

Russ Targ email small con

CITY OF PALO ALTO
Office of the City Clerk
APPEAL FROM THE DECISION OF DIRECTOR OF PLANNING
AND COMMUNITY ENVIRONMENT*

CITY OF PALO ALTO, CA
CITY CLERK'S OFFICE
18 APR -9 PM 4:01

For appeals of final decisions on Architectural Review Board and Home Improvement Exception applications (rendered after public hearing), this appeal form shall be completed and submitted by appellant within fourteen days from date of the Director's decision. Appeals of final decisions on Individual Review applications (rendered after public hearing) must be submitted within ten days of the Director's decision. Complete form, the current fee and a letter stating reasons for the appeal shall be submitted to front desk staff of the Planning Division, 5th floor, City Hall, 250 Hamilton Avenue, except for 980 Fridays when City Hall is closed, when these items shall be submitted to Planning staff at the Development Center, 285 Hamilton Avenue (glass storefront across from City Hall on the corner of Bryant and Hamilton).

* Director of Planning includes his designees, which are Planning Managers or the Chief Planning Official

Appeal Application No. 18-AP-7
Name of Appellant Russell & Patricia Targ
Address 1010 Harriet Street Palo Alto CA 94301
Street City ZIP
Receipt No. 2018099001-64
Phone (650) 323 8550

LOCATION OF PROPERTY SUBJECT TO APPEAL:

Street Address All Approvals of use of utility poles for 4656 Telecomm
Name of Property Owner (if other than appellant) Russell & Patricia Targ
Property Owner's Address 1010 Harriet Street Palo Alto 94301
Street City ZIP

The decision of the Director of Planning and Community Environment dated _____, 20____
whereby the application All Approvals of use of utility poles for 4656 Telecomm by _____
(file number) (original project applicant)

17PLN169 R Targ
was _____, is hereby appealed for the reasons stated in the attached letter (in duplicate)
(approved/denied)

Date: 4/9/18 Signature of Appellant Russell Targ

PLANNING COMMISSION RECOMMENDATION TO THE CITY COUNCIL (TO BE FILLED OUT BY STAFF):

Date _____ Approved _____ Denied _____

Remarks and/or Conditions:

CITY COUNCIL DECISION (TO BE FILLED OUT BY STAFF):

Date _____ Approved _____ Denied _____

Remarks and/or Conditions:

SUBMITTAL REQUIREMENTS SATISFIED:

- 1. Letter stating reasons for appeal IM Received by: IRMA MORA
- 2. Fee (currently \$280.00) IM Received by: IRMA MORA

Received

APR 09 2018

Appeal and Claim of Russell Targ and Patricia Targ in opposition to the proposed placement of 4G and 5G close proximity radiation emitting devices on utility poles within the City of Palo Alto.

Background statement of Russell Targ

I am a Silicon Valley engineer and physicist. I have lived in Palo Alto for approximately 50 years and have lived in our current home on Harriet Street for the last 45 years. My earlier background is as a laser physicist, my work at SRI with Hal Putoff on governmental projects has been the subject of several books and articles.

Faced with this brand-new (to me) data, I find it ironic that I have been a student of the effects of electromagnetic radiation at different times for more than 60 years. My first such engagement was in physics at The Sperry Gyroscope company in Great Neck New York, where my scientific investigations of a nearby non-ionizing radiation source led to the installation of a Faraday wall screen to protect our laboratory area from a nearby source of such radiation.

I must now submit this Appeal and Claim on the basis of fragmentary information, because my wife Patricia and I never received any Notice of the impending installation of what the San Jose Mercury News reports will be 92 additional new cell towers within our city limits on previously publically owned utility poles. This entire event series would have transpired without our even knowing about these impending health risks had it not been that a friend mentioned this to me by telephone last Saturday.

I am satisfied from study that the microwave broadcast from these so-called Small Cell towers present risks to the human biological system. I Object to the continuation of any installation of these cell towers on our residential and commercial streets as set forth under the Claims section below.

Background statement of Patricia Targ

My name is Patricia Targ. I am an artist. I have lived in the Bay Area for twenty-five years, and taught elementary school in San Jose for fifteen of those years. I am a resident of the City of Palo Alto. I am married to Russell Targ and live with him in our home on Harriet Street in Palo Alto. I have lived in Palo

Alto for fifteen years. I only learned about the proposed installation of these utility pole towers yesterday, and with any detail today, I am told the last day to file, and like my husband have no choice other than to proceed on my currently limited data. However, from my recent examination of materials in this area I believe that the concentrations of radiation from the proposed installation of these towers on utility poles presents health risks to residents to Palo Alto and visitors to our City, and I Object to the continuation of this process on the grounds stated in the Claims section.

Nature of Objections and Claims

Each and both Russell Targ and Patricia Targ, only within days aware of the action of their City, Object and Claim against any use of utility poles which are public property owned or cooperatively endeavored by or with the City of Palo Alto for the installation of cellular towers.

Each and both Russell Targ and Patricia Targ, only within days aware of the action of their City, Object and Claim, and Appeal against each and every action or proposed action, by contract, ordinance, policy, or otherwise, under which the City of Palo Alto allows the use of public sidewalks for the installation of power supplies for these microwave generating 4G and/or 5G radiation distribution towers. In every instance where there is attempted or actual legal enablement of the installation of such microwave generating communication devices on public utility poles or publicly owned easements or rights of way, such installations on poles or sidewalks result, by Joint Venture, Agency, Landlord Tenant, and direct action, governmental actions and thus State Actions.

Appeal and Claims

1. NOTICE: I, and each of us, and together as a married couple, Appeal and Claim against any use of utility poles which are public property owned or cooperatively endeavored by or with the City of Palo Alto for the installation of cellular towers on the basis that we did not receive any proper Notice of such intention of the City or Verizon, and that we and each of us have thereby been deprived of Due Process, to our disadvantage, including the losses and damages stated herein.

2. DANGEROUS CONDITION OF PUBLIC PROPERTY AS TO UTILITY POLE MOUNTED TELECOMMUNICATIONS MICROWAVE ANTENAS: I and each of us, and together as a married couple, Appeal and Claim against any use of publically owned utility poles within the City of Palo Alto for close proximity radiation generating devices, including as described as Smart Cell Towers in discussions between the City and Telecom, including but not limited to Verizon, on the basis that upon the installation of such devices upon said publicly owned utility poles, including and not limited to because of the Doctrine of Fixtures, the melded resultant hybrid structures, meaning the City utility poles coupled with the health-endangering microwave broadcast towers, become dangerous public property, including within the meaning of Government Code 835 and other law, and we seek and request that such attachment of such radiation generators to said publicly owned utility poles not be allowed to proceed. We Object and Claim against any such installation of such health endangering radiation broadcast systems on any of said utility poles and Appeal from each, any, and every prior act of our City Counsel which has given indications of permission, by ordinance, contract, or otherwise, for the installation of such towers on such public property.

