SUPREME JUDICIAL COURT
SITTING AS THE LAW COURT

Law Docket No. PUC-15-20

ED FRIEDMAN, et al,

Appellants

v.

MAINE PUBLIC UTILITIES COMMISSION

Appellee

ON APPEAL FROM THE MAINE PUBLIC UTILITIES COMMISSION

BRIEF OF APPELLANTS

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I. STATEMENT OF FACTS AND PROCEDURAL HISTORY.

This appeal is taken from the Maine Public Utilities Commission's (the "Commission") Order dated December 19, 2014, in Docket No. 2011-00262 (the "Decision"). The Decision terminated the Commission's investigation into the safety of Central Maine Power Company's ("CMP") smart meter system, which was commenced on remand from the Law Court in *Friedman v. PUC*, 2012 ME 90, 48 A.3d 794 (*"Friedman I")*. The Decision comprises two sharply divergent opinions written by Commissioners Littell and Vannoy followed by a brief Order joined by both Commissioners. The Order states that the smart meter system is safe but this conclusion is directly contradicted by many of the findings and conclusions made by Commissioner Littell in his opinion.

The Commission proceeding was commenced on July 29, 2011, when Ed Friedman and other Complainants filed a Ten-Person Complaint, alleging that CMP's smart meter system was a threat to health and safety and violated privacy, property rights and constitutional rights of CMP customers. On August 31, 2011, the Commission dismissed the Ten-Person Complaint stating that all of the issues raised in it were resolved in a previous proceeding referred to as the "Opt-Out Investigation." On appeal, the Law Court concluded the Commission failed to determine whether the system was safe, vacated the dismissal, and remanded the matter for a determination of whether the smart

meter system posed a "credible threat to the health and safety of CMP customers." *Id.*, 2012 ME at P. 10, 48 A2d at 798-800.

CMP's smart meter system is referred to as an advanced metering infrastructure ("AMI") system. It includes radio-frequency ("RF") transmitting smart meters installed on or in houses and commercial buildings throughout CMP's service territory. The meters use 2.4 GHz RF radiation to transmit electric usage information to CMP's headquarters, referred to as the head-end component of the system. Appendix ("A.") 79. The peak power level (1W)[1] is the same as cell phones (Record ("R.") 85, pp. 31-32), and the frequency (2.4 GHz) is the same as that used for WiFi and microwave ovens. *Id.* p. 29.

The meters transmit within a "mesh network" of RF transmitting devices communicating with each other and with other devices called "repeaters" within a Neighborhood Area Network ("NAN"), but also within a Wide Area Network ("WAN") of "collectors," "extenders" and "gateway devices" that forward information to CMP's Head End System. The WAN devices transmit at 5.8GHz with EIRP power levels of 4 to 63 Watts. A. 79.

Each smart meter transmission is a brief burst that lasts 4.26 milliseconds. A. 80. The RF radiation within the mesh network travels unimpeded through most buildings, and permeates the public spaces within CMP's 11,000 square

[1] Power levels are also expressed as equivalent isotropically radiated power (EIRP). EIRP for smart meters range between 1.6 - 2.5 watts. R. 663, p. 16

mile territory. The mesh of RF radiation extends into the private spaces of individual residences -- every yard, driveway, play area, living room and bedroom located within proximity of a smart meter or other AMI device is intermittently permeated with RF radiation.

As the system is currently configured, CMP reports that each meter transmits RF radiation at least 34 times per day (once every hour plus ten transmissions during the "active period"). R. 86, p. 5. However, most meters also serve as relay stations within the mesh network, receiving and forwarding additional RF transmissions from other meters in the vicinity. The meters that forward transmissions to other meters are called "descendants" of those other receiving meters. *Id.*, p. 4. Under the current configuration, a meter can have as many as 4,998 descendants. *Id.*, p. 11. Because a smart meter relays at least 34 additional RF transmissions per day for each descendant, a meter with the maximum number of descendants will transmit at least 170,000 times per day. This number is a minimum because it does not include "maintenance command" transmissions or retry transmissions, which occur whenever the transmission traffic is heavy. *Id.*, p. 5.[2]

Before this proceeding commenced, CMP had received many customer complaints, citing concerns about health and safety, as well as privacy, security,

[2] There is no evidence in the record about the frequency of maintenance commands and there is no limit to the number of retries. *D.R. D.W.* 01-23, R. 125, p. 53. *See* footnote 3 re: data responses not on list of Record items.

and property rights, which can also implicate safety concerns. *Data Response*[3] ("D.R.") *Fr. 01-01; D.R.Stone 01-02.* The health complaints included severe electro-hypersensitivity ("EHS") symptoms, and concerns about heightened vulnerability to RF radiation due to existing health conditions, *e.g.* immune deficiencies, heart conditions, pacemakers and other medical implants, and brain tumors. *See e.g,* D.R. Fr. 01-01, Att. 1, p. 2, 5, 8-9, 12, 13, 16-17, 19; Att. 2, p. 10.

EHS is a well-established, but controversial phenomenon involving a variety of physiological symptoms experienced in response to electromagnetic field ("EMF") exposure. Some of the major symptoms include headache, fatigue, tinnitus, disruption of sleep, mental dullness and a general feeling of ill health. R. 200, Carpenter Part 1, p. 13. Other symptoms include heart palpitations or arrhythmia, and burning skin. R. 200, Conrad, p. 6. While the etiology of the symptoms has not been scientifically established, there is consensus that EHS sufferers can experience severe, sometimes disabling and debilitating conditions. *Id*., p. 4 & 10. The prevalence of EHS in the population is steadily increasing over time. R. 200, Conrad, p. 13 and Ex. E, Table 1, Fig. 1. The Austrian Medical Association has issued guidelines for diagnosing and treating EHS, which the association refers to as "EMF Syndrome." R. 198,

[3] Many of CMP's data responses were not included on the list of record items provided to the Law Court by the Commission. They may be found in the Commission's online case file, under "Data Requests." All data responses referenced in this Brief were admitted into evidence. *See* R. 607.

Morgan, Ex. O. In Sweden, EHS is recognized as a handicap. The Austrian guidelines, which were issued in March of 2012, summarize some of the scientific research related to EHS or EMF Syndrome and provide detailed procedures for diagnosing and treating EMF Syndrome, as well as preventing or reducing EMF exposure. *Id.*

CMP made no effort to keep track of safety and health complaints. D.R. Fr. 01-04. It developed no policies related to the health and safety effects of smart meters. D.R. Stone 01-09. CMP's only effort to ensure safety was to confirm the smart meters and AMI equipment had been laboratory tested in accordance with requirements of the Federal Communications Commission ("FCC"). D.R. Fr. 01-09. In contrast to complaints about interference with human health, CMP promptly responded to complaints about interference with mechanical RF devices, tracking complaints about interference with computers and other electronic equipment. R. 150, p. 42. Even when there was no proof of causation, the interference with mechanical equipment was addressed. "[W]e did not do a root cause assessment to say what is the cause of interference here. We essentially just worked to mitigate -- to address whatever the customer's issue might be." *Id.*, p. 43. Indeed, one method of mitigation was to provide an analog meter with no RF antenna. *Id.*, p. 42. In response to interference with

the health of human bodies, which are living RF devices, CMP relied on the lack of scientific consensus about proof of causation to justify taking no action.

