TGG: JGL: MMG: AJO: RF
XF: Desk

TO: Distribution

FROM: T. G. Grumbles
DATE: May 15, 1989

Interoffice Communication

SUBJ: ALUMINA INHALATION TOXICITY TESTING

VISTA

I have identified a toxicology consultant to assist us in designing and monitoring an inhalation study for alumina. He is Lawrence Jenkins, President of Toxicology Resources. He has numerous years of experience in inhalation toxicity (resume attached).

I have asked him to prepare a proposal and estimated costs for doing a study to assess the acute effects of exposure to alumina at several levels, specifically to include levels below the established exposure limits.

He feels this study is technically and scientifically feasible. However most labs are set-up to do standard "kill-em and count-em" studies and we will need to identify a laboratory with expertise to do the type of study we need. He can help us do this. Also we probably will need to use a guinea pig model, vs. rats, to assure we can detect the acute effects we are looking for.

Based on our discussion of the problem, a very rough estimate of study costs is in the $15,000 range.

T. G. Grumbles

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Distribution: K. L. Fogg, J. Friend-LCCP
G. Hoenes, J. R. Drumwright

cc: J. Fenton, R. Poe-Ponca City
R. J. Andersen

Attachment

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curriculum vitae

Lawrence J. Jenkins

20622 Laverton Drive

Katy, Texas 77450

(713) 578–0200

Professional Experience:

1983–present–President, Toxicology Resources, Katy, Texas

1982–1983–Deputy Director, Life Sciences Division and Manager, Toxicology Department, Gulf South Research Institute, New Iberia, Louisiana

1980–1982–Group Leader, Inhalation Toxicology, Shell Development Company, Houston, Texas

1976–1980–Officer in Charge, Navy Toxicology Detachment, Wright–Patterson Air Force Base, Dayton, Ohio

1975–1976–Head, Toxicology Division, Naval Medical Research Institute, Bethesda, Maryland

1972–1975–Officer In Charge, Navy Toxicology Unit, Bethesda, Maryland

1969–1972–Full time student under Navy sponsorship, Harvard School of Public Health, Boston, Massachusetts

1965–1969–Deputy Officer in Charge and Head, Biochemistry Department, Navy Toxicology Unit, Bethesda, Maryland

1963–1965–Biochemist, Nutritional Biochemistry Division, Naval Medical Research Institute, Bethesda, Maryland

1959–1963–Clinical Chemist and Medical Research Chemist, U.S. Naval Hospital, Chelsea, Massachusetts.

Research Experience:

Conducted, directed, collaborated and published in the following areas of toxicology research and evaluation:

Combustion toxicology, toxicologic evaluation, inhalation toxicology, biochemical toxicology, hepatotoxicity, nephrotoxicity, neurotoxicity, behavioral toxicity, continuous exposures, closed environments, hyperbaric environments, toxicokinetics, occupational health, chlorinated hydrocarbons, nitrate esters, hydrocarbons, petroleum and shale–derived fuels, toxic chemical/stress interactions.

Professional Memberships:

Society of Toxicology
Member since 1972
Recipient of Frank R. Blood Award, 1982
Member, Inhalation Specialty Section
Organizing Committee, Gulf Coast Chapter
Member, Gulf Coast Chapter

American Institute of Aeronautics and Astronautics

American College of Toxicology

Education and Training:

1958–A.B., Chemistry, Central Methodist College, Fayette, Missouri

1964–1968 (part–time) Graduate Biochemistry, The George Washington University, Washington, D.C.

1965–1967 (part time) Biochemistry and Toxicology. Foundation for Advanced Education in the Sciences, Bethesda, Maryland

1971–M.S., Toxicology, Harvard School of Public Health, Boston, Massachusetts

1969–1972–Doctoral Program (exams completed) Harvard School of Public Health, Boston, Massachusetts.

Major Field: Toxicology;
Minor Fields: Occupational Health and Biostatistics

Personal:

Born:

St. Louis, Missouri, 23 June 1936

Married:

Former Mary Ellen Magruder of New Madrid, Missouri, 5 June 1960

Children:

Lance (Graduate of Houston Community College and University of Houston.)