3. DANGEROUS CONDITION OF PUBLIC PROPERTY AS TO SIDEWALK POWER SUPPLIES FOR UTILITY POLE MOUNTED TELECOMMUNICATIONS MICROWAVE ANTENAS: I and each of us, and together as a married couple, Appeal and Claim against any use of publically owned sidewalk or roadway easements within the City of Palo Alto for the installation of power supplies for close proximity radiation generating devices, including as described as Smart Cell Towers in discussions between the City and Telecom, including but not limited to Verizon, on the basis that upon the installation of such devices upon said public sidewalk and roadway easements, including and not limited to because of the Doctrine of Fixtures, the melded resultant hybrid structures, meaning the City utility poles coupled with the health-endangering microwave broadcast towers, as powered by such power supplies, become dangerous public property, including within the meaning of Government Code 835 and other law, and we seek and request that such placement

of such power supplies for such radiation generators on said publicly owned utility poles not be allowed to proceed. We Object and Claim against any such installation of such power supplies for said health endangering radiation broadcast systems on any of said City roadway or sidewalk easements and Appeal from each, any, and every prior act of our City Counsel which has previously given indications of permission, by ordinance, contract, or otherwise, for the installation of such power supplies on towers on such public property. With regard to the Dangerous Condition of Public Property inherent in such power supplies, it is noted that all reserve power provisions, whether by lithium batteries or by petroleum or propane powered generators, present a risk of explosion and fire and that said installation of said power supplies on such rights of way are objected to by this Appeal, Claim, and Objection as herein set forth.

4. DUE PROCESS OBJECTION TO SIDEWALK AND ROADWAY POWER SUPPLIES:

We, Russell and Patricia individually, and as a married couple, did not receive any Notice of the proposed installation of these structures on public rights of way, and therefore Object, and Claim, and Appeal against any such power supply installation on public rights of way due to the absence of proper notice to us, who, like all residents of Palo Alto are affected by these proposed installations.

5. FISCAL OBJECTIONS TO THE INSTALLATION OF CLOSE PROXIMITY RADIATION GENERATING DEVICES AND THE POWER SUPPLIES THEREFORE, ON PUBLIC UTILITY POLES AND RIGHTS OF WAY.

The effect of this installation of Dangerous Conditions of Public Property will have the effect of transferring liability from Telecom to the Taxpayer, and as Taxpayers, not only for direct damage or injury to persons and animals, but in that the effect of such installation will subject such governmental entities to potential liability for all cellular radiation injury based claims, including those asserted by persons claiming to have been injured, such as by brain cancer, from their use of

their personal cellular devices. I and we Object, Claim, and Appeal that the City should immediately and forthwith renounce any such contractual involvement with Verizon or other carriers, to avoid having the City with other governmental entities becoming liable to persons injured and or damaged by such radiation coming from such joint venture operated radiation broadcast mechanisms on such public rights of way and utility poles.

6. OBJECTION BASED UPON NON-DISCLOSURE OF MATERIAL FACTS. The work of Dr. Henry Lai, showing DNA strand fracture from cellular radiation is but one example of the well-established health risks from cellular signal not fully disclosed by any Telecom carrier or entity to the City of Palo Alto. There are many other scientific proofs of damage to the human biological system from such non-ionizing radiation, such as from Dr. Martha Herbert of The Harvard University School of Medicine, including but not limited to as set forth in her letter of February 2013 to the Los Angeles Unified School District, and other letters, from Dr. Herbert and other medical entities, as can be seen, for one of many examples, at the webpage of epidemiologist Dr. Devra Davis at www.ehtrust.org , and many other sites, including www.greenswan.org, and including articles in late March of this year which appeared in Scientific American, Wired, and especially The Nation, all as published on March 29th in such publications on the linkage between microwave signal and cancer formation. It is specifically alleged that each and all of the carriers involved, including Verizon, and including CTIA, are aware of these well-documented health risks, including but not limited to from their reading of the July 19, 2017 letter from attorney Harry V. Lehmann to the Assembly Appropriations Committee in California, in opposition CA SB 649, which letter opposing SB 649, amongst others, and which letter I have received and examined, is known to persons in Sacramento and national advocacy for CTIA and multiple cellular carriers. Despite knowledge of such documented health risks, such risks were not disclosed to the City of Palo Alto, and on that basis the City should be morally and legally released from any contractual obligation resulting

from such non-disclosure of such material facts, and for such repudiation with just cause we hereby Appeal and Claim.

7. OBJECTION AND APPEAL AND CLAIM BASED ON UNLAWFUL TAKING: Appeal, Claim, and Objection is hereby stated against any installation of any use of public easement over private property, including sidewalk easements, for microwave broadcast or related power supply purposes, on the ground that no utility easement, granted to any entity or the City allows for such physical encroachment by such sidewalk power supplies, and same are a Trespass, and an Unlawful Taking of Property, in violation of Due Process due to its absence.

8. CLAIM FOR LOSS OF PROPERTY VALUE: It is asserted and thereupon Appealed, Claimed, and Objected that the value of real property in Palo Alto is and will be diminished by the close proximity of such radiation generating devices.

9. NOTICE OF ADA VIOLATIONS: The proposed installations as above discussed will immediately injury those people in our community who are electromagnetically sensitive. The City faces great liability on that basis, and we and individually Object, Claim, and Appeal against allowance of said here-described radiation generators is stated upon the basis of the ADA liability of the City, and the ADA liability which may be imposed on us and others as homeowners from said installations.

WHEREFORE, we claim, as a married couple and individually, as set forth above, and Appeal for reversal of any allowance from the City of Palo Alto of the use of its utility poles, or the use of utility poles that collaboratively uses with other entities, for the installation of telecommunication radiation broadcasting devices, including but not limited to the so-called Small Cell installations. I, Russell Targ, sign here below on behalf of myself individually, for my wife and myself as a married couple, and for Patricia at her direction.