RF radiation can have both thermal and non-thermal biological effects. R. 201, Leszczynski, pp. 9-10. Generally speaking, non-thermal effects occur at levels of exposure lower than the levels causing thermal effects. Because RF devices must be licensed by the Federal Communications Commission ("FCC"), smart meters are subject to the FCC guidelines for maximum exposure limits. The FCC guidelines, however, are based on the thermal effects only. R. 443, p. 3, R. 609, Ex. 12, pp. 52-53; R. 86, Ex. A, p. 24. Consequently, they are not designed to protect humans from non-thermal effects and are not protective against such effects. R. 200, Carpenter Part 1; R. 197, De Kun Li, p. 6; R. 201, Leszczynski, p. 10; R. 206, Hardell, p. 5; R. 198, Morgan, p. 17-18; R. 197, Kumar, p. 3. Because the FCC is not a safety agency, the Environmental Protection Agency ("EPA"), has played the "lead role in RF radiation health effects." *Cellular Phone Taskforce v. FCC*, 205 F.3d 82, 91 (2d Cir. 2000)(citing 42 U.S.C. §2021(h)). The EPA has explained that "the generalization by many that the [FCC] guidelines protect human beings from harm by any or all mechanisms is not justified." R. 329. Norman Hankin ltr. at p. 2. *See also*, R. 326, EPA Comments, p. 2.

There is disagreement in the scientific community about: 1) what adverse health effects are associated with non-thermal effects, and 2) at what levels of RF exposure such effects can occur. These two issues were the subject of much of the testimony in the Commission's proceeding. The other major issue was determining what levels of RF exposure are associated with smart meters and other components of CMP's smart meter system. Although the proceeding was described as a Commission investigation, the Commission took no affirmative action to investigate. It did not hire independent experts or conduct independent testing of the smart meters. It conducted an adversary proceeding relying on the unevenly matched parties to present competing evidence and experts. Appellants were able to present scientific studies through their expert witnesses. But, other intervenors who attempted to submit scientific evidence were frustrated by the Commission's rejection of hundreds of abstracts of highly relevant peer-reviewed scientific studies, showing adverse non-thermal effects of RF radiation. A. 261-288. The intervenors did not have the resources to purchase the copyrighted studies. The Commission could have admitted the abstracts as evidence and used its resources to obtain the actual studies, but it chose not to engage in such an *investigative* task.

CMP hired Exponent, Inc. ("Exponent"), which has been characterized as an industry defense firm or "product protection firm." R. 198, Morgan, p. 6-7.

Two employees of Exponent, Drs. Bailey and Shkolnikov, testified for CMP. Dr. Bailey is a neuropsychologist and Dr. Shkolnikov is an electrical engineer. Neither has performed original research about the biological effects of RF radiation. R. 150, p. 45. We estimate that Exponent received several hundred thousand dollars for its work on behalf of CMP in this case.[4] Commissioner Littell was very critical of Exponent's testimony on the science about the adverse health effects of RF radiation. In addition to testifying about the science of RF radiation, Dr. Shkolnikov performed field testing of a few CMP smart meters and produced a report about his testing. R. 86. The Decision notes the flawed nature of this report and Dr. Shkolnikov's field testing. A. 115, 133.

With very minimal resources, Appellants were able to present sworn testimony from nine scientists, each highly qualified to testify with respect to an aspect of RF radiation and its potential health effects. Drs. Phillips and Leszczinski have decades of experience performing original laboratory experiments testing the biological effects of low-level RF radiation. R. 198, Phillips, pp. 1-2; R. 201, Leszczynski, pp. 1-3. Dr. Hardell, as well as Dr. De-Kun Li and Lloyd Morgan, have decades of experience performing epidemiological studies on the subject. R. 206, Hardell, pp. 1-5; R. 197, De Kun Li, pp. 1-3; R. 198, Morgan, pp. 1-2. Dr. Carpenter has decades of experience

[4] As of 4/27/2013, less than half way through the investigation, Exponent had been paid $457,347.23, with over $225,000 for its written rebuttal testimony alone. *D.R. Fr.* 03-001.

working on and studying public policy issues related to EMF and health. R. 200, Carpenter, Pt. I, pp. 1-3. Dr. Kumar is an electrical engineer with decades of experience both developing microwave antennas and studying RF radiation and associated health threats. R. 197, Kumar, pp. 1-2. Dr. Rea has decades of experience treating patients with electro-hypersensitivity ("EHS"). R. 206, Rea, pp. 1-4. Collectively, these scientists have written many hundreds of peer-reviewed articles as well as books and book chapters on non-thermal effects of EMF and RF radiation.

CMP chose not to challenge any of Appellants' experts through cross-examination. Commissioner Littell noted the qualifications of Appellants' experts and found much of their testimony credible, in particular the qualifications and testimony of Drs. Hardell and Leszczynski. A. 106, 107. Drs. Hardell and Leszczynski, were members of a Working Group made up of thirty scientists from 14 countries appointed by the International Agency for Research on Cancer ("IARC") to assess the carcinogenicity of radiofrequency electromagnetic fields, including low-level RF radiation. *Id.* Based on their review of the science, the Working Group determined there is "limited evidence in humans" of carcinogenicity caused by RF-EMF and IARC classified RF-EMF as a possible carcinogen. Dr. Leszczynski explained that "limited evidence" means:

> A positive association has been observed between exposure to the agent and cancer for which a *causal interpretation* is considered by the working group to be *credible*, but chance, bias or confounding could not be ruled out with reasonable confidence.

A. 107; R. 201, Leszczynski, p. 7 (emphasis added).

Appellants also presented the sworn testimony of 65 lay witnesses describing adverse health conditions suffered after exposure to smart meter radiation as well as a reduction in symptoms after avoiding exposure. Many witnesses testified to medical diagnoses and care related to their symptoms. Many testified to their extreme sensitivity to radio frequency (RF) radiation due to electro hypersensitivity ("EHS") causing major disruptions in their daily lives related to smart meter and other RF exposures. Further direct accounts of adverse health effects were provided by 210 respondents to a survey conducted by Dr. Richard Conrad, who has worked extensively with EHS sufferers. *See* R. 210, *Conrad*, Ex. D, pp. 65-96. Dr. Conrad's study shows symptoms of moderate and severe intensity experienced by EHS sufferers following smart meter installation, often with no awareness the meters had been installed. R. 210, p. 61. CMP chose not to investigate any of the circumstances or claims to which these lay witnesses testified, and chose not to question any of them through cross-examination. Commissioner Littell found much of the lay witness testimony credible. A. 124. The Commission's summaries of their testimony is

appended to the Decision (A. 154), and summaries of testimony by some of the lay witnesses is appended to this Brief in Addendum A.

Human exposure to RF radiation is measured in the form of power density, expressed in milliwatts per square centimeter (mW/cm^2). Power density is calculated using an equation with multiple factors including the power of the transmitter and the distance between the exposed person and the transmitting device. A. 84. The power of CMP's smart meters is 1W. The power density, or exposure, at three feet is 0.031 mW/cm^2 A. 233. These are referred to as instantaneous "peak" exposures, as opposed to time "averaged" exposures.

The FCC guidelines are based on time averaged exposures from multiple transmissions over a 30-minute period. A. 15, 17. The FCC uses 30-minute averaging based on evidence of the human body's capacity to cope with thermal stimuli over time. R. 86, Ex. A, p. 24; R. 167, p. 49. This makes sense for guidelines designed to protect people from thermal effects. But, there is no evidence in the record suggesting that averaging of exposure is appropriate for assessing safety from adverse non-thermal effects. Dr. Hardell testified that studies tend to show *accumulating* adverse health effects over time, instead of a homeostatic response to non-thermal levels of RF radiation. R. 206, p. 26.

Nevertheless, Exponent's testimony focused on averaged exposures and the Decision is based on average exposures. There are three forms of evidence

in the record about averaged smart meter exposures: 1) using devices that detect and measure RF transmissions, and calculate the averaged exposure from transmissions detected; 2) using known power densities and predicted duty cycles to calculate averaged exposures; and 3) using known power densities and a maximum duty cycle to calculate averaged exposures. The duty cycle is the percentage of time a device is transmitting. The maximum duty cycle is the maximum percentage of time a device is capable of transmitting.