Lee Anne (Fashion Merchandising Major, Sam Houston State University)

Mark (Marketing Major, University of Texas)

Military Service:

U.S. Navy, 18 September 1958 to 30 June 1980 (Retired with the rank of Commander, Medical Service Corps, U.S. Navy)

Personal Memberships:

National Railway Historical Society

The Retired Officers Association

Honors:

1987—Invited participant, Workshop on the Effects of Combined Fire Products on Human Physiological and Psychological Performance, Naval Submarine Medical Research Laboratory, Groton, Connecticut

1987—Present. Scientific Review Board, Toxic Hazards Research Unit, Wright-Patterson Air Force Base, Dayton, Ohio

1987—Present. Chairman, Institutional Laboratory Animal Care and Utilization Committee, Stillmeadow, Inc., Houston, Texas

1986—1987. Panel on Hyperbarics and Mixtures. Committee on Toxicology, National Academy of Sciences, National Research Council, Washington, D.C.

1984—Invited speaker on "Experimental Methods of Combustion Toxicology," Gulf Coast Occupational Health Council, Houston, Texas

1983—Invited speaker on "The Evolving Science of Toxicology," School of Pharmacy, Northeast Louisiana University, Monroe, Louisiana

1982—Frank R. Blood Award, Society of Toxicology

1982—Invited seminar on "Combustion Toxicology and Disaster Management," University of Southwestern Louisiana, Lafayette, Louisiana

1982—Invited seminar on "Combustion Toxicology," School of Tropical Medicine and Hygiene, Tulane University, New Orleans, Louisiana

1980—Organizer and Chairman, International (NATO) Conference on "Toxic Hazards in Aviation," Toronto, Canada

1980—Present. Manuscript reviewer, *Toxicology and Applied Pharmacology* and *American Industrial Hygiene Association Journal*

1978—Invited lecturer on "Occupational Toxicology," Navy Industrial Environmental Health Workshop, Norfolk, Virginia

1977—Organizer and Chairman, Session on "Assessment of Toxic Effects of Combustion and Pyrolysis Products," Eighth Conference on Environmental Toxicology, Dayton, Ohio

1977—Chairman, Session on "Halogenated Hydrocarbons," Seventeenth Annual Meeting, Society of Toxicology, San Francisco, California

1976—1980—Interagency Committee on Shale Fuel Toxicology, Washington, D.C.

1976—Invited lecturer on "Personnel Survival Implications of Shipboard Fires," Navy Workshop on Shipboard Fire Protection Research and Development. Washington, D.C.

1975—Invited lecturer on "Combustion Toxicology," U.S. Naval Academy, Annapolis, Maryland

1975—Invited lecturer on "Combustion Toxicology Testing Using Experimental Animals," Industry Council on Fabric Flammability, Washington, D.C.

1973—Invited lecturer on "Inhalation Toxicology," School of Pharmacy, University of Maryland, Baltimore, Maryland

1973—Invited lecturer on "Industrial Toxicology," Navy Workshop on Occupational Health, Industrial Hygiene and Safety, New Orleans, Louisiana

1973—Invited lecturer on "The Toxicology of Closed Ecological Systems," Harvard School of Public Health, Boston, Massachusetts

1972—Invited lecturer on "The Toxicology of Explosives," Navy Environmental Protection Research and Development Conference, Annapolis, Maryland

1972—1977—Liason representative, Committee on Toxicology, National Academy of Sciences, National Research Council.

Publications:

Jones, H.L., Ball, R.E., Jenkins, L.J. Jr., Galipon, Q., Demmer, C.A., Juda, T.A. and Galipeau, R.E. "Studies of Systemic Hemostatic Factors in Patients with Bleeding Duodenal Ulcer." *Amer. J. Gastroenterol.* 35, 243 (1961).

Wallach, S., Zemp, J.W., Cavins, J.A., Jenkins, L.J. Jr., Bethea, M., Freshette, L., Haynes, L.L. and Tullis, J.L. "Cation Flux and Electrolyte Composition of Frozen–Deglycerolized Blood." *Blood.* 20, 344 (1962).

Van Reen, R., Simmons, W.K. and Jenkins, L.J. Jr. "Urolithiasis in the Rat. IV. Influence of Amino Acid Supplements on the Occurrence of Citrate Calculi." *J. Nutrition* 83, 358 (1964).

Prendergast, J.A., Jones, R.A., Jenkins, L.J. Jr. and Siegel, J. "Effects on Experimental Animals of Long–Term Inhalation of Trichloroethylene, Carbon Tetrachloride, 1,1,1–Trichloroethane, Dichlorodifluoromethane and 1,1–Dichloroethylene." *Toxicol. Appl. Pharmacol.* 10, 270 (1967).

Fishman, E.G., Jenkins, L.J. Jr., Coon, R.A. and Jones, R.A. "Effects of Acute and Repeated Inhalation of Dimethyl Sulfoxide in Rats." *Toxicol. Appl. Pharmacol.* 15, 74 (1969).

