Ridgway Town Council
Regular Meeting Agenda
Wednesday, March 11, 2020
201 N. Railroad Street, Ridgway, Colorado

5:30 p.m.

ROLL CALL Councilors Robb Austin, Tessa Cheek, Ninah Hunter, Beth Lakin, Russ Meyer, Mayor Pro Tem Eric Johnson and Mayor John Clark

EXECUTIVE SESSION

The Council will enter into a closed session pursuant to Colorado Revised Statutes 24-6-402(4)(e) for a conference with the Town Attorney for the purpose of determining positions relative to matters that may be subject to negotiations, developing strategy for negotiations, and/or instructing negotiators, regarding Lake Otonawanda.

6:00 p.m.

ADDITIONS & DELETIONS TO THE AGENDA

ADOPTION OF CONSENT CALENDAR All matters listed under the consent calendar are considered to be routine by the Town Council and enacted by one motion. The Council has received and considered reports and recommendations prior to assigning consent calendar designations. Copies of the reports are on file in the Town Clerk's Office and are available to the public. There will be no separate discussion on these items. If discussion is requested, that item will be removed from the consent calendar and considered separately.

1. Minutes of the Regular Meeting of February 12, 2020.

2. Minutes of Joint Workshop held on February 10, 2020.

3. Register of Demands for March 2020.

4. Renew restaurant liquor license for True Grit Cafe.

5. Appoint Andy Nasisse to the Ridgway Creative District, Creative Advocacy Team.

6. Water leak adjustment for Meter #6270.1/ 155 S. Elizabeth Street.

PUBLIC COMMENTS Established time for the public to address the Council regarding any item not otherwise listed on the agenda. Comments will be limited to 5 minutes per person.

PUBLIC REQUESTS AND PRESENTATIONS Public comments will be limited to 5 minutes per person; discussion of each item may be limited to 20 minutes.

7. Request to use Hartwell Park for Ridgway Old West Fest on September 25, 26 and 27th and request to use Town streets for wagon rides during the event - Eve Becker Doyle.

8. Request for Town to consider adopting regulations for small cell and other communication facility installations in Town rights-of-ways and on Town infrastructure - Kristine Skovli.

POLICY MATTERS Public comments will be limited to 5 minutes per person; overall discussion of each item may be limited to 20 minutes.

9. Request for extension of preliminary plat submittal for The Preserve PUD - Town Planner.

10. Request from Alpenglow Cohousing Subdivision for additional time to meet condition of the subdivision preliminary plat approval relative to stormwater planning - Town Planner.

11. Follow up to request from ROCC for Town participation in the San Miguel Power Association 'Totally Green Program' - Town Manager.

12. Introduction of Ordinance Revising Section 7-3-12 of the Ridgway Municipal Code Regarding Sign Regulations - Town Planner.

WRITTEN REPORTS Written reports may be provided for informational purposes prior to the meeting updating Council on various matters that may or may not warrant discussion and action.

13. Town Manager's Report.

COUNCIL COMMITTEE REPORTS Informational verbal reports from Councilors pertaining to the following committees, commissions and organizations:

Committees, Commissions, Task Forces:
Ridgway Parks, Trails & Open Space Committee - Mayor Pro Tem Johnson
Ridgway Planning Commission - Councilor Cheek and Mayor Clark
Ridgway Creative District Creative Advocacy Team - Councilor Hunter
Ridgway Scholarship Committee - Mayor Pro Tem Johnson and Mayor Clark

Board Appointments:
Ouray County Weed Board - Councilor Lakin; alternate - Town Engineer
Ouray County Joint Planning Board - Councilor Meyer, citizens Rod Fitzhugh & Tom McKenney; alternate-Mayor Pro Tem Johnson
Sneffels Energy Board - Councilor Lakin and Public Works Services Administrator; alternate - Mayor Pro Tem Johnson
Region 10 Board - Mayor Clark
WestCO Dispatch Board - Town Marshal; alternate - Town Manager
Gunnison Valley Transportation Planning Region - Town Manager; alternate - Public Works Services Administrator
Ouray County Transit Committee - Public Works Services Administrator; alternate - Town Manager
Ouray County Water Users Association - Councilor Meyer
Ouray County Affordable Housing Advisory Committee - Councilor Austin.

Liaisons and Participation:
Chamber of Commerce - Councilmember Hunter
Communities That Care Coalition - Mayor Clark
Ouray County Fairgrounds - Councilor Austin

ADJOURNMENT

Deadline for agenda items for next regular meeting, Wednesday, April 1, 2020 at 4:00 p.m., Town Clerk's Office, 201 N. Railroad Street, Ridgway, Colorado.

Consent Agenda

RIDGWAY TOWN COUNCIL

MINUTES OF REGULAR MEETING

FEBRUARY 12, 2020

CALL TO ORDER

The Mayor called the meeting to order at 5:35 p.m. in the Community Center at 201 North Railroad Street, Ridgway, Colorado. The Council was present in its entirety with Councilors Austin, Cheek, Hunter, Lakin, Meyer, Mayor Pro Tem Johnson and Mayor Clark in attendance.

The Town Attorney requested adding to the agenda an executive session to receive legal advice regarding the upcoming election.

ACTION:

Councilor Hunter moved to add an executive session to the agenda. Councilor Meyer seconded and on a call for the vote, the motion carried unanimously.

CONSENT AGENDA

1. Minutes of the Regular Meeting of January 8, 2020.

2. Register of Demands for February 2020.

3. Renew liquor license for Colorado Boy Depot.

ACTION:

It was moved by Councilmember Austin, seconded by Councilor Lakin and unanimously carried to approve the consent calendar.

PUBLIC COMMENTS

Terry Schuyler addressed the Council on behalf of the Ridgway Ouray Community Council (ROCC) Clean Energy Committee's 'Totally Green Program'. He explained the goal is to "source 100%" electricity generated with renewable energy sources. He suggested the Council consider all public facilities "go totally green" with electrical use, "all sourced from renewables". He presented an analysis of the Town's annual usage and noted converting to renewables would "cost $5,000 a year or $419 a month". The Clean Energy Committee may have matching funds to offset costs the first year, he reported.

There was discussion and consensus of the Council was to direct staff to work with Mr. Schuyler regarding participation in the program, and report back at the next meeting.

PUBLIC REQUESTS AND PRESENTATIONS

4. Request to renew agreement with Ridgway Area Chamber of Commerce for percentage of lodging tax remittances to provide marketing services for the Town

Staff Report from the Town Manager for the 2-12-20 meeting, presenting a letter of request from the Ridgway Area Chamber of Commerce (RACC) dated 1-23-20 requesting a renewal of the agreement to share lodging tax receipts to provide marketing services; 2020 marketing budget and narrative.

Representing the Ridgway Area Chamber of Commerce (RACC) Tim Patterson and Hilary Lewkowitz requested renewal of the agreement for a 70% portion of the proceeds from lodging tax remittance, to provide marketing services. They explained the board is requesting bi-annual reporting, instead of quarterly; would like to change the requirement for submission of year end report to January 15th of the following year; and continue to receive payment on a monthly basis.

There was discussion by the Council and it was agreed a financial summary should be submitted quarterly, and a verbal report presented twice a year.

ACTION:

Councilor Meyer moved to approve renewal of the agreement with Ridgway Area Chamber of Commerce for a percentage of lodging tax remittances to provide marketing services, and approve modifying the agreement to bi-annual in person reporting, monthly payments and quarterly financial reporting. Councilor Lakin seconded the motion which carried unanimously.

5. Presentation from Uncompahgre Watershed Partnership

Tanya Ishikawa with the Uncompahgre Watershed Partnership (UWP) presented an Annual Report for 2019 and a new Watershed Guide.

Arlen Huggins presented a PowerPoint presentation with graphs addressing the UWP involvement in the statewide River Watch Program. The program is operated by the Division of Colorado Parks and Wildlife, and administered by volunteers monitoring the water basins throughout the state for baseline quality data. The UWP monitors six segments along the Uncompahgre River, and he presented statistical data from the sites, between 2013 and 2018.

There were questions, and discussion by the Council.

Ashley Benbenk presented information on the Governor Basin Restoration Project located seven miles southwest of Ouray. The project, which will benefit downstream users, is currently in the planning process. Construction will begin in late 2020 or early 2021 and the area will be monitored for ten years.

6. Request from Habitat for Humanity to support the project on Laura Street by contributing water and sewer taps

Erica Weeks, Executive Director for Habitat for Humanity of the San Juan's, explained the organization is "ready to break ground" and construct a tri-plex project on Laura Street. She explained the building will provide affordable housing to three families that "live and work in Town", granting them an "affordable mortgage of $600 to $700 a month". She requested the Council consider contributing to the project by waiving water and sewer tap fees.

Mayor Clark explained the Council can not waive tap fees, as they are enterprise funds. If the Council choses to contribute to the project the funds must come from the general fund. The Town Manager noted the subsidy would be $14,960.

There were questions from Council to staff and representatives from Habitat for Humanity.

The Town Planner explained the subdivision plat notes waive excise development fees for affordable housing units, and waive building and plan check fees, which would waive approximately $12,000 in fees.

There was discussion by the Council. The Town Clerk noted the 2020 general fund budget contains funds for affordable housing.

ACTION:

Councilor Austin moved to accept the request from Habitat for Humanity with funds to be used from the Affordable Housing line item in the General Fund in the amount of $14,960. Mayor Pro Tem Johnson seconded the motion which carried unanimously.

7. Request to use parking lot on the southeast corner of Hartwell Park for parking lot sale on May 9th

On behalf of Friends of Ridgway Schools Bernadette and Rick Taylor requested use of half of the south Hartwell Park parking lot, for a parking lot sale fundraising event on May 9th. They explained the organization desires to use the area which is adjacent to the highway "to get more exposure".

ACTION:

Moved by Councilor Lakin to approve the Friends of the Ridgway School request to use half of the parking lot for a parking lot sale on May 9th, Councilor Meyer seconded the motion, which carried unanimously.

POLICY MATTERS

8. Adoption of the application for International Dark Sky Community Designation

Staff Reported dated 2-12-20 from the Town Planner presenting the application for International Dark Sky Community Designation, which was prepared by the ROCC Ridgway Dark Sky Committee.

Planner Coburn reported the Town has received comments and suggested edits from International Dark Sky Association (IDA) regarding a draft of the document.

Val Szwarc representing the committee asked that any comments the Council would like included in the application be submitted by the weekend. He noted the comments from the IDA will also be included.

Speaking from the audience it was noted the regulations will also benefit residents in unincorporated areas of the county.

ACTION:

It was moved by Councilor Lakin, seconded by Councilor Meyer and unanimously carried to approve the application for International Dark Sky Community Designation subject to administrative changes and review by staff.

9. Authorization for Mayor to sign letter of support for Clearnetworx funding request to the Department of Regulatory Agencies to expand broadband network in Ouray County

Staff Report from the Town Manager presenting a proposed letter for the Mayors signature supporting a funding request for Clearnetworx LLC to the Department of Regulatory Agencies; and a map of the area to which broadband network will be expanded.

Manager Neill explained the request for a letter of support mirrors action taken by the Council in July. The current proposal will expand service to lower Log Hill and Colona.

ACTION:

Moved by Mayor Pro Tem Johnson to authorize the Mayor to sign a letter of support for the Clearnetworx funding request to the Department of Regulatory Agencies to expand broadband network into the lower Log Hill and Colona area. Seconded by Councilor Lakin, the motion carried unanimously.

10. Scholarship funds to attend the annual CML conference

Mayor Clark reported there are scholarship funds available for registration to the annual Colorado Municipal League (CML) conference in June. He encouraged members of the Council to attend the event.

11. Intergovernmental Agreement for Shared Victim Advocate Services with the City of Ouray and Ouray County

Memorandum from the Town Attorney dated 2-7-20 presenting an intergovernmental agreement (IGA) between the City and County of Ouray for victim advocacy services.

Attorney Nerlin reported the IGA was discussed at the December meeting, and changes have been made at the request of the County Attorney.

ACTION:

Councilmember Lakin moved to approve the Intergovernmental Agreement between the Town of Ridgway, City of Ouray and Ouray County for Shared Victim Advocate Services. Councilor Meyer seconded and on a call for the vote, the motion carried unanimously.