Attempts were made to detect and measure averaged exposures by Exponent and by an expert hired by the OPA. Both performed field testing on a few CMP smart meters. R. 86, Ex. B; R. 196. The testing was inconclusive for a number of reasons, but most significantly, there was no confirmation that the smart meters were transmitting during the test periods. A. 115; R. 196, p. 10; R. 440. Both Commissioners concluded these flawed test results were merely "informative" and only with respect to FCC compliance. A. 115, 133.

Exponent made multiple attempts to calculate exposures using a predicted duty cycle for "typical" CMP smart meters. In November 2010, Exponent submitted written testimony predicting a typical duty cycle of .05% of the time. R. 86, Ex. A, p. 28; R. 150, p. 142. It calculated an averaged exposure for this "typical" CMP meter of 0.000015 mW/cm^2. *Id.* Only a month earlier, on October 6, 2010, Exponent had reported to CMP that a typical CMP meter

would transmit 0.35% of the time. A. 229. In May of 2013, Exponent changed its prediction again, saying in its Rebuttal testimony that a "typical" duty cycle is 0.001% of the time. R. 477, p. 70. At 3 feet with this duty cycle, Exponent calculated averaged exposures from a "typical" CMP smart meter of 0.00000031 mW/cm^2. R. 477, p. 88. It appears that this is the exposure level, about which the Commissioners have rendered their opinion of safety.

The 0.001% duty cycle was derived by averaging the numbers of transmissions made by 1,100 CMP smart meters during a 13-day period. A. 193-194. The 1,100 meters were "surveyed" by Trilliant, CMP's smart meter contractor. A. 80, n. 15. In September, 2012, Exponent testified the survey was a "statistical sample of the records of the CMP network." R. 85. In November, 2012, they testified they assumed the sample was statistically representative of CMP's smart meters. A. 176-177. However, in December, 2012, CMP's engineers testified that the sample was not statistically representative of CMP's 600,000 smart meters. A. 227.

The third method of determining averaged exposures is the most reliable, and the only reliable method on this record, because it uses a known maximum duty cycle and a known power density. Indeed, for compliance with FCC guidelines, use of a device's maximum duty cycle is required. A. 173. And, Exponent testified that because the range between "minimum communication

time and longest communication time can be quite dramatic", exposures at the maximum duty cycle must be considered. A. 181-182. The maximum duty cycle of CMP's smart meters is 10%. *Id.* Exponent reported the averaged exposures from CMP smart meters using a 10% duty cycle are: 0.99 mW/cm^2 at two inches, 0.028 mW/cm^2 at one foot, and 0.00306 mW/cm^2 at three feet. A. 230. Six inches from the meter, the averaged exposure would be 0.1 mW/cm^2. A. 233; R. 156, Ex. 4, p. 8.

While a true worst case scenario would consider exposures from all sources of RF, there is no evidence in the record of total exposures levels from multiple RF sources, which would include banks of multiple meters, other CMP devices (collectors), WIFI, and multiple other RF devices. A. 120-121. Field testing under the FCC guidelines are intended to account for RF exposure from all nearby sources. R. 660(e), p. 49.

Appellants' experts testified that adverse non-thermal effects can occur at or below exposure levels associated with CMP meter peak exposures (0.0031 mw/cm^2 at three feet) and averaged 10% duty cycle exposures (0.032 at three feet). As early as 2000, a major scientific study performed by Ecolog-Institut for T-Mobile, reported adverse biological effects at 0.02 mw/cm^2, and that such effects could not be excluded at 0.01 mw/cm^2. R. 249, p. 37. Some of the effects they reported included genotoxicity, disruption of cellular processes,

disruption of cell transformation and cell proliferation, evidence of pathological effects on the immune system, the blood-brain barrier, neurotransmitters, cognitive functions, stress hormones, and carcinogenesis. *Id.* pp. 12-33. Ecolog recommended a safe exposure limit of 0.001 mW/cm^2. *Id.*, p. 37.

Many peer-reviewed scientific studies were referenced and discussed by Appellants experts and by other intervenors, all reporting adverse non-thermal effects at very low levels of exposure. *See* R.206, Hardell, pp. 16-20; R. 198, Phillips, pp. 3-9; R. 201, Leszczynski, pp. 2-13; R. 198, Morgan, pp. 17-22. *See also* charts identifying studies with exposure levels at A. 235, 236, 247. Exponent acknowledged there is evidence of such effects reported in the scientific literature, but relied on the "weight of the evidence" method of reviewing the "state of the science" to conclude these reported effects are not "established" or proven. A. 109-110; R. 150. Indeed the opinions of Exponent rely on weight of the evidence judgments made by others with little to no transparency about the weighing process employed. R. 477, p. 105-106; R. 198, p. 12-16.

CMP chose to not conduct any cross-examination of Appellants witnesses. Because the Commission requires all direct testimony be in writing, CMP's strategy had the effect of preventing any opportunity for Appellants' witnesses to appear before the Commissioners, unless the Commission itself

chose to question them. The Commission chose to question one of Appellants' witnesses, Dr. Lennart Hardell, a renowned epidemiological expert. Commissioner Littell noted that Dr. Hardell's expertise was recognized by the international scientific community and found his testimony credible. A. 106.

Post-Hearing Briefs were filed on December 13, 2013, and Reply Briefs were filed on January 24, 2014. Two months later, the Examiners issued their Report. Exceptions to the Examiners' Report were filed on April 11, 2014. Deliberations were held over five months later on September 23, 2014. At the deliberations, Commissioner Littell read from a lengthy opinion concluding that CMP customers should be able to opt-out without a fee based on medical practitioner recommendations. Commissioner Vannoy disagreed, concluding the smart meter system was safe without a medical opt-out. The disagreement was unresolved at the deliberation session and no vote was taken on a joint conclusion or a Commission decision.

Three months later, on December 19, 2014, the Commission issued its Decision containing the two Commissioners' differing opinions, virtually identical to the opinions they put on the record at deliberations. Commissioner Littell concluded that many CMP customers have a reasonable concern that smart meters cause their asserted health effects and that it is an unreasonable utility practice for CMP to not provide a medical opt-out "where a treating

medical professional makes treatment recommendations." A. 126. On the ultimate question of safety, Commissioner Littell concluded that "*provided accommodations are made for those with medical treatment recommendations*," CMP . . . "established the *relative safety* of the AMI meters operating *under typical parameters* and that the meters do not constitute a credible threat to the health and safety of CMP's customers." A. 118 (italics added).

Notwithstanding his specific findings to the contrary, Commissioner Littell joined Commissioner Vannoy in a one-page order, stating: "we conclude that CMP's installation and operation of its smart meter system poses no credible threat of harm . . . and is therefore safe on this record . . ." A. 148. Both Commissioners appear to have based their findings and conclusions on Exponent's prediction of averaged RF exposure levels associated with smart meters that are "typical" of the unrepresentative sample surveyed by Trilliant. Appellants filed a timely appeal from the Decision.

II. STATEMENT OF ISSUES PRESENTED

1. Whether the Decision fails to ensure safety (35-A M.R.S. §101) – by relaxing this Court's legal standard to allow some credible threat; by injecting a reasonableness factor; by requiring a threat of immediate or imminent risk of harm when the risk is comparable to common risks; and/or by shifting the burden of proof to Appellants.

2. Whether the Decision fails to ensure safety (35-A M.R.S. §101) by limiting its assurance of safety to only those CMP customers with "typical" smart meters and by failing to account for the cumulative and additive effects of RF radiation.

3. Whether the Decision's reliance on RF exposures averaged over time and its reliance on data from an unrepresentative sample of 1,100 of CMP's 600,000 smart meters to calculate RF exposure levels associated with typical CMP's smart meters is supported by sufficient evidence in the record.

4. Whether Commissioner Littell's joinder in the Decision is an abuse of discretion that leaves a deadlock failing to satisfy the vote required by 35-A M.R.S. §108-A for Commission action.