Russell Targ 4/9/18
1010 Harvard St Palo Alto CA

City of Palo Alto Revenue Collections

Received From: Russell Farg

Date: 4/9/18

In Payment Of: Appeal

By: _____

| ITEM | | | | |
|------|------------------------------------|----------|--------------|---------------|
| () | Certified Mail Fee | 40050009 | 18990 | \$ _____ |
| () | False Alarm Late Fee | 70020002 | 13110 | \$ _____ |
| () | Miscellaneous Revenue | 10200000 | 18990 | \$ _____ |
| () | Transient Occupancy Tax | 10200000 | 11850 | \$ _____ |
| () | Sales Tax | 10200000 | 60050 | \$ _____ |
| () | Utility User Tax | 10300000 | 11870 | \$ _____ |
| () | ZoneMapSales | 60020201 | 17030 | \$ _____ |
| () | Univ Ave Parking | 23600000 | 14510 | \$ _____ |
| () | Calif Ave Parking | 23700000 | 14520 | \$ _____ |
| () | Lot S Parking | 23600000 | 14500 | \$ _____ |
| () | Other <u>Appeal 21020402</u> | | <u>13290</u> | \$ <u>500</u> |
| | Total | | | \$ <u>280</u> |

Copies to: _____

Cash () Check ()

22-37 REV 10/03

City of Palo Alto
City of Palo Alto
Revenue Collection

Reference Number: 2018099001-64
Date/Time: 04/09/2018 3:53:10 PM

Miscellaneous
2018099001-64-1
Reference: russell farg hearing
Allocation 29
GL #: 60020402..13290....
Total: \$280.00

1 ITEM TOTAL: \$280.00
TOTAL: \$280.00

Check
Check Nbr: 002328 \$280.00
Total Received: \$280.00



Customer Copy

Submitted as rush comment in support
of Tars Appeal of April 9, 2018

Harry Vere Lehmann,
Principal Attorney

Law Offices of Harry V. Lehmann PC
4 Vineyard Court
P. O. Box 1846
Novato, California 94948-1846

Area Code 415
Telephone: 897-2121
Facsimile: 898-6959

Via facsimile of even date and Federal Express.

July 19, 2017

Ms. Jennifer Galehouse, Deputy Chief Consultant
Assembly Appropriations Committee
State Capitol, Room 2114
Sacramento, CA 95814
Via 10 page fax: 916-319-2181
& Federal Express overnight

LAW OFFICES OF HARRY V. LEHMANN, P.C.

HARRY V. LEHMANN
ATTORNEY AT LAW

P.O. Box 1846
Novato, CA 94948

Tel: 415.897.2121
Fax: 415.898.6959

- Re: 1. Incorrect data given in Telecom testimony regarding
Liability: The State faces liability exposure from SB 649
2. Whether exquisitely planned for this inevitable result, or
'just lucky' for Telecom, SB 649 once deployed will have the
effect of shifting massive Industry liability to the State of
California.

Dear Ms. Galehouse -

The liability-shift component of the SB 649 issue set has not been previously addressed. I didn't see the underlying liability-shift until after the testimony last Wednesday. The liability-shift consequence of SB 649 is a difficult point to see, but essential to be recognized. This letter is divided into two sections, the **GENERAL OVERVIEW** which appears next below presents the gist in three pages, and then a larger section titled **IN GREATER DETAIL**. Because the liability shifting aspect of this analysis was not seen by the undersigned until after the close of testimony on July 12th, and because the Appropriations Committee hearing on SB 649 is only a week away, and because this analysis implies possible billions in losses to the State, an Appropriations issue, this is an initial overview of the situation in the expectation that seasoned and competent unbiased legal analysis will be made of the most startling of the two issues here addressed, before passage of this Bill: In-depth legal analysis is encouraged.

GENERAL OVERVIEW

This letter reaches the conclusions stated through several vectors of analysis but bottom line this boils down to two core points: 1. During the hearings on SB 649, assurances were given by industry that the telecom companies would be the only entities affected by liability from radiation injuries. That is not true. Rather and instead, through SB 649 California faces potential liability for any injuries claimed to have resulted from the allegedly 'small cell,' antennas delivered to our residents from SB 649. 2. More profound in implication if true, and difficult to see, **there is a heretofore non-disclosed sequella from SB 649; the potential transfer all financial liability for cellular injury cases from the telecom corporations to the State.**

The State of California faces liability for damages sustained from Senate Bill 649

Typically any very serious or catastrophic injury case will be handled by experienced counsel - I believe any experienced lawyer who has been long engaged in plaintiffs work with governmental entities would agree with the following points, not one involves rocket science:

1) The defendants in a lawsuit do not get to choose whether to be sued. That choice is made by plaintiffs' counsel. There is no way for any industry representative to honestly claim that the State will not be sued for such injuries.

2) Once the involved cellular antenna box is attached to the involved governmental utility pole, for several reasons including the Doctrine of Fixtures as often used in tenancy situations, a melding takes place, and plaintiffs counsel will allege, as is consistent with the law, that the melded unit as a whole is Public Property.

3) Though plaintiffs can't sue the State for negligence or other Common Law causes of action, under our Government Code suit can be brought for Dangerous Condition of Public Property.

4) These *public* utility poles are demonstrably 'Dangerous' within the meaning of Government Code 835, because the radiation they emit has been scientifically proven to be carcinogenic, and the radiation is damaging to the human biological system. This is most dramatically proven by the \$25 million NIH study released on May 27, 2016, showing that cellular radiation causes the malignant cancer cell glioma, which is what causes the deadly brain cancer: glioblastoma.

5) The State of California, as a result of the Firefighters's Exemption, or Firehouse Exemption as it is alternatively called, is, a unique development, ***admitting the dangerous nature of the about-to-be-built 'small cell,' system, because, as a matter of provable Legislative Intent, the firehouses were exempted due to health concerns.*** So our Legislature is poised to create at least 30,000 different pieces of Public Property while in one fell swoop also branding each one as Dangerous. Other examples supportive of this point will appear below, in the discussion of the liability-shifting aspects of SB 649.

Senate Bill 649 can shift liability exposure from the telecom industry to the State of California.

The most important purpose of this letter is to alert Assemblymembers of previously undisclosed economic consequences which to the undersigned appear legally very likely to ensue from the passage of SB 649. State lawyers with extensive trial experience should evaluate what is said here and advise Appropriations and the Assembly whether the warnings here represent real issues. The consequence of greatest concern is that passage of SB 649, contrary to appearances, ***will result in the mass transfer of***

liability for cellular microwave injury from the telecom industry to State government, with \$Billions involved. Whether this here-disclosed consequence is the result of a brilliant and intricate multiple-stage legal stratagem by the best lawyers that Telecom could retain, or whether the industry just got lucky, the result for the State of California will be the same, financial ruin. Consider the following factors:

1. The State can't be sued for 'negligence' or other basic common-law theories of relief, and Claimants can only sue as allowed in the Government Code.
2. The main CA Government Code section which is virtually always pled by all experienced public entity lawyers is Dangerous Condition of Public Property, Government Code 835. .
3. If the 'taking,' of county and city properties in SB 649 is allowed, then what next follows when the cell tower is affixed to the publicly-owned utility pole, due to the 'fixtures,' doctrine and other legal reasons, is the merger of antenna and pole into Public Property. This is a complex issue with other criteria supporting the same Public Property finding.
4. Through the 'Firefighters Exemption' to SB 649, prohibiting cellular antenna construction near where firefighters sleep, based on health grounds as pushed by their unions, ***the State is acknowledging that its new melded-exposure property is Dangerous.***
5. As a result of the above the enabling legislation makes the resulting Public Property Dangerous in character in the light of Government Code 835, which in turn makes lawsuits against the State much easier.
6. There is now overwhelming evidence of DNA and cellular damage from radio-frequency EMF as emitted by cellular phones and towers. If you have doubt about this, set up a debate between me and the best they've got. See prior letters, notably of May 23rd to Senate Appropriations, with integrated sworn Declaration of McGavin.
7. It is a matter of well-established public record that the international re-insurance industry has long refused to insure any aspect of the telecom industry for injuries caused by cellular devices or installations. There is no net.
8. ***The only avenue left to the cellular industry, other than just honestly facing up to this mess and helping us solve it, is to shift the legal responsibility to government.***
9. Though good challenge may be on the horizon, the current stance of federal law under the Telecommunications Reform Act of 1996 it is not possible to prevail against a cellular company for liability for a phone made in roughly the last two decades.

