks for that.
Interesting point you raise on the blood flow but it takes an expert to comment on this I'm afraid…

David, could we bundle these points in a short but balanced positioning document with reference to the WHO conclusion?

Best regards and thanks,
Christophe

From: FARMER, DONNA R [AG/1000]
Sent: Thursday, November 06, 2008 4:23 PM
To: GUSTIN, CHRISTOPHE [AG/5040]; SALTMIRAS, DAVID A [AG/1000]; COSTA, JAIME [AG/5158]
Cc: KRONENBERG, JOEL M [AG/1000]; GARNETT, RICHARD P [AG/5040]
Subject: RE: Pk recovery Wester et al

Christophe and all,

Unfortunately that wasn't our only response we were going to add additional argumentation we were trying to find out how far below the AOEL we were.

See the attached it is the overview from our WHO submission.

We were going to suggest adding the consistency across the species …no metabolism, rapid elimination, and if you look at the table with IV, IP and IM injections you see the urine and fecal excretions. The IM was in monkeys and 89.9% of the applied radioactivity was excreted in the urine - they did not look at fecal or tissue levels. The summary goes on to say…"Following intraperitoneal, intravenous or intramuscular administration glyphosate is primarily excreted in the urine. The limited faecal excretion is probably due to biliary elimination. Therefore, excretion of absorbed material is almost entirely in urine with the majority of faecal radioactivity representing unabsorbed material."

I was also thinking about the cutaneous absorption and blood flow. In humans the venous drainage for the skin around the umbilicus connects with veins that drain directly into the portal vein and then directly into the liver. Contrast this to the IV, IM or IP…where veins from those areas take blood to the heart, then it goes to the lung, then back to the heart and out the arterial system via the aorta and is then distributed to the rest of the body…..liver, kidneys etc.

In the cutaneous exposure could some glyphosate be absorbed directly into the liver, excreted into the bile and therefore never has a chance to circulate and get to the kidney?

How would this influence the levels of glyphosate that we see between those two routes of exposure and the variability in the cutaneous study? Could there be differences in the venous drainage from animal to animal?

Thoughts???

Donna

<< File: WHO ADME overview.doc >>

-----Original Message-----
From: GUSTIN, CHRISTOPHE [AG/5040]
Sent: Wednesday, November 05, 2008 5:45 AM
To: SALTMIRAS, DAVID A [AG/1000]; COSTA, JAIME [AG/5158]
Cc: FARMER, DONNA R [AG/1000]; KRONENBERG, JOEL M [AG/1000]; GARNETT, RICHARD P [AG/5040]
Subject: RE: Pk recovery Wester et al

All,

Even though we can absorb additional 'uncertainty factors' in our risk assessment based on our biomonitoring results, I feel uncomfortable with this discussion. This approach by Spain sets a precedent and contradicts the fact that we always claimed to fully understand the glyphosate pharmaco-kinetics. The Wester iv-experiment suggests that almost the entire 'systemically' available dose was excreted in urine. The low dose topical *in vivo* experiment suggests that almost the entire dose (82%) that was absorbed through the skin was excreted in feces (3.6% feces versus 0.8% in urine). We should have a robust and well documented explanation for this and stick to our original risk assessment or develop additional data to fully understand this matter and adjust our systemic dose calculations accordingly.

Just my humble opinion,
Christophe

From: SALTMIRAS, DAVID A [AG/1000]
Sent: Tuesday, November 04, 2008 9:46 PM
To: COSTA, JAIME [AG/5158]; GUSTIN, CHRISTOPHE [AG/5040]
Cc: FARMER, DONNA R [AG/1000]; KRONENBERG, JOEL M [AG/1000]
Subject: RE: Pk recovery Wester et al

Jaime,

Joel, Donna & I have discussed your approach and you are correct.

How much below the AOEL are your calculations?

Christophe - by our rough calculations Jaime's approach is approximately 50 x below the AOEL of 0.2 mg/kg/day. Even if we applied the 90th percentile for the passive dosimetry numbers we would be below the AOEL.

Thanks,

David

David Saltmiras, Ph.D., D.A.B.T.
Toxicology Manager
Regulatory Product Safety Center
Monsanto
ph (314) 694-8856

From: COSTA, JAIME [AG/5158]
Sent: Tuesday, November 04, 2008 9:40 AM
To: GUSTIN, CHRISTOPHE [AG/5040]
Cc: FARMER, DONNA R [AG/1000]; SALTMIRAS, DAVID A [AG/1000]
Subject: RE: Pk recovery Wester et al

Christophe,

Many thanks for your help, which I will try to defend as Monsanto position, but the authorities will decide next week –that means they are now doing the homework- if our proposed safety evaluation for CAYENNE formulation is compatible with the Acceptable Operating Exposure Level (AOEL) for glyphosate. I imagine we do not have other studies on the urine/feces excretion after topical applications of glyphosate to support our position. As it is critical that we have our product accepted in this coming meeting, I would like to complete my defense with a paragraph like this one:

Although we believe that the intravenous dose is accepted by toxicology peer reviewers as the best indicator to simulate the systemic presence of glyphosate, in case the Spanish authorities consider that the excretion through the urine should be taken from the variable data reported in the topical administration (urine / urine + feces = 75,86% or 18,18%), the average excretion in the urine of 47,02% would mean that our final exposure values should be multiplied by 2,13, resulting in exposure levels which are well below the AOEL of 0,2 mg/kg/day.

Donna and David,
Please let me know if I should rephrase my statements.

Best regards
Jaime.

From: GUSTIN, CHRISTOPHE [AG/5040]
Sent: martes, 04 de noviembre de 2008 15:40
To: COSTA, JAIME [AG/5158]
Cc: FARMER, DONNA R [AG/1000]; SALTMIRAS, DAVID A [AG/1000]
Subject: Pk recovery Wester et al
Importance: High

Jaime,

I also included Donna Farmer and David Saltmiras into the discussion.. ..
Indeed the Wester Study has an IV-experiment and an in vivo dermal experiment in Rhesus monkeys.

The IV data gives in vivo disposition of a systemic available dose. This dose could be the result of aggregate systemic exposure (meaning a systemic dose after combined oral, dermal in inhalation exposure). The total accountability of this experiment is high >96% -~100% and we know exactly the amount that was systemically available. The recovery factor for urine is therefore relevant and reliable.

The in vivo dermal absorption experiment yielded variable results (table 4) and much lower total accountability 77-82% which is normal for this kind of experiments. The authors take the outcome of the IV-experiment to justify the use of the urinary excretion results from the topical experiment **only** as an estimate for dermal uptake : "Since all of the iv administered doses were excreted in urine, the percutaneous absorption of glyphosate is estimated to be 0.8-22% of the applied dose" (p728-729). They did not take the feces into account based on the iv-study.

So they acknowledge that an IV dose is representative for a systemic dose that results from e.g dermal exposure. In addition this means that the urinary recovery we applied to correct our systemic dose is conservative (Wester assumed everything would be recovered in urine).

The methodology used in our bio-monitoring study was peer reviewed (Acquavella paper) so recognized by independent experts as sound and valid.

Donna, please brief david and give Jaime additional ammunition. I'm running late for an appointment outside the office. I will check e-mail tonight to see whether there are still open questions.

Thanks and regards,
Christophe

Christophe Gustin, Ir.
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Avenue de Tervueren 270-272
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tel: +32 (0)2 776 76 31
mobile: +32 (0)478 90 40 25
fax: +32 (0)2 776 76 42
e-mail: christophe.gustin@monsanto.com

EXHIBIT 32

Message

From: HAUPFEAR, ERIC A [AG/1000] [/O=MONSANTO/OU=NA-1000-01/CN=RECIPIENTS/CN=177538]
Sent: 12/20/2007 7:34:50 PM
To: GRAHAM, JEFF A CROP [AG/1000] [jeff.a.crop.graham@monsanto.com]; GOLDSTEIN, DANIEL A [AG/1000] [daniel.a.goldstein@monsanto.com]; FARMER, DONNA R [AG/1000] [donna.r.farmer@monsanto.com]
Subject: RE: Question re metallic ions in glyphosate

Dan,

We could look back at old spectral results to see if any Sb was detected...however, if it was detected, since we never calibrated for Sb, we will not be able to provide a quantitative level, but just a qualitative "it was detected." To quantitate would then be to calibrate the method for Sb and run new samples.

