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UNITED STATES DISTRICT COURT
CENTRAL DISTRICT OF CALIFORNIA

CITY OF LOS ANGELES; ORANGE COUNTY SANITATION DISTRICT; COUNTY SANITATION DISTRICT NO. 2 OF LOS ANGELES COUNTY; RESPONSIBLE BIOSOLIDS MANAGEMENT, INC.; R&G FANUCCHI, INC.; SHAEN MAGAN, both individually and d/b/a HONEY BUCKET FARMS and TULE RANCH/MAGAN FARMS; WESTERN EXPRESS, INC.; SIERRA TRANSPORT, INC.; CALIFORNIA ASSOCIATION OF SANITATION AGENCIES,

Plaintiffs,

v.

COUNTY OF KERN; KERN COUNTY BOARD OF SUPERVISORS,

Defendants.

No. CV 06-5094 GAF (VBKx)

DECLARATION OF PROFESSOR IAN L. PEPPER, PH.D., IN SUPPORT OF PLAINTIFFS' MOTION FOR A PRELIMINARY INJUNCTION

Date: October 16, 2006
Time: 9:30 a.m.
Place: 255 East Temple St., Los Angeles, CA 90012 Room 740
Judge: Hon. Gary A. Feess

Declaration of Professor Ian Pepper, Ph.D.

I, Ian Pepper, declare as follows:

1. The following facts and opinions are true to my own personal knowledge and if called as a witness I could so testify.

2. I am a tenured professor in the Department of Soil, Water and Environmental Science of the College of Agriculture and Life Sciences of the University of Arizona in Tucson, Arizona. I am also Director of the Environmental Research Laboratory of the University of Arizona, where I maintain my office and laboratory, and I am Director of the University of Arizona National Science Foundation Water Quality Center, the only such Center of its kind in the United States. I have taught and researched at the University of Arizona since 1977 and have been a full professor since 1988. I received a Ph.D. in soil microbiology from Ohio State University in 1975. I have researched and published widely in the fields of environmental science, microbiology, and land application of biosolids, including six books, approximately 50 book chapters and 121 peer reviewed articles. I have also undertaken numerous speaking engagements on land application at national and international scientific and professional conferences. My current Curriculum Vitae is attached to this Declaration.

3. I have been asked to provide my scientific opinions regarding the environmental and public health impacts of allowing Green Acres Farm to continue to operate while this case is heard. I understand that this Declaration will be used in support of a motion for a preliminary injunction in which the City of Los Angeles will ask that the Kern County Ban on land application be stayed to allow Green Acres Farm to continue to land apply biosolids while this case is considered. I have declined compensation for my work on this matter and am providing my time and expertise because of my interest in disseminating accurate scientific information regarding land application of biosolids. Similarly, from 2000-2002 I served by invitation and without compensation on a Committee of the National Academy of Sciences that studied land application at the request of the United States Environmental Protection Agency, resulting in the 2002 publication of *Biosolids Applied to Land: Advancing Standards and Practices.*

4. For the past twenty years, much of my work has focused on the environmental and public health impacts of land application of biosolids. This research interest coincides with the expansion of the

practice in the United States, and in particular the development of the Part 503 regulations by the Environmental Protection Agency that govern land application. I have conducted many research studies on biosolids and land application, with an emphasis on collecting data in the field from active land application sites. Much of this research has been at land application sites with arid and semi-arid climates and environments, similar to Kern County, California.

5. My work has evaluated both the benefits and potential hazards of land application of biosolids. As discussed below, the benefits of land application include recycling primary and secondary plant nutrients, improving soil quality, and providing a safe and sustainable outlet for large quantities of solid residuals from wastewater treatment plants. Potential hazards studied have included the fate of trace amounts of certain chemicals potentially found in biosolids, including organics, inorganics, and metals. I also have studied the fate of biological components of biosolids, including human pathogenic (disease-causing) microorganisms, which can include certain bacteria and viruses. In particular, these studies have looked at routes of exposure of chemical and biological contaminants via air, soil, and water, to off-site communities. To date these studies have resulted in 50 peer review publications on biosolids and land application. I have also assisted with the design and funding of other projects involving land application, which are conducted by other University of Arizona faculty. As an example, a project is currently underway evaluating the fate of pharmaceuticals including endocrine disruptors such as polybrominated diphenyl ethers (PBDEs), otherwise known as fire retardants.