10. Seasoned and competent counsel, where injuries occur of a sort consistent with EMF injury to DNA, including glioblastoma as indicated by glioma from the NIH study, will file suit against responsible corporate entities, broadly, and also sue the State of California. Right now many serious lawyers avoid this area due to the 1996 Telecommunications Reform Act. However the practical immunity offered to telecom under the act is conditional upon compliance with FCC standards, and there are now material means available to show that none of the currently marketed smart phones meet FCC standards when measured *as actually used in the field*, namely up against the face.
11. In the instance of the successful bar to civil prosecution which is currently provided by said industry-inspired 1996 Act, and in a State where 'joint and several liability' means that a 5% liability contributor has 100% of financial responsibility from a loss, ***the result of the combination of the factors stated above is that in the instance of suit, including 'friendly,' all financial burdens from cellular injury are shifted to the State of California, under the results from SB 649 as here-projected, through exercise of the federal regulatory bar to such prosecution of cases against the telecom industry.***

I assert no position as to whether the stream of results capsulized above will arise from the prior formation of an intricate plan from very smart lawyers, or whether the industry just 'got lucky,' in regard to the seemingly inevitable consequences of signing SB 649 into law. It doesn't matter, but when you look five or six moguls down this hill, the financial crash is inevitable. The above introductory language has provided the essential elements. A more detailed section below will provide related details.

IN GREATER DETAIL

Below is described in numerical sub-sections is the financial burden-shifting hidden in SB-649, which exists regardless of whether that liability-shifting aspect is inherent in the Bill from actual intention or lucky accident: The effect of S-649 being signed into law and then the antennas deployed thereunder, will shift liability for massive numbers of cellular device injuries from industry to Government.

1. Under SB 649 and as a result of the corporate 'taking' of municipal, county, and State property, in the form of forced corporate seizure of previously publicly owned utility poles, the cellular antenna placed thereupon by such installation, including in real estate law, become an integrated 'fixture,' of said public property, ***in several ways legally indivisible therefrom.*** Other examples to the point of shared conduct imbuing with Public character arise from joint venture, etc. ***Once industry puts these antennas up on public poles, all risks and injuries from such antennas will be from a Dangerous Condition of Public Property, as defined in Government Code 835.*** The resulting Jury Instructions can be seen at CACI 1100.
2. In California law, state, regional and local governments cannot be sued for 'negligence.' Rather, the basis for which a suit may go forward against the State or an element thereof will, and must, be grounded in a statutorily prescribed Cause of

Action. Most commonly in these governmental tort situations, seasoned counsel will file, first, a Governmental Tort Claim alleging **Dangerous Condition of Public Property**, and thereafter, post-denial of the claim, the central plead liability theory of most such cases is just that, **Dangerous Condition of Public Property**, as provided for in Government Code 835.

3. It is established by clear and convincing evidence that cellular microwave broadcasts have adverse health consequences. The recent positive demonstration of the causation of malignant glioma (thus glioblastoma) cells from cellular energy in perfectly Faraday protected environments from our National Institutes of Health was only the most recent of similar and earlier findings. Much of these data and citations thereto have been provided to all Senators and Assemblymembers, including from my own letters. There can be arguments about varying danger of differing exposure routines, *but the fact that the danger exists is overwhelmingly demonstrated*, including by exposure standards for technicians engaged in cellular tower work. The epidemiological proof of non-thermal effect on the human biological system is now beyond reasonable dispute, as shown for just one example in the work of DeKun Li, the senior epidemiologist from Kaiser, Oakland, showing statistically significant increases in asthma and obesity in children of mothers who experienced higher level of EMF exposure during pregnancy. The data are readily accessible to all legislators. *With the Firefighters Exemption, the Bill itself is stating that the installation of small cell antennas on poles is "Dangerous,"* else no reason for the Exemption.
4. It is well established in publicly available records and news reports that the re-insurance industry has refused, for decades, to insure or even defend manufacturers or carriers or others in telecom against lawsuits on behalf of persons claiming to have been injured by cellular radiation exposure. Therefore, the Telecom industry, now the largest dollar industry in the world, is on the high wire without a net. **The industry likely has no insurance for injuries from cellular radiation, and it is not the proper job of the People of the great State of California to insure industry for that exposure.**
5. *In this situation, lawyers for the industry have almost certainly been tasked with examining ways through which the burden of this possible cellular injury exposure could be deflected onto other entities.* These people are too smart not to have seen this far down the road.
6. Recent news reports have speculated that SB 649 may result in as many as 50,000 new cellular towers in California; in his recent correspondence Dr. Joel Moskowitz has indicated a range of between 30,000 and 50,000: The total may not reach 50K in the near term, as there are no provisions in SB 649 to truly extend past the Divide in rural areas. If for illustration we assume the lower number, it becomes a simple math problem: **LEGISLATIVELY CONFESSED DANGER x 30,000 PUBLIC POLES = 30, 000 SEPARATE INSTANCES OF DANGEROUS PIECES OF PUBLIC PROPERTY.**

We have all heard allegations of people jumping on municipal transit buses immediately post crash, seeking to participate in recoveries. I think that is actually very uncommon, but recognition of tort opportunity will be easier here as these are stationary Dangerous Public Properties, which conveniently bring the carcinogenic radiation right into your living room, especially if you live in a crowded building, which with 5G exponentially expands the field density to which residents are exposed, the broadcasts not being cohesive EMF, each neighbor is affected by his or her neighbor's use of 5G.