Please advise if there are any steps you would like for us to take that would be useful.

Eric

-----Original Message-----
From: GRAHAM, JEFF A CROP [AG/1000]
Sent: Wednesday, December 19, 2007 2:54 PM
To: GOLDSTEIN, DANIEL A [AG/1000]; FARMER, DONNA R [AG/1000]; HAUPFEAR, ERIC A [AG/1000]
Subject: Re: Question re metallic ions in glyphosate

Eric Haupfear, who leads Process Chemistry, can answer your question.

Jeff
Jeffrey A. Graham
Monsanto Company - O2G
St. Louis, MO 63167
M:314-422-4088
O:314-694-6310

----- Original Message -----
From: GOLDSTEIN, DANIEL A [AG/1000]
To: GRAHAM, JEFF A CROP [AG/1000]; FARMER, DONNA R [AG/1000]
Sent: Wed Dec 19 14:36:30 2007
Subject: Question re metallic ions in glyphosate

Jeff; some experimental work with antimony catalysis in glyphosate production (you probably know far more about this than I do) has raised a question about antimony in the final product.

My own feeling, given what I know of elemental P sources, was that antimony was likely in our PCl3, and this has been confirmed by the process chem folks, but there seem to be no data on antimony in final product.

I know we have used rare earth and other isotopic metallic tracers in our products at some times in the past. If I recall, the analysis method used for these traces was ICP-MS. If this is the case, Sb certainly should have left a signal. Whether we bothered to record it or not, and/or whether the spec data would contain the answer if we look back at it, I have no idea.

Any chance that we actually have the answer to this sitting in hand already??

PLEASE NOTE: NO decision has been made that we need to answer this question. If we happen to know, that is fine, but I am NOT suggesting analytical work be initiated on this….. Just thought we might have it.

Dan

Daniel A. Goldstein, M.D.
Senior Science Fellow
Director, Medical Toxicology

Monsanto Company, A2NE
800 N. Lindbergh Blvd.
St Louis, MO 63167, USA

Telephone: 314-694-6469
Facsimile: 314-694-5925
Mobile: 314-922-5845

EXHIBIT 33

Message

From: HAUPFEAR, ERIC A [AG/1000] [/O=MONSANTO/OU=NA-1000-01/CN=RECIPIENTS/CN=177538]
Sent: 2/20/2001 2:26:28 PM
To: HAUPFEAR, ERIC A [AG/1000] [/O=MONSANTO/OU=NA-1000-01/CN=RECIPIENTS/CN=177538]; HERZIG, REED [AG/1000] [/O=MONSANTO/OU=NA-1000-01/CN=RECIPIENTS/CN=211585]; KLOPF, GARY J [AG/1000] [/O=MONSANTO/OU=NA-1000-01/CN=RECIPIENTS/CN=162545]; JORGENSON, AMY L [AG/1000] [/O=MONSANTO/OU=NA-1000-01/CN=RECIPIENTS/CN=99614]
Subject: RE: NNG in MON CR2 conc.

Importance: High

FYI... I mis-spoke below... the spec is actually 1 ppm (not 0.1 ppm).

Also, I wanted to ask everyone to please not forward the note below any further...

My opening sentence in my note below could be interpreted as more "alarming" than this really is (the problem of giving a sentence proper tone in an e-mail)... and I don't want to start or imply an unnecessary fire drill. This impurity is related to things that are coming into our system with the GI or with the W-building water supply rather than the process itself.

Really all we need to do is just monitor it over the next few weeks in our CR2 runs...

Eric

-----Original Message-----
From: HAUPFEAR, ERIC A [AG/1000]
Sent: Tuesday, February 20, 2001 7:59 AM
To: HERZIG, REED [AG/1000]; KLOPF, GARY J [AG/1000]; JORGENSON, AMY L [AG/1000]
Subject: RE: NNG in MON CR2 conc.
Importance: High

Thanks for the result... but actually this ***IS NOT*** a good result...

I'll run through the math...

Crystallizer Concentration = 0.26 ppm.

Flow from the Crystallizer Purge = ~50 ml/min x (1.1 gram/ml) = 55 gram/min

NNG Flow from Crystallizer = 0.26 ppm x (1/10^6) x 55 gram/min = 0.0000143 gram/min
(THE ABOVE REPRESENTS THE MAKE RATE OF NNG IN THE SYSTEM)

Total "Glyphosate" Produced (I am assuming this was when we were feeding 25% GI slurry to process) =
50 ml/min x 1.1 gram/ml x 25% x (169/227) = 10.24 gram/min production rate

Concentration of NNG in Glyphosate: (0.0000143 / 10.24) = 1.4 ppm!! (Our spec is 0.1 ppm!!)

Now the question is whether or not this concentration is "abnormal" due to the harsh conditions, or if this result is an anomaly.

AMY: We should get a few of the recent 3/4 rate runs with real recycle analyzed for NNG.

Eric

-----Original Message-----
From: HERZIG, REED [AG/1000]
Sent: Monday, February 19, 2001 8:31 AM
To: HAUPFEAR, ERIC A [AG/1000]; KLOPF, GARY J [AG/1000]
Subject: FW: NNG in MON CR2 conc.

Sorry about the initial scare.

Eric, let me know if you want to pursue analysis of other matrices.

Reed

-----Original Message-----
From: NORD, PAUL J [AG/1000]
Sent: Saturday, February 17, 2001 6:34 PM
To: NORD, PAUL J [AG/1000]; HERZIG, REED [AG/1000]
Subject: NNG in MON CR2 conc.

Reed,

NNG in CR2 sample analyzed NBP 6913369 Atlas workbook # pjnord01-0215-0919
The result looks good. The NNG peak was sitting on top of a broad, high baseline shift that I have never seen before, which is what put detector peak off-scale for the first dilution.

Sample	SAMPLE		Storage	NNG
Type Lot/Sam#		(other)	(ppm)	
CR2 conc.	process sam.		Final	0.26

Paul

EXHIBIT 34

This document is to remain under seal pursuant to PTO #15, ECF No. 186

EXHIBIT 35

This document is to remain under seal pursuant to PTO #15, ECF No. 186

UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

IN RE: ROUNDUP PRODUCTS LIABILITY LITIGATION	MDL No. 2741 Case No. 16-md-02741-VC
This document relates to: ALL ACTIONS	

PLAINTIFFS' CASE MANAGEMENT STATEMENT

Pursuant to the Court's February 1, 2017 order, Plaintiffs submit this joint case management statement.

PLAINTIFFS' POSITION

I. Introduction

Plaintiffs request that the Court order the Defendants to produce the custodial files of Monsanto employees Mark Martens, Lisa Hodge-Bell, Lisa Flagg, and Gary Klopf. Plaintiffs further request that the Court order the Defendants to produce employees Richard Garnett and Eric Haupfear for deposition. These are narrowly tailored and modest requests and are proportional to the magnitude of this litigation.

Under Rule 26(b)(1), Parties have a joint responsibility to determine whether discovery is proportional. The Advisory Committee Notes explain that "Restoring the proportionality calculation to Rule 26(b)(1)...does not place on the party seeking discovery the burden of addressing all proportionality considerations. Nor is the change intended to permit the opposing party to refuse discovery simply by making a boilerplate objection that it is not proportional." "[F]actors that must be considered in weighing proportionality include 'the importance of the issues at stake in the action, the amount in controversy, the parties' relative access to relevant information, the parties' resources, the importance of the discovery in resolving the issues, and

whether the burden or expense of the proposed discovery outweighs its likely benefit.' Id. Discovery need not be admissible in evidence to be discoverable. *Salazar v. McDonald's Corp.*, No. 14-CV-02096-RS (MEJ), 2016 WL 736213, at *2 (N.D. Cal. Feb. 25, 2016).