III. SUMMARY OF ARGUMENT/STANDARDS OF REVIEW

On appeal, Commission decisions are reviewed for questions of law and determinations of fact not supported by the record. Determinations of fact made by the Commission will be upheld by this Court if they are supported by substantial evidence in the record. *New England Tel. & Tel. Co. v. Public Util. Comm'n*, 448 A.2d 272, 278 (Me. 1982). The Court will vacate a Commission decision, "when the Commission abuses the discretion entrusted to it, or fails to follow the mandate of the legislature, or to be bound by the prohibitions of the constitution," all of which present questions of law. *Indus. Energy Consumer Group v. PUC*, 2001 ME 94, P11, 773 A.2d 1038, 1041. And, this Court has a "longstanding practice of '[examining] closely proceedings of the Commission to ensure that they comply with statutory and other standards.'" *Central Maine Power Co. v. Public Utilities Com.*, 382 A.2d 302, 313 (Me. 1978) (quoting *Eastern Maine Electric Cooperative, Inc. v. Maine Yankee Atomic Power Company*, 225 A.2d 414, 415 (Me. 1967)).

There are two statutory requirements or mandates applicable to the circumstances of this case. The first is that the Commission must ensure safe, reasonable, and adequate services. 35-A M.R.S. §101. This mandate is reinforced by every Maine citizen's constitutional right to "pursue and obtain safety" (Me. Const. Art. I, §1); and by the judicial maxim *salus populi suprema lex* -- the safety of the people is the supreme law. *Seavey v. Preble*, 64 Me. 120, 121 (Me. 1874). The second applicable mandate is that an act or decision by the Commission requires the assent of a majority of the commissioners present, when at least a quorum is present. 35-A M.R.S. §108-A. There are three duly appointed commissioners, requiring at least two for a quorum, and the agreement of both when only two are present. *Id.*

The statutory mandate to ensure safety and its constitutional and judicial counterparts, are encompassed within this Court's directive to the Commission in *Friedman I,* that safety will be ensured if the Commission determines there is no credible threat to health or safety. The Decision must be vacated because it fails to faithfully implement, and indeed repudiates, the Law Court's directive and the underlying mandates in a number of respects. The Commissioners impermissibly relaxed the Court's no credible threat standard, opining that some threat to health and safety must be allowed. Commissioner Littell also injected a

reasonableness factor and required a threat of immediate or imminent risk of harm when the risk is comparable to common risks.

Both Commissioners justify relaxing the standard to relieve CMP from the burden of "proving a negative." A. 92, 133. Further justification is offered, by analogizing the threat to risks associated with other utility services such as gas and electric lines. A. 97-98, 99, 131. But these risks are mitigated by protective and preventative measures. The analogy would be appropriate only if the utility were proposing to expose its customers to electricity and gas fumes without protective measures like pipes and insulated wiring. Because exposure to RF radiation from smart meters is direct, intentional, unprotected, and unmitigated, the Law Court's standard of no credible threat must be faithfully applied.

The Commission also fails to satisfy the safety mandates by impermissibly limiting the assurance of safety to fewer than all of CMP's customers. It determines that a "typical" CMP smart meter is safe, providing no assurance of safety for customers who have smart meters that create exposures in excess of the "typical" smart meter. It also fails to account for the cumulative and additive effects of RF radiation, providing no assurance to customers with impaired immune systems, EHS, or other conditions making them more susceptible to the adverse effects of RF radiation.

Finally, the Decision must be vacated because it is not supported by substantial evidence in the record. The determination of safety is for RF exposures that are averaged over time, but there is no evidence in the record that averaging of exposures is relevant to determining whether there is a credible threat of adverse non-thermal effects. And, the RF exposure levels determined to be safe are not based on reliable evidence. They are calculated using the predicted duty cycle of a smart meter deemed to be "typical" of 1,100 smart meters that are not statistically representative of CMP's 600,000 smart meters.

Commissioner Vannoy does not directly dispute most of Commissioner Littell's findings. The primary distinction between the two opinions is Commissioner Vannoy's erroneous application of a causation standard, effectively requiring Appellants to prove the causation of the credible threat. Applying the correct legal standard and burden of proof to the facts compels the conclusion CMP's smart meter system poses a credible threat to health and safety.

IV. ARGUMENT

A. The legal mandate is to ensure safety and CMP's legal burden was to prove no credible threat to health or safety.

The Law Court granted the appeal in *Friedman I* because the Commission failed to perform the Legislature's mandate to ensure safety when it issued the Opt-Out Orders. "Ensure" is the operative word chosen by the Legislature and

emphasized by the Court to describe the Commission's fundamental duty, for which the Commission is entrusted by the Legislature as "the primary guardian of the public interest." *Brink's, Inc. v. Maine Armored Car & Courier Service, Inc.*, 423 A.2d 536, 538 (Me. 1980). "Ensure" means to "guarantee or to warrant" that something is accomplished or occurs. *United States v. Ray*, 273 F. Sup. 2d 1160, 1165 (D. Mont. 2003); see also, *Heckman v. Pennsylvania Bd. of Probation & Parole*, 744 A.2d 371, 375 (Pa. Commw.Ct. 2000) ("'to make sure [or] certain' or to 'guarantee'" quoting *Webster's Third New International Dictionary* 756 (1993)). "Safety" is defined as "freedom from harm or danger; the state of being safe; a place that is free from harm or danger; a safe place." *Merriam Webster Online Dictionary*.

The Commission and CMP contend Appellants make too much of the legal standard. They contend Appellants unreasonably expect a guaranty of safety, and proof of a negative. They protest too much. CMP is not required to prove a negative, only to carry its burden of showing no credible threat, by a preponderance of the evidence. Litigating parties must make similar showings all the time. Here, public policy and legislative, constitutional, and judicial mandates require it. A multinational corporate utility with monopoly powers and the agency entrusted to protect the public have acted in concert to create a system that causes every resident in the utility's reach to be directly exposed to a

toxic substance the World Health Organization has classified as a "possible human carcinogen." They should not be heard to complain when the residents ask for assurances of safety.

In *Friedman I,* the Law Court articulated a standard for determining whether safety is ensured. Because CMP's system, as authorized by the Opt-Out Orders, compels customers to be directly exposed to a toxin in their own homes with no protection or mitigation, the Commissioners' modification of the no credible threat standard is inappropriate. As explained in detail below, the Commissioners circumvented the Court's directive by relaxing the standard, in part, to avoid a misplaced concern about making CMP prove a negative, and in part by their inapt analogy to risks of accidental exposures to harmful agents controlled by protective and mitigation measures.

First, for context, we briefly review the nature and quality of the evidence presented by the parties and Commissioner Littell's findings supporting the conclusion a credible threat to health and safety exists. We then review the errors underlying the Decision's conclusion the smart meter system is "safe."

B. Appellants proved a credible threat to health and safety.

Appellants' burden in this case was limited to presenting their complaints and establishing the Commission's jurisdiction to investigate. *Hogan v. Hampden Telephone Co*., F.C. No. 2438, Order (Me. P.U.C. May 16, 1980). In

a Commission proceeding, complainants are "not required to demonstrate the validity of their claims by 'affirmative evidence.'" *MacMaster v. Gardiner Water Dist*., No. 98-309, Order (Me. PUC December 4, 1998). *See*, A. 92. In *Hogan*, the Complainants alleged their phone service was inadequate or faulty. The Commission did not require the customers in *Hogan* or *MacMaster* prove their claims. The utility had the burden "to prove the conditions or practices complained of do not exist or that, if they do exist, they do not constitute inadequate [or unsafe] service." *Hogan*, at 8 (brackets added). Presumably, CMP was mindful of this burden when it promptly resolved complaints of RF interference with mechanical equipment, but the Commission has applied a different burden when the interference is with the human body instead of a mechanical device.

