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February 1, 2013

Karen Geraghty, Administrative Director  
Maine Public Utilities Commission  
State House Station #18  
Augusta, Maine 04333-0018

RE: *Ed Friedman, et al v. Maine Public Utilities Commission, et al*  
PUC Docket No. 2011-00262

Dear Ms. Geraghty:

Complainants Ed Friedman *et al* hereby submit their direct testimony in this case, which is summarized below.

## **Expert Witness Testimony:**

Lennart Hardell, MD, PhD  
Orebro University Hospital  
Orebro, Sweden

Jerry L. Phillips, PhD  
University of Colorado -- Colorado Springs  
Colorado Springs, CO

Dariusz Leszczynski, PhD, DSc  
Visiting Professor, Swinburne University of Technology  
Melbourne, Australia

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De-Kun Li, MD, PhD, MPH  
Division of Research  
Kaiser Foundation Research Institute  
Oakland, CA

Girish Kumar, PhD  
Professor, Department of Electrical Engineering  
IIT Bombay, India

David O. Carpenter, M.D.  
Institute for Health and the Environment  
University at Albany  
Rensselaer, NY

Lloyd Morgan, BS Electrical Engineering  
Senior Research Fellow, Environmental Health Trust  
Berkeley, CA

William J. Rea, MD  
Environmental Health Center  
Dallas, TX 75231

Richard H. Conrad, PhD  
Waianae, HI

Dr. Hardell is an oncologist and a preeminent research scientist specializing in the study of cancer risks associated with radio frequency radiation from cell phones. He has authored over 300 peer-reviewed scientific papers and served on the 2011 IARC expert committee on the evaluation of the carcinogenic effect of RF-EMF on humans. Dr. Hardell testifies about the current state of epidemiology relating to cancer risks associated with low-level RF-EMF exposure and non-thermal effects. He also testifies about other scientific studies establishing the existence of non-thermal biological effects, including increased serum concentrations of TTR, concentrations of BTP in the blood, DNA damage, increased generation of reactive oxygen species oxidation, and leakage of the blood-brain barrier. He provides testimony about how these biological effects can occur at very low RF-EMF exposure limits, and about plausible mechanisms explaining the biological effects. Dr. Hardell concludes that the scientific evidence shows risks of adverse health effects from low-level RF-EMF exposure, including in the range of 2.4 GHz, and that there is sufficient evidence to warrant actions that would prevent or avoid such exposure.

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Dr. Phillips is a preeminent research scientist serving as the Director of the Center for Excellence in Science, who has studied the biological effects of low-level RF-EMF since 1983, and is the author of over 50 peer-reviewed scientific studies. Dr. Phillips testifies about the peer-reviewed scientific studies showing biological effects of low-level RF-EMF and about some of the mechanisms by which these effects occur. Dr. Phillips also testifies about the improper application of the “weight of the evidence” analysis used by CMP’s experts (Exponent) to support their opinions, which disregard the many studies reporting positive results for biological effects of low-level RF-EMF exposures. He testifies that the science cannot support Exponent’s conclusions about RF-EMF safety.

Dr. Leszczynski is a leading research scientist who has worked in the field of biological and health effects of cell phone radiation for the past 15 years, and has authored over 90 peer-reviewed scientific studies. Dr. Leszczynski served with Dr. Hardell as a member of the 2011 IARC expert committee on the carcinogenicity of cell phone radiation. His research group has conducted experiments in the laboratory and experiments on human volunteers and has developed highly specialized screening techniques for transcriptomic and proteomic analyses showing cell phone radiation effects on gene expression and on the expression and activities of proteins. Dr. Leszczynski also provides a critique of the “weight of the evidence” process relied upon by Exponent and testifies about flaws in some of the agency reviews (AGNIR) cited by Exponent. Dr. Leszczynski concludes that existing safety guidelines for RF-EMF exposure are not reliable, that there is sufficient evidence of health risks to warrant actions to prevent or avoid exposure to low-level RF-EMF and that utility companies should have the burden of resolving any uncertainty in the science on the question of safety.

Dr. De Kun-Li is a leading research scientist in reproductive and prenatal epidemiology. He has authored over 60 peer-reviewed scientific papers, including five papers specifically on the health effects of exposure to magnetic fields. He testifies about some of the limitations of the science relied upon by Exponent and emphasizes the need to protect people, particularly vulnerable individuals, from RF emitting devices such as smart meters.

Dr. Kumar is a professor of electrical engineering who has published more than 200 scientific papers in peer-reviewed scientific journals. He testifies about the state of the science relating to adverse health effects associated with exposure to RF-EMF, including exposures as low as  $0.01 \mu\text{W}/\text{cm}^2$  power density. Dr. Kumar testifies that the state of the science supports the conclusion that exposures to RF-EMF at low intensities can adversely affect biological systems, including the human body.

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Dr. Carpenter is a professor of environmental health sciences, Director of the Institute for Health and the Environment at the University at Albany, and a public health expert specializing in health risks associated with RF-EMF exposure. He is an editor of the *Bioinitiative Report*, 2007 and 2012 update, which provides a comprehensive assessment of the science on the subject. In his testimony, he provides an overview of the scientific literature on the subject of exposures to low-level RF-EMF, including epidemiological and laboratory studies (*inter vivo* and *in vivo*). He too provides a critique of Exponent's reliance on the "weight of the evidence" process, which disregards the strength of the evidence found in hundreds of peer-reviewed studies demonstrating biological effects caused by exposure to low-level RF-EMF. Dr. Carpenter also provides a table listing many experimental studies reporting biological effects at very low power density exposures, including exposures below the intensity levels associated with smart meters. He testifies that he and many other public health experts are of the opinion that exposure to low-level RF-EMF, including in the range of 2.4 GHz, poses a potentially serious threat to the public health, and that the existing FCC safety guidelines cannot be relied on to protect the public health.