The Rule 26 factors weigh heavily in favor of granting Plaintiffs' limited requests. The importance of the issue of whether Roundup® causes cancer is immense. Since 1974, over three billion pounds of glyphosate has been sprayed in the United States alone. Benbrook, *Trends in glyphosate herbicide use in the United States and globally*, Environmental Sciences Europe, 28:3 (2016). Approximately 275 million pounds of glyphosate were sprayed in the United States in 2014. *Id*. Glyphosate is now the most widely used agricultural in the history of the world.[1] There is a high public interest in thoroughly exploring whether this pesticide causes cancer. The amount-in-controversy is also great. There are currently hundreds of cases filed against Monsanto in state and federal courts alleging that Roundup® causes NHL. Several thousand more cases are likely to be filed. The damages suffered by these Plaintiffs would likely exceed several billion dollars. Unfortunately, Monsanto is not forthcoming with sharing their information on Roundup® with the public. Therefore, most of the information on the health effects of Roundup® are solely within Defendants' hands which necessitates extensive discovery. The Defendants have extensive resources as Monsanto is currently valued at 66 billion dollars.[2] Plaintiffs will highlight the importance of each request below which demonstrates that the benefit of the discovery easily outweighs the burden.

II. Requested Custodial Files

Mark Martens:

[1] http://www.newsweek.com/glyphosate-now-most-used-agricultural-chemical-ever-422419

[2] http://www.news.bayer.com/baynews/baynews.nsf/id/ADSF8F-Bayer-and-Monsanto-to-Create-a-Global-Leader-in-Agriculture

Mark Martens is a vital witness to this litigation, he was Monsanto's Toxicology Director, Europe/Africa from 1994 to approximately 2004. Exhibit 1 (MONGLY01870235). His job duties included "gathering (i.e. literature search, Monsanto studies, and commissioning of toxicology studies in contract laboratories), selection and interpretation of health effects data within the European regulatory context.. positioning of cancer classification issues of herbicides ... and registration defence of Monsanto's pesticides in EU member states..." *Id*. In January 2002, Martens was nominated to the Monsanto Fellow's Program. It was noted that Martens strengths and contributions included:

- Broad toxicology expertise, ingenuity, persuasiveness and external recognition by scientific societies and regulators
- A "hands-on" scientist who develops the strong scientific basis for regulatory decisions and for maintaining key regulatory approvals
- Consistent delivery on key scientific issues which impact/protect Monsanto ' s bottom line..

Exhibit 2 MONGLY00905589. Among Marten's most important contributions was that he "Developed the data to gain key EU scientific support that the reported genotoxicity of Roundup herbicide was due to secondary consequences unrelated to glyphosate, thereby preventing adverse effect on Roundup business." *Id*. Certainly, Plaintiffs are entitled to get the data developed by Martens regarding the genotoxicity of Roundup® and documents relating to how that data was developed. Scientific data and contacts with scientists developed in Europe were not always shared with Monsanto U.S. employees. Exhibit 3 (MONGLY00891769) ("One of the problems with email - everyone can start running around looking for solutions. Can we keep this to a limited number of people as we have the opinions and the solutions in Europe.")

There are several other examples of why Dr. Martens' file is important. Of particular importance to this litigation is Mark Martens' work on the genotoxicity of Roundup®. In 1999, he was assigned to work with Dr. James Parry, a highly respected expert in genotoxicity. Dr.

Parry, who passed away in 2010 "was at the forefront of studies in genetic toxicology and he was the founding father of much of this discipline within the UK." Waters, et al. *James M. Parry (1940–2010)* Mutagenesis (2011) 26 (1): 1-2. Dr. Martens' work with Dr. Parry in 1999 left Monsanto in what was called a "genotox hole." Exhibit 4 (MONGLY00878595). After reviewing the published literature and Monsanto's unpublished in-house genotoxicity studies, Dr. Parry concluded that "glyphosate is a potential clastogenic *in vitro*" and that the "clastogenic activity **may** be reproduced *in vivo* in somatic cells." Exhibit 5, p. 12 (MONGLY01314233). A clastogen is as substance that causes "structural damage of genetic material." Exhibit 6 (Farmer Dep. Trans. 178:11-20). Dr. Parry concluded that the literature "suggests that the genotoxicity observed may be derived from the generation of oxidative damage in the presence of glyphosate." Exhibit 5, p. 12. Sixteen years later IARC came to the same conclusion that glyphosate is genotoxic because of its ability to induce oxidative stress. Exhibit 6 at 287:6-288:6. Dr. Parry's report has never been made public nor submitted to the EPA.

In his report, Dr. Parry recommended that Monsanto conduct multiple additional tests including the COMET assay to determine genotoxicity. *Id*. at 34. Dr. Parry noted that if an "oxidative damage mechanism is proved then it may be necessary to consider the possibility of susceptible groups within the human population" and that "if such individuals can be identified then the extent of exposure should be determined and their lymphocytes analysed for the presence of chromosome aberrations." *Id*. at 34-35. After reading the report, Monsanto employees questioned whether he had "ever worked with industry before" and "hoped that it didn't cost too much." *Id*. at 37. William Heydens from Monsanto upon reading the Parry report stated they needed to find another expert because "[w]e simply aren't going to do the studies Parry suggests." Exhibit 7 MONGLY03734971. For example, Monsanto has to date never conducted the Comet Assay on glyphosate. Exhibit 6 at 188:20-24. Plaintiffs can also find no evidence that Monsanto has ever tested the lymphocytes of agricultural works for the

presence of chromosome aberrations.

Mark Marten's custodial file is important because he was the point of contact for Dr. Parry and would have in his possession all communications and studies that were sent to Dr. Parry. *See e.g*. Exhibit 5, p. 38; *see also* Exhibit 8 (MONGLY00905534)(email from Dr. Parry exclusively to Mark Martens, which was then forwarded to other employees). Emails suggest that there was data sent to Dr. Parry after his report and that there were numerous communications between Dr. Parry and Mark Martens through 2002, but these communications do not show up in the database because Plaintiffs don't have Mark Martens'custodial file. Exhibit 3; Exhibit 6 at 151:3-194:16. Searching Dr. Parry's email address in documents received to date turns up in only a handful of emails from Dr. Parry and there is no mailed correspondence subsequent to 1999. It would seemingly be to Defendants' benefit to produce Marten's file to show that Dr. Parry changed his mind with respect to the genotoxic nature of Roundup® as claimed by Dr. Farmer at her deposition. Exhibit 6 194:10-16. Currently there is no correspondence from Dr. Parry to support Donna Farmer's claim.

Mark Martens was also the author of a paper explaining how the surfactants in Roundup® formulations increase the absorption of glyphosate in the human skin. Specifically Dr. Martens wrote:

> Surfactants are able to increase glyphosate absorption through the skin by (1) removal of lipids (sebum) from the epidermal surface due to surfactant action, (2) increase of the hydration state of the skin (under closed exposure conditions), (3) increase of skin contact (spreading of water droplets by surfactant action), (4) increase of contact time with the skin due to decrease of evaporation of water from the droplets containing surfactant (surfactant monolayer at surface of droplets slows down passage to vapour phase,) increase of sub epidermal blood flow due to irritant action of surfactant, (6) intra-epidermal and sub epidermal intercellular water accumulation due to the irritant action of the surfactant.
>
> Exhibit 9, p. 3 (MONGLY01839476).

Plaintiffs found several draft versions of this paper in Donna Farmer's custodial file. When asked whether it was true that surfactants increase the absorption of glyphosate in human skin,

Dr. Farmer responded "I have no data to support that statement." Exhibit 6, 57:4-12. When asked about the paper by Dr. Martens, Defense Counsel continually objected to the document because it was a draft paper and Dr. Farmer claimed she was unable to answer any questions about the document because she said didn't write it and because she said it was a draft. Exhibit 6, 58:17-63:3. Obviously Dr. Martens has data to support these statements and these would be in his custodial file. Plaintiffs did receive a custodial file from Christophe Gustin, another author on the document, but there was no reference to this paper in his files. Where Defendants will continue to deny that surfactants increase absorption of glyphosate in the skin, Plaintiffs need the reports of Dr. Martens and the underlying data he used to conclude that surfactants increase human exposure to glyphosate.