Far exceeding their burden, Appellants presented credible and compelling complaints of debilitating conditions resulting from smart meter RF exposures. CMP has made no effort to prove the symptoms experienced by Complainants' witnesses do not exist, or that the symptoms they experienced are not related to the installation of smart meters in their homes. CMP has made no attempt to challenge the credibility or reliability of these witnesses. Neither CMP nor the Commission made any attempt to investigate the circumstances relating to the complaints of these witnesses, or to interview or cross-exam these witnesses

about their symptoms or the circumstances relating to their smart meter exposures. The credibility and reliability of their testimony is unchallenged in the record and must be taken at face value. *State v. Fenderson*, 449 A.2d 381, 383 (Me. 1982)(unrebutted evidence was sufficient to prove guilt beyond a reasonable doubt). Indeed, Commissioner Littell found much of their tesimony credible and concluded there is a "reasonable supposition that there may be symptoms for some people related to the installation of smart meters." A. 125.

Complainants presented expert testimony and scientific studies, providing objective evidence of physiological effects that may be associated with EHS symptoms, consistent with Appellants' lay witness testimony. R. 201, Leszczynski, p. 4-5; R. 608, Ex. 4; R. 200 Carpenter Part 1, pp. 10-14 (citing McCarty et al, 1991; Abel in, et al, 2005; Hutter, et al, 2006; Eliyahu, et al, 2006; Altpeter, et al, 2006; Volkow, et al, 2011); R. 646, Pt. II, Sections 8 and 9. Expert testimony and scientific studies were also presented demonstrating substantial evidence of other adverse health effects from low-level RF radiation, including cancer and other disease related effects. *See* R. 645, pp. 49-71. Dr. Hardell testified to his opinion that there is sufficient evidence to conclude a causal relationship between low-level RF exposure and certain forms of brain cancer. R. 604, p. 3 and Ex. D; A. 206-209.

The record evidence includes hundreds of studies showing adverse health effects at very low levels of RF exposure, e.g., R. 197, Kumar, p. 3, Ex. E; R. 198, Morgan, Part II, Ex. F (list of studies showing adverse effects reported at very low RF levels between 0.002 and 6.0 μW/cm^2); A. 236. The first five pages of an 11-page chart (A. 236) identifies 67 studies with RF exposures, most of which are below the peak exposures (0.031 mw/cm^3) for CMP's smart meters *and* the averaged exposures using a 10% duty cycle (0.0031 mw/cm^2).

A recent study discussed by Dr. Hardell in his testimony reported oxidative stress responses in mice after an exposure to 2.4 GHz RF radiation at a power density of 0.033549 mW/cm^2. R. 206, Hardell, p. 20; R. 290, *Shahin et al, 2013*, p. 6[5], *see also* A. 109. This is the same frequency as CMP's smart meters with comparable peak exposure levels without averaging. The oxidative stress caused by this exposure affected the process of egg implantation and pregnancy. R. 290. The authors noted that "pregnant women and children are exposed to this low-level MW radiation (especially by microwaves, mobile phones, and Wi-Fi signals)." *Id*. They also observed highly significant DNA damage in the brains cells of mice, which they noted was supported by their previous study and also by Lai and Singh. *Id.*, p. Dr. Hardell discussed the

[5] Page reference to un-numbered pages of on-line version.

Shahin study on cross-examination, also noting that the exposure level is similar to that for Wi-Fi's and smart meters. A. 203.

Dr. Hardell testified there is no known threshold "for cancer effects from radiofrequency radiation," A. 204, that a single hit can have negative effects, and that repeated exposures can affect a body's repair mechanics. A. 204-207. Recall that CMP's smart meters transmit between 34 and 170,000 "hits" per day. "Single peaks of radiation may have toxic effects and multiple peaks of radiation may have cumulative effects that are not accurately represented by averaged values." R. 206, Hardell, pp. 25-26, *see also* R. 198, Morgan, pp. 17-18. There are "no well-done studies that show homeostasis in the human body for non-thermal effects." R. 206, Hardell, p. 26. In a worst case scenario, one CMP smart meter emits many thousands of hits every day; banks of meters multiply that number; and other nearby AMI equipment can add many more hits in a day.

Dr. Hardell further testified that the IARC classification of RF carcinogenicity applies to all forms of RF radiation, including smart meters. *Id.*, p. 16. Although the averaged exposure levels may be less than that from cell phones, "the hazard still exists." *Id.* He cautioned that "children, pregnant mothers, the elderly, and those with immunity defects are more vulnerable to RF exposure" (*Id.*, pp. 22-23). He concluded that "exposure to the public should be as low as possible." *Id.*, p. 32.

C. CMP failed to prove no credible threat to health and safety.

CMP's only response to the credible testimony of lay witnesses was to offer the opinion of its experts that the symptoms experienced by these witnesses may, by some unknown mechanism, have a psychological cause. These experts did not question or interview the witnesses or investigate their symptoms or the circumstances of their complaints nor are they qualified to make psychological determinations. The witness testimony includes specific circumstances that cannot be explained by the generalized testimony of CMP's experts about potential psychological causes. Many witnesses testified that they experienced their adverse health symptoms for the first time immediately or not long after the smart meters were installed, but before they were aware of the installation, and for many, before they were even aware of concerns about smart meters. *E.g. Tupper,* R. 199, p. 20 of 287, p. 3; *Knoll,* R. 214, p. 156 of 287; p. 1; *Brust,* R. 214, #7, p. 274 of 287; *Renaud,* R. 211, Pt. II, p. 78 of 287; *Smith,* R. 199, p. 58 of 287. *See also,* R. 206, Rea, p. 7; R. 200, Conrad, p. 10-12; *Hart Test.*, p. 2, ll. 21-23; *See also* A. 154; Brief Addendum A.

CMP's expert testimony about the science does not prove no threat to health and safety from low level RF radiation. Commissioner Littell criticized Exponent's testimony about the science so extensively, their opinions about the potential risks of harm from low level RF cannot be relied upon. Indeed, there

is no indication Commissioner Littell relies upon Exponent's testimony on the science at all. Exponent's opinions on the science depend directly on the legitimacy of their use of the so-called "weight of the evidence" to address uncertainties and inconsistencies in the science. Commissioner Littell soundly rejects Exponent's use of this methodology. A. 91, 109-110 and 42-43

Exponent readily acknowledges that its opinions on the safety of low-level RF relies on certain Agency reviews, which heavily rely on this same "weight of the evidence" approach. R. 477, p. 105-106. An expert may rely on the opinions of other experts, but only to the extent the others opinions are reliable on the issue at hand. Reliance on the Agency Reviews is problematic for other reasons as well, including a lack of transparency about the competence and conflicts of the individuals participating in the reviews, and the inability to cross-examine the reviewers in this proceeding. *See* R. 645, pp. 14-26.

Commissioner Littell also criticizes Exponent's rejection of the WHO/IARC classification of low level RF radiation as a possible carcinogen. Commissioner Littell found the WHO/IARC Report to be persuasive and credible evidence of "a possible risk from RF/EMF," (A. 106, 91), and found Dr. Hardell's testimony and Dr. Leszczynski's testimony to be credible (A. 106, 107, 112). Much of Exponent's effort to criticize Dr. Hardell's work and the WHO/IARC evidence relies on the Danish Cohort study, which Littell also

rejects due to the methodological weaknesses of the study. A. 108-109. Littell also criticizes Exponent's attempts to equate smart meter radiation to the low level background RF radiation naturally occurring in our environment. A. 110. And he criticizes Exponent's attempts to shift the burden of proof through its weight of the evidence approach to the inconsistencies and uncertainties in the scientific evidence. A. 91, 111. Finally, the Commissioner concluded "CMP's witnesses are unable to rebut the evidentiary value of the WHO/IARC evidence together with much of the testimony of Doctors Hardell and Leszczynski. See *Hardell Hearing Test.* (Oct. 30, 2013); *Hardell Test.*; *Leszczynski Test.*" A. 108.

D. Commissioner Littell's findings require the determination there is a credible threat to health and safety, but his medical opt-out is insufficient to address the threat.