6. In addition to my research, experience, and knowledge of the literature on biosolids, in preparation of this Declaration I have reviewed and relied on data and literature specific to Green Acres Farm and Kern County, California. This review included both summary reports and individual data. Green Acres Farm and the Los Angeles Bureau of Sanitation that generates the biosolids used at Green Acres have generated an unusually large amount of data regarding the quality and uses of biosolids, more than is required by applicable EPA, California and Kern County regulations. Documents that I have received include:

a) The Land Application of Biosolids Reports
b) Summary Field Reports
c) Cumulative Pollutant Summaries
d) Achieving Exceptional Quality Biosolids, prepared by City of Los Angeles, Department of Public Works, Bureau of Engineering and Bureau of Sanitation, re: Hyperion Treatment Plant and Terminal Island Treatment Plant

e) Biosolids Program Table of Sampling and Testing Requirements Overview under Federal Part 503 EPA Regulations and local Kern County requirements
f) 2001-2005 Annual Reports for Green Acres, prepared by RBM
g) Annual (December) Report for Assessment of Biosolids for Hyperion and Terminal Island Treatment Plants for 2001-2005
h) Monthly Progress Report: Biosolids Program Management, prepared by City of Los Angeles (March 2006). Application of Biosolids Site Maintenance and Management Plan, Revised April 2006, prepared by RBM
i) 1996 NAS Report: *Use of Reclaimed Water and Sludge in Food Crop Production*
j) 2002 NAS Report: *Biosolids Applied to Land Advancing Standards and Practices*

These reports provide extensive data on the metal and pathogen content within the biosolids to be land applied.

7. I also visited Green Acres Farm on August 24, 2006, where I observed the land application operations including the trucking, unloading, spreading and incorporation of biosolids. I traveled throughout the Farm and viewed fields in various stages of crop production and observed the irrigation system. I interviewed individuals who work at Green Acres, including farmers, the land application contractor, and City of Los Angeles personnel who supervise operations and regulatory compliance. I was provided access to and reviewed work files, including work sheets for calculation of agronomic rates (the amount of biosolids that can be applied to a particular field).

8. My opinions on the operations and effects of land application of biosolids at Green Acres Farm in Kern County are summarized below:

a) Green Acres Farm workers efficiently and quickly land apply biosolids and incorporate them into the soil, which is important for reducing any risk of the spread of pathogens and for reducing odors. Tractor trailers loaded with biosolids from the City of Los Angeles enter from the highway directly to the fields and promptly begin land application.

b) Based on multiple factors, Green Acres Farm is in a good location for the land application of biosolids, which enhances its safety and value. These factors include distance from the nearest urban center, dry and hot climate, soil type, subsurface hydrology and depth to groundwater. There are no abutting residential dwellings that could be exposed to wind-blown contaminants from the farm.

c) Soils at Green Acres consist of the Cajon, Chino, Traver and Pond soil series. These soils are moderately to heavy-textured and are generally alkaline. While not ideal for maximizing crop production, the clay content and high pH of the soil help reduce mobilization and transport of trace metals and organic contaminants that may be introduced into the soil by biosolids. Nitrate transport would be limited to the depth of wetting provided by irrigation and the limited rainfall that occurs in this arid climate. In addition, a hard pan located two to four feet beneath the soil surface occurs beneath much of the site which would further impede leaching of nitrate or other contaminants that might become mobile. Finally, the depth to groundwater is great, more than 70-100 feet below the ground surface. Therefore, risks to the community from groundwater contamination will be minimal.

d) The nature of the biosolids applied at Green Acres -- Class A "Exceptional Quality (EQ)" under EPA Part 503 standards -- ensures that metal concentrations are low and pathogens are non-detectable. The data collected by City of Los Angeles demonstrate that metal concentrations in the biosolids are well below EPA EQ standards, and data on cumulative metal build-up in the soils at Green Acres are well within Part 503 limits and show a high level of safety. Title 22 organics such as PCB arochlors and dioxin, are also monitored quarterly to ensure low concentrations in biosolids. The Class A, EQ biosolids also ensure that risks to local communities from aerosolized pathogens (bacteria or viruses that become airborne) are negligible. My extensive work on bioaerosols at many land application sites has demonstrated a low potential for aerosolization of pathogens, even at sites that use Class B biosolids that contain measurable amounts of pathogens.

9. Based on the above data and observations, and my experience with hundreds of land application sites, including many similar to Green Acres, I conclude that if land application of Class A EQ biosolids at Green Acres Farm continues during the period of an injunction, there is negligible risk to human health or the environment. In fact, the use of biosolids over the last 12 years at Green Acres has plainly improved the soil quality, and the farm is producing good crops.