Lisa Flagg

Lisa Flagg is part of Monsanto's Quality Assurance Unit which monitors levels of N-ntirosoglyphosate ("NNG") in Roundup®. Exhibit 6, 200:1-15. She is also the communication point of contact for quality control issues involving Roundup®. https://www.linkedin.com/in/lisa-flagg-6576507. There are several carcinogens in Roundup® in addition to Glyphosate. NNG is a potential carcinogen in Roundup® formulations that is formed when glyphosate interacts with nitrites [redacted] in the human body. Exhibit 10, pp. 14-19 (MONGLY01377215); Exhibit 11 (MONGLY00925905). The public will not find any reference to NNG on the Roundup® label. NNG is part of a family of carcinogenic chemicals called nitroso compounds. Nitroso compounds that have been tested have consistently been shown to be carcinogenic. Loh, et al. *N-nitroso compounds and cancer incidence: the European Prospective Investigation into Cancer and Nutrition (EPIC)–Norfolk Study*, Am J Clin Nutr May 2011, vol. 93 no. 5 1053- 061

The EPA initially required that Monsanto test for the carcinogencity of NNG in the 1970s and early 1980s. The testing for NNG by Monsanto was mainly conducted by IBT laboratories

which was shut down in the 1970s due to fraud. The EPA determined that these NNG studies were not acceptable to show that NNG was not mutagenic. Exhibit 12 (MONGLY01298438). The EPA, however, did not require additional testing on NNG provided that Monsanto keep the levels of NNG below 1 ppm. *Id*. Before getting a pass from the EPA, Monsanto did conduct one long-term carcinogenicity test of NNG in mice outside of IBT laboratories. This study demonstrated a statistically significant increase in malignant lymphomas in male mice. Exhibit 13 (MONGLY04272196). Plaintiffs can't find any evidence that this study was provided to the EPA. In order to avoid the debate, Monsanto has endeavored to keep NNG levels below 1 ppm "rather than to engage in scientific debate around its biological activity." Exhibit 14 (MONGLY01185582)

[redacted] Within the last few years, there seems to be an uptick in NNG testing at Monsanto which is why the custodial file of a current Quality Assurance employee, such as Lisa Flagg is needed. In an email dated 5/19/2014, wherein Lisa Flagg was copied, it was noted that "[w]e are completing so Much work around NNG that there is a real backlog in the number of samples we can run through the analytical system." Exhibit 16 (MONGLY03771170). Lisa Flagg is currently involved with testing of how long-term storage of glyphosate increases NNG levels. Exhibit 17 (MONGLY06758730) ("I would suggest we agree in writing that `bad results' of NNG due to accelerated ageing can be caused by the heat level and is therefore not representative for "normal ageing'.") Monsanto itself acknowledges in internal emails that NNG is indeed toxic. Exhibit 18 (MONGLY03549275) (" If you talk to Kerry [Liefer, an EPA employee], I wouldn't push the

NNG issue too hard --- don't want to draw attention to the toxicity of our product...")

At Donna Farmer's deposition, Plaintiffs asked Dr. Farmer who they should talk to in order to learn more about NNG levels in Roundup®. Dr. Farmer told Plaintiffs counsel that the Quality Assurance Unit and Lisa Flagg would know about the levels of NNG in glyphosate. Exhibit 6, 200:1-15. Plaintiffs would need Monsanto's most up-to-date knowledge about how NNG forms in Roundup® and therefore the custodial file of Lisa Flagg, a current Quality Assurance Unit employee would be important in resolving the issue of whether Roundup® is carcinogenic.

Gary Klopf

According to Monsanto discovery responses, Gary Klopf is the Team Lead, Chemistry and.and/or process Technology (2000-2010; and Team Lead, Chemistry, Formulations & Delivery Technology (2010-2016). In addition to being involved with manufacturing issues such as NNG, Klopf is in charge of Surfactant Science & Formulations. *See e.g*. Exhibit 16; Exhibit 19 (MONGLY03993451). Gary Klopf actually has patents for the detection of impurities in glyphosate formulates. http://patents.justia.com/inventor/gary-klopf. Of particular interest to this litigation is how the Surfactants in Roundup® interact with glyphosate to increase the cancer risk to humans. One of the ingredients in surfactants is 1, 4 dioxane, which is carcinogenic in animals and likely to be carcinogenic humans. https://www.atsdr.cdc.gov/phs/phs.asp?id=953&tid=199 . Reference to 1, 4 Dioxane will not be found on the Roundup label. As noted in an internal email by Monsanto employees, 1, 4 Dioxane "is an impurity in the ethoxylated surfactants and not in the glyphosate manufacturing process itself" and that :

> we have to be very careful before we go slinging mud about 1,4-dioxane in Chinese glyphosate in public, because whether it is 1 ppm or 10 ppm, we most likely have it on our products too, and the general public does not understand the difference between 1 ppm and a bucket full...if there is a chemical that is considered to be a cancer-causing, it don't matter how much is in there, just that it is in there!

Exhibit 20 (MONGLY01041300). However, the surfactant manufacturers believe that 1, 4 Dioxane warrants a cancer warning. Exhibit 21 (MONGLY03829270) ("there is still 1,4-dioxane, and the Prop 65 reference on our product will remain on the SURFONIC AGM-550 MSDS.")

One of the deficiencies in the production to date are communications and safety studies conducted by the surfactant manufacturers. Gary Klopf's custodial file would help fill in those gaps. We know that Gary Klopf was involved with communications with Huntsman and Azko Nobel, the two main manufacturers of surfactants, because of an email chain that was eventually forwarded to Steve Adams. Exhibit 22 (MONGLY04175012). The subject of this 2013 email chain is particularly concerning because it involves Monsanto pressuring a surfactant manufacturer, Azko Nobel, to take off a Prop 65 cancer warning from their surfactant material safety data sheets, so that Monsanto can avoid a Prop 65 warning on Roundup®. *Id*. It was noted in this email that Gary Klopf or Andy Dyszlewski would approach Huntsman, the other surfactant manufacturer, to have them remove the Prop 65 warning. These communications with third party surfactant manufacturers are much less likely to appear in the current custodial files, because the custodians to date are not points of contact with these manufacturers. The data provided by these manufacturers to Monsanto would be important to resolving the issues in this case because it would help clarify the carcinogenic nature of the surfactants which compelled the surfactant manufacturers to put cancer warnings on their Material Safety Data Sheets.

Kimberley Hodge-Bell

Kimberly Hodge-Bell is a known participant and orchestrator in drafting waiver requests to regulatory agencies. Ex. 23 (MONGLY0211857 (email), MONGLY02111919 (attachment)). Waiver requests ask regulatory bodies to waive certain testing/study submission requirements. Although connected to regulatory bodies, this issue is more germane to Plaintiffs' instant case

concerns and begs the questions: How and why does Monsanto determine the certain adjuvants (additives) need no additional toxicity testing, such that a waiver from the agency is consistent with the adjuvant's safety?

Kimberly Hodge-Bell is known to monitor laboratory studies related to exploratory surfactants for the purpose of potential use in Roundup®. Ex. 24 (MONGLY02155592 (Study Report)). Surfactants and other additives that make the eventual formulated Roundup® product are important to Plaintiffs' cases as the allegations include and concern overall toxicity of the marketed Monsanto product.

At least five (5) Toxicology Studies relating to Roundup® ingredients were authored by Kimberly Hodge-Bell: MIRD Nos.: 48117115-48117119. It is believed that these summaries relate to toxicity findings in surfactants and are part of Monsanto's catalog of studies related to inert submissions to regulatory bodies to support Roundup® safety. Ex. 25 (MONGLY05190476 (email), MONGLY05190478 (attachment) at MONGLY05190481)

In addition to her work with surfactants and other additives, Ms. Hodge-Bell also appears to be Monsanto's point person for dermal absorption studies. In fact, she self describes her involvements as "the St. Louis point of contact" for dermal absorption studies where she considers and analyzes the protocols and studies related to same. Ex. 26 (MONGLY05359546 at 0359550 (email chain)).