Attached in Addendum B is a list of the Commissioner's findings on the strength of Appellants' evidence and the weakness of CMP's evidence. He finds the science shows a credible threat of adverse non-thermal effects from low-level RF. He finds the testimony of harm by many of the lay witnesses credible. These findings require the determination of a credible threat to health and safety, which he implicitly finds when he requires a medical opt-out.

Having found "there is some credible evidence of potential harm," he concludes there must be a determination of whether the "potential harm is being adequately managed to be 'safe,' and therefore, not a credible threat . . ." A. 111.

Commissioner Littell offers a medical opt-out, but then arbitrarily abandons it by joining in the Order. In any case, this limited opt-out is not adequate to address the threat. If the system poses a credible threat, it is not eliminated by giving an opt-out to only those for whom the threat has become symptomatic and for whom a medical professional has been willing to make the causal connection between the symptoms and smart meters. What about the other CMP customers being exposed on a daily basis, subjected to this invisible and odorless threat that may be gradually impairing their immune systems or having genotoxic and other adverse effects? The medical opt-out proposed by Commissioner Littell is also insufficient because it does not offer the option of a standard electro-mechanical meter (specifically allowed for in the original opt-out order A. 73); instead it still requires a smart meter but with the transmitter turned off.

As discussed below in Sections E-H, Commissioner Littell erroneously limits the implications of his findings about the threat by relaxing the legal standard, limiting his conclusions to typical smart meters, and failing to require CMP to prove with reliable evidence the actual exposure levels associated with its smart meter system. Commissioner Vannoy commits the same errors and shifts the burden of proof.

E. The Decision is not supported by a common set of findings approved by both Commissioners, and is contradicted by Commissioner Littell's findings rendering it invalid.

Whether or not Commissioner Littell's findings compel the conclusion there is a credible threat, they necessarily preclude the Commissioner's joining in the opposite conclusion that CMP has proven there is no credible threat. Commissioner Littell very carefully explains that his determination about safety is conditioned upon mandating the medical opt-out. "I find it is not a reasonable utility practice for CMP to fail to provide sufficient risk mitigation." A. 128.

> Based on the evidence reviewed herein and *provided accommodations are made for those with medical treatment recommendations*, CMP and analysis by other governmental and standards organizations on the record have established the relative safety of the AMI meters operating under typical parameters and that the meters do not constitute a credible threat to the health and safety of CMP's customers. A. 118. (emphasis added).

Commissioner Littell then inexplicably and arbitrarily joins Commissioner Vannoy in a joint Order determining there is no threat and safety has been proven without accommodations. The Decision that safety is ensured without accommodations or protective measures is diametrically opposed to the conclusion that safety is ensured, *provided accommodations are made.* And, the Decision allowing smart meters without a medical opt-out is diametrically opposed to the conclusion that the failure to allow the opt-out is an "unreasonable utility practice."

The Commissioners were deadlocked at the deliberation session in September. Nothing occurred on the record to alter the deadlock and no vote was taken before the Decision was issued in December. The arbitrary act of joining Commissioner Vannoy in a written decision that contradicts his own findings and conclusions cannot cure the deadlock. Commissioner Littell's joinder in the Decision is a classic example of an arbitrary and capricious act. Action by an administrative agency is arbitrary and capricious when it "is unreasonable, has no rational factual basis justifying the conclusion or lacks substantial support in the evidence." *Central Maine Power Co. v. Waterville Urban Renewal Authority*, 281 A.2d 233, 242 (Me. 1971)(citations omitted).

F. Both Commissioners erroneously applied a relaxed legal standard and reduced CMP's burden of proof.

Notwithstanding Commissioner Littell's affirmative findings showing a credible threat, he concludes the system is safe, so long as medical opt outs are available. He does so in part by applying a relaxed legal standard. Both Commissioners fail to faithfully apply the "no credible threat" standard directed by this Court, contending that to do so imposes an the insurmountable burden of proving a negative. "However, it is also not reasonable to require CMP to prove a negative." A. 92. "Science simply cannot prove a negative." A. 130. This concern is based on a misunderstanding of the legal and evidentiary standards in play. The standard requires proof, by a preponderance of the evidence of 1) the

actual levels of exposure created by the system, and 2) no credible threat to health and safety at those levels of exposure. Neither proof was made and both were excused.

To avoid the perceived burden of "proving a negative," the Commissioners sought different justifications for allowing some degree of threat to health and safety. Both Commissioners justify some deree of threat or risk, by analogizing to threats of accidental fires and exposures related to power lines and natural gas pipelines. "[T]he operation of power lines and natural gas pipelines cannot be said have zero risk of harm to the public." A. 130-131. These comparisons are inapposite. These risks or threats arise from accidents or unanticipated failures of risk prevention or mitigation measures. The comparison would be more appropriate if the risk or threat under consideration were limited to a smart meter fire or explosion, or accidental exposures. The threat posed by exposure to smart meter RF radiation is neither accidental nor subject to any prevention or mitigation efforts.

The threats to health and safety posed by electricity and gas are carefully avoided, prevented and mitigated by safety measures and precautions. Direct exposure to these dangerous substances is prevented by containing them in pipes and insulated electrical wiring, among other measures. Harmful exposures occur when accidents cause protective measures to fail or to become

overwhelmed, or when people accidentally breach or intentionally circumvent recommended safety measures or precautions. Exposure to smart meter radiation is direct, intentional, unprotected, and unmitigated. And to make matters worse, the radiation is invisible and difficult to test. CMP has installed no protective measures. There are no warning signs and no restrictions maintaining safe distances between smart meters and humans. Children can play in the vicinity of one meter, or a whole bank of them, for hours, or sit next to one, or lean on one -- by the side of a house, in a driveway, in a utility room. Meters may be placed a foot or less from a bed, or cradle, located on the other side of an exterior wall. With no protective measures to fail, an accident is not required to create a threat to health and safety. The threat is just there -- potentially excessive exposures occurring continuously on a daily basis.

Direct exposure to a potentially harmful substance with no protection, prevention or mitigation requires a strict standard of proving the substance does not pose any threat to health and safety. If the issue was direct, unprotected bare exposure to electricity or propane or natural gas, we would not tolerate our public trust regulators wringing their hands at the prospect of making the utility "prove a negative." Early in the Commission's history, it was correctly determined that bare exposure to gas and electricity poses a credible threat to health and safety. Accordingly, regulations have been imposed on utilities to

ensure safety with protective, preventative and mitigation measures. Threats from the gas leaks or downed power lines can be quite serious but tend to be localized and accidental in nature; such threats may pale in comparison to theats of genotoxic and neurotoxic effects from RF emissions intentionally distributed throughout the CMP service area into 600,000 homes. The fact that there is a lack of consensus in the scientific community about the threat, does not alter the analysis. It is not the utility customer's burden to resolve the uncertainty; it is the burden of the utility enjoying a monopoly and its regulator -- the parties with the obligation to ensure safety – that must resolve the uncertainties in the science. A. 110.

Commissioner Littell expressly altered the Law Court's standard in other ways as well. First, he excludes long-term threats, requiring immediate or imminent risk of harm when the risk is comparable to common risks. A. 93.

> Credible evidence of risk does not equate to a violation of CMP's obligation to provide safe electric service nor to a credible threat of harm where that risk is neither likely to produce immediate nor imminent harm and is comparable to risks common in our society. *Id.*

This conclusion is untenable, and expressing it in this fashion demonstrates how untenable the Decision itself is. The Commissioner is saying CMP may introduce a toxin, irritant or dangerous substance into its customers' homes that poses a threat to health and safety over time so long as the exposure is similar to

common exposures outside the home. This completely ignores a homeowner's constitutional right to obtain safety by managing, limiting or eliminating exposures to toxics in their own home. Incongruously, Littell acknowledges the "involuntary nature of this risk is a consideration" (A. 126), yet he is willing to compel involuntary exposures in private spaces regardless of long term threats to health so long as customers might suffer similar exposures in public spaces.