10. My conclusion that Green Acres Farm is a safe and sustainable land application site is consistent with both my prior work and the considerable scientific literature on biosolids over the last few decades. Much of this literature was surveyed, analyzed, and discussed in two Committees of the National Academy of Sciences that produced reports in 1996 and 2002. I served on the 2002 Committee and am familiar with its work and report, *Biosolids Applied to Land: Advancing Standards and Practices*. The task of this committee was to re-evaluate the scientific basis of the Part 503 rule specifically with respect to human health protection. The first "overarching finding" of the Committee was that "there is no evidence that the Part 503 rule has failed to protect public health." However the committee also stated that "additional work is needed," and identified many areas to improve the data and understanding of biosolids and their constituents. I have been engaged in researching many of the identified areas since 2002. We also concluded that there was no basis on which to suspend, terminate, or modify current land application practices and that allegations of environmental damage and personal injury from biosolids were unproven. Our conclusions were recently confirmed by the State of California in its 2004 Environmental Impact Report, *Final Statewide Program Environmental Impact Report Covering General Waste Discharge Requirements for Biosolids Land Application*, and the resulting 2004 California General Order, both endorsing the continued use of biosolids as a soil amendment in California. The General Order provides a single regulatory framework for the land

application of biosolids in California and streamlines the permitting process that each RWQCB uses for biosolids application projects. Notably for this case, the EIR finds the "potential for increased incidence of chronic human disease resulting from ingestion of biosolids-derived metals in crops grown on land application sites or animals fed with crops grown on land application sites" was "less than significant," thus requiring no mitigation. I agree with these assessments.

11. During my career the presence of excess metals and pathogens in biosolids have been examined as legitimate agents of concern. But, in Class A EQ biosolids, metals and pathogens do not pose a risk, due to absence or very low concentrations. In regard to metals, EPA performed a comprehensive risk assessment as part of the development of the Part 503 regulations that examined 14 different pathways for exposure to metals from a land application site (including shallow groundwater and crop consumption). In regard to pathogens, EPA assessed and approved specific technologies for treatment of sewage sludge to produce biosolids with quantifiable reductions in pathogen loads. These pathogen reduction techniques have been validated with regard to their risk reduction by the subsequent work at land application sites discussed above.

12. Occasionally, allegations have been made or hypotheses offered that certain chemical and biological contaminants might exist in biosolids and pose a significant hazard to human health or the environment. Data collected in the many studies in which I have participated and other published data do not support these allegations. Examples are illustrated below.

a. Hypothesis: The "Time Bomb Theory" propagated the idea that metals from land application accumulate in soils, and following biodegradation of soil organic matter, result in a flood of bioavailable toxic metals.
   Fact: Metals become sorbed to soil colloids and in fact become less bioavailable with time. *See,* Rufus Chaney, *Trace Metal Movement: Soil-Plant Systems and Bioavailability of Biosolids-Applied Metals* in *Sewage Sludge: Land Utilization and the Environment* (1994).

b. Hypothesis: *Staphylococcus aureus* is an active biological agent in biosolids that results in community infections following land application.
   Fact: *S. aureus* does not survive wastewater treatment and is not found in biosolids (Rusin et al., 2003. *Env. Sci. Technol.* **37**:4027–4030).

c. Hypothesis: Aerosolized human pathogens are transported off-site and infect residents in local communities.
   Fact: Sorption of pathogens within biosolids and inactivation of aerosolized pathogens causes the risk to residents to be negligible. (Brooks et al., 2005. *J. Appl. Microbiol.* **98**:397–405).

d. Hypothesis: Aerosolized endotoxin from land application of biosolids poses a risk to human health.

Fact: The majority of endotoxin aerosolized during land application is due to soil borne organisms. Tractor operations with or without biosolids causes aerosolization of endotoxin (Brooks et al., 2006. *Can. J. Microbiol.* **52**:150–156).

e. Hypothesis: Neighbors of land application sites have suffered injuries, illness or even death caused by the biosolids.

Fact: Our NAS Committee reviewed several of these allegations and found no data or corroborated evidence linking injuries to proximity to land application sites, and no plausible hypothesis has been published that supports the necessary elements of scientific causation. EPA also reviewed many of these allegations and came to the same conclusion as the NAS Committee.

13. Farms that use biosolids as a fertilizer and soil conditioner can sometimes be unpopular in their communities due to the public's lack of accurate information regarding biosolids and superficial speculation regarding sewage sludge. The work of thousands of scientists, wastewater treatment engineers, and other professionals in biosolids and agriculture, however, have established rigorous standards for land application that ensure safety.

14. My observations at Green Acres Farm and my review of the literature demonstrate that land application at this site poses negligible risk to the neighboring communities. Moreover, land application at Green Acres is likely to be sustainable and actually improve soil due to enhanced total soil organic carbon concentrations, which result in superior soil physical properties, including soil structure and enhanced populations of beneficial soil microorganisms. Such benefits from long-term land application of biosolids have been observed in our twenty year old land application plots at the University of Arizona. Therefore, in summary, I find the Green Acres land application operation to be a sustainable ecosystem that actually benefits the Kern County environment.