Topically, Ms. Hodge-Bell is not duplicative of other Monsanto toxicologists. Unlike Donna Farmer and David Saltmiras, her work relates to studies of dermal exposure to the formulated product as well as toxicology studies of the adjuvant/surfactant in Roundup®. Monsanto has represented that Ms. Hodge-Bell has the same/similar function of other toxicologists – this is simply not so. Plaintiffs do acknowledge that presently, Ms. Hodge-Bell appears to hold a similar position as her counterparts, though historically, most documents of interest highlight topics and issues not yet fully produced to Plaintiffs. Production of the custodial file of Ms. Hodge-Bell will clear up any transparency and/or completeness issues of the already produced custodial files of Monsanto identified custodians, Donna Farmer, Davis Saltmiras, et al., [redacted]

[redacted]

III. Requested Depositions

Richard Garnett:

Richard Garnett is a vital witness to this litigation and Plaintiffs request his deposition. His custodial file contains over 80,000 documents. In addition to being a Monsanto employee, Richard Garnett is the Chairman of the Glyphosate Task Force, which is "a consortium of companies joining resources and efforts in order to renew the European glyphosate registration with a joint submission." http://www.glyphosate.eu/legal-notice. The Glyphosate Task Force funded such studies as Kier & Kirkland (2013) and Greim (2015) which are going to be recurring names in this litigation. Garnett is currently also Monsanto's Global Crop Protection Regulatory Lead. https://be.linkedin.com/in/richard-garnett-6b986a18. Plaintiffs would like to ask Richard Garnett how the Glyphosate Task Force developed the scientific database necessary to support Glyphosate registration in Europe.

Garnett has a long history of dealing with issues involving Roundup®. For example, in 2002, Garnett was assigned the task of "coordinator and filter for glyphosate issues in Europe..." Exhibit 28 (MONGLY06414231). Part of his duty would be to create a team to "kill" issues related to glyphosate that popped up in the scientific literature. *Id*. This job was created in response to the Sea Urchin study which showed that the Roundup® ingredients acted synergistically to affect cell cycle regulation. Marc, et al. *Pesticide Roundup provokes cell division dysfunction at the level of CDK1/cyclin B activation*, Chem Res Toxicol. 2002 Mar;15(3):326-31. This email was not forwarded to any U.S. employees who have been deposed. Richard Garnett was also key to managing issues with the toxicity of surfactants that haver regularly arisen in Europe, but not the United States. In 2008, Garnett was in charge of protecting "tallow amine formulations" in Europe and to counter allegations of "synergistic effects of tallow amine with glyphosate." Exhibit 29 (MONGLY06449761). Monsanto uses tallow amine as a surfactant in both Europe and the U.S., but Europe has been more vigilant in regulating this toxic chemical which is being banned later this year. Exhibit 6 at 79:13-80:19.

Plaintiffs would like to ask how Monsanto went about killing safety issues about glyphosate that were raised by European scientists and how they went about protecting tallow amine in Europe. Plaintiffs would further like to examine Richard Garnett on what scientific data caused Europe to ban Tallow Amine.

Richard Garnett was also involved with issues of the absorption of glyphosate into human skin. Plaintiffs' counsel attempted to ask David Saltmiras at deposition about the dermal absorption and excretion of Roundup, but Dr. Saltmiras did not seem to have all of the data.

> Plaintiffs Counsel: [Y]ou're aware that it's more appropriate to measure -- the excretion [of glyphosate] is significantly more in the feces than in the urine for dermal absorption of Roundup, right?
>
> Saltmiras: There is no scientific basis for saying that glyphosate absorbed through the skin is found in the feces. That's utter nonsense. I don't know where you're coming up with this.

Exhibit 30, 250:11-251:12. Plaintiffs' question, however, was not utter nonsense and Plaintiff came up with the question from an email of Richard Garnett. Richard Garnett, in a 2008 email, states that:

> The movement of glyphosate in the blood flow from dermal contact, is different to that through oral or intravenous exposure. The little data we have suggests that the excretion is significantly more through the faeces than the urine.
>
> Dermal exposure is the greatest risk of exposure for operators. Therefore, we need to be secure on the ADME of such exposure.

Exhibit 31 (MONGLY02155826). Unfortunately, despite Garnett's recommendation, Monsanto declined to do additional testing on dermal absorption because the potential of finding a new glyphosate metabolite was "too risky." *Id*.

The issue of whether glyphosate is excreted through the urine rather than feces is important because Monsanto only considers urine levels of glyphosate in an effort to underestimate glyphosate exposure and does not measure levels in feces. For that reason Dr. Farmer and Dr. Saltmiras both deny that dermally absorbed glyphosate is excreted through the

feces. Exhibit 4 at 56:5-8, Exhibit 30 at 250:11-22. Since the Monsanto U.S. employees contradict statements by Richard Garnett, it is necessary to take Richard Garnett's deposition.

Eric Haupfear:

Eric Haupfear has been the director for process technology at Monsanto for twenty years. https://www.linkedin.com/in/eric-haupfear-bba48210 . As part of his job, Haupfear is an expert on impurities in glyphosate manufacturing. Exhibit 32 (MONGLY02478386). Earlier in his career, Haupfear was involved in monitoring NNG levels of glyphosate. For example in 2000, Haupfear found that the levels of NNG exceeded the limit of 1 ppm due to a manufacturing defect. Exhibit 33 (MONGLY04683604); *see* [redacted]

Haupfear is not duplicative of Lisa Flagg, because there are no substantive documents from his file on NNG after 2014. Lisa Flagg, however, starts working on NNG in 2014 until present where there is increased testing on NNG levels. Plaintiffs would like to examine Haupfear on the reasons that NNG exceeded safe levels and on the frequency that such excessive levels occurred. Plaintiffs would like to examine Haupfear on the frequency of testing of glyphosate samples and on the likelihood that glyphosate with excessive amounts of NNG is being sold to the public.

IV. Conclusion

For the aforementioned reasons, Plaintiffs request the custodial files of Monsanto

employees Mark Martens, Lisa Hodge-Bell, Lisa Flagg, and Gary Klopf. Plaintiffs further request that the Court order the Defendants to produce employees Richard Garnett and Eric Haupfear for deposition.

MONSANTO'S POSITION

I. Introduction

Plaintiffs have requested depositions of Group C custodians Dr. Eric Haupfear, Director, Trait Delivery, Biotechnology at Monsanto, Dr. John Acquavella, formerly an epidemiologist at Monsanto, and Group D custodian Dr. Richard Garnett, Global Chemistry Regulatory Strategy Lead at Monsanto's European subsidiary. Monsanto has agreed to facilitate the deposition of Dr. Acquavella. The other two Group C and D deponents are in dispute. At the time that the telephone conference on this submission occurs, plaintiffs will have taken six depositions: three U.S.-based regulatory toxicologists for Monsanto (Dr. Donna Farmer, Dr. William Heydens, and Dr. David Saltmiras), one U.S.-based medical toxicologist (Dr. Daniel Goldstein), one U.S. regulatory affairs professional (Steve Adams), and the U.S.-based Director, Global Glyphosate Sustainability (Dr. David Heering). The parties have jointly agreed to defer two additional depositions of U.S. regulatory professionals (Daniel Jenkins – a former Monsanto employee – and Susan Martino-Catt) until the resolution of the pending briefing regarding the lack of relevance of regulatory affairs to *Daubert* pursuant to Pretrial Order No. 8 ("PTO8") (Dkt. #120). On December 23, 2016, this Court entered Pretrial Order No. 5 ("PTO5") (Dkt. #78) governing the taking of depositions from individuals in Groups C and D. PTO5 provides that, if there is a disagreement as to any Group C and D deponents, "the plaintiffs must include in the case management statement a detailed and particularized explanation for their position on each disputed individual, including citations as to any documents or deposition testimony they rely on for support." *Id*. at 2.