12. Temporary Access Agreement with Echo Properties Corp., Ridgway Railroad Museum and Ouray County Ranch History Museum

Memorandum from the Town Attorney dated 2-10-20 presenting a temporary access agreement between the Town, Echo Properties Corp., the Ouray County Ranch History Museum and Ridgway Railroad Museum.

Attorney Nerlin explained the Council has previously approved similar access agreements with Echo Corporation and it's tenants. The agreement will expire on June 1, 2020, and allows entry to the property from three points off North Railroad Street.

ACTION:

Moved by Councilor Meyer, and seconded by Mayor Pro Tem Johnson to approve the Temporary Access Agreement between the Town, Echo Properties Corp., Railroad Depot Funding LLC, Ridgway Railroad Museum and Ouray County Ranch History Museum. The motion carried on a unanimous vote.

STAFF REPORTS

The Council received written reports pertaining to the Creative District and Main Street Program; and an update from the Town Manager.

TOWN COUNCIL REPORTS

Councilor Hunter reported on the Creative District Committee.

Councilor Austin noted he will not be seeking re-election to office, and thanked the Council, and the residents for the opportunity to serve the community.

EXECUTIVE SESSION

The Town Attorney suggested the Town Council enter into an executive session pursuant to Colorado Revised Statutes 24-6-402(4)(b) for conference with the Town Attorney, for the purpose of receiving legal advice regarding the upcoming election.

ACTION:

It was moved by Councilor Lakin, seconded by Councilor Meyer and unanimously carried to enter into closed session.

The Council entered into executive session at 7:30 p.m. with the Town Attorney, Town Clerk and Town Manager.

The Council reconvened to open session at 7:40 p.m.

ADJOURNMENT

The meeting adjourned at 7:40 p.m.

Respectfully Submitted,

Pam Kraft, MMC
Town Clerk

MINUTES OF JOINT WORKSHOP
RIDGWAY TOWN COUNCIL
& PLANNING COMMISSION

FEBRUARY 10, 2020

The Town Council convened for a Joint Workshop with the Planning Commission at 6:05 p.m. in the Ridgway Community Center at 201 N. Railroad Street, Ridgway, Colorado. In attendance Councilors Austin, Cheek, Meyer, Hunter, Lakin, Mayor Pro Tem Johnson and Mayor Clark. Chairperson Canright and Commissioners Falk and Nelson were in attendance representing the Planning Commission.

Town Clerk's Notice of Joint Workshop dated January 10, 2020 to review proposed code updates pertaining to affordable housing with Clarion Associates.

Town Planner Shay Coburn noted the proposed codes changes are specific to the Master Plan housing goals. These would make housing accessible for a range of income levels, ages, and households, and encourage a diversity of housing options that meet the need of residents. This could be obtained by implementing action items of the Master Plan. Proposed changes to Municipal Code Section 7-3 zoning regulations, Section 6-6 for single family home design standards, are intended to help reduce costs for housing.

Consultant Don Elliott with Clarion Associates reviewed new and updated definitions in the municipal code; clarified the difference between manufactured and factory built homes; explained the difference between live/work and employee housing and explained the intention for a new Mixed Use Residential District. The new district would be a floating district with no specific land proposed for rezoning, support mixed uses and allow up to eighteen dwelling units per acre.

Mr. Elliott reviewed proposed expanded allowances proposed for existing districts and changes to the dimensional requirements for the Residential and Historic Residential Districts. The changes include updates to off-street parking requirements and use of specific standards for accessory dwelling units, short term rentals and employee housing. Mr. Elliott reviewed the variance requirements for building footprint and roof pitch. Architectural standards have been clarified, and new deviation criteria has been added for promoting work-force housing.

Members of the audience participated in the discussion with the Town Council and Planning Commission. Mr. Elliott provided clarification and answered questions about the presentation and revisions to the regulations.

The Council and Commission discussed future impacts regarding the proposed reductions in lot size and lot width in the Historic Residential District, and agreed to submit comments and concerns to the Town Planner by February 24th .

Planner Coburn circulated a comment form for the audience to submit by February 24th. The comments will be incorporated into an updated draft that will be published and then reviewed by Planning Commission at the March meeting. The Commission will make recommendations for code revisions to the Town Council.

ADJOURNMENT

The meeting adjourned at 7:55 p.m.

Respectfully Submitted,
Karen Christian, Deputy Clerk
Pam Kraft, Town Clerk

Town of Ridgway
Register of Demands
March 2020

Name	Memo	Account	Paid Amount
Black Hills Energy-Broadband		**Alpine-Operating Account**	
	broadband building	5075GO1 · Region 10	-37.10
TOTAL			-37.10
Black Hills Energy-Lift Station		**Alpine-Operating Account**	
		942SOO · Utilities	-26.08
TOTAL			-26.08
Black Hills Energy-PW Building		**Alpine-Operating Account**	
		742POO · Utilities	-60.70
		642GO2 · Utilities	-60.69
		942SOO · Utilities	-60.69
		942WOO · Utilities	-60.69
TOTAL			-242.77
Black Hills Energy-PW Office		**Alpine-Operating Account**	
		642GO2 · Utilities	-21.26
		942SOO · Utilities	-21.26
		942WOO · Utilities	-21.25
TOTAL			-63.77
Black Hills Energy-Hartwell Park		**Alpine-Operating Account**	
		742POO · Utilities	-49.27
TOTAL			-49.27
Black Hills Energy-Town Hall		**Alpine-Operating Account**	
		742PO1 · Utilities - community center	-71.75
		842GO3 · Utilities	-71.74
		542GOO · Utilities	-71.74
TOTAL			-215.23
Impact Promotional Products		**Alpine-Operating Account**	
	LYVF glasses - shipping	781POO · Events & Festivals	-128.83
TOTAL			-128.83
Xerox Financial Services		**Alpine-Operating Account**	
	Feb 2020	948SOO · Office Equipment - Leases	-28.00
	Feb 2020	948WOO · Office Equipment - Leases	-28.00
	Feb 2020	548GOO · Office Equipment - Leases	-96.64
TOTAL			-152.64

Town of Ridgway
Register of Demands
March 2020

Name	Memo	Account	Paid Amount
Consolidated Consulting Servi...		**Alpine-Operating Account**	
	RiverSage (to be reimb)	519GOO · Contractual Services	-520.00
	engin - SWPlan	614GO2 · Consulting/ContracturalServices	-2,460.00
	specs	914WOO · Consulting & Engineering Ser...	-1,785.00
	specs	914SOO · Consulting & Engineering Servs	-2,085.00
	specs	614GO2 · Consulting/ContracturalServices	-450.00
	review Lake O survey	914WOO · Consulting & Engineering Ser...	-300.00
	Ridgway Cohousing (to be reimb)	519GOO · Contractual Services	-2,405.00
TOTAL			-10,005.00
Clear Networx, LLC		**Alpine-Operating Account**	
	Mar 2020	543GOO · Telephone	-56.00
	Mar 2020	643GO2 · Telephone	-56.00
	Mar 2020	843GO3 · Telephone	-61.00
	Mar 2020	943WOO · Telephone	-56.00
	Mar 2020	943SOO · Telephone	-56.00
	Mar 2020	530GOO · Computer	-50.00
	Mar 2020	630GO2 · Computer	-50.00
	Mar 2020	730POO · Computer	-50.00
	Mar 2020	830GO3 · Computer	-50.00
	Mar 2020	930WOO · Computer	-50.00
	Mar 2020	930SOO · Computer	-50.00
	Mar 2020	917WOO · IT Services	-50.00
	Mar 2020	917SOO · IT Services	-25.00
	Mar 2020	615GO2 · IT Services	-25.00
	Mar 2020	843GO3 · Telephone	-55.00
TOTAL			-740.00
Clarion Associates LLC		**Alpine-Operating Account**	
	Housing Element - Jan 2020	514GOO · Consulting Services	-2,697.50
TOTAL			-2,697.50
USABlueBook		**Alpine-Operating Account**	
	influent flow meter	931SOO · Maintenance & Repairs	-2,367.95
	chlorine reagent set	931WOO · Maintenance & Repairs	-418.83
TOTAL			-2,786.78
petpickups.com		**Alpine-Operating Account**	
	dog p/up mitts	732POO · Supplies & Materials	-1,623.00
TOTAL			-1,623.00
Verizon Wireless		**Alpine-Operating Account**	
		943WOO · Telephone	-35.04
TOTAL			-35.04

Town of Ridgway
Register of Demands
March 2020

Name	Memo	Account	Paid Amount
True Value		**Alpine-Operating Account**	
		632GO2 · Supplies & Materials	-4.99
		661GO2 · Vehicle & Equip Maint & Repair	-2.65
		732POO · Supplies & Materials	-8.56
		761POO · Vehicle & Equip Maint & Repair	-208.70
		732PO1 · Supplies - community center	-49.97
		832GO3 · Equipment & Supplies	-11.99
		961SOO · Vehicle & Equip Maint & Repair	-18.99
		932SOO · Supplies & Materials	-5.00
	pc claim - tools	920SOO · Insurance (Property/Casulty)	-123.47
		932WOO · Supplies & Materials	-66.97
		961WOO · Vehicle & Equip Maint & Repair	-19.87
TOTAL			-521.16
Federal Express		**Alpine-Operating Account**	
		990WOO · Testing - water	-271.02
	ship lost wallet (to be reimb)	828GO3 · Other - law enforcement	-27.71
TOTAL			-298.73
Verizon Wireless		**Alpine-Operating Account**	
		741POO · Telephone	-34.72
		943SOO · Telephone	-74.43
		943WOO · Telephone	-155.90
		843GO3 · Telephone	-153.22
		543GOO · Telephone	-41.28
		643GO2 · Telephone	-52.93
		552GOO · GIS Mapping - admin	-10.00
		952SOO · GIS Mapping - sewer	-10.01
		952WOO · GIS Mapping - water	-10.01
		830GO3 · Computer	-160.18
TOTAL			-702.68
Alpenglow Publishers LLC		**Alpine-Operating Account**	
	bid - cleaning	540GOO · Printing & Publishing	-26.10
	bid for construction	CP1902 · Bank Fees	-26.10
TOTAL			-52.20
FleetPride		**Alpine-Operating Account**	
	mirror bracket - snowplow	661GO2 · Vehicle & Equip Maint & Repair	-76.48
TOTAL			-76.48
WestCo		**Alpine-Operating Account**	
	1st qtr 2020	885GO3 · Dispatch Services	-10,003.60
TOTAL			-10,003.60
Mountain Market		**Alpine-Operating Account**	
		553GOO · Meetings & Community Events	-32.43
TOTAL			-32.43

Town of Ridgway
Register of Demands
March 2020

Name	Memo	Account	Paid Amount
Rocky Mountain Aggregate & C...		**Alpine-Operating Account**	
		635GO2 · Gravel & Sand	-954.36
TOTAL			-954.36
Honnen Equipment Company		**Alpine-Operating Account**	
	1/14-2/10 loader	662GO2 · SnowRemoval Equip&Services	-2,191.32
TOTAL			-2,191.32
Maynes Tires LLC		**Alpine-Operating Account**	
	tire repair - backhoe	961WOO · Vehicle & Equip Maint & Repair	-79.07
TOTAL			-79.07
Department of Labor		**Alpine-Operating Account**	
	boiler inspection	731PO1 · Maint & Repairs - comm cntr	-40.00
TOTAL			-40.00
Superior Fire Protection		**Alpine-Operating Account**	
	fire ext. inspections	731PO1 · Maint & Repairs - comm cntr	-43.00
	fire ext. inspections	931WOO · Maintenance & Repairs	-52.33
	fire ext. inspections	631GO2 · Maintenance & Repairs	-24.34
	fire ext. inspections	931SOO · Maintenance & Repairs	-24.33
	fire ext. inspections	832GO3 · Equipment & Supplies	-22.00
	fire extinguisher	732PO1 · Supplies - community center	-225.00
TOTAL			-391.00
The Paper Clip LLC		**Alpine-Operating Account**	
		541GOO · Office Supplies	-83.29
		941WOO · Office Supplies	-22.62
		941SOO · Office Supplies	-22.62
TOTAL			-128.53
Bobcat of the Rockies LLC		**Alpine-Operating Account**	
	filters - Toolcat	761POO · Vehicle & Equip Maint & Repair	-244.85
	filters - Toolcat	661GO2 · Vehicle & Equip Maint & Repair	-81.62
TOTAL			-326.47
SGM		**Alpine-Operating Account**	
	thru 2/15/20	552GOO · GIS Mapping - admin	-376.17
	thru 2/15/20	952WOO · GIS Mapping - water	-376.16
	thru 2/15/20	952SOO · GIS Mapping - sewer	-376.17
TOTAL			-1,128.50