Mr. Morgan is an electrical engineer who has extensively studied the health risks associated with low-level RF-EMF exposure and has authored peer-reviewed journal articles on the subject, including meta-analyses of epidemiological studies on cell phone cancer risks. He provides an extensive critique of the agencies and organizations relied upon by Exponent and the conflicts of interest of some of the scientists sitting on the review committees of these agencies and organizations. He also provides a critique of the industry bias of the Exponent witnesses and their disregard of scientific evidence demonstrating the adverse biological effects of low-level RF-EMF radiation. Mr. Morgan appends a number of exhibits to his testimony with statements and recommendations issued by some of the most qualified experts in the field, and by highly knowledgeable public policy experts and physicians, calling for action to avoid and reduce exposure to low-level RF-EMF radiation, which would include devices like smart meters. Based on his electrical engineering expertise, Mr. Morgan also provides a critique of the Exponent report "Measurement Validation of Exposure Predictions." He testifies about Exponent's selection and use of measuring equipment and its design of the study, concluding that the study appears to have been designed to *not* detect any smart meter transmissions. Mr. Morgan also testifies about the importance of measuring peak power density and about the critical significance of the digital modulation of smart meter transmissions.

Dr. Rea is an award winning physician and research scientist, who has authored more than 150 peer-reviewed research papers, including a seminal study in 1991 designed to establish an effective method for evaluating electromagnetic field sensitivity. Since then, Dr. Rea has studied and treated thousands of patients using the procedures

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established in his 1991 study. Dr. Rea testifies about the patients he has treated for EHS symptoms related to smart meters, and offers his opinion that there is a scientific basis for concluding that smart meters can trigger EHS symptoms in people, particularly people with immune irregularities.

Richard Conrad has a PhD in biochemistry and has made an extensive study of electrical sensitivity or EHS associated with exposure to low-level radiofrequency radiation. Mr. Conrad has interviewed and worked with hundreds of people who suffer from EHS over the past 10 years and has conducted a well-designed survey of people with EHS symptoms associated with smart meters. He provides a summary report of the findings of his Smart Meter Health Effects Survey and provides compelling testimony about EHS symptoms associated with smart meter exposure. His testimony provides objective evidence demonstrating that EHS symptoms, including those associated with smart meters, are very real.

#### **Lay Witness Testimony.**

Also included in this submission are lay witness testimonies. Most of these witnesses provide testimony about their EHS symptoms, some very severe and debilitating, experienced as a result of exposure to smart meter transmissions. Others testify that they are concerned about health risks, because they have health conditions that make them particularly vulnerable to RF-EMF exposure. Others, like Jeffrey Edelstein, testify to their concern about the public health risks and public policy considerations of the CMP's smart meter deployment. The names of most other lay witnesses are not mentioned in this letter because their testimonies are submitted in redacted form as confidential documents in accordance with the Commission's Temporary Protective Order No. 4.

In addition, there are three lay witnesses, whose testimonies include attached exhibits with declarations collected from many individuals suffering from EHS related to their exposure to smart meter transmissions. Joshua Hart, Director of Stop Smart Meters!, testifies that he has been collecting complaints about smart meters, including their RF health effects, since October, 2011. Attached to Mr. Hart's testimony are 23 personal declarations of individuals who have suffered EHS symptoms associated with smart meters. Sandi Maurer, Director of the EMF Safety Network, testifies that she has compiled hundreds of smart meter health complaints on the Network website and taken declarations from individuals reporting their adverse health experiences related to smart meters. Ms. Maurer also testifies about a survey conducted by the Network to investigate the health and safety complaints related to smart meters. She attaches to her testimony a copy of the September 13, 2011, professional report with the summary results of the survey. Ms. Maurer also attaches to her testimony a copy of the official transcript from

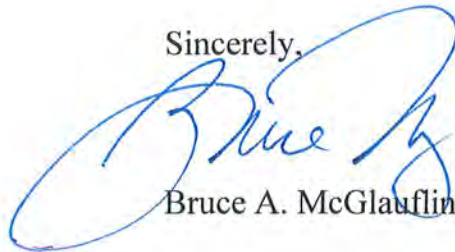
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public hearings held in Santa Rosa, CA, containing personal declarations of people testifying about adverse health impacts associated with smart meters. And finally, are copies of individual surveys of EHS sufferers attached to the expert testimony of Richard Conrad. These are people who responded to his Smart Meter Health Effects Survey and wanted to have their survey responses submitted in this proceeding.

Collectively, the lay witness testimonies and the declarations attached to the testimonies of J. Hart, S. Maurer, and R. Conrad, provide compelling evidence of the direct adverse health effects related to the radio frequency radiation transmitted by smart meters. When this direct evidence of real-life human consequences is evaluated together with the expert testimony of some of the most highly qualified scientists and public-policy specialists, there is but one conclusion to reach – smart meters pose a significant health risk. This is particularly true for people who have EHS, people with compromised immune systems, children and the elderly. CMP has failed to provide any reliable scientific evidence to prove that such health risks do not exist. CMP relies on the opinions of two industry-funded Exponent scientists, who have no direct experience studying the health effects of RF radiation. Their opinions, stated in the negative, contend that the good science relied upon by Complainants' experts does not conclusively prove the health risks. This misses the mark and will ultimately be insufficient to meet CMP's burden of proof in this case.

Thank you for your assistance.

Sincerely,



Bruce A. McGlaulin

BMcG/d