Plaintiffs have requested that Monsanto produce documents from seven additional document

custodians as Group E custodians. Monsanto has agreed to produce documents for three of these custodians: U.S. regulatory affairs professional Eric Sachs and former Monsanto regulatory toxicologists Richard Dirks and Timothy Long. Plaintiffs' withdrew their request for an eighth custodian, U.S. regulatory affairs professional Tracey Reynolds, in exchange for Monsanto's agreement to provide documents from Mr. Sachs. Four additional document custodians are in dispute: Lisa Flagg, Crop Protection Global Quality Lead, Dr. Mark Martens, formerly a regulatory toxicologist for Monsanto's European subsidiary, Dr. Kimberly Hodge-Bell, Monsanto's current regulatory toxicologist for glyphosate, and Gary Klopf, Chemistry, Formulations & Delivery Technology – Team Lead, Surfactant Science and Formulation. Plaintiffs have received 700,000 documents from nineteen document custodians as of the date that the telephone conference on this submission will occur.[5] PTO5 provides that if the parties are unable to reach agreement on Group E document custodians, "the plaintiffs should include a detailed and particularized explanation of why production from each disputed custodian would yield relevant, non-duplicative information." *Id*.

PTO5 clearly places the burden on plaintiffs to justify the additional burdens that these depositions and document productions will impose on Monsanto pursuant to Federal Rule of Civil Procedure 26(b)(1). As shown below, plaintiffs' justifications above are inadequate to satisfy the burden established by this Court in PTO5. Instead the disputed requests for additional discovery are needlessly cumulative and duplicative, and not proportional to the needs of this phase of the litigation.[6] Plaintiffs' requests for depositions from two Group C and D custodians

[5] This document count does not include documents produced for Dr. John Acquavella or the productions from other third parties.

[6] Plaintiffs misconstrue the proportionality analysis of Rule 26. The 10 million pages of documents produced by Monsanto to date from voluminous productions of non-custodian-based categories and nearly 20 custodians, and additional custodians Monsanto has agreed to produce here more than account for the amount in controversy and other considerations that plaintiffs ask the Court to consider. But plaintiffs' continued requests are

and for the production of documents from four of the seven Group E custodians they have identified should be denied.

A. Group C and D Deponents

Two of the depositions plaintiffs have requested from the Group C and D document custodians are in dispute: Group C custodian Eric Haupfear, a U.S.-based employee engaged in the manufacturing process, and Group D custodian Richard Garnett, a European regulatory professional. For the reasons discussed below, plaintiffs cannot meet their burden of demonstrating that deposition testimony from these two individuals would be relevant, non-cumulative, and non-duplicative of deposition testimony that plaintiffs have already obtained on general causation issues. Accordingly, Monsanto requests that the Court preclude plaintiffs from taking the depositions of these individuals during the current discovery phase on general causation.

1. Eric Haupfear

Dr. Haupfear is a Group C document custodian.[7] He is currently Director, Trait Delivery, Biotechnology at Monsanto. His current role, which he assumed in 2014, is unrelated to glyphosate-based herbicides ("GBHs"). Between 1997 and 2014, he held a variety of roles involved in the manufacturing process that creates "technical glyphosate" and the process by

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the type of "over-discovery" that the federal rule amendments seek to avoid. *See, e.g.*, *In re Bard IVC Filters Prods. Liab. Litig.*, 317 F.R.D. 562, 566 (D. Ariz. 2016) (denying requested discovery in products MDL as not proportional where "substantial discovery" was already permitted and additional requests were "marginally relevant"). Monsanto has provided substantial information regarding the burdens associated with collecting, processing, and producing its files, and those same considerations apply here. Monsanto has provided substantial information regarding the burdens associated with collecting, processing, and producing its files, and those same considerations apply here. *See Hardeman v. Monsanto Co.*, No. 3:16-cv-00525, ECF No. 63-4 (RAND, Where the Money Goes, Understanding Litigation Expenditures for Producing Electronic Discovery, http://www.rand.org/content/dam/rand/pubs/monographs/2012/RAND_MG1208.pdf); ECF No. 88-1 (declaration regarding discovery burdens associated with producing custodial files of Mr. Garnett and Mr. Gustin).

[7] Monsanto offered to put up Dr. Haupfear for deposition voluntarily if plaintiffs would withdraw their request for documents from Lisa Flagg. Plaintiffs refused that compromise.

which technical glyphosate is mixed with surfactants to create formulated Roundup® products. His most recent title in that role was Production Technology Lead. Plaintiffs wish to depose Dr. Haupfear in support of their arguments that certain impurities in technical glyphosate (formaldehyde and non-nitrosoglyphosate (NNG)) and impurities in certain surfactants (1,4 dioxaine) could be cancer-causing components of Roundup® products.

Plaintiffs' relevancy argument is based upon a false predicate - that the scientific studies on the safety of glyphosate or surfactants were conducted with "pure" glyphosate or "pure" surfactants that did not contain the trace levels of impurities (NNG, formaldehyde, 1,4 dioxaine) and that the presence of these impurities in the glyphosate based herbicides ("GBHs") used by plaintiffs thus adds some separate, unmeasured cancer risk. Plaintiffs provide no basis for this predicate. The trace impurities at issue are introduced in the ordinary course of the manufacturing process and they were thus present in the glyphosate, surfactants and GBHs analyzed in all of the scientific carcinogenicity, epidemiology, and genotoxicity studies that will be addressed by the general causation experts in the Phase I proceedings. In other words, if the presence of these impurities created any cancer risk, that risk already would be reflected in the scientific studies at issue. For example, fourteen animal cancer bioassays of glyphosate at issue in this litigation *each* studied glyphosate with measured levels of impurities ranging as high as 5.4%. *See* Helmut Greim et al., *Evaluation of carcinogenic potential of the herbicide glyphosate, drawing on tumor incidence data from fourteen chronic/ carcinogenicity rodent studies*, 45 Critical Revs. In Toxicology 185, 189-90, 192-93, 195-96, 199-202 (2015) (purity levels in studies highlighted) (Ex. 36). And, of course, all of the epidemiological studies at issue in this litigation studied exposures to formulated GBHs, which likewise would have included these same levels of impurities. The presence of these impurities thus does not provide any separate scientific basis for an expert causation opinion regarding the carcinogenicity of glyphosate and GBHs, and it has no impact on the general causation issue before the court.

Plaintiffs are already aware of this fact through the testimony of Donna Farmer and through a Monsanto scientific analysis produced in discovery and explained by Dr. Farmer that establishes this very point. Plaintiffs also have questioned a number of the regulatory toxicologists on the levels of impurities in glyphosate and how those levels compare to EPA guidances (the levels are well within EPA safety standards).

Accordingly, because the allegations have been thoroughly discussed in prior depositions and plaintiffs can identify nothing in Dr. Haupfear's documents that contradicts this prior testimony, deposing Dr. Haupfear on NNG would be unduly burdensome, irrelevant, cumulative, and duplicative of prior deposition testimony.

2. Richard Garnett

Dr. Garnett is a Group D document custodian. He is a weed scientist by training. Weed scientists have expertise in herbicide efficacy and the movement of herbicides in soil and water, but they do not have expertise on issues of toxicology regarding the safety of herbicides to humans. During his employment by Monsanto's European subsidiary, his job has been to support the registration of glyphosate and Roundup® products in European countries. His current title is Global Chemistry Regulatory Strategy Lead and he has held that position in Europe since 2013. He is also currently the Chair of the European Glyphosate Task Force, a group formed by multiple companies that manufacture GBHs to provide joint submissions related to the renewal of regulatory approval of glyphosate in Europe. Between 1998 and 2013, Dr. Garnett served as the European, Middle East, and Africa ("EMEA") Regulatory Affairs Manager for Glyphosate and then the EMEA Chemistry Regulatory Affairs Lead for Monsanto. He has not been involved directly in Monsanto's regulatory interactions with the United States Environmental Protection Agency.