Town of Ridgway
Register of Demands
March 2020

Name	Memo	Account	Paid Amount
Ridgway Office Supply & Servic...		**Alpine-Operating Account**	
	draft building plan copies	CP1900 · Design	-47.50
TOTAL			-47.50
Mesa County HDR Laboratory		**Alpine-Operating Account**	
		990WOO · Testing - water	-20.00
TOTAL			-20.00
Sunset Automotive		**Alpine-Operating Account**	
	hose connector - grader	661GO2 · Vehicle & Equip Maint & Repair	-7.16
	hose connector - grader	961WOO · Vehicle & Equip Maint & Repair	-2.38
TOTAL			-9.54
Hartman Brothers Inc		**Alpine-Operating Account**	
	cylinder lease renewal	661GO2 · Vehicle & Equip Maint & Repair	-48.00
	cylinder lease renewal	961SOO · Vehicle & Equip Maint & Repair	-48.00
	cylinder lease renewal	961WOO · Vehicle & Equip Maint & Repair	-48.00
		661GO2 · Vehicle & Equip Maint & Repair	-2.12
		961WOO · Vehicle & Equip Maint & Repair	-2.13
		961SOO · Vehicle & Equip Maint & Repair	-2.13
TOTAL			-150.38
Eurofins Eaton Analytical Inc.		**Alpine-Operating Account**	
		990WOO · Testing - water	-150.00
TOTAL			-150.00
Pro Velocity		**Alpine-Operating Account**	
		556GOO · IT Services	-25.00
		820GO3 · IT Services	-63.75
TOTAL			-88.75
Caselle Inc		**Alpine-Operating Account**	
	Apr 2020	914SOO · Consulting & Engineering Servs	-159.50
	Apr 2020	914WOO · Consulting & Engineering Ser...	-159.50
TOTAL			-319.00
UNCC		**Alpine-Operating Account**	
		915WOO · Dues & memberships	-4.47
		915SOO · Dues & Memberships	-4.47
TOTAL			-8.94

Town of Ridgway
Register of Demands
March 2020

Name	Memo	Account	Paid Amount
Pureline Treatment Systems		**Alpine-Operating Account**	
	Mar 2020	989WOO · Plant Expenses - water	-1,650.00
TOTAL			-1,650.00
Recla Metals LLLP		**Alpine-Operating Account**	
	floor grating - utility trailer	761POO · Vehicle & Equip Maint & Repair	-8.04
TOTAL			-8.04
Amerigas		**Alpine-Operating Account**	
	propane - wtr plant	942WOO · Utilities	-614.93
TOTAL			-614.93
San Miguel Power Assoc, Inc.		**Alpine-Operating Account**	
	1/19/20-2/19/20	542GOO · Utilities	-74.80
	1/19/20-2/19/20	638GO2 · Street Lighting	-594.52
	1/19/20-2/19/20	642GO2 · Utilities	-334.05
	1/19/20-2/19/20	742POO · Utilities	-320.67
	1/19/20-2/19/20	742PO1 · Utilities - community center	-74.79
	1/19/20-2/19/20	842GO3 · Utilities	-74.80
	1/19/20-2/19/20	942SOO · Utilities	-2,639.02
	1/19/20-2/19/20	942WOO · Utilities	-627.90
TOTAL			-4,740.55
Ouray County Road & Bridge		**Alpine-Operating Account**	
	Feb 2020	660GO2 · Gas & Oil	-286.16
	Feb 2020	760POO · Gas & Oil	-42.51
	Feb 2020	960WOO · Gas & Oil	-208.75
	Feb 2020	960SOO · Gas & Oil	-390.34
	Feb 2020	860GO3 · Gas & Oil	-495.28
TOTAL			-1,423.04
Bruin Waste Management		**Alpine-Operating Account**	
	Feb 2020	516GOO · Refuse Collection Franchise	-13,211.79
TOTAL			-13,211.79
NAPA		**Alpine-Operating Account**	
	filters - F350	961SOO · Vehicle & Equip Maint & Repair	-142.47
	lift support - F350	961SOO · Vehicle & Equip Maint & Repair	-99.96
	filters - F150	961WOO · Vehicle & Equip Maint & Repair	-8.04
	filters - F150	961SOO · Vehicle & Equip Maint & Repair	-8.04
TOTAL			-258.51

TOWN HALL PO Box 10 | 201 N. Railroad Street | Ridgway, Colorado 81432 | 970.626.5308 | www.town.ridgway.co.us

To: Ridgway Town Council
From: Diedra Silbert, Community Initiatives Facilitator
Date: March 4, 2020
RE: Recommendation from Creative Advocacy Team for New Member

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At its February 18,' 2020 meeting, the Creative Advocacy Team (C.A.T.) of the Ridgway Creative District unanimously agreed to recommend to Town Council Andy Nasisse's membership on the C.A.T. As a longtime practicing ceramic artist and a retired university-level art professor, Andy has much experience and knowledge to offer to the C.A.T. and the RCD.

In the past several months, the C.A.T. has lost four members: Jennifer Randolph, Paula Marlatt, Julia Reid, and most recently Sue Lake. (Three of these have moved away from Ridgway or are in the process of moving.) If you are aware of community members who may be interested in joining the C.A.T., please ask them to contact me. Additional folks are definitely needed to do the work we planned for 2020.

The C.A.T. and I request your official approval for Andy Nasisse to join the Creative Advocacy Team of the RCD, a standing committee of the Ridgway Town Council.

Agenda Item _____

File No. _____

STAFF REPORT

Subject: Request for water leak adjustment - Account #6270.1/Becker
Initiated By: Pam Kraft, MMC, Town Clerk
Date: March 4, 2020

BACKGROUND:

Attached is a request for water leak adjustment from Michelle Becker for excess usage of 76,200 gallons of water at 155 S. Elizabeth Street. The property owner identified a break in a line and it was repaired.

ANALYSIS:

Pursuant to Municipal Code Section 9-1-23 the Council has the authority to authorize water leak adjustments. The provisions are as follows:

9-1-23:WATER BREAK ADJUSTMENTS.

(A) The Town Council shall have authority to make an equitable adjustment to a water bill when the bill is extraordinarily high due to an undiscovered break downstream of the customer's meter if the break was not caused by the customer's negligence and the customer did not have a reasonable opportunity to discover the break more quickly than it was discovered.

(B) No adjustment shall be allowed unless the customer submits a written request for the adjustment within fifteen days of the mailing of the bill in question and unless the leak has been repaired.

(C) The adjustment shall not reduce the customer's bill below the cost to the Town of producing the water supplied through the meter.

The customer used 76,200 gallons in February and was billed $1084.00. This calculates to 66,200 gallons over the base allotment; based on the leak adjustment rate of $11.00 for each 1,000 gallons between 5,000 and 10,000 gallons; $13.00 between 10,000 and 18,000 gallons; and $15.00 over 18,000 gallons, the customer can be awarded a water leak adjustment credit of $281.90.

ATTACHMENT: Email from Michelle Becker

Pam Kraft

From: [redacted]
Sent: Thursday, March 05, 2020 8:57 AM
To: Pam Kraft
Subject: Water break at 155 S. Elizabeth.

I am hoping the Town (Council) will take in consideration that this break was unknown to me. I do not know when the reading was last done but my bill for January was in the normal range. I am told by Wanda that the reader has rechecked and since the repair the usage rate is back down to normal. The water was shut off and the repair was made this Monday as soon as the leak was discovered. I was not contacted by the Town until Tuesday regarding the water situation but by then, the repair had already been made.

Pam, I have no way to pay such a large bill or anything close to an amount so extreme. I think you will find that my overall water usage for almost 16 years falls way below the allocated amount for a residential dwelling. I am only 1 person here and have never used the amount that I have been paying each month for all these years- unlike a family of 3 or 4.

This was a breakage situation that I was unaware of having happened and that I had repaired immediately. Please consider my overall usage and perhaps you can average this huge amount with my much lower usage for the past years..

I received your call but came in to late to return it.

Thank You,
Michelle Becker
155 S. Elizabeth
Ridgway, Colorado 81432

AGENDA ITEM #7

TOWN HALL PO Box 10 | 201 N. Railroad Street | Ridgway, Colorado 81432 | 970.626.5308 | www.town.ridgway.co.us

To: Ridgway Town Council
From: Preston Neill, Town Manager
Date: March 6, 2020
RE: **Request to use Hartwell Park for Ridgway Old West Fest on September 25, 26 and 27, 2020 and Request to use Town Streets for Wagon Rides during the Event**

SUMMARY:
Eve Becker Doyle will attend Wednesday's meeting to make a request to Council to use Hartwell Park for Ridgway Old West Fest on September 25 through 27, 2020. In addition, she will request the use of Town streets for wagon rides during the event. She intends to prepare a PowerPoint presentation for the meeting.

AGENDA ITEM #8

Dear Mayor and Councillors,

I will be addressing you at our March town meeting on behalf of myself and a group of residents who are concerned about the unknown and potentially serious health and environmental effects of the new generation cell phone network- 5G.

As you might already know, telecom companies across the world are working hard to roll out 5G across the country and the world.

5G utilizes millimeter waves which travel shorter distances than the wave frequencies in our current cell network and therefore requires placement of powerful small cell transmitters throughout the community- on lamp posts and utility poles in front yards. In most towns where these have been deployed, the structures contain not only 5G enabled cells but also 4G cells, exponentially increasing our exposure to both tested and untested frequencies of microwave radiation.

We want to make sure you are aware of the robust body of science (1) linking exposure to radio-frequency (RF) microwave radiation (wireless radiation), with serious adverse biological impacts in humans, wildlife, birds and insects. Scientifically documented health detriments (2) include neurological problems, cognitive impairments, immune system impairments and reproductive health problems. Recently, the U.S. National Toxicology Program, in a 25 million dollar study- the largest of its kind, found clear evidence of cancer associated with chronic exposure to RF radiation (3). Please note that long term exposure to the frequencies that 5G employ has never been studied and the effects on humans, wildlife and vegetation are unknown.

Realizing that the scientific studies in attachment 2 and 3 are time consuming to read, I have attached a report by EMF scientist Magada Havas entitled "Radiation from wireless technology affects the blood, the heart, and the autonomic nervous system" (4) It is easy to read and has great visuals from studies on humans. The report also shows a graph of heath complaints in relation to household distance from cell towers.

Since 2004 the International Association of Firefighters (IAFF) has formally opposed the placement of cell towers and/or antennas on or near fire stations due to wireless radiation health risks (5), and in 2015 California firefighters fought in court and became legally exempt from the placement of wireless telecommunications equipment on their facilities, including small cell facilities(6). A pilot study on neurological impacts on RF exposure in firefighters revealed symptoms like slowed reaction time, lack of focus, lack of impulse control, severe headaches, anesthesia-like sleep, sleep deprivation, depression, and tremors.(6)
Yet, we have NO regulations in place that protects the general public from having these cell towers put up at daycare centers, schools or right in our own front yards.

The FCC only considers thermal effects from RF radiation to be harmful, and ignores the biological effects that occur far below thermal levels. Their current exposure guidelines were established in 1996. Attachment (7) is a report from the US Airforce from 1994 that shows that many of the biological adverse effects of RF radiation where already well known at that time. Two separate lawsuits against the FCC were filed at the beginning of February this year for failure to take the vast body of available scientific research into consideration and ruling not to update their 25 year old radiation guidelines last fall.

The federal communications act of 1996 put into law that local governments cannot cite health concerns about the effects of tower radiation to deny tower licenses so long as the towers comply with FCC regulations.

Whom are these laws and regulations protecting?