7. Our Assembly should insist upon detailed legal analysis before passing SB 649: Under current constructions of The Telecommunications Reform Act of 1996, the companies are protected from liability, whereas it appears that the State is unlikely to benefit from the liability avoidance aspects of the 1996 Act. This is a complex area, to be further litigated, hopefully to correction for the benefit of the consumer, but there is a widely prevailing current legal view that current constructions of the Act protect the companies from any injury claims stemming from radio-frequency exposure. *After the SB 649 cellular towers are up, and claims come forward, in any such resulting suits, until the law is more to the benefit of consumers than is currently the apparent case, where manufacturers and Telecom companies and the governmental body are all sued, and telecom can dodge out, there is a substantial legal argument the government entity involved cannot.* This Bill sets up the State for massive losses by putting it in the place of an insurance company insuring against losses based on cellular exposure.
8. Causation will be a core issue of proof in the wave of Claims and then Complaints on this issue that is inevitable to come, given the science. Ultimate adjudication may be by Court, which is all we have at this point, or perhaps as some now visualize, something akin to the National Vaccine Injury Program, which has dispensed billions of dollars to injured claimants since its inception. Given that with the Firefighter's Exemption the State is acknowledging that its conduct of putting these antennas on every block is intentional conduct being pursued despite clear repeated science-based Notice of the risk. Here, if SB 649 goes forward, despite the repeated clear warnings of harm that have been given in submitted written records, a Court may also reasonably conclude that such further engagement in such State activity is an Extra-Hazardous Activity. The legal point that derives from this is that in Extra-Hazardous Activity the scope of Proximate Cause will be allowed to expand, a factor which puts the State at risk.

If the Assembly goes forward despite this risk, bankruptcy of the State of California can be reasonably expected to result. Just think of the testimony that we've recently heard, on July 12th, from residents who have suffered from and are still fighting brain cancer, which they attribute, with science-based cause, to extensive long term up close exposure to cellular telephony. Thus, if there is a phone-based lawsuit, where the claim derives from an area of SB 649 saturation, the lawyers involved, in order to meet the ordinary standards of care of the work, will be compelled to sue the State. It is further noted that the effective immunities enjoyed by mobile telecom service providers and manufacturers under the 1996 Act are conditional upon the device(s) involved radiating

within the FCC designated range of radiation values, yet our measurements in Palo Alto, for example, show that the strength of the allegedly 'small' cellular devices on poles there are in some instances *multiples* of the approved safety standards for human tissue saturation. In the urban context, with many households, including children, using 5G where cable used to work, most residents of dense apartment buildings will receive radiation saturation not only from what people (multiple TV's) in *their* apartment, but also from broadcast, which is not a cohesive signal, as received by nearby neighbors.

With wide-spread increasing rates of long term use, the inevitable will be put forward based upon alleged injury from a cell phone: Because of the cumulative nature of DNA damage, even with only episodic breakage increases, an upward numerical trend of DNA strand breakage percentage over time appears inevitable if SB 649 is allowed to pass. In normal balance against damaging influences, our bodies rely upon the abilities of the human biological system to self-repair, including at a DNA level, but where the capacity for repair is exceeded by direct exposure (*as distinguished from environmental exposure*) from a carcinogenic radio source, the potential for increased levels and rates of mutagenic process can reasonably be expected to occur as a result of the overwhelm of such repair capacities: Once the entire urban and suburban areas are densely saturated with so-called 'small cell' 5G (+ ?) cellular signal, and additionally given the overlapping EMF factors involved, seasoned counsel would always name the telecommunications company, the manufacturer, the seller, the service provider, and now the State, based on SB 649-rooted liability exposure. The State will be permanently exposed to liabilities so numerous and great that all other California state government programs will suffer, from roads to good policing, to schools, to public safety, to pensions.

Our laws recognize both concurrent cause, and joint and several liability where the injury resulted from multiple entities acting in concert. Joint and several liability also results in the instance of the concurring negligence of independent tortfeasors, such as in the classic Summers v. Tice context. As is not uncommon in civil lawsuits, an entity with only a tiny factual contribution to the occurrence of the liability inducing event, say 5% of the negligence pie, under Joint and Several Liability is liable for the whole quantum of the injury involved in the instance of legal unavailability of the other defendants. Therefore, if, post SB 649, there is a cellular device based lawsuit, and 5G radio-frequency saturation was present during time of injury recognition, then normal standard of care obligations, in most instances, would require the naming of that entity by name, if known, as a defendant. Due to the admitted Dangerous Condition of Public Property recognized as dangerous by the Firefighter's exemption) inherent in the melded 'small cell' 5G antenna/pole Public Property, if SB 649 passes, given Joint and Several Liability, if the companies are excluded from liability by federal law, then the State will be the full-paying defendant in such suits. Next discussed below is the question of causation, forced upon us by the looming nightmare of SB 649.

On the Subject of Causation

A science-compliant discussion of non-thermal causation of damage to people by cellular devices is forced upon us here by the incomplete physics analysis which industry lobbyists attempt to repeat in their rebuttal to claims of injury. After the Senate

Appropriations hearing which included SB 649, I was approached in the corridor by a lead lobbyist from a very major telecom company. He said to me, I paraphrase ". . .you know, Mr. Lehmann, in order to affect tissue molecules without heat, you have to move the neutrons . . .and there's not enough energy in cellular signal to affect those neutrons."

The above-described exchange with this lobbyist is described in the 14 page letter and sworn Declaration that Mr. McGavin and I presented to the Senate Appropriations Committee. That kindly lobbyist was actually mis-stating the company line: Contrary to the above lobbyist's remarks, the long-stated industry position has not been about 'neutrons,' but rather that: 1) Cellular non-ionizing radiation doesn't have enough energy to directly modify an electron's shell position in an atom, *so that the valence of that atom cannot by such cellular radiation be directly changed*, and: 2) Therefore direct, non-thermal DNA damage to human tissue is not possible from cellular radiation because the energy involved is not sufficient to occasion molecular re-combination except via heat.

The industry position on the disclosed part of their physics to chemistry argument makes sense: That there is not enough energy in current or anticipated civilian cellular radiation to cause an electron to jump a shell position. However, this electron-shell-no-can-go routine is defective in its predicate: The industry position, choir sung by most industry engineers (not the late great Robert C. Kane), is predicated upon the incorrect assumption that the only mechanism of non-thermal damage is ionic forced change, meaning situations in which so much energy is by radiation placed into the molecules involved that over-loading of charge forces electron migration resulting in molecular re-combination, experienced as tissue damage.

Ionic-forced-immediate-direct chemical change, which *does* occur with ionizing radiation, does not occur with less powerful non-ionizing radiation from cellular devices. However, clear science shows that DNA strand breakage is occurring from the non-ionizing radiation from these sources. As you likely know, it is well proven scientifically that high frequency sound can, for example, shatter glass. The data indicate that DNA breakage is resulting from mechanical vibration of the DNA molecule as DNA molecules dissipate the energy which is undeniably pumped into them via radio-frequency EMF. In this regard, the 1983 interferometer findings of Swicord and Brown at the University of Maryland were mentioned in the 14 page compendium which submitted to Senate Appropriations, containing my 7 page letter and Mr. McGavin's Declaration, under Penalty of Perjury, which was also 7 pages, and which 14 page letter to Senator Lara, dated May 23rd, is integrated herein by this reference as though more fully set forth herein. It was found by Swicord/Brown's work that the addition of DNA salts to plain water, to a 7.43 percentage in the resulting fluid, **caused a twenty-four fold increase in Specific Absorption Rate, and that this massive 24X change was non-ionic**, but rather 'acoustic,' meaning as a result of the mechanical receipt of vibration energy from the cellular frequency by the DNA molecular structure.