So long as the toxin can be found outside the home at similar exposure levels, CMP would be allowed to exacerbate the threat by pumping the toxin into every customer's home, regardless of whether the customer has a sensitivity or susceptibility to the toxin, and regardless of efforts made by the customer to limit or eliminate exposures in the home environment. This ignores the threat of additive cumulative exposures over time for CMP customers experiencing anywhere from thirty-four to hundreds of thousands of smart meter radiation hits per day, in addition to the other RF exposures in their environment.

Commissioner Littell also introduces a reasonableness qualifier to the legal standard. A. 99. He suggests determining reasonableness depends on the magnitude, probability and availability of alternatives and mitigation. As discussed in the next Sections, CMP has failed to establish the magnitude of the exposures. And as discussed above, there is no mitigation of the risk or threat from smart meter exposures (except Commissioner Littell's medical opt-out

which he has arbitrarily abandoned), and the probability and availability of alternatives is obvious, but has been rejected by the Commission -- replace the smart meters with standard electromechanical meters, or at least allow electromechanical opt outs without cost. Discussion of the reasonableness of the threat, the counterbalancing of benefits, and the acceptability of the threat are not part of the analysis of whether the threat exists. The Commission short-circuited the analysis by relaxing the standard and by not requiring proof with specificity and reliability of the actual levels of exposure created by CMP's system and proof that such levels pose no threat without any protective, preventative, or precautionary measures.

G. Both Commissioners failed to require proof of the actual levels of exposure created by its smart meter system.

Both Commissioners make generalized statements to the effect that the exposure levels created by CMP's smart meters are below levels at which a credible threat may exist. But neither Commissioner makes specific findings about which exposure levels reported by CMP he is using for these statements. We infer from their references to averaged exposures from typical smart meters that they mean 0.00000031 mW/cm^2 (R. 477, p. 88) based on Exponent's 2014 prediction of a 0.01% duty cycle relying on the statistically unrepresentative sample of 1,100 smart meters (R. 85, p. 3), or perhaps 0.000015 mW/cm^2, based on Exponent's 2010 prediction of a 0.035% duty cycle (A. 230). It appears the

Commissioners base their analysis on another version of the facts presented by Exponent in a previous proceeding in 2011, reporting a typical averaged exposure at 1 yard of 0.0000008 mW/cm^2. A. 86, Table 2. The Table 2 identifies its source of information as "ODR-01-29 and TX Study." There was no ODR-01-29 in this proceeding. Upon inquiry to Commission staff, Appellants discovered that the ODR-01-29 referenced is from a different proceeding (Docket Nos. 2010-0345/2010-0389) and is dated February 14, 2011.

Regardless, it seems clear the Commissioners make their safety determination based on averaged, not peak, exposures using predicted duty cycles, not the 10% duty cycle. A. 52 ("typical operation"); A. 54 ("average/typcial"). This is how they avoid the extensive expert witness testimony and numerous studies in evidence showing adverse effects at exposure levels associated with peak exposures (0.031 mW/cm^2 at 1 yard) and with averaged exposures based on the 10% duty cycle (0.0031 mW/cm^2 at 3 feet). *See* A. 235 – 257.

Even if reliance on averaged exposures were appropriate, there is no reliable evidence of actual exposure levels for those CMP smart meters that transmit most frequently, and there isn't even reliable evidence of the duty cycle of a smart meter that is truly "typical" of CMP's 600,000 meters.

H. The Decision repudiates the mandate to ensure safety for all Maine residents and all CMP utility customers. It erroneously relies on "averaged" exposure data and "typical" exposure scenarios, and fails to consider long-term effects from cumulative and incremental exposures.

Even if CMP's evidence of exposure from a typical CMP smart meter was reliable, the Commission erred by limiting its finding of safety to the typical meter. The Legislature's mandate to ensure safety, and the Law Court's mandate to determine no credible threat, apply to *all* CMP smart meters. It applies to all CMP customers and Maine residents, including the most vulnerable, not just healthy customers whose smart meter happens to be typical. The Commission's fundamental duty as guardian of the public trust is not limited to only some of the public, some of the time. Given the chronic nature of the risk, everyone is potentially susceptible and entitled to protection, not just those showing immediate acute sensitivities.

A conclusion that CMP's smart meter system is safe for only some CMP customers does not, as a matter of law, satisfy the statutory mandate to ensure safety for all. Yet, that is what the Commission has concluded. Indeed Commissioner Littell readily acknowledges: "the safety issue is not litigated for higher exposures than CMP's average/typical exposures, nor is there evidentiary support for such measured exposures." A. 54.

CMP's proof must take into consideration worst case scenarios where the radiation levels are the highest. This means consideration of exposures from smart meters that transmit thousands of time more frequently than the "typical" smart meter. It means consideration of exposures from banks of multiple smart meters.[6] It must also take into consideration cumulative exposures and their effects on those most susceptible and vulnerable to RF radiation, and consideration of the total exposures from RF emitting devices in the vicinity of smart meters.

Exponent testified that in the assessment of potential health risks to RF fields, "the level of exposure is a critical factor." R. 477, p. 125. Exponent also testified the worst case exposure from one meter is "a few inches away from the smart meter at ten percent duty cycle." R. 151, p. 27. Exponent reported that with a 10% duty cycle, the averaged exposure for one smart meter at one foot is 0.028 mW/cm^2. A. 233. Commissioner Littell finds "the evidence on meters in multiple configurations shows that RF may approach the ICNIRP, IEEE and FCC limit." A. 54. This would be far in excess of the exposures at which many scientific studies have reported adverse health effects.

But, there is no information in the record indicating how many meters there are in CMP's largest bank of meters, or whether there is any limit on the

[6] Even FCC compliance requires "consideration of multiple units or banks of meters in the same location." R. 86, p. 31.

number of meters in a bank. D.R. DW 01-077. Exponent did not conduct any testing of collectors or other AMI devices. One CMP customer complained that a collector device was located 20 feet from his bedroom. D.R. Fr. 01-01, Att. 2 p. 12. CMP has no information about the proximity of AMI devices to schools, playgrounds, sports fields and other public spaces. D.R. DW 01-078. Accordingly, Commissioner Littell correctly concluded there is insufficient evidence in the record to determine "whether or not the meters are safe in dense urban environments." *Id.*

To meet its burden CMP had to provide sufficient evidence for the Commission to make assurances to all residents and customers that the RF radiation permeating their homes is not a credible threat, either directly from CMP's equipment or in combination with other RF sources; assurances to an elderly CMP customer who has already suffered from one brain tumor and does not want to increase the threat of another; assurances to a CMP customer with an immune deficiency making her more vulnerable to the effects of low-level RF radiation; assurances to residents suffering from EHS; and assurances to a cautious mother who has read the scientific literature and wants to obtain safety for her family by limiting exposure to all sources of RF radiation.

Commissioner Littell acknowledges the risks posed by low-level RF radiation are more likely to be chronic compared to the risks of a century ago

posed by the introduction of electric and gas facilities, which were more likely to involve immediate bodily and property damage. A. 93. Commissioner Littell acknowleges his assurances involve "averaging the exposure and ignores potential peak exposure impacts." A. 118. As noted earlier, Commissioner Littell's gloss on the legal standard erroneously requires proof of imminent or immediate harm, completely removing the threat posed by cumulative exposures from CMP's burden. Commissioner Littell acknowledges the record is insufficient to make a determination about the threats posed by cumulative and incremental expsoures and that the Decision's conclusion about safety does not encompass such threats. A. 114. These statements compel the conclusion that CMP failed to meet its burden of proof on this issue.