Many communities across the US are also concerned about the potential decline in property values resulting from small cell facilities being placed in close proximity to residences. A 2014 survey conducted by The National Institute for Science, Law and Public Policy which included 1,000 respondents, revealed that 94% reported that cell towers and antennas in a neighborhood or on a building would impact interest in a property and the price they would be willing to pay for it. And 79% said under no circumstances would they ever purchase or rent a property within a few blocks of a cell tower or antennas. And almost 90% of respondents said they were concerned about the increasing number of cell towers and antennas in their residential neighborhood, generally. (8)

The FCC is currently subject a class action lawsuits by municipalities across the US for what they call a "land grab"- mandating the lease of the public right-of-way to telecom companies at below market value.

In 2017 Colorado lawmakers also fell victim to the telecom industry's "land grab" strategy. The house of Representatives passed HB 17-1193, which robs municipalities of the authority to regulate cellular wireless facilities in their local communities. Under the bill all applications for "small cell" antennas need to be approved within 90 days and no public notice is required. The bill also disallows communities from charging market rates for leasing public rights-of-way. The organization Coloradans for Safe Technology who are lobbying to repeal the bill describes it this way: "The bill grants telecom companies access rights to our public rights-of-way for their private corporate benefit. It paves the way for the proliferation of small cell installations in Colorado communities and creates a massive de facto subsidy for the telecom industry by local taxpayers."

As you can see, neither our regulatory bodies or our laws serve to protect public health or local economies.
As elected officials, we know you are naturally concerned about fulfilling your responsibility to our community. We urge you to look deeply into the 5G issue and explore ways in which you can help restore local control over small cell facilities.

Right now we urge you to do the following:

1) Contact our house representative and express your support for restoring local control over small cell facilities. Coloradans for Safe Technology are currently working hard to have HB 17-1193 repealed. All the house representatives they have spoken with so far agree that the bill should be repealed, but as of yet nobody has offered to sponsor a bill that would do so. Please find repeal material in attachment (9)

2) Revise the local code for communications facilities in order to have as much control as possible over the deployment of "small cell’ antennas in public rights-of-way. Please find a document containing legal recommendations for such revisions by Americans For Responsible Technology in attachment (10)

3) Familiarize yourselves with the NEPA review requirements and ensure that you hold any small cell applicants accountable to this review process.

4) Ask the town lawyer to review and stay up to date with 5G rulings and pending cases, and evaluate legal arguments that may be raised to challenge the validity of the state and federal small cell regulations.

Thank you for your time.

Kristine Skovli Martinez

ATTACHMENT 1

National Toxicology Program
U.S. Department of Health and Human Services

Share This:
https://ntp.niehs.nih.gov/go/cellphone

Cell Phone Radio Frequency Radiation

Final reports from the rat and mouse studies, plus the press release and fact sheet, are now available.

Research Overview

Status: Completed
Substances: Cell Phone Radiation: GSM, Cell Phone Radiation: CDMA
Nominated: May 1999

BACKGROUND INFORMATION

Cell phones are currently used by 95% of American adults. The U.S. Food and Drug Administration (FDA) nominated radio frequency radiation (RFR) used by cell phones for an NTP study because of widespread public use of cell phones and limited knowledge about potential health effects from long-term exposure.

NTP STUDIES & FINDINGS

NTP conducted two-year toxicology studies in rats and mice to help clarify potential health hazards, including cancer risk, from exposure to RFR like that used in 2G and 3G cell phones which operate within a range of frequencies from about 700–2700 megahertz (MHz). These were published as Technical Reports in November 2018.

What did the studies find?

The NTP studies found that high exposure to RFR (900 MHz) used by cell phones was associated with:

- **Clear evidence of tumors in the hearts of male rats.** The tumors were malignant schwannomas.
- **Some evidence of tumors in the brains of male rats.** The tumors were malignant gliomas.

ATTACHMENT 1

- **Some evidence of tumors in the adrenal glands of male rats.** The tumors were benign, malignant, or complex combined pheochromocytoma.

It was unclear if tumors observed in the studies were associated with exposure to RFR in female rats (900 MHz) and male and female mice (1900MHz).

The results are based on NTP's four categories of evidence that a substance may cause cancer: clear evidence (highest), some evidence, equivocal evidence, no evidence (lowest).

As a follow-up, NTP published an article in October 2019 that evaluated DNA damage in three regions of the brain, the liver, and in blood cells in rats and mice that were removed at an earlier timepoint from the ongoing 2-year toxicology study. DNA damage, if not repaired, can potentially lead to tumors. This work was also included in NTP's published Technical Reports, but this study includes analyses of the data in the supporting information not included in the Technical Reports.

NTP scientists found that RFR exposure was associated with an increase in DNA damage. Specifically, they found RFR exposure was linked with significant increases in DNA damage in:

- the frontal cortex of the brain in male mice,
- the blood cells of female mice, and
- the hippocampus of male rats.

There are many factors that influence whether damaged DNA will lead to tumors. NTP plans to conduct additional studies to learn more about how RFR might cause DNA damage. Please see the FAQs below for more information about the specific studies and NTP's cell phone RFR program.

What are NTP's future plans for studying cell phone RFR and 5G wireless technology?

5G is the emergent technology that will eventually overtake the existing 2G, 3G, and 4G technology. In the meantime, people will continue to be exposed to RFR in the 700–2700 MHz range. As the 5G network is implemented, some of the signals used by the 5G network will use the same lower frequencies used by the older technology previously studied by NTP, but the 5G network will also use higher frequencies—up to 60,000 MHz—thereby exposing wireless users to a much broader spectrum of frequencies. The higher frequencies, known as millimeter waves, can rapidly transmit enormous amounts of data with increased network capacity compared with current technologies. Millimeter waves do not travel as far and do not penetrate

ATTACHMENT 1

the body as deeply as do the wavelengths from the lower frequencies. Millimeter waves are likely to penetrate no deeper than the skin, whereas the lower frequencies have been shown to penetrate at least three to four inches into the human body.

NTP is currently evaluating the existing literature on the higher frequencies intended for use in the 5G network and is working to better understand the biological basis for the cancer findings reported in earlier studies on RFR with 2G and 3G technologies. Additionally, work is ongoing to develop smaller RFR exposure chambers for additional short-term studies that will take weeks and months to complete rather than years. The exposure system is also being designed to have the capability to conduct studies with various RFR frequencies and modulations to keep up with the changing technologies in the telecommunications industry.

NTP also aims to repeat studies in the smaller RFR exposure chambers and to identify biomarkers of damage from RFR exposure. The biomarkers would be measurable physical changes, such as molecular changes, that can be seen in shorter amounts of time than it takes to develop cancer and that might be predictive of the disease. If scientists can better understand biological changes in animals, they will know more about what to look for in humans. Additional studies could also identify whether the behavior of animals is affected by RFR exposure.

INFORMATIONAL RESOURCES

Fact Sheet and NIEHS Health Topic
FAQ
Additional Resources
Media Briefing and Interviews
Newsletters
Presentations
Publications
Photos of the Radiofrequency Radiation Research Facility

STAY INFORMED & CONTACT US

Stay Informed

Subscribe to receive email to stay informed about cell phone radio frequency radiation research and other NTP information.

Contact Us

ATTACHMENT 1

For questions or additional information, email us or use our contact form.

Web page last updated on Feb. 18, 2020

NTP is located at the National Institute of Environmental Health Sciences, part of the National Institutes of Health

Radiation from wireless technology affects the blood, the heart, and the autonomic nervous system1)

Article *in* Reviews on environmental health · November 2013

DOI: 10.1515/reveh-2013-0004 · Source: PubMed

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Magda Havas
Trent University
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DE GRUYTER DOI 10.1515/reveh-2013-0004 — Rev Environ Health 2013; 28(2-3): 75–84

Magda Havas*

Radiation from wireless technology affects the blood, the heart, and the autonomic nervous system[1)]

Abstract: Exposure to electrosmog generated by electric, electronic, and wireless technology is accelerating to the point that a portion of the population is experiencing adverse reactions when they are exposed. The symptoms of electrohypersensitivity (EHS), best described as rapid aging syndrome, experienced by adults and children resemble symptoms experienced by radar operators in the 1940s to the 1960s and are well described in the literature. An increasingly common response includes clumping (rouleau formation) of the red blood cells, heart palpitations, pain or pressure in the chest accompanied by anxiety, and an upregulation of the sympathetic nervous system coincident with a downregulation of the parasympathetic nervous system typical of the "fight-or-flight" response. Provocation studies presented in this article demonstrate that the response to electrosmog is physiologic and not psychosomatic. Those who experience prolonged and severe EHS may develop psychologic problems as a consequence of their inability to work, their limited ability to travel in our highly technologic environment, and the social stigma that their symptoms are imagined rather than real.

Keywords: electrosmog; radio-frequency radiation; rouleau; tachycardia; WiFi; Wolff-Parkinson-White Syndrome.

[1)]Presented at the Corporate Interference with Science and Health: Fracking, Food, and Wireless, Scandinavia House, New York, NY, March 13 and 14, 2013.

***Corresponding author: Magda Havas,** PhD, Environmental and Resource Studies, Trent University, Peterborough, ON, K9J 7B8 Canada, E-mail: mhavas@trentu.ca; www.magdahavas.com

Introduction

Our exposure to devices using electricity and emitting extremely low-frequency and radio-frequency electromagnetic fields has been increasing ever since Edison invented the incandescent light bulb and Tesla and Marconi discovered that radio-frequency (RF) radiation can be transmitted without wires. Radio, television, computers, cell phones, and their accompanying cell phone antennas, cordless phones, wireless routers (WiFi), wireless baby monitors, wireless games, and smart meters are increasing our exposure to RF radiation and especially to microwave radiation (300 MHz–300 GHz).

As an example of the proliferation of this technology, access to WiFi was limited in 2002 but by 2012 access was virtually ubiquitous in the USA (Figure 1). We have city-wide WiFi in some communities, WiFi at work, at home, in school, universities, and hospitals, in restaurants and coffee shops, on public transit, at airports, and on an increasing number of airplanes. As a society, we seem to be insatiable for wireless technology and the connectivity it affords.

Although the downside to this technology, namely, the potentially harmful effects of nonionizing radiation, has received relatively little attention in North America and remains controversial, it is an area that deserves proper research funding based on the sheer number of users and people exposed worldwide to RF electromagnetic fields.

In this article, the relationship between electrosmog exposure and electrohypersensitivity (EHS), with a focus on the cardiovascular system, is presented, based on provocation studies and on reports of ill health among those living near cell phone base stations or exposed to WiFi in schools.

Electrohypersensitivity

Just as some people have multiple chemical sensitivity or react to pollen, mold, and certain types of food, a growing population is becoming "sensitive" to electromagnetic radiation.

Khurana et al. (1) reviewed ten epidemiologic studies, three dealing with cancer and seven with neurobehavioral effects, that examined the putative effects of mobile phone base stations. All of the neurobehavioral studies reported more symptoms with proximity to base stations, and only

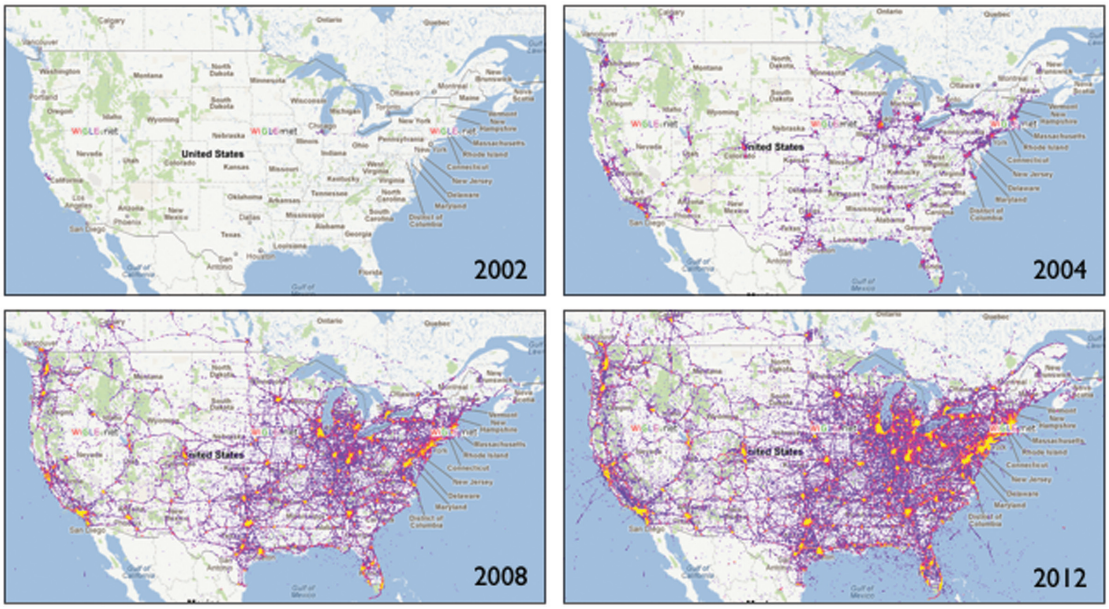

Figure 1 WiFi networks in the USA from 2002 to 2012 (source: wigle.net).

one attributed these health effects to stress rather than RF exposure.