Swicord and Brown, as stated in their paper on their interferometer testing of SAR levels, were verifying prior peer-reviewed projections that this level of SAR change in DNA would result. It is my current understanding that Dr. Swicord was at FDA when that agency, which usually passes judgement on radiation-generating consumer products,

exempted cell phones, and then, as I understand it as informed opinion, Dr. Swicord lived out his remaining career at Motorola. So, bottom line, we have extreme vibrational change in DNA from cellular range radiation, namely a drastic 24 fold increase in Specific Absorption Rate. The importance of this repeated finding is best illustrated by the work of Dr. Henry Lai, when this work was published he was with the University of Washington School of Medicine I heard Dr. Lai's presentation of his experimental findings at the International EMF Conference in Stavanger, Norway, in late 2009, and later in Norway was honored to travel to and reside for a while in the mountains over Bergen with the world's top scientists in this field, including people at the level of Dr. Martin Blank of Columbia and Dr. Olle Johansson of the Karolinska Institute, Stockholm.

Dr. Lai's experiments unequivocally proved the fact of DNA strand breakage from cellular telephone radiation. So, once the reader understands that: 1) Through the interferometer work of Swicord and Brown at Maryland, 1983, that DNA change occurs via acoustic means, while also understanding that: 2) The work of Dr. Lai, showing that such cellular signal causes DNA breakage, then it may be responsibly suggested that the occurrence of DNA breakage, not by ionic means, but via acoustic receipt of the vibrational energy. That's how people are getting hurt. Plus the calcium ion findings, noted, supra, from the elegant work of Dr. Pall at the Washington State University, and propriety requires the mention of the ground breaking work of Dr. Andrew Galsworthy of Imperial College London, whose pioneering work regarding the stripping action of cellular and other microwave on intra-cellular calcium is forth in Dr. Galsworthy's March 2012 paper The Biological Effects of Weak Electromagnetic Fields - Problems and Solutions. As to vibrational fracture of the DNA molecule, see also *Electrosmog and autoimmune disease*, by scientists Trevor G. Marshall and Trudy J. Rumann Heil. The core point sought to be communicated here is that the industry dirge; 'it can't be us, cause non-ionizing radiation can't force an ionic change,' is an incomplete as an analysis of cell damage causation, because it is a red herring of belief that has distracted the busy from seeing the actual causation.

Many environmental influences can contribute to the formation of the more serious illnesses. The book *The Secret History of the War On Cancer*, by epidemiologist Dr. Devra Davis is the best available professional source towards an understanding of the relationships between industrial toxins and health patterns in the population. This section on Causation is here only because the industry excuse sheds less light than smoke. By background, I have practiced trial based law for four decades, specializing in engineering and scientific proof cases since 1983. After the deaths of four friends and colleagues from brain cancer, I became a student of the EMF issues, to which issues myself and many others are dedicated to public education, including through our ongoing work at Green Swan, Inc.

SB 649 Seeks to Keep Cellular Telecom Off The Ropes at California's Expense.

Telecom is giant and powerful, but the truth, science, ethics and the law are far more important than the \$1.43 trillion that industry has poured into lobby efforts since 1998 (www.opensecrets.org). But even with all its massive funding, the industry has not been able to buy insurance for this industry regarding potential mobile phone casualties.

The re-insurance industry, giants like Zurich, Lloyds, long ago announced that they would not insure for personal injuries caused by cellular devices. As a result the telecom companies are at this point on their own. If they don't shift liability responsibility to another entity or entities, they face massive and potentially ruinous. Perhaps this led to a multiple stage, difficult to see legal tactic of risk shifting to the public. If something like this were going on, it would all of a sudden make a lot of sense if there were an *extreme rush* placed on this legislation. Senate Bill 649 mimics legislation that the industry tried to get through the federal Senate (S-19), which didn't work out for them, it was placed on Hold at the end of March, where it now remains, *and directly thereafter commenced this massive hard push to get California on board with the same 'seize the light poles' effort, to which obviously immense professional lobby effort is being devoted to an ongoing ongoing push for fast passage.* Normally, we could say, 'well, that's life, sometimes you've got to let the big dog eat.' But this situation is very different from ordinary because lives and souls are at stake here. This isn't a game or a hobby, this is serious.

Whether planned or not, after infrastructure is established resulting from SB 649, one crucial result *is to transfer the financial burden of impending severe liability exposure from the industry to the government.* In the instance of S-19, a substantially duplicate Bill now sensibly remaining on Hold at the federal Senate, the transference of liability exposure would have been to the federal government. With the failure of S-19 at the federal level the telecom industry went immediately to work in California. With the telecom industry having consumed a great feast at the restaurant of commerce, the effect of signing SB-649 into law would be to stick California with the tab for that very feast.

Lawmakers in California to insure that any legislation which is passed will not harm the public. Any member of our Legislature who, *knowing that there is scientific evidence of harm*, votes for SB 649 will be no different than those in power over Flint Michigan, who knew of the health hazards in the water, and yet allowed that public health hazard to continue. However, in terms of the number of people to be severely harmed, the situation with SB 649 is far more severe even than what tragically happened in Flint.

Very truly yours,



Harry V. Lehmann

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Harry Vere Lehmann,
Principal Attorney

Law Offices of Harry V. Lehmann PC
4 Vineyard Court
P. O. Box 1846
Novato, California 94948-1846

Area Code 415
Telephone: 897-2121
Facsimile: 898-6959

Via facsimile of even date and Federal Express.

July 19, 2017

Ms. Jennifer Galehouse, Deputy Chief Consultant
Assembly Appropriations Committee
State Capitol, Room 2114
Sacramento, CA 95814
Via 10 page fax: 916-319-2181
& Federal Express overnight

- Re:
1. Incorrect data given in Telecom testimony regarding Liability: The State faces liability exposure from SB 649
 2. Whether exquisitely planned for this inevitable result, or 'just lucky' for Telecom, SB 649 once deployed will have the effect of shifting massive industry liability to the State of California.

Dear Ms. Galehouse -

The liability-shift component of the SB 649 issue set has not been previously addressed. I didn't see the underlying liability-shift until after the testimony last Wednesday. The liability-shift consequence of SB 649 is a difficult point to see, but essential to be recognized. This letter is divided into two sections, the *GENERAL OVERVIEW* which appears next below presents the gist in three pages, and then a larger section titled *IN GREATER DETAIL*. Because the liability shifting aspect of this analysis was not seen by the undersigned until after the close of testimony on July 12th, and because the Appropriations Committee hearing on SB 649 is only a week away, and because this analysis implies possible billions in losses to the State, an Appropriations issue, this is an initial overview of the situation in the expectation that seasoned and competent unbiased legal analysis will be made of the most startling of the two issues here addressed, before passage of this Bill: In-depth legal analysis is encouraged.