Jenkins, L.J. Jr., Jones, R.A., Coon, R.A. and Siegel, J. "Repeated and Continuous Exposures of Laboratory Animals to Trichlorofluoromethane." *Toxicol. Appl. Pharmacol.* 16, 133 (1970).

Coon, R.A., Jones, R.A., Jenkins, L.J. Jr., and Siegel, J. "Animal Inhalation Studies on Ammonia, Ethylene Glycol, Formaldehyde, Dimethylamine and Ethanol." *Toxicol. Appl. Pharmacol.* 16, 646 (1970)

Jenkins, L.J. Jr., Jones, R.A. and Siegel, J. "Long–Term Inhalation Screening Studies of Benzene, Toluene, *o*–Xylene and Cumene on Experimental Animals." *Toxicol. Appl. Pharmacol.* 16, 818 (1970).

Jones, R.A., Coon, R.A., Jenkins, L.J. Jr., and Siegel, J. "Effects of Long–Term Continuous Inhalation of Ozone on Experimental Animals. *Toxicol. Appl. Pharmacol.* 17, 189 (1970).

Lyon, J.P., Jenkins, L.J. Jr., Jones, R.A., Coon, R.A. and Siegel, J. "Repeated and Continuous Exposures of Laboratory Animals to Acrolein." *Toxicol. Appl. Pharmacol.* 17, 726 (1970).

Rose, C.S., Jones, R.A., Jenkins, L.J. Jr., and Siegel, J. "The Acute Hyperbaric Toxicity of Carbon Monoxide." *Toxicol. Appl. Pharmacol.* 17, 752 (1970)

Jenkins, L.J. Jr., Coon, R.A., Lyon, J.P. and Siegel, J. "Effects on Experimental Animals of Long–Term Inhalation Exposure to Mineral Spirits. II. Dietary, Sex and Strain Influences in Guinea Pigs." *Toxicol. Appl. Pharmacol.* 18, 53 (1971).

Jenkins, L.J. Jr, Trabulus, J. and Murphy, S.D. "Effects of Adrenalectomy and Phenobarbital Pretreatment on the Toxicity and Biochemical Effects of 1,1–Dichloroethylene." *Toxicol. Appl. Pharmacol.* 19, 371 (1971).

Jenkins, L.J. Jr., Trabulus, M.J. and Murphy, S.D. "Biochemical Effects of 1,1–Dichloroethylene in Rats: Comparison with Carbon Tetrachloride and 1,2–Dichloroethylene." *Toxicol. Appl. Pharmacol.* 23, 501 (1972).

Andersen, M.E. and Jenkins, L.J. Jr. "The Acute Toxicity of Dimethylnitroamine." *Toxicol. Appl. Pharmacol.* 33, 185 (1975).

Andersen, M.E., Koppenhaver, R.E. and Jenkins, L.J. Jr. "Some Neurotoxic Properties of Triethylene Glycol Dinitrate: A Comparison with Decamethonium." *Toxicol. Appl. Pharmacol* 36, 585 (1976).

French, J.E., Bradley, S.L., Schneider, N.R., Andersen, M.E. and Jenkins, L.J. Jr. Cyclotrimethylenetrinitramine (RDX)–Induced Ultrastructural Changes in Rat Liver and Kidney." *Toxicol. Appl. Pharmacol.* 37, 122 (1976).

Jenkins, L.J. Jr., Jones, R.A. and Andersen, M.E. "The Use of Mean Survival Time Analysis in Assessing Toxic Interactions." *Toxicol. Appl. Pharmacol.* 37, 129 (1976).

Andersen, M.E. and Jenkins, L.J. Jr. "Some Factors Affect ing the Mortality of Fasted Rats Intubated with 1,1–Dichloroethylene." *Toxicol. Appl. Pharmacol.* 37, 172 (1976)

Andersen, M.E., Jones, R.A., Kurlansik, L., Mehl, R.G. and Jenkins, L.J. Jr. "Sulfolane–Induced Convulsions in Rodents." *Res. Comm. Chem. Pathol. Pharmacol.* 15, 571 (1976).

French, J.E., Andersen, M.E. and Jenkins, L.J. Jr. "Vinylidene Chloride–Induced Ultrastructural Changes in Rat Liver." *J. Cell Biol.* 70, 361a (1976).

Jenkins, L.J. Jr., Jones, R.A. and Andersen, M.E. "The Use of Mean Survival Time Analysis to Determine Com parative Toxicity of Fire Atmospheres." *J. Combust. Toxicol.* 4, 87 (1977).