The results from one of these studies are presented in Figure 2 (2). People who lived closest to the antennas experienced the following symptoms more often than those who lived further away: fatigue, sleep disturbance, headaches, feeling of discomfort, difficulty concentrating, depression, memory loss, visual disruptions, irritability, hearing disruptions, skin problems, cardiovascular problems, dizziness, loss of appetite, movement difficulties, and nausea. Many of these symptoms are more common as we age, thus I prefer to call this rapid aging syndrome (RAS). The difference between real aging and RAS experienced by those who are electrically hypersensitive is that when these people go into an electromagnetically clean environment, many of their symptoms diminish

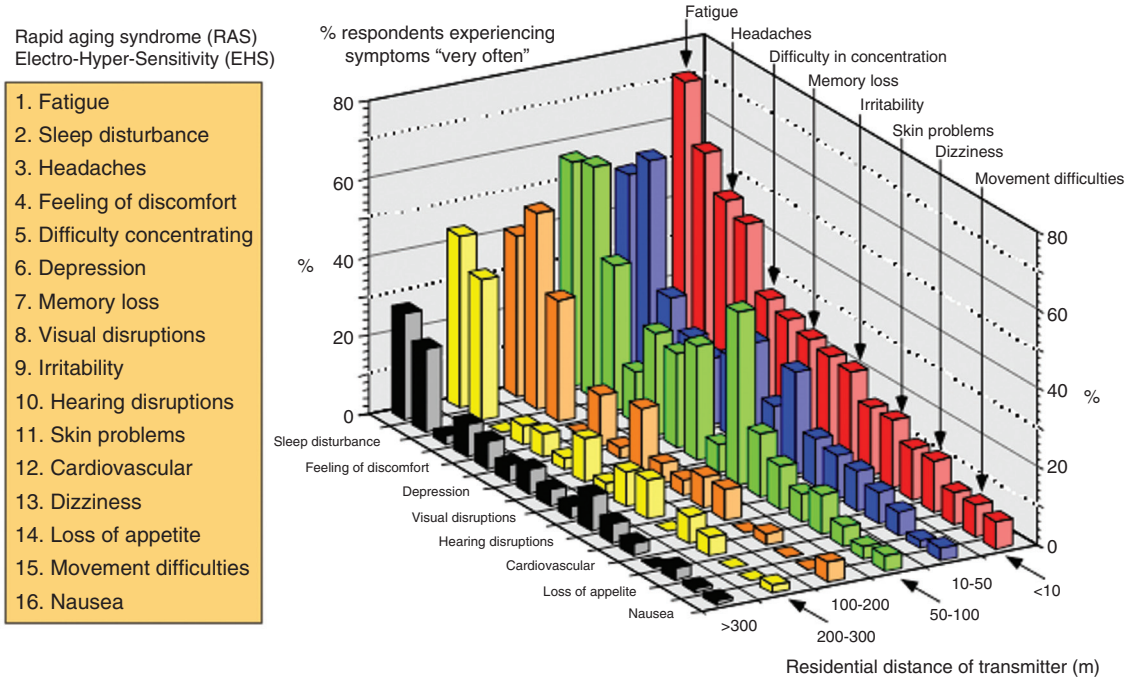

Figure 2 Symptoms experienced by people near cellular phone base stations [based on the work of Santini et al. (2)].

or disappear. Obviously, this does not happen with real aging.

Because cell towers are proliferating and difficult to avoid in both urban and rural communities and if the results of Santini et al. (2) represent what is happening to those who live near cell towers, then it is quite likely that we are going to experience (or are in the midst of experiencing) an emerging health crisis that is contributing to chronic ill health and is promoting the sale of pain medication, sleep medication, antidepressants and antianxiety medication, pills to moderate energy level and mood, and drugs for those with attention deficit hyperactivity disorder such as Ritalin® (metylfenidat).

In 2006, Hallberg and Oberfeld (3) documented the increasing prevalence of EHS. Figure 3 clearly shows that self-perceived EHS is on the rise. According to the authors, by 2017, 50% of the population is going to be complaining of this illness. Admittedly, this is a rough calculation but it demonstrates that symptoms of EHS are increasing.

It is difficult to estimate the percentage of the population that has EHS. I use a conservative estimate of 3% of the population for those who have severe symptoms, and this is based on the population in Sweden who have registered as being electrohypersensitive (4). Another 35% population may have mild to moderate symptoms of EHS when exposed to electrosmog (5). Based on these percentages, the cumulative number of people who may be adversely affected in Canada, the USA, and Europe is 25 million, for severe sensitivity (EHS), and another 300 million, for mild to moderate sensitivity (electrosensitivity). People in this latter group can function in an electrosmog environment but may develop headaches or have difficulty sleeping and are living a life compromised by increasingly poor health as a consequence of their exposure (Figure 2).

Historically, environmental contaminants have been presented as contentious issues due, in part, to the media's need for "balanced reporting" and, in part, to the economic consequences of altering our behavior as consumers. This was certainly the case with asbestos, dichloro-diphenyl-trichloroethane (DDT), lead, mercury, acid rain, and tobacco smoke and is currently the case with climate change and EHS.

EHS may be viewed as a contentious issue, yet a growing number of international experts, scientists, and medical doctors have been asking governments and international agencies for decades to lower existing guidelines for RF radiation because the current guidelines do not protect public health. Table 1 provides a list of some of these resolutions and appeals.

Some governments have heeded the warnings and have exposure guidelines that are a fraction of those recommended by the World Health Organization (WHO) and accepted by the USA, UK, and Canada.

The WHO held an international workshop on electrosensitivity in Prague in 2004 (6), and they defined EHS as follows:

> "... a phenomenon where individuals experience adverse health effects while using or being in the vicinity of devices emanating electric, magnetic, or electromagnetic fields (EMFs)."
>
> "Whatever its cause, EHS is a real and sometimes a debilitating problem for the affected persons.... Their exposures are generally several orders of magnitude under the limits in internationally accepted standards."

What role should the WHO and other leading health authorities play in helping these sensitive individual? Some would advocate, at the very least, lower exposure

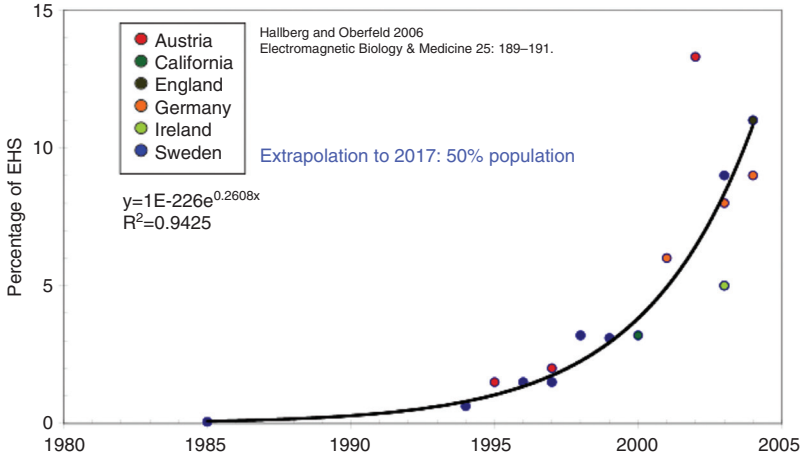

Figure 3 Estimated prevalence of self-proclaimed EHS in various countries [based on the work of Hallberg and Oberfeld (3)].

Table 1 Appeals and resolutions from international groups of scientists and medical doctors.

Resolution/group	Country	Year	Link
Salzburg Resolution	Austria	2000	http://www.magdahavas.com/international-experts-perspective-on-the-health-effects-of-electromagnetic-fields-emf-and-electromagnetic-radiation-emr/
Catania Resolution	Italy	2002	www.emrpolicy.org/faq/catania.pdf
Freiburger Appeal	Germany	2002	http://www.magdahavas.com/international-experts-perspective-on-the-health-effects-of-electromagnetic-fields-emf-and-electromagnetic-radiation-emr/
World Health Organization	Czech Republic	2004	http://www.who.int/peh-emf/meetings/hypersensitivity_prague2004/en/
Irish Doctors' Environmental Association	Ireland	2005	www.ideaireland.org
Helsinki Appeal	Finland	2005	www.emrpolicy.org/headlines/helsinki_appeal_05.pdf
Benevento Resolution	Italy	2006	http://www.icems.eu/docs/BeneventoResolution_REVISED_march2008.pdf
BioInitiative Report	USA	2007 and 2012	www.bioinitiative.org
Venice Appeal	Italy	2008	http://www.icems.eu/resolution.htm
Porto Alegre	Brazil	2009	http://www.icems.eu/docs/resolutions/Porto_Alegre_Resolution.pdf
Seletun	Norway	2011	http://www.magdahavas.com/international-experts-perspective-on-the-health-effects-of-electromagnetic-fields-emf-and-electromagnetic-radiation-emr/
International Doctors Appeal	Germany	2012	http://www.icems.eu/resolution.htm

limits and possibly places where the radiation is not allowed, similar to smoke-free environments. Instead, the WHO recommended that this illness be referred to as "idiopathic illness", which basically means the cause is unknown. By refusing to acknowledge the cause, the WHO undermines the need for governing agencies to act.

In contrast to the WHO, the Austrian Medical Association (7) came out with guidelines to help doctors diagnose and treat those who experience EHS. In that document, they recognize that there is a rise in stress-related illness and that electrosmog may play a role. They even provide a temporary code (Z58.4, exposure to radiation) under the *International Classification of Diseases, 10th Edition* to be used for EMF syndrome, which is their term for EHS.

A group of psychologists considers EHS to be entirely a psychologic illness rather than a physiologic response to electrosmog (8, 9). A number of the articles reviewed by Rubin et al. are based on flawed assumptions about (1) who is truly experiencing EHS, (2) how people with EHS respond to exposure, (3) what frequencies and intensities they respond to, (3) how quickly they respond and recover following exposure, and (3) how the data should be analyzed. These flawed assumptions lead to flawed conclusions.

For example, not everyone who believes they have EHS actually have EHS. Thus, combing the results for the self-proclaimed "EHS group" is likely to dilute the results, producing no significant effect when analyzed statistically. The question that is being tested by this type of analysis is, "Do those who believe to be electrically sensitive all respond the same way to provocation testing?" and the answer is likely to be "no".

In the study by Rea et al. (10) of 100 people who believed they were electrically hypersensitive, only 16 responded consistently to real exposure and not to sham exposure. Had the results been statistically analyzed for the entire 100 subjects tested, they would have shown no effect of EMF exposure. Objective testing is required, and people should be assessed as individuals rather than members of a group for analysis. An analogous situation is if there were 16 people with diabetes among a group of 100 people who all thought they were diabetic. Statistical analysis of blood sugar measurements before and after consuming a standard meal for the entire group would likely miss the 16 people with diabetes.

The proper way to test for EHS is to monitor and assess individual responses to electrosmog exposure in a double-blind study, as was done by Rea et al. (10).

However, it is clear that those who experience EHS and are no longer able to live a "normal" life and who are not supported by their family, friends, and physicians also experience stress leading to psychologic problems including depression and anxiety disorders. Where I disagree with Rea et al. (10) about EHS is that I believe the physiologic response precedes the psychologic problem.