GENERAL OVERVIEW

This letter reaches the conclusions stated through several vectors of analysis but bottom line this boils down to two core points: 1. During the hearings on SB 649, assurances were given by industry that the telecom companies would be the only entities affected by liability from radiation injuries. That is not true. Rather and instead, through SB 649 California faces potential liability for any injuries claimed to have resulted from the allegedly 'small cell,' antennas delivered to our residents from SB 649. 2. More profound in implication if true, and difficult to see, there is a heretofore non-disclosed sequella from SB 649; the potential transfer all financial liability for cellular injury cases from the telecom corporations to the State.

Submitted as public comment supporting Taras Appeal
April 9, 2018

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LAW OFFICES OF HARRY V. LEHMANN, P.C.

Beatrice Alexandra Golomb, MD, PhD
Professor of Medicine
UC San Diego School of Medicine
9500 Gilman Drive, #0995
La Jolla, CA 92093-0995
Phone: 858 558-4950 x201

HARRY V. LEHMANN
ATTORNEY AT LAW

P.O. Box 1846
Novato, CA 94948

Tel: 415.897.2121
Fax: 415.898.6959

August 18, 2017

To whom it may concern,

I urge in the strongest terms that you vigorously oppose California SB 649.

If this bill passes, many people will suffer greatly, and needlessly, as a direct result.

This sounds like hyperbole. It is not.

My research group at UC San Diego alone has received hundreds of communications from people who have developed serious health problems from electromagnetic radiation, following introduction of new technologies. Others with whom I am in communication, have independently received hundreds of similar reports. Most likely these are a tip of an iceberg of tens or perhaps hundreds of thousands of affected person. As each new technology leading to further exposure to electromagnetic radiation is introduced – and particularly introduced in a fashion that prevents vulnerable individuals from avoiding it – a new group become sensitized to health effects. This is particularly true for pulsed signals in the radiowave and microwave portion of the spectrum, the type for which the proposed bill SB 640 will bypass local control.

Mechanisms by which health effects are exerted have been shown to include oxidative stress (the type of injury against which antioxidants protect, see optional section below), damage to mitochondria (the energy producing parts of cells), damage to cell membranes^{1, 21}, and via these mechanisms, an impaired “blood brain barrier”³⁻⁵ (the blood brain barrier defends the brain against introduction of foreign substances and toxins; additionally, disruption can lead to brain edema⁶), constriction of blood vessels and impaired blood flow to the brain⁷, and triggering of autoimmune reactions^{8, 9}. Following a large exposure, that depresses antioxidant defenses, magnifying vulnerability to future exposures, some persons no longer tolerate many other forms and intensities of electromagnetic radiation that previously caused them no problem, and that currently cause others no problem. But this group deserves – nay needs -- the right to be able to avoid these exposures.

Affected individuals not only experience “symptoms” that “merely” cause them distress and suffering, when they are exposed – symptoms like headaches^{10, 11}, ringing ears^{10, 11} and chest pain¹⁰ from impaired blood flow, heart rhythm abnormalities^{10, 11}, and inability to sleep^{10, 11}. These symptoms arise from physiological injury. Moreover, **many experience significant health problems that can include seizures¹¹, heart failure, hearing loss¹²⁻¹⁴ and severe cognitive impairment^{11, 15}.** The mechanisms involved are those also involved in development and progression of neurodegenerative conditions including Alzheimer’s disease¹⁶.



Fully half who were employed when their problems developed lost their job because of the problem, among participants of a survey we conducted. They reported that their condition had cost them up to 2 million dollars to date. Many had lost their homes. A number became homeless, and have swelled the ranks of so-called “EMF refugees”¹⁷⁻¹⁹. Among those affected, many were previously high functioning individuals – engineers, doctors, lawyers. The best and the brightest are among those whose lives – and ability to contribute to society – will be destroyed. High profile individuals with acknowledged electrohypersensitivity include, for instance, Gro Harlem Brundtland – the former 3-time Prime Minister of Norway and former Director General of the World Health Organization²⁰; Matti Niemela, former Nokia Technology chief²¹; as well as the wife of Frank Clegg²², who formerly headed Microsoft Canada and is current head of Canadians for Safe Technology²³.

Each new roll-out of electromagnetic technology for which exposure is obligatory, swells the ranks of those who develop problems with electromagnetic fields (EMF).- particularly following a significant exposure to pulsed radiowave-microwave radiation, and particularly when people have no ability to avoid it.

Many state that they didn’t give credence to the problem (if they had heard of it at all) **until they themselves fell prey to it.**

This is not a psychologically driven condition. Multiple objective physiological changes reflecting mechanisms of injury have been shown in persons with this condition^{24, 25}.

The role for oxidative stress, that has been shown in innumerable studies (below), **is affirmed by evidence of a link of this condition to genetic variants in antioxidant defenses**, that are less avid in defending against oxidative stress³⁰⁷. People cannot manipulate their genes, to produce such an outcome by suggestibility.

An analysis by a University of Washington researcher showed that most studies funded by industry reported failure to show physiological effects. However, most studies without such industry bias affirmed effects. This is redolent of findings shown in medicine²⁶, regarding which the former editor in chief of the BMJ (the British Medical Journal), Richard Smith, noted, based on findings of a study, “This {result} suggests that, far from conflict of interest being unimportant in the objective and pure world of science where method and the quality of data is everything, it is the main factor determining the result of studies.”²⁷. So where articles deny injury from nonionizing radiowave-microwave radiation, there is commonly a stake aligned with financial benefit from such denial.

Those who are affected are in desperate need of protection by our elected officials. They need creation of safe spaces and housing, and roadways to allow travel, not removal of any prospect of one; protection of local rights to make decisions - **not removal of any recourse or ability to avoid what injures them.** They are far more strongly in need of protections than a great many protected classes – their problems arose due to actions of others, against which they were given no control – *and can be reversed*, in most cases, if the assault on them is rolled back. Through no fault of their own, and in some cases against their will (e.g. before opt out was permitted with smart meters), they were subjected to an



exposure that has altered their lives as they knew them, and forced them – needlessly - to the margins of society.

Let our focus be on safer, wired and well shielded technology – not more wireless.

This legislation, if passed, and the resulting unrestricted roll-out of this technology, will predictably and directly injure and disable a new group, and add depth of suffering to those already affected.

In other spheres we abridge freedoms to protect the vulnerable few. We require that every schoolchild be vaccinated, supposedly to protect the vulnerable few who may not respond effectively to a vaccine. The need to protect the vulnerable group is deemed to be so great that it justifies the decision to abridge individual rights.