I declare under penalty of perjury pursuant to the laws of the State of California that the foregoing facts are true and correct, and if called upon to do so, I could and would testify thereto.

Executed this 8TH day of September, 2006. in Tucson, Arizona.

Ian L. Pepper

Ian L. Pepper

EXHIBIT A

CURRICULUM VITA OF

Ian L. Pepper, Director
Environmental Research Laboratory
The University of Arizona
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Email: ipepper@ag.arizona.edu
Ph: (520) 626–3328

DATE OF BIRTH October 5, 1946

PLACE OF BIRTH Tonypandy, Wales, United Kingdom

EDUCATION

1975 Ph.D. in Soil Microbiology, The Ohio State University, USA
1972 M.S. in Soil Biochemistry, The Ohio State University, USA
1970 B.Sc. in Chemistry, University of Birmingham, Great Britain

MAJOR RESEARCH INTERESTS

Environmental microbiologist specializing in the molecular ecology of the environment.

- Water quality
- Fate and transport of microbial pathogens in soil, air, and water
- Land application of biosolids

PROFESSIONAL EXPERIENCE

1999–Present	Director, National Science Foundation Water Quality Center, The University of Arizona.
2001–Present	Director, Environmental Research Laboratory, The University of Arizona
1993–1998	Chair, Undergraduate Program in Environmental Science, Department of Soil, Water and Environmental Science, The University of Arizona.
1993–Present	Investigator, Center for Toxicology, The University of Arizona.
1988–Present	Professor and Research Scientist, Departments of Soil, Water and Environmental Science, and Microbiology and Immunology, The University of Arizona.
1981–1988	Associate Professor and Associate Research Scientist, Departments of Soil and Water Science, and Microbiology, The University of Arizona.
1977–1981	Assistant Professor and Assistant Research Scientist, Department of Soil, Water and Engineering, The University of Arizona.
1975–1976	Post-Doctoral Research Associate, Washington State University.
1973–1975	Teaching Associate, The Ohio State University.
1971–1975	Research Associate, The Ohio State University.

HONORS AND AWARDS—NATIONAL AND INTERNATIONAL

2005	Awarded EPA/Department of Homeland Security Center for Advancement of Microbial Risk Assessment (CAMRA) (Co-investigator)
2004–2009	Awarded National Science Foundation Center on Water Quality *(renewal)*
2004–2005	Invited member National Academy of Science Committee: Research Priorities for Earth Science and Public Health
2001–2007	Invited member Committee on Environmental Microbiology 'American Society for Microbiology'
2004–2006	Invited member National Academy of Science Committee: U.S. National Committee for Soil Science (USNC/SS) (Second Term)
2001–2003	Invited member National Academy of Science Committee: U.S. National Committee for Soil Science (USNC/SS) (First Term)
2001–2002	Invited member National Academy of Science Committee: National Research Council Committee on Toxicants and Pathogens in Biosolids
2001	Invited member National Science Foundation United States/Egypt Workshop on Microbial Ecology
2000	Member Environmental Protection Agency, FIFRA Science and Advisory Panel
2000	Invited member of National Aeronautics and Space Administration (NASA) Committee on Development of Handling Protocols for Environmental Samples from Mars
1999–2004	Awarded National Science Foundation Center on Water Quality
1994	Fellow, Soil Science Society of America
1994	Fellow, American Society of Agronomy
1994	Chair, Soil Biology and Biochemistry Division of Soil Science Society of America
1992	Fellow, American Academy of Microbiology
1983	CIBA-GEIGY Award—a National award for excellence in research and teaching
1980	Invited member of National CAST Task Force on "Plant Uptake of Sludge Applied Zn and Cd"

HONORS AND AWARDS—STATE AND UNIVERSITY

1997–2001	Member Faculty Senate, The University of Arizona
1994	Researcher of the Year, College of Agriculture, The University of Arizona
1992	Outstanding Research Team Award, College of Agriculture, The University of Arizona
1986–1992	Invited member of the Arizona State Advisory Committee for Best Management Practices
1979	Gamma Sigma Delta Junior Faculty Award. An award for excellence in agricultural science

FUNDED GRANTS

Total Funds Awarded = $10,383,566

2005	1,200,00	EPA/Department of Homeland Security Center for Advancement of Microbial Risk Assessment (CAMRA) (Co-Investigator)
2005	462,991	National Science Foundation Water Quality Center Private Sector Funds
2004	602,742	National Science Foundation Water Quality Center Private Sector Funds
2004	20,000	Research Experience for Teachers, National Science Foundation. Principal Investigator
2004	150,000	Regulatory Networks of Halophiles Utilized for Remediation of Co-Contaminated Industrial Effluents. National Science Foundation Supplemental Funding, TIE Project with Questor, Queens University, Belfast Northern Ireland. Co-principal Investigator.