In this article, examples of the effects of electrosmog on the blood, heart, and autonomic nervous system (ANS) are provided, indicating that EHS is a physiologic response to electromagnetic pollution. The only legitimate use of the term "idiopathic" (i.e., disease or disorder that has no known cause) is in reference to the trigger that initiated the electromagnetic sensitivity. In some cases, with good medical investigation, this also can be surmised.

Electrosmog affects the blood

Healthy blood consists of erythrocytes (red blood cells), which are round and which float freely in the plasma. A live blood sample, consisting of a drop of blood from a finger prick, can be viewed under the microscope, as shown in Figure 4. Changes in the size, shape, and clumping of these erythrocytes can indicate impaired health.

Figure 4 shows live blood (blood without any chemicals added to it) in an electromagnetically clean environment (A) and the blood from the same person spoke on a cordless phone for 10 min (B) and after using a wired computer for 70 min (C). The erythrocytes are sticking together and resemble a stack of coins. This is known as rouleau formation and indicates unhealthy blood.

Usually rouleau is caused by an increased fibrinogen concentration or other changes in plasma proteins as in multiple myeloma or macroglobulinemia. An alternative explanation is that the rouleau may be due to a reduction in the electrical potential at the cell membrane, which would weaken the repellent forces between cells. A third possibility is that it is a microscopic artifact, which, in this case, is unlikely because the results are repeatable. Research on the mechanisms involved in the rouleau formation is needed.

With rouleau formation, the surface area of the red blood cells is significantly reduced, and the release of nutrients and the removal of waste products are compromised. Symptoms may include headaches, difficulty concentrating, dizziness, nausea, heart and blood pressure problems as well as cold, numbness, or tingling sensation in the extremities (hands and feet).

The good news is that live blood analysis may be a useful diagnostic for EHS. How quickly the blood clumps and how quickly it recovers following exposure may be a good indicator of the degree of sensitivity.

Electrosmog affects the heart and the autonomic nervous system

Some people who are electrically hypersensitive complain of pain or pressure in the chest area, heart palpitations,

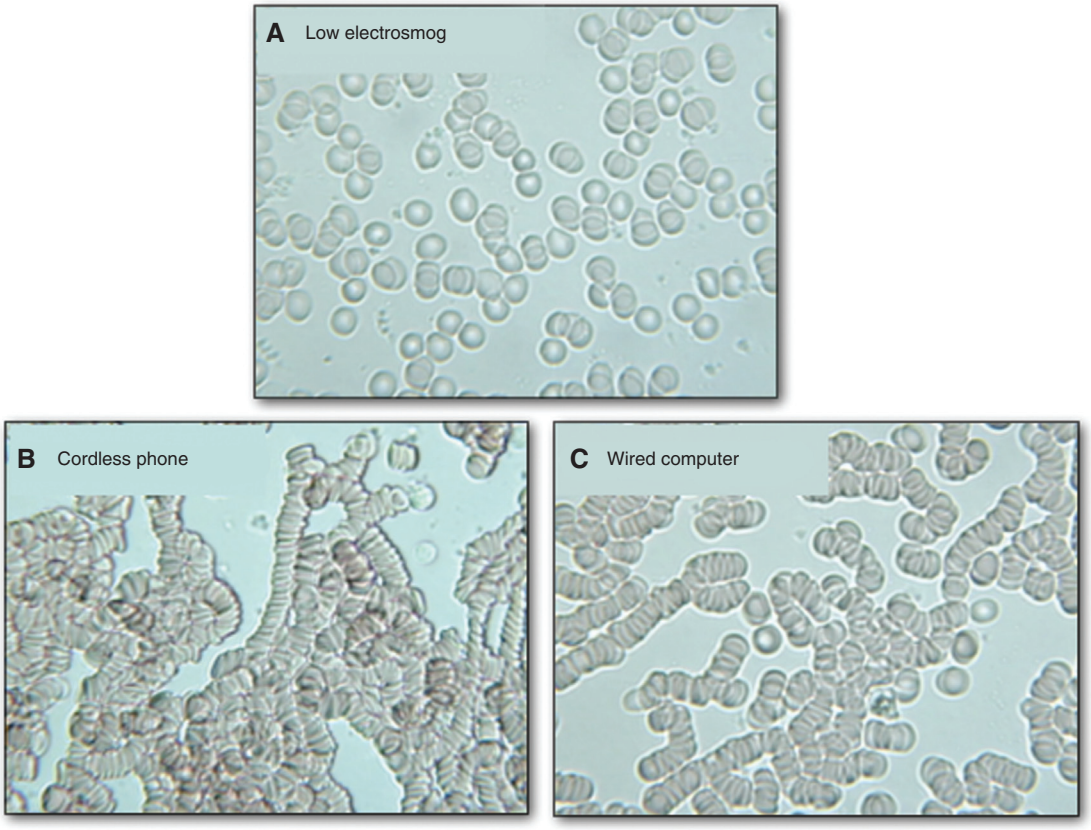

Figure 4 Live blood cells in a low-electrosmog environment (A), after using a cordless phone for 10 min (B), and after using a wired computer for 70 min (C).

and/or an irregular heartbeat, accompanied by feelings of anxiety that develop rapidly. The symptoms resemble a heart attack and thus contribute to even more anxiety.

To test the effect of electrosmog on the heart, Havas et al. (11) designed a simple experiment where subjects were exposed to electromagnetic radiation generated by the base of a cordless phone. This was a double-blind study with randomized real and sham exposure. A cordless phone base station was selected as the source of exposure because the base emits a constant beacon signal when it is plugged into an electrical outlet. The beacon signal in this case was a pulsed frequency of 2.4 GHz, the same frequency used in WiFi.

In the original study (11), 25 subjects from Colorado were tested, and although most subjects did not react adversely to the radiation from the cordless phone base station (see Figure 5, subject A), a few did react with either tachycardia (rapid heart rate) or arrhythmia (irregular heart rate) (Figure 5, subject B). The reaction was often immediate and coincided with exposure to the radiation. When the radiation ceased, the heart returned to normal.

Two examples of responsive subjects are provided. The heart rate of subject B increased from a resting heart rate of 68 beats per minute (bpm) to a rapid 122 bpm during exposure, decreased to 66 bpm as soon as the radiation was stopped, and increased to 129 bpm when it was resumed. This reaction occurred while the subject was resting in a supine position and was unaware of when he or she was or was not exposed.

During the exposure to radiation from the cordless phone base station, subject C (Figure 6) experienced a slight increase in heart rate (from 65 to 86 bpm), an irregular heartbeat, and changes in the response of the sympathetic and parasympathetic nervous system (SNS and PNS, respectively). This upregulation of the SNS and downregulation of the PNS is an example of the "fight-or-flight" response, indicating physiologic stress. During periods of this type of stress, the body redirects most of the blood and energy from the internal organs to the arms and legs to prepare the organism for fighting or fleeing a stressful situation. Intermittent exposure may not cause a problem but if the exposure is continuous and long-term, the immune system of the body will be compromised and the body will not be able to repair itself, resulting in symptoms that are commonly experienced by those who are electrically hypersensitive. This inability to heal is what then accelerates the symptoms of aging (i.e., RAS).

The level of radiation in this experiment was well below international guidelines. Subjects were exposed to 3 $\mu W/cm^2$, or 0.3% of the guidelines recommended by International Centre for Non-Ionizing Radiation Protection (ICNIRP), the Federal Communication Commission (in US) (FCC), and Health Canada for 2.4-GHz frequencies. According to these organizations, harmful biologic effects do not occur below these thermal guidelines. Both blood and heart results from these provocation experiments indicate otherwise, i.e., that biologic effects that can have serious health implications do occur at levels well below current thermal guidelines.

The cordless phone provocation study has since been repeated for a larger group of subjects and shows similar results (12).

Some suggested that the radiation from the cordless phone was interfering with the technology rather than the heart. If this were the case, then 100% of the subjects would have had similar results because the

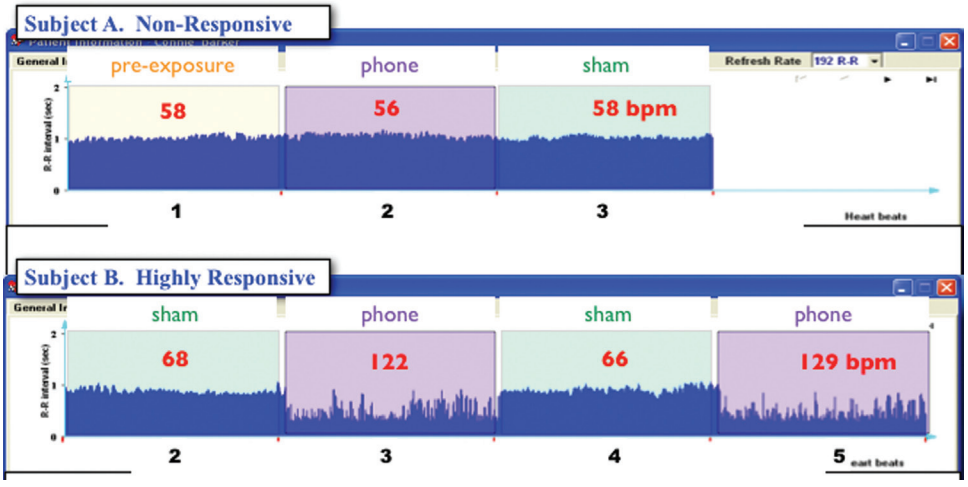

Figure 5 Rhythmograph of HRV during provocation with a digital 2.4-GHz cordless phone and sham exposure. The x-axis unit is time, with each stage lasting approximately 3 min. The y-axis is the R-R interval (in seconds).

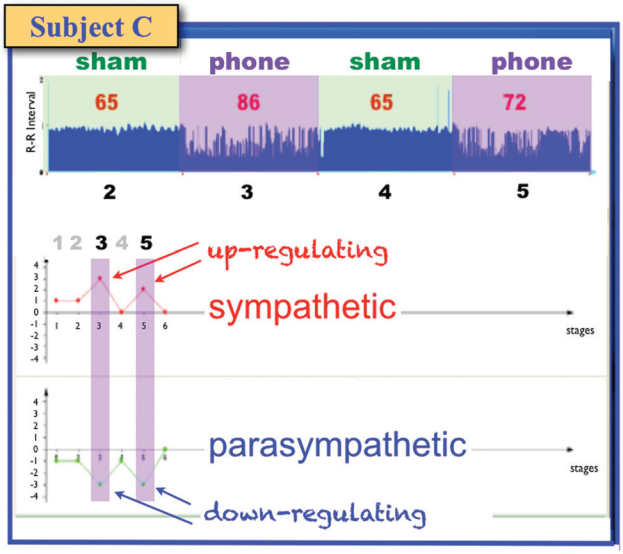

Figure 6 Rhythmograph of HRV and functioning of the SNS and PNS during provocation with digital 2.4-GHz cordless phone and sham exposure.

electromagnetic interference (EMI) would have been consistent rather than highly variable and individualistic. Additional testing of higher levels of radiation at the sensor did not affect the heart rate variability (HRV) of a subject who was nonresponsive to the original levels. Had it been EMI, then higher levels of exposure should have had a greater response, but this was not the case (12).

One subject (52-year-old man) told us that he normally experiences a delayed reaction to electrosmog exposure, and thus we monitored him for 30 min postexposure and observed the delayed response during a period of no exposure. The response included periods of short-term and intermittent irregularity in the R-R interval (HRV) as well as episodic downregulation of both the SNS and the PNS, which were both low to begin with (12). The normally low heart rate, 53–55 bpm, began to increase slightly (61 bpm) 25 min postexposure.

WiFi in schools affects student health

Students in schools with WiFi are complaining of headaches, difficulty concentrating, weakness, and heart palpitations, prompting their parents to take them to their family doctor and to their pediatric cardiologist to determine the nature of their problem.

In one Ontario school district, several students complained of heart problems. A 6-year-old girl had a "musical heart", and she experienced headaches and dizziness only at school. A 12-year-old boy had tachycardia (rapid heart rate). A 12-year-old girl experienced nausea, vomiting, no fever, insomnia, blurred vision, and tachycardia only at school. A 13-year-old boy had a pounding heart, insomnia, and headaches. His family moved to a different school district, and his symptoms disappeared.