In contrast, this bill seeks to abridge individual freedoms, and local rights, in the service of *harming a vulnerable group, and creating a new one.*

(The common factor appears to be that in both cases, the direction is aligned with a powerful industry that influences political decisions.)

Luckily, no abridgment of individual rights and freedoms is required to protect, here.

If any group can opt out (such as, I understand, firefighters*)²⁸; then every group deserves that equal right. Others should not be second class citizens, subject to fewer protections.

It would go far to helping this cause if anyone complicit in promoting or passing the legislation (and then after that, *their* families) were required to be the first subjected, for a substantial test period, to the *greatest* amount of exposure that anyone *else* (and their families) may be subjected to, when new policies of this type are rolled out. It will still not do them equal damage; because they may not represent the vulnerabilities that others will have; but such a policy might help them to think twice. *That* is a bill I would strongly endorse.

Most who are now affected – were not, until they were. This may become you – or your child or grandchild. Moreover, if you have a child, or a grandchild, his sperm, or her eggs (all of which she will already have by the time she is a fetus in utero), will be affected by the oxidative stress damage created by the electromagnetic radiation, in a fashion that may affect your future generations irreparably.

It was noted above that, among survey completers, fully half of those who were employed at the time they developed electrosensitivity, lost employment *due to* this problem. (This may understate the scope of the tragedy, since this most-affected group may be least likely to be able to respond to an online survey.) **Many who previously had no problem navigating in the world are now restricted from access to basic services** like hospital care, post offices and libraries because of these problems. With each new introduction of technology that exposes many to yet a new nondiscretionary source of electromagnetic radiation, particularly (but not exclusively) that which emits pulsed radiation in the radiowave-microwave part of the spectrum, a new group of people are affected; and the suffering of those who are already affected increases greatly.



Please, defend the public and our future. Protect the rights of the individual and the locality, against a form of incursion that will lead to serious harm to some – and set a terrible precedent. **Vote no on California SB 649**, and urge that everyone else do the same.

Sincerely,

Beatrice Alexandra Golomb, MD, PhD
 Professor of Medicine
 UC San Diego School of Medicine

*Comment on the fire fighter exemption: “The legislature granted an exemption from SB 649 to the firefighters who requested it for health reasons. Throughout California firefighters have long complained of often disabling symptoms from cell towers on their stations. Cities frequently rent out space on fire stations to add to city revenue. ...Symptoms experienced by the firefighters have included neurological impairment including severe headache, confusion, inability to focus, lethargy, inability to sleep, and inability to wake up for 911 emergency calls. Firefighters have reported getting lost on 911 calls in the same community they grew up in, and one veteran medic forgot where he was in the midst of basic CPR on a cardiac victim and couldn’t recall how to start the procedure over again...Prior to the installation of the tower on his station, this medic had not made a single mistake in 20 years. A pilot study (2004) of California firefighters showed brain abnormalities, cognitive impairment, delayed reaction time, and lack of impulse control in all 6 firefighters tested (<https://ecfsapi.fcc.gov/file/7022117660.pdf>). This study led to the overwhelming passage of Resolution 15 by the International Association of Firefighters in Boston in August 2004. Res. 15 called for further study and was amended to impose a moratorium on the placement of cell towers on fire stations throughout the US and Canada.”^{15 28}
 Clearly, others who experience similar problems also deserve protections.

Optional – More on the Science

There is a robust literature showing that electromagnetic radiation, including in nonionizing frequencies, and at levels^{29,30} below those that are cause thermal effects (heating) – causes physiological effects, injury, and cell death –not only in humans but many animals and plants^{3,7,31-49}. Unsurprisingly, industry has sought – against the tide of evidence to the contrary - to maintain that radiation must be ionizing or heating to cause injury.

Scores or hundreds of studies show that radiation, including specifically radiowave-microwave spectrum radiation, and including low-level exposure, can impair antioxidant defenses, increase “oxidative stress” (free radical injury) and damage mitochondria, the energy producing parts of cells^{1, 2, 34, 50-6930, 70-104105-13646, 137-171}. These effects occur with ionizing and nonionizing radiation, at thermal and subthermal levels. (Indeed, much or most of the damage by ionizing radiation, and radiation above the thermal limit, occurs by mechanisms also documented to occur without ionization, and below the thermal limit.) These



mechanisms cohere with the mechanisms documented to play a role in symptoms and health conditions that are reported in those who are electrosensitive – extending to seizures¹⁷²⁻¹⁷⁶, heart failure¹⁷⁷⁻¹⁸⁴ and cognitive decline^{5, 32, 57, 108, 185-195}.

These mechanisms have known involvement in induction of brain cancer, metabolic diseases like obesity and diabetes, autism, autoimmune disease, and neurodegenerative conditions, conditions that have exploded. In each case these have been linked, or presumptively linked, in some studies to electromagnetic radiation^{8, 9, 16, 34, 196-219}.

Such radiation also has effects on sperm^{33, 100, 220-228}, and the DNA of sperm²²⁹ (consistent with recent news reports of marked recent declines in sperm counts and function)..

Such radiation also has toxic effects in pregnancy²³⁰, to the fetus and subsequent offspring²³¹⁻²³⁵ including at low levels²³⁶, and is tied to developmental problems in later life, including attention deficit and hyperactivity^{31, 235-241}. It is critical to defend pregnant women (and eggs of girls who may at a later time become pregnant) from exposures with such toxicity.

Electromagnetic radiation across much or most of the spectrum (not excluding visible light) has been shown to depress levels of melatonin^{40, 72, 242-252}, which is best known for its role in sleep (and indeed, impaired sleep is the most consistent symptom in affected individuals^{10, 11}).

Melatonin is in fact a critical antioxidant that defends the body against harm from many toxic exposures²⁵³⁻²⁶⁶ including electromagnetic radiation itself^{61, 66, 67, 82, 101, 107, 118, 121, 138, 144, 151, 204, 249, 267-284} - reducing the oxidative stress that is implicated in cancer, metabolic diseases like obesity and diabetes, autism, autoimmune disease, bipolar disorder and neurodegenerative conditions, and that also plays a role in heart attack and stroke^{9, 285-329, 330-343}.

Radiation, and specifically radiation in the radiowave-microwave portion of the spectrum can also depress levels of other critical antioxidant systems that also defend the body against chemical, radiation, and other sources of injury. These other antioxidant systems include the glutathione system, superoxide dismutase and catalase^{81, 102, 115, 116, 233, 344-358} - which are also involved in defending against health problems.

This suggests that depression of antioxidant defenses due to electromagnetic radiation may magnify risk of chemically induced health effects (and depression of antioxidant systems due to some chemicals may amplify risk of harm from electromagnetic radiation). Indeed just such effects have been reported^{359, 360}.



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