Appellants provided extensive evidence of the threat of cumulative exposures, far more than required to meet their initial burden. Dr. Phillips testified that RF radiation could lead to cumulative DNA damage in nerve cells of the brain, which "has been associated with neuro-degenerative diseases, such as Alzheimer's, Huntington's and Parkinson's diseases." R. 198, Phillips, p. 7. Dr. Phillips also testified that effects such as increased permeability of the bloodbrain barrier and changes in gene expression and protein expression may contribute to other disease conditions over time. *Id.*, p. 8. "Single peaks of radiation may have toxic effects and multiple peaks of radiation may have

cumulative effects that are not accurately represented by averaged values." R. 206, Hardell, p. 25.

Exponent acknowledged that any adverse effects from RF "can become additive and have cumulative effects." R. 167, pp. 75-76. CMP has not provided any evidence to prove incremental effects from its RF devices do not pose a credible threat. There is no evidence in the record from which the Commission could determine the total RF exposure in neighborhoods in close proximity to cell towers or AM-FM radio towers, or other settings with high exposure levels. The risk is heightened further because the added exposure from smart meters is within the home environment of each CMP customer and is continuous in the sense that it creates a daily dose. As Dr. Hill prophetically stated, "we should need very strong evidence before we made people burn a fuel [or be exposed to RF radiation] in their homes that they do not like." R. 642, p. 296 (brackets added).

The fact that RF exposure is becoming more and more ubiquitous in public places, is not a justification for imposing additional RF exposure on vulnerable individuals in their home environment. Those who are vulnerable struggle every day to avoid exposures in public places, and take extraordinary measures to make their homes as free of exposure as possible. Instead of respecting these efforts, the Decision appears to use the ubiquity of involuntary

exposure in public places as a justification for compelling smart meter exposures in the private homes of CMP customers. Commissioner Littell asserts RF exposure is extensive in most homes and workplaces, "unless there is a specific effort to limit or eliminate RF." A. 104. And, he acknowledges the involuntary nature of the risk is a consideration. A. 126. Yet, he fails to acknowledge the Decision prevents CMP customers, who are concerned about the threats posed by RF radiation, from limiting or eliminating RF in their homes.

I. Commissioner Vannoy erred by shifting the burden to Appellants to show the science establishes proof of harm.

The Commissioner Vannoy concludes smart meters are safe based on his finding Appellants failed to prove adverse non-thermal effects caused by low level RF in general and smart meter RF specifically. Instead of analyzing whether CMP has proven no credible threat, he focuses on whether causation has been proven. His findings confirm this impermissable shift of the burden of proof:

> insufficient science for "causal relationship" of non-thermal effects. A. 135.
>
> the studies have not "confirmed negative non-thermal biological impacts on human health from RF emissions of smart meters." A. 136.
>
> "no scientific consensus that this exposure [cell phones] is causal to harmful effects." A. 139-140.

> there are no dependable scientific studies that confirm the existence of such hypersensitivity. A. 142.

Commissioner Vannoy even admits applying a causation standard, although he claims to use an "inductive" vs. "a simple deductive causation standard." A. 37. Even if Appellants had the burden, proof of a threat of harm does not require proof of the harm. This is the kind of burden shifting analysis that Commissioner Littell expressly rejects. A. 92.

> This is an erroneous standard to force Complaints [sic] to "prove" that RF causes such harm, when by law . . . it is CMP that has the burden of proof, not the Complainants.

A. 110.

And finally, Commissioner Vannoy relies on reports by other utility commissions and administrative bodies that have reviewed far less evidence and heard much less, or no, expert testimony, and with no information about the qualifications of the decision-makers or about the procedures used to review and assess the evidence. A. 141-145. Moreover, there is no indication the issue being resolved by those agencies was the same as the issue to be decided here, or that the issue is governed by the same legal framework and standards. It is error to rely on the conclusions of other agencies and administrative bodies without evidence of their competence, disinterestedness, adequate procedures, full review of all the science, and identical governing law and legal standards. Indeed, the agencies and administrative bodies cited by Commissioner Vannoy

tend to rely on the same weight of the evidence analysis that Commissioner Littell soundly criticized.

These other administrative bodies make the same error as Commissioner Vannoy. They base their decisions on the sufficiency of evidence to prove causation, not the sufficiency of evidence to prove no threat. This point is most critical when the exposure is involuntary and the RF radiation is emitted in the home environment. It defies all notions of fairness and justice to directly or indirectly shift the burden to CMP customers to resolve the inconsistencies and uncertainties in the science and to effectively prove causation, particularly where CMP has exercised its monopoly powers to compel customers to either accept the installation of RF radiation devices on their homes or to pay a lifetime of special fees to keep their old meters, while still being exposed to the AMI system radiation in their neighborhoods.

Commissioner Vannoy does not reject or expressly disagree with most of the findings made by Commissioner Littell. He does not challenge the findings that much of the lay testimony or expert testimony presented by Appellants is credible. He just concludes that this evidence is not enough because it is insufficient to prove adverse effects from CMP's smart meter system to a scientific certainty. Imposing this burden is clear error.

V. Conclusion

CMP customers have been complaining about the safety of the smart meter system since it was first installed. There have been seven 10-person complaints filed over the last five years, five in the original Opt-Out proceedings (A. 71-72), and two in this proceeding. The Commission failed to satisfy the Legislature's mandate to ensure safety when it authorized the system, when it responded to complaints in the Opt-Out proceedings in 2010-2011, and when it dismissed Appellants' complaint in late 2011, as found by this Court in *Friedman I*. Now, three years after this Court's mandate in *Friedman I*, it has failed again, not only the Legislature's mandate but this Court's mandate, and the Constitutional mandate that all Maine residents have the right to obtain safety.

The Decision must be vacated because:

1) it directly contradicts the specific findings and conclusions made by Commissioner Littell in his separate opinion and because his joinder in the Decision is an abuse of discretion, rendering the Decision invalid under 35-A M.R.S. §108-A.

2) it fails to ensure safety (35-A M.R.S. §101) -- both Commissioners erroneously concluded some credible threat to health and safety

must be allowed, and Commissioner Vannoy erroneously shifted the burden of proof;

3) it limits its assurance of safety to fewer than all CMP customers (35-A M.R.S. § 101) and fails to account for the cumulative and additive effects of RF radiation, resulting in no assurance to customers with impaired immune systems, to customers with EHS, and to customers who may develop EHS over time.

4) it is not supported by substantial evidence in the record – its findings of safety are based on RF exposures averaged over time, but there is no evidence in the record that averaging of exposures is relevant to the threat of non-thermal effects; and the RF exposure levels determined to be safe are estimated values based on data from an unrepresentative sample of 1,100 of CMP's 600,000 smart meters.

Applying the correct legal standard to the facts in the record compels the conclusion there is a credible threat of harm from the direct, unprotected exposure to RF radiation from CMP's smart meter system. The findings and conclusions made by Commissioner Littell require this conclusion. The Decision should be vacated with directions for Commission action ordering CMP to: 1) remove or disable the AMI system unless and until safety is

ensured; 2) remove from its records all payment obligations of opt-out customers who chose to defer payment of the opt-out fees until this case is resolved; 3) reimburse all customers who initially opted out but gave up and paid the fees; and 4) allocate to CMP's shareholders the expenses incurred for Exponent's fees.

Dated at Portland, Maine this 11th day of May, 2015.

/s/ Bruce A. McGlauflin
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MAINE SUPREME JUDICIAL COURT
SITTING AS THE LAW COURT

Docket No. CUM-11-532

ED FRIEDMAN, et al,	)	
	)	
Appellants	)	
v.	)	
	)	CERTIFICATE OF SERVICE
MAINE PUBLIC UTILITIES COMMISSION,	)	
	)	
Appellee	)	

I, Bruce A. McGlauflin, counsel for Appellants, hereby certify that I have served two copies of the Brief of Appellant and one copy of the Appendix to the Briefs by depositing same in United States Mail, postage prepaid, addressed as follows:

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Dated at Portland, Maine this 12th day of May, 2015.

/s/ Bruce A. McGlauflin
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