In the same area, 4 students had sudden cardiac arrests (SCA) during exercise class within a 2-year period. Two of these students were resuscitated. The annual rate for SCA among young people in Canada is approximately 7 per year; hence, 4 in a small community is unusual.

According to Sinatra (13), a cardiologist, Wolff-Parkinson-White (WPW) syndrome, which is a disorder of the conduction system of the heart, is present in 1 out of 700 students. In a school district with 50,000 students, as many as 70 may have this generally undiagnosed condition. According to Sinatra (13), when students with WPW syndrome are exercising and are exposed to microwave radiation, the combined stress on the heart can lead to supraventricular tachycardia, thus creating the "perfect storm".

Fortunately, due to the Defibrillator Access Act, schools and other public buildings are installing defibrillators. What they should also be doing is trying to determine what is causing SCA and why students are complaining of headaches and heart palpitations at school. A key question that needs to be asked is, "What role does RF radiation from a school's WiFi system and from nearby cell phone base stations play in these symptoms?"

The effects of microwave radiation on the heart have been known for decades (14). In a 1969 symposium on the biological effects and health implications of microwave radiation, the authors clearly state that, "In the interest of occupational hygiene…researchers have recommended that cardiovascular abnormalities be used as screening criteria to exclude people from occupations involving radio-frequency exposures". Perhaps students need to be screened at school to ensure that they do not have an underlying heart condition that may be exacerbated with WiFi microwave exposure.

According to Drezner et al. (15), out-of-hospital SCA among young people is on the rise in the USA, although doctors do not know the reason. The increasing exposure to electrosmog may be to blame for at least part of this increase. More research is urgently needed in this area.

Children are much more sensitive to environmental toxins than are adults, and as such, there should be stricter guidelines for exposure. To date, at least nine countries have issued warnings that children should limit their use of cell phones. These countries include the UK (2000), Germany

(2007), France (2008), Russia (2008), India (2008), Belgium (2008), Finland (2009), the USA (2009), and Canada (2012). The same warning should be issued for children exposed to wireless games and WiFi routers, depending on the amount of time students are exposed to these emitters.

WiFi routers emit a beacon signal that is continuous as long as the device is activated. In other words, you do not have to be connected to the Internet to be exposed to the radiation generated by the wireless router. When information is either uploaded or download, the radiation levels increase both at the router and at the computer. The same is true for cordless phones and wireless baby monitors. Voice-activated baby monitors and cordless phones that radiate only when in use are available in Europe but are not currently available in North America.

Historic research on microwave illness resembles current research on electrohypersensitivity

The information provided in this article is not new. Reviews as far back as 1969 summarized the effects of microwave radiation and identified many of the same symptoms. Dodge (16) reviewed the Soviet and Eastern European literature and reported that microwave radiation affects the central nervous system, ANS (as shown here), neurohumoral systems, endocrine glands and functions, eye and ocular function, blood and hematopoietic system (as shown here), and miscellaneous organs.

Dodge (16) identified general subjective complaints resulting from exposure to electromagnetic radiation (Table 2) that are similar to the symptoms experienced by those who live near cell phone base stations (Figure 2). The major difference is that Dodge was reviewing symptoms for men who were occupationally exposed, whereas Santini et al. (2) was documenting symptoms for those who lived near cell phone antennas and were exposed to radiation in their own homes and as such were unable to avoid exposure.

Glaser (17) reviewed the literature on the biologic effects of microwave radiation and provided more than 2000 references in 1972. Although many of these studies were conducted at levels above existing guidelines, we are getting similar results at levels of microwave radiation that are well below these guidelines.

Most revealing are the "psychophysiologic disorders" based on human behavioral studies. These disorders include the following and are similar to those reported by Santini et al. (2): neurasthenia (general "bad" feeling), depression, impotence, anxiety, lack of concentration, hypochondria, dizziness, hallucinations, sleepiness, insomnia, increased irritability, decreased appetite, loss of memory, scalp sensations, increased fatigability, chest pain, and tremor of the hands.

Both Glaser and Dodge worked for the US Navy and had access to information that was later declassified. In one limited-edition (only 15 copies were produced) document, Pollack and Healer (18) recommended that the power density guideline in the USA be reduced from 10,000 $\mu W/cm^2$ to the same level used in the Soviet Union (10 $\mu W/cm^2$), but little attention was paid to this recommendation.

Table 2 Subjective symptoms associated with RF and microwave radiation.

General subjective complaints resulting from exposure to electromagnetic radiation (16)	Symptoms experienced "very often" by those who live within 300 m of a cell phone base station (2)
Similar symptoms	
Pain in head and eyes	Headaches and visual disruptions
Weakness, weariness, and dizziness	Dizziness and fatigue
Depression, antisocial tendencies, and general irritability	Depression and irritability
Impairment of memory and general mental function	Memory loss
Adenoma and inability to make decisions	Difficulty concentrating
Chest pain and heart palpitation	Cardiovascular
Dyspepsia, epigastric pain, and loss of appetite	Loss of appetite
Sensitivity of mechanical stimulation and dermagraphism	Skin problems
Different symptoms	
Lacrimation	Irritability
Hypochondria, sense of fear, and general tension	Nausea
Inhibition of sex life (male)	Movement difficulties
Scalp sensations and hair loss	Hearing disruption
Trembling of eyelids, tongue, and fingers	Sleep disturbance
Asthma	Feeling of discomfort
Brittle fingernails	

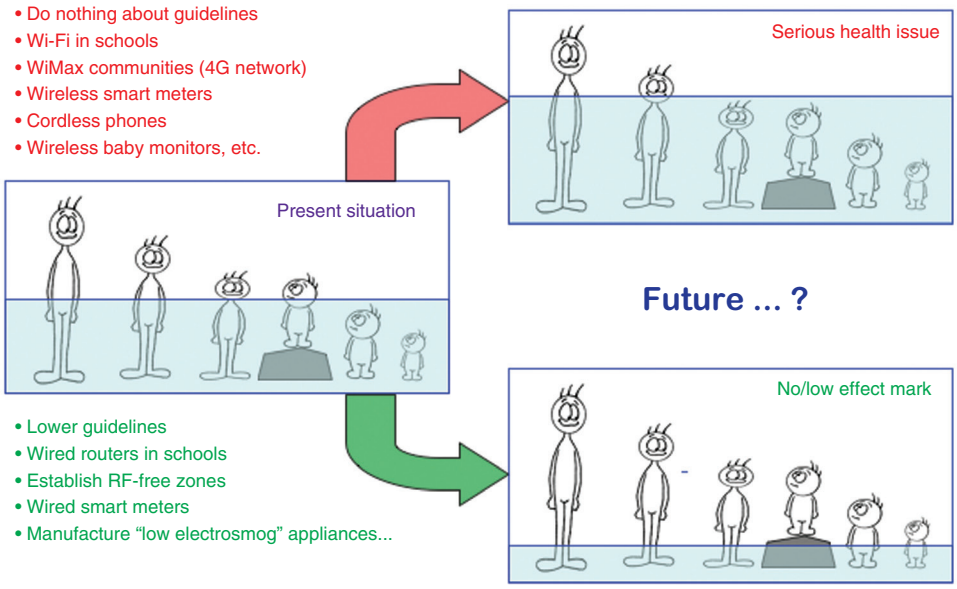

Figure 7 Two future health scenarios based on the steps we take or fail to take to reduce electrosmog exposure.

Years later, the power density guideline in the USA was reduced from 10,000 to 1000 μW/cm^2, although this was still based on thermal effects.

Where do we go from here?

If we do nothing about guidelines and allow WiFi to be installed in schools, if we allow WiMax to come into neighborhoods as part of the 4G network, if we allow wireless smart meters to be installed on homes, and if we fail to regulate the technology in a way that minimizes microwave exposure, then many more people are likely to become ill and some will die (Figure 7).

If we choose to minimize exposure by establishing biologically based guidelines rather than the current thermal guidelines, by encouraging wired Internet access in schools, universities, hospitals, workplaces, and homes, by installing wired smart meters, and by establishing RF-free zones for those who are highly sensitive, then we can reverse much of the damage that has been inflicted (Figure 7).

The choice is ours, and the real question is, "Do we have the foresight and courage to make the right decision or will we require a health tsunami before we act?"

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CELL TOWER RADIATION HEALTH EFFECTS

The International Association of Fire Fighters' position on locating cell towers commercial wireless infrastructure on fire department facilities, as adopted by its membership in August 2004 (1), is that the IAFF oppose the use of fire stations as base stations for towers and/or antennas for the conduction of cell phone transmissions until a study with the highest scientific merit and integrity on health effects of exposure to low-intensity RF/MW radiation is conducted and it is proven that such sitings are not hazardous to the health of our members.

Further, the IAFF is investigating funding for a U.S. and Canadian study that would characterize exposures from RF/MW radiation in fire houses with and without cellular antennae, and examine the health status of the fire fighters as a function of their assignment in exposed or unexposed fire houses. Specifically, there is concern for the effects of radio frequency radiation on the central nervous system (CNS) and the immune system, as well as other metabolic effects observed in preliminary studies.

It is the belief of some international governments and regulatory bodies and

of the wireless telecommunications industry that no consistent increases in health risk exist from exposure to RF/MW radiation unless the intensity of the radiation is sufficient to heat body tissue. However, it is important to note that these positions are based on non-continuous exposures to the general public to low intensity RF/MW radiation emitted from wireless telecommunications base stations. Furthermore, most studies that are the basis of this position are at least five years old and generally look at the safety of the phone itself. IAFF members are concerned about the effects of living directly under these antenna base stations for a considerable stationary period of time and on a daily basis. There are established biological effects from exposure to low-level RF/MW radiation. Such biological effects are recognized as markers of adverse health effects when they arise from exposure to toxic chemicals for example. The IAFF's efforts will attempt to establish whether there is a correlation between such biological effects and a health risk to fire fighters and emergency medical personnel due to the siting of cell phone antennas and base stations at fire stations and facilities where they work.

Background

Critical questions concerning the health effects and safety of RF/MW radiation remain. Accordingly, should we allow exposure of our fire fighters and emergency medical personnel to this radiation to continue for the next twenty years when there is ongoing controversy over many aspects of RF/MW health effects? While no one disagrees that serious health hazards occur when living cells in the body are heated, as happens with high intensity RF/MW exposure (just like in a microwave oven), scientists are currently investigating the health hazards of low intensity RF/MW exposure. Low intensity RF/MW exposure is exposure which does not raise the temperature of the living cells in the body.

Additionally, a National Institute of Environmental Health Sciences panel designated power frequency electromagnetic fields (ELF/EMF) as "possible

human carcinogens." (2) In March 2002 The International Association on Research on Cancer of the World Health Organization also assigned this designation to ELF/EMF in Volume 80 of its IARC Monographs on the Evaluation of Carcinogenic Risks to Humans. (3)

Fixed antennas used for wireless telecommunications are referred to as cellular base stations, cell stations, PCS ("Personal Communications Service") stations or telephone transmission towers. These base stations consist of antennas and electronic equipment. Because the antennas need to be high in the air, they are often located on towers, poles, water tanks, or rooftops. Typical heights for freestanding base station towers are 50-200 feet.

Some base stations use antennas that look like poles, 10 to 15 feet in length, that are referred to as "omni-directional" antennas. These types of antennas are usually found in rural areas. In urban and suburban areas, wireless providers now more commonly use panel or sector antennas for their base stations. These antennas consist of rectangular panels, about 1 by 4 feet in dimension. The antennas are usually arranged in three groups of three antennas each. One antenna in each group is used to transmit signals to wireless phones, and the other two antennas in each group are used to receive signals from wireless phones.

At any base station site, the amount of RF/MW radiation produced depends on the number of radio channels (transmitters) per antenna and the power of each transmitter. Typically, 21 channels per antenna sector are available. For a typical cell site using sector antennas, each of the three transmitting antennas could be connected to up to 21 transmitters for a total of 63 transmitters. When omni-directional antennas are used, a cellular base station could theoretically use up to 96 transmitters. Base stations used for PCS communications generally require fewer transmitters than those used for cellular radio transmissions, since PCS carriers usually have a higher density of base station antenna sites.