In providing guidance to the parties at the November 16, 2016 Case Management Conference ("November CMC"), the Court noted that document collection from European

custodians would be allowed "to the extent a European agency's conclusion about Roundup is relevant to these proceedings … why can't we, sort of, examine what went into the agency's decision and what information the agency was receiving from Monsanto compared to the information that Monsanto had." November CMC Tr. at 103. The Court also premised its guidance regarding allowing discovery of European regulatory issues at all on its "reluctan[ce] to say that, you know, there can be no discovery on the people from Europe and the communications they – you know, the sort of, pitch that Monsanto was making to European regulatory agencies in light of the fact that it is going to be, on some level, part of the case." November CMC at 106.

As Monsanto argued recently in its briefing responding to this Court's Pretrial Order No. 8, although the regulatory agencies in Europe, the United States, and elsewhere have consistently found that GBHs are unlikely to present any cancer risk, those decisions have all been made under regulatory standards that are different from those this Court must apply under *Daubert*. *See* Monsanto Company's Brief Regarding the Relevance of IARC and EPA to General Causation, ECF No. 134, at 1-2 ("PTO8 Brief"). *Daubert* requires an evaluation of the science itself, and is not focused on regulatory or other conversations regarding it. Therefore, any deposition testimony by Dr. Garnett regarding these regulatory matters is irrelevant at this stage of the litigation.

Plaintiffs point to Dr. Garnett's involvement in European regulatory authorities' evaluation of tallow amine surfactants as grounds for his deposition. Again, Dr. Garnett's communications with European regulators are not relevant to this Court's upcoming evaluation of the scientific evidence under the different *Daubert* standard. Moreover, plaintiffs have already obtained deposition testimony from Dr. Donna Farmer regarding European efforts to ban such surfactants, the lack of scientific evidence underpinning those efforts, and whether such efforts demonstrate "vigilance" or an unscientific approach by the regulators to account for

political pressures. Dr. Garnett's testimony on this issue would be duplicative of Dr. Farmer's testimony.

Furthermore, even if testimony regarding regulatory affairs is relevant (which it is not), to the extent that Dr. Garnett would offer any testimony relevant to the regulation of GBHs in the United States, his testimony would be cumulative and duplicative of Steve Adams, the U.S.-based Chemical Regulatory Affairs Manager for Glyphosate, whom plaintiffs have already deposed in this litigation. Plaintiffs claim that Dr. Garnett worked to respond to isolated papers challenging the robust data set demonstrating the safety of GBHs. Plaintiffs have already collected documents and obtained deposition testimony on those issues. During the first five depositions, Monsanto's response to efforts to challenge the safety of GBHs in the United States has been explored in great detail. Any testimony by Dr. Garnett on similar efforts in Europe is cumulative and duplicative. In any event, the general causation issue before the Court turns on the substance of the scientific studies at issue, not on allegations regarding how Monsanto responded to those studies.

As for Dr. Garnett's purported involvement in dermal absorption studies, Monsanto has already produced voluminous dermal absorption studies through its non-custodian-based productions of its scientific and regulatory files. Such studies are not likely to be available uniquely in the files of document custodians. *See, e.g.*, 5/23/16 Decl. of Donna Farmer, 3:16-cv-00525-VC, ECF No. 62-2 ("Email and other custodian-based-records collections would not be expected to contain unique copies of studies or other scientific research relevant to the safety of glyphosate-containing herbicides to people or animals."). Plaintiffs do not explain how Dr. Garnett's testimony regarding these studies would not be duplicative of testimony they did or could have obtained from the four Monsanto toxicologists that they have already deposed.

B. Group E Document Custodians

On February 11, 2017, plaintiffs named eight additional document custodians from whom

they sought the production of documents in Group E. Monsanto has agreed to provide documents for three of these eight custodians: U.S.-based regulatory professional Eric Sachs and former U.S.-based regulatory toxicologists Richard Dirks and Timothy Long. Plaintiffs agreed to withdraw their duplicative request for documents from U.S.-based regulatory professional Tracey Reynolds in exchange for Monsanto's agreement to produce documents from Mr. Sachs.[8] Plaintiffs cannot satisfy their burden of demonstrating that the remaining four Group E custodians possess relevant, non-cumulative, and non-duplicative documents for the general causation phase of this litigation. Further, discovery also would not be proportional to the needs of this general causation phase, given the nearly 900,000 documents (estimated to total around 10 million pages) already produced by Monsanto, as well as the other information that plaintiffs and their experts have access to through public sources. Monsanto requests that the Court deny plaintiffs' excessive and unduly burdensome requests for yet more documents on irrelevant issues from the four remaining Group E custodians.

1. Lisa Flagg

Ms. Flagg is currently Crop Protection Global Quality Lead at Monsanto. She is responsible for global quality assurance for the manufacturing of GBHs. She has been in that role for only three years. Her prior positions at Monsanto did not involve glyphosate-based products. Like Mr. Haupfear, plaintiffs seem to be interested in Ms. Flagg's documents based on their theory that NNG in technical glyphosate or GBHs render those products carcinogenic.[9] Any potential carcinogenic effect of trace impurities in glyphosate or GBHs is already addressed in the epidemiology, animal toxicology, and genotoxicology studies of glyphosate and GBHs.

[8] Mr. Sachs had previously been named as a Group D custodian, but plaintiffs elected to forgo production of his documents as part of a compromise on the scope of the Group D custodians.

[9] Plaintiffs use the word "toxic" in their section, which is not the same as carcinogenic. Plaintiffs also misrepresent the contents of Ex. 16 when they portray it as a concession that NNG is toxic.

Documentation regarding NNG levels in GBHs accordingly does not provide any additional information that could impact the general causation issue before the Court.[10]

Plaintiffs have already received thousands of documents that mention formaldehyde, NNG and 1,4 dioxaine in technical glyphosate and formulated Roundup® products via the document collection of Group C custodian Dr. Eric Haupfear (more than 4000 documents on formaldehyde, more than 1500 documents on NNG and several hundred on 1,4 dioxaine). Accordingly, any relevant documents in Ms. Flagg's possession are likely cumulative and duplicative of the information contained in Mr. Haupfear's document collection.

Plaintiffs cite to documents that they contend show an "uptick" in NNG testing since 2014, when Ms. Flagg assumed her current role. They point to no documents, however, that demonstrate that NNG tolerance levels have been exceeded during that time period and no evidence that Ms. Flagg was involved in evaluating the safety of NNG in GBHs – because she was not. As noted above, the presence of NNG in GBHs is not relevant to the question before the court of whether glyphosate or GBHs can cause the blood cancer non-Hodgkin's lymphoma because any purported risk already would be reflected in the scientific studies at issue. Accordingly, evidence regarding what sort of testing is done for NNG and whether tolerances have been exceeded is not relevant to the issues currently before the Court.

2. Mark Martens

Dr. Martens is a regulatory toxicologist formerly employed by Monsanto's European subsidiary. He is presently located in Europe. Thus, production of his documents would present additional challenges due to foreign privacy law concerns, as did the prior production of documents from European custodians Richard Garnett and Christophe Gustin. As a result of

[10] Plaintiffs' citation to a 2011 paper from the American Journal of Clinical Nutrition is misleading, as NNG was not considered in that paper. Plaintiffs have pointed to no evidence that NNG, as opposed to other non-nitroso compounds, is carcinogenic.

those concerns the Court was required to enter a discovery order with special safeguards and findings (Dkt. #66). Such an order would be required here before Monsanto could produce any documents from Dr. Martens.[11]

There is no reason to go to such an effort here. Plaintiffs have obtained documents from and deposed three U.S.-based regulatory toxicologists and a U.S.-based medical toxicologist in this litigation. Monsanto has agreed to produce documents from two additional regulatory toxicologists (Dirks and Long). Plaintiffs also have received documents from two European regulatory affairs professionals (Garnett and Gustin). There is no basis for this court to conclude that Dr. Martens' documents are non-cumulative and non-duplicative of information that plaintiffs have already received in discovery from these custodians on the issue of general causation.