Andersen, M.E., Jones, R.A., Mehl, R.G., Hill, T.A., Kurlansik, L. and Jenkins, L.J. Jr. "The Inhalation Toxicity of Sulfolane (Tetrahydrothiophene–1,1–dioxide)." *Toxicol. Appl. Pharmacol.* 40, 463 (1977).

Andersen, M.E. and Jenkins, L.J. Jr. "Enhancement of 1,1–Dichloroethylene Hepatotoxicity by Pretreatment with Low Molecular Weight Epoxides." *Toxicol. Appl. Pharmacol.* 41, 148 (1977).

Andersen, M.E., Jones, R.A. and Jenkins, L.J. Jr. "The Enhancement of 1,1–Dichloroethylene Toxicity by Pre treatment of Fasted Male Rats with 2,3–Epoxypropan–1–ol." *Drug Chem. Toxicol.* 1, 63 (1977).

Andersen, M.E. and Jenkins, L.J. Jr. "The Oral Toxicity of 1,1–Dichloroethylene in the Rat: Effects of Sex, Age and Fasting." *Environ. Health Perspect.* 21, 157 (1977).

Andersen, M.E., Gargas, M.L. and Jenkins, L.J. Jr. "The Role of Saturable Enzymatic Activation in the Expression of the Inhalation Toxicity of 1,1–Dichloroethylene." *Toxicol. Appl. Pharmacol.* 45, 285 (1978).

Jenkins, L.J. Jr. and Andersen, M.E. "1,1–Dichloroethylene Nephrotoxicity in the Rat." *Toxicol. Appl. Pharmacol.* 46, 131 (1978).

Andersen, M.E., Jones, R.A. and Jenkins, L.J. Jr. "The Acute Toxicity of Single, Oral Doses of 1,1–Dichloroethylene in the Fasted Male Rat: Effects of Induction and Inhibition of Microsomal Enzyme Activities on Mortality." *Toxicol. Appl. Pharmacol.* 46, 227 (1978).

Andersen, M.E. and Jenkins, L.J. Jr. "The Toxicity of Single Doses of N–Nitrodimethylamine in Rodents." *Drug Chem. Toxicol.* 1, 363 (1978).

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Andersen, M.E., Gargas, M.L., Jones, R.A. and Jenkins, L.J. Jr. "The Use of Inhalation Techniques to Assess the Kinetic Constants of 1,1–Dichloroethylene Metabolism." *Toxicol. Appl. Pharmacol.* 47, 395 (1979).

Andersen, M.E., Thomas, O.E., and Jenkins, L.J. Jr. "Glutathione, Epoxides and Multiple Detoxification Pathways in the Metabolism of 1,1–Dichloroethylene." *Toxicol. Appl. Pharmacol.* 48, 105 (1979).

Andersen, M.E., Gargas, M.L. and Jenkins, L.J. Jr. "Inferences Concerning Metabolism of Inhaled Toxicants Based on Rates of Toxicant Depletion from Recirculated Atmospheres." *Toxicol. Appl. Pharmacol.* 48, 106 (1979).

Cowan, M.J. Jr., Jenkins, L.J. Jr. and Doptis, L.E. "The Navy's Toxicity and Shipboard Hazard Evaluation of Selected Shale and Petroleum Derived Fuels." *Proceedings of the Ninth Annual Conference on Environmental Toxicology.* p. 58 Aerospace Medical Research Laboratory, Dayton, Ohio (1979).

Andersen, M.E., Thomas, O.E., Gargas, M.L., Jones, R.A. and Jenkins, L.J. Jr. "The Significance of Multiple Detoxification Pathways for Reactive Metabolites in the Toxicity of 1,1–Dichloroethylene." *Toxicol. Appl. Pharmacol.* 52, 422 (1980).

Andersen, M.E., Gargas, M.L., Jones, R.A. and Jenkins, L.J. Jr. "Determination of the Kinetic Constants of Metabolism of Inhaled Toxicants *in vivo* Based on Gas Uptake Measurements." *Toxicol. Appl. Pharmacol.* 54, 100 (1980).

Cowan, M.J. Jr. and Jenkins, L.J. Jr. "Navy Toxicity Study of Shale and Petroleum JP–5 Aviation Fuel and Diesel Fuel Marine." *Health Effects Investigations of Oil Shale Development.* (W.H. Greist, M.R. Guerin and D.L. Coffin, eds.) p. 129. Ann Arbor Science Publishers, Ann Arbor, Michigan (1981).

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Hilderbrand, R.L., Andersen, M.E. and Jenkins, L.J Jr. "Prediction of *in vivo* Kinetic Constants of Metabolism of Inhaled Vapors from Kinetic Constants Measured *in vitro*." *Fundament. Appl. Toxicol.* 1, 403 (1981).