Dr. Martens was a regulatory toxicologist in Europe responsible for the registration of GBHs in European countries and associated regulatory testing. As noted above with respect to Dr. Garnett, if the Court agrees with Monsanto's argument in its PTO8 Brief that regulatory consideration of glyphosate science is not relevant to the Court's *Daubert* inquiry, then Monsanto's interactions with regulatory authorities are not relevant to this general causation phase of the litigation.

Plaintiffs point to interactions between Dr. Martens and a Dr. James Parry addressing various published genotoxicity studies and possible additional research suggested by Dr. Parry.

[11] The additional burdens and foreign privacy law concerns associated with producing foreign custodians provide further grounds for denying plaintiffs' request with respect to Dr. Martens. *See, e.g.*, *In re: Bard*, 2016 WL 4943393, at *5 (D. Ariz. Sep. 16, 2016) (holding defendant Bard "need not search the ESI of foreign Bard entities" because "the burden and expense" of the search "outweighs the benefit of the proposed discovery"); *see also Benicar*, 2016 WL 5817262, at *7 (refusing to direct defendants to produce documents from Daiichi Europe unless "plaintiffs satisfy the Court that requests are well-grounded, materially relevant and non-cumulative"). Monsanto has briefed discovery from European custodians more extensively at ECF No. 28 (discovery letter) and ECF No. 61 (consent motion).

Plaintiffs have in their possession documents regarding those interactions and have obtained many pages of deposition testimony from Monsanto toxicologist Donna Farmer regarding them. Plaintiffs also cite an email regarding Dr. William Heydens' position on Dr. Parry's involvement as justification for his deposition, but fail to inform the Court that they elected not to elicit any testimony from Dr. Heydens on that document. There is no basis to conclude that Dr. Martens' documents on that issue are not cumulative and not duplicative of the information and testimony that plaintiffs have already obtained. In fact, plaintiffs admit that the examples of communications between Dr. Martens and Dr. Parry they have seen were forwarded on to other Monsanto employees whose files have been produced and some of whom have been deposed. There is no basis to conclude that Dr. Martens' files contain unique information on interactions with Dr. Parry.

Plaintiffs' also point to a memorandum purportedly prepared by Dr. Martens which suggested hypothetical reasons why surfactants might increase the absorption of glyphosate through the skin. Plaintiffs do not explain the relevance of dermal absorption studies or this memorandum to their general causation arguments. Any such relevance would turn on the data from actual studies, not hypotheses. Moreover, plaintiffs have already obtained deposition testimony and documents addressing that draft study and testimony regarding its meaning from Dr. Donna Farmer and failed to ask the other three Monsanto toxicologists who have been deposed any questions about that draft study.

In addition, any documents Dr. Martens may have in his own possession are not in the custody or control of Monsanto and documents in his personal possession created after he left the company would need to be sought by independent subpoena directed to Dr. Martens himself. Monsanto requests that the Court not require the production of any documents from Dr. Martens.

3. Kimberly Hodge-Bell

Dr. Hodge-Bell is the current regulatory toxicologist for glyphosate products. She has

been in that role since January 2015, less than a year and a half. Between 2010 and 2015, she was a senior toxicologist on glyphosate supervised by Dr. David Saltmiras, who has already been deposed in this litigation. Two other regulatory toxicologists for glyphosate (Donna Farmer and William Heydens) and the medical toxicologist for glyphosate (Daniel Goldstein) also have been deposed. Documents from these four Monsanto toxicologists have already been produced in this litigation and Monsanto has agreed to produce documents from two additional regulatory toxicologists who worked at Monsanto during the period in which many of the carcinogenicity studies at issue in this litigation were conducted (Richard Dirks and Timothy Long). The information contained in Dr. Hodge-Bell's documents is cumulative and duplicative of documents previously produced to plaintiffs or that will be produced and deposition testimony already obtained.

Plaintiffs' contend that they are interested in Dr. Hodge-Bell's documents because she has been involved in dermal-absorption studies and studies on surfactant toxicity. As to the dermal-absorption studies, the studies at issue did not evaluate carcinogenicity, systemic exposure, or the metabolism of glyphosate. As noted above, Monsanto has already produced voluminous dermal absorption studies through its non-custodian-based productions of its scientific and regulatory files. At most, the files of Dr. Hodge-Bell are expected to contain duplicative copies. *See, e.g.*, 5/23/16 Decl. of Donna Farmer, 3:16-cv-00525-VC, ECF No. 62-2 ("Email and other custodian-based-records collections would not be expected to contain unique copies of studies or other scientific research relevant to the safety of glyphosate-containing herbicides to people or animals."). Accordingly, these studies do not provide a basis for the production of her documents in this litigation, which alleges that GBHs pose a risk of the blood cancer non-Hodgkin's lymphoma in humans. Plaintiffs point to five exploratory surfactant studies connected with Dr. Hodge-Bell. Multiple witnesses have already testified about the testing Monsanto conducts on any surfactant and the need for regulatory approval before that

surfactant is available for use in a formulated Roundup® product. Plaintiffs provide no basis to assume testimony on these five studies is anything other than duplicative of the larger set of genotoxicity tests they received from the production of Monsanto's scientific files and through other toxicologists' testimony.

The suggestion that the work of Dr. Hodge-Bell is somehow unique or segregated from the work of the other four toxicologists who have been deposed and who have produced documents in this matter is untrue and unfounded. Dr. Hodge-Bell was doing the normal work of toxicologists at Monsanto and was supervised by Dr. David Saltmiras and worked closely with Dr. Donna Farmer, Dr. William Heydens and Dr. Daniel Goldstein for her entire career at Monsanto. There is no basis other than speculation to conclude that Dr. Hodge-Bells files contain unique information regarding the regulatory toxicology studies.

4. Gary Klopf

Gary Klopf's current title at Monsanto is Chemistry, Formulations & Delivery Technology – Team Lead, Surfactant Science & Formulation. In that role and prior roles held since 1995, he has been responsible for evaluating the viability of using various different surfactants in formulated Roundup® products. His work has focused on whether the surfactant is compatible with technical glyphosate to create stable formulated product and evaluating whether particular surfactants have any impact on the efficacy of Roundup® formulated products. Mr. Klopf has never had any responsibility for studying the safety of surfactants or resulting formulated product. That work is the responsibility of the regulatory toxicology department and, as previously noted, three regulatory toxicologists and one medical toxicologist have already been deposed and served as document custodians in this case. The documents for two more toxicologists will also be produced as a part of Group E. Their testimony and documents included information regarding the evaluation of the safety of surfactants used in formulated Roundup®. Accordingly, any relevant documents in Mr. Klopf's files related to surfactants are

duplicative of the information already obtained from other custodians and through depositions already taken in this litigation.

The fact that some of the information that Mr. Klopf received from the manufacturers of surfactants include safety information does not mean that Mr. Klopf was involved in evaluating the safety of those surfactants or resulting formulated product. There is no basis to conclude that production of Mr. Klopf's documents would contain studies on surfactant safety from product manufacturers and every reason to believe that, if he had received such studies, he would have passed them on to the regulatory toxicologists responsible for human safety of GBHs. Those regulatory toxicologists have produced documents and been deposed. The absence of such documents in the production to date does not demonstrate that Mr. Klopf has them. It is just as likely that they don't exist because no such documents were provided to Monsanto. Mr. Klopf's work is not relevant to the claims and defenses in this litigation and, to the extent he possesses documents regarding the safety of surfactants, information contained in his documents is cumulative and duplicative of information obtained from other custodians and through deposition testimony. Accordingly, Monsanto requests that the Court not require production of Mr. Klopf's documents during this general causation discovery period.

C. Conclusion

Monsanto requests that, for the foregoing reasons, the Court deny plaintiffs' request to depose Dr. Richard Garnett and Dr. Eric Haupfear, two of the three Group C and D custodians plaintiffs have requested, and deny plaintiffs' request for documents from four of the seven Group E designees: Lisa Flagg, Dr. Mark Martens, Dr. Kimberly Hodge-Bell and Dr. Gary Klopf.

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Respectfully submitted,

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