The electromagnetic RF/MW radiation transmitted from base station antennas travel toward the horizon in relatively narrow paths. The individual pattern for a single array of sector antennas is wedge-shaped, like a piece of pie. Cellular and PCS base stations in the United States are required to comply with limits for exposure recommended by expert organizations and endorsed by government agencies responsible for health and safety. When cellular and PCS antennas are mounted on rooftops, RF/MW radiation levels on that roof or on others near by would be greater than those typically encountered on the ground.

The telecommunications industry claims cellular antennas are safe because the RF/MW radiation they produce is too weak to cause heating, i.e., a “thermal effect.” They point to “safety standards” from groups such as ANSI/IEEE or ICNIRP to support their claims. But these groups have explicitly stated that their claims of “safe RF/MW radiation exposure is harmless” rest on the fact that it is too weak to produce a rise in body temperature, a “thermal effect.” (4)

There is a large body of internationally accepted scientific evidence which points to the existence of non-thermal effects of RF/MW radiation. The issue at the present time is not whether such evidence exists, but rather what weight to give it.

Internationally acknowledged experts in the field of RF/MW radiation research have shown that RF/MW transmissions of the type used in digital cellular antennas and phones can have critical effects on cell cultures, animals, and people in laboratories and have also found epidemiological evidence (studies of communities, not in the laboratory) of serious health effects at “non-thermal levels,” where the intensity of the RF/MW radiation was too low to cause heating. They have found:

- Increased cell growth of brain cancer cells (5)
- A doubling of the rate of lymphoma in mice (6)
- Changes in tumor growth in rats (7)

- An increased number of tumors in rats (8)
- Increased single- and double-strand breaks in DNA, our genetic material (9)
- 2 to 4 times as many cancers in Polish soldiers exposed to RF (10)
- More childhood leukemia in children exposed to RF (11)
- Changes in sleep patterns and REM type sleep (12)
- Headaches caused by RF/MW radiation exposure (13)
- Neurologic changes (14) including: Changes in the blood-brain-barrier (15),Changes in cellular morphology (including cell death) (16),
- Changes in neural electrophysiology (EEG) (17), Changes in neurotransmitters (which affect motivation and pain perception) (18),
- Metabolic changes (of calcium ions, for instance) (19) and Cytogenetic effects (which can affect cancer, Alzheimer's, neurodegenerative diseases) (20)
- Decreased memory, attention, and slower reaction time in school children (21)
- Retarded learning in rats indicating a deficit in spatial "working memory" (22)
- Increased blood pressure in healthy men (23)
- Damage to eye cells when combined with commonly used glaucoma medications (24)

Many national and international organizations have recognized the need to define the true risk of low intensity, non-thermal RF/MW radiation exposure, calling for intensive scientific investigation to answer the open questions. These include:

- The World Health Organization, noting reports of "cancer, reduced fertility, memory loss, and adverse changes in the behavior and development of children." (25)
- The U. S. Food and Drug Administration (FDA) (26)
- The International Agency for Research on Cancer (IARC) (27)
- The Swedish Work Environmental Fund (28)
- The National Cancer Institute (NCI) (29)

- The European Commission (EC) (30)
- New Zealand's Ministry of Health (31)
- National Health and Medical Research Council of Australia (32)
- Commonwealth Scientific Industrial Research Organization of Australia (CSIRO) (33)
- The Royal Society of Canada expert group report prepared for Health Canada (34)
- European Union's REFLEX Project (Risk Evaluation of Potential Environmental Hazards from Low Frequency Electromagnetic Field Exposure Using Sensitive in vitro Methods) (35)
- The Independent Group on Electromagnetic Fields of the Swedish Radiation Protection Board (SSI) (36)
- The United Kingdom's National Radiological Protection Board (NRPB) (37)
- The EMF-Team Finland's Helsinki Appeal 2005 (38)

Non-thermal effects are recognized by experts on RF/MW radiation and health to be potential health hazards. Safe levels of RF/MW exposure for these low intensity, non-thermal effects have not yet been established.

The FDA has explicitly rejected claims that cellular phones are "safe." (39)

The Environmental Protection Agency (EPA) has stated repeatedly that the current (ANSI/IEEE) RF/MW safety standards protect only against thermal effects. (40)

Many scientists and physicians question the safety of exposure to RF/MW radiation. The CSIRO study, for example, notes that there are no clear cutoff levels at which low intensity RF/MW exposure has no effect, and that the results of ongoing studies will take years to analyze. (41)

Internationally, researchers and physicians have issued statements that biological effects from low-intensity RF/MW radiation exposure are scientifically established:

- The 1998 Vienna-EMF Resolution (42)

- The 2000 Salzburg Resolution on Mobile Telecommunication Base Stations (43)
- The 2002 Catania Resolution (44)
- The 2002 Freiburger Appeal (45)
- The 2004 Report of the European Union's REFLEX Project (Risk Evaluation of Potential Environmental Hazards from Low Frequency Electromagnetic Field Exposure Using Sensitive in vitro Methods) (46)
- The 2004 Second Annual Report from Sweden's Radiation Protection Board (SSI) Independent Expert Group on Electromagnetic Fields Recent Research on Mobile Telephony and Health Risks (47)
- Mobile Phones and Health 2004: Report by the Board of NRPB (The UK's National Radiological Protection Board) (48)

The county of Palm Beach, Florida, the City of Los Angeles, California, and the country of New Zealand have all prohibited cell phone base stations and antennas near schools due to safety concerns. The British Columbia Confederation of Parent Advisory Councils [BCCPAC] passed a resolution in 2003 banning cellular antennae from schools and school grounds. This organization is comparable to the Parent Teachers Association (PTA) in the United States. The resolution was directed to B.C. Ministry of Education, B.C. Ministry of Children and Family Development, B.C. School Trustees Association, and B.C. Association of Municipalities.

US Government Information

In the United States, the Federal Communications Commission (FCC) has used safety guidelines for RF/MW radiation environmental exposure since 1985.

The FCC guidelines for human exposure to RF/MW radiation are derived from the recommendations of two organizations, the National Council on Radiation Protection and Measurements (NCRP) and the Institute of Electrical and

Electronics Engineers (IEEE). In both cases, the recommendations were developed by scientific and engineering experts drawn from industry, government, and academia after extensive reviews of the scientific literature related to the biological effects of RF/MW radiation.

Many countries in Europe and elsewhere use exposure guidelines developed by the International Commission on Non-Ionizing Radiation Protection (ICNIRP). The ICNIRP safety limits are generally similar to those of the NCRP and IEEE, with a few exceptions. For example, ICNIRP recommends different exposure levels in the lower and upper frequency ranges and for localized exposure from certain products such as hand-held wireless telephones. Currently, the World Health Organization is working to provide a framework for international harmonization of RF/MW radiation safety standards.

In order to affirm conformity to standards regarding heating of tissue, measurements are time averaged over 0.1 hours [6 minutes]. This method eliminates any spikes in the readings. Computer power bars have surge protectors to prevent damage to computers. Fire fighters and emergency medical personnel do not!

The NCRP, IEEE, and ICNIRP all have identified a whole-body Specific Absorption Rate (SAR) value of 4 watts per kilogram (4 W/kg) as a threshold level of exposure at which harmful biological thermal effects due to tissue heating may occur. Exposure guidelines in terms of field strength, power density and localized SAR were then derived from this threshold value. In addition, the NCRP, IEEE, and ICNIRP guidelines vary depending on the frequency of the RF/MW radiation exposure. This is due to the finding that whole-body human absorption of RF/MW radiation varies with the frequency of the RF signal. The most restrictive limits on whole-body exposure are in the frequency range of 30-300 MHz where the human body absorbs RF/MW energy most efficiently. For products that only expose part of the body, such as wireless phones, exposure limits in terms of SAR only are specified.

Similarly, the exposure limits used by the FCC are expressed in terms of SAR,

electric and magnetic field strength, and power density for transmitters operating at frequencies from 300 kHz to 100 GHz. The specific values can be found in two FCC bulletins, OET Bulletins 56 and 65.

OET Bulletin 56, “Questions and Answers about Biological Effects and Potential Hazards of Radiofrequency Electromagnetic Fields” was designed to provide factual information to the public by answering some of the most commonly asked questions. It includes the latest information on FCC guidelines for human exposure to RF/MW radiation. Further information and a downloadable version of Bulletin 56 can be found at: http://new.iaff.org/HS/PDF/FCC%20Bulletin%2056%20-%20EMF.pdf

OET Bulletin 65, “Evaluating Compliance With FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields” was prepared to provide assistance in determining whether proposed or existing transmitting facilities, operations or devices comply with limits for human exposure to RF/MW radiation adopted by the Federal Communications Commission (FCC). Further information and a downloadable version of Bulletin 65 can be found at: http://new.iaff.org/HS/PDF/FCC%20Bulletin%2065%20-%20Cell%20Towers.pdf

The FCC authorizes and licenses products, transmitters, and facilities that generate RF and microwave radiation. It has jurisdiction over all transmitting services in the U.S. except those specifically operated by the Federal Government. Under the National Environmental Policy Act of 1969 (NEPA), the FCC has certain responsibilities to consider whether its actions will significantly affect the quality of the human environment. Therefore, FCC approval and licensing of transmitters and facilities must be evaluated for significant impact on the environment. Human exposure to RF radiation emitted by FCC-regulated transmitters is one of several factors that must be considered in such environmental evaluations. In 1996, the FCC revised its guidelines for RF/MW radiation exposure as a result of a multi-year proceeding and as required by the Telecommunications Act of 1996.

For further information and answers to questions about the safety of RF/MW radiation from transmitters and facilities regulated by the FCC go to http://www.fcc.gov/oet/rfsafety/rf-faqs.html.

Canadian Government Information

Industry Canada is the organization that sets regulatory requirements for electromagnetic spectrum management and radio equipment in Canada. Industry Canada establishes standards for equipment certification and, as part of these standards, developed RSS-102, which specifies permissible radiofrequency RF/MW radiation levels. For this purpose, Industry Canada adopted the limits outlined in Health Canada's Safety-Code 6, which is a guideline document for limiting RF exposure. A downloadable version of "RSS-102 – Evaluation Procedure for Mobile and Portable Radio Transmitters with respect to Health Canada's Safety Code 6 for Exposure of Humans to Radio Frequency Fields", as well as additional information can be found at: http://new.iaff.org/HS/PDF/Safety%20Code%206.pdf

Safety Code 6 specifies the requirements for the use of radiation emitting devices. This Code replaces the previous Safety Code 6 – EHD-TR-160. A downloadable version of "Limits of Human Exposure to Radiofrequency Electromagnetic Fields in the Frequency Range from 3 kHz TO 300 GHz – Safety Code 6", as well as further detailed information can be found at .http://new.iaff.org/HS/PDF/Non-Ionizing%20Radiation%20Volume%2080.pdf

US and Canadian Legal Issues

Although some local and state governments have enacted rules and regulations about human exposure to RF/MW radiation in the past, the Telecommunications Act of 1996 requires the United States Federal Government to control human exposure to RF/MW radiation. In particular, Section 704 of the Act states that, "No State or local government or

instrumentality thereof may regulate the placement, construction, and modification of personal wireless service facilities on the basis of the environmental effects of radio frequency emissions to the extent that such facilities comply with the Commission's regulations concerning such emissions." Further information on federal authority and FCC policy is available in a fact sheet from the FCC's Wireless Telecommunications Bureau at www.fcc.gov/wtb.

In a recent opinion filed by Senior Circuit Judge Stephen F. Williams, No. 03-1336 EMR Network v. Federal Communications Commission and United States of America, the Court upheld the FCC's decision not to initiate an inquiry on the need to revise its regulations to address non-thermal effects of radiofrequency (RF) radiation from the facilities and products subject to FCC regulation as EMR Network had requested in its September 2001 Petition for Inquiry.

At the request of the EMR Network, the EMR Policy Institute provided legal and research support for this appeal. On January 13, 2005, a Petition for Rehearing en banc by the full panel of judges at the DC Circuit Court of Appeals was filed. Briefs, background documents and the DC Circuit decision are found at: http://www.emrpolicy.org/litigation/case_law/index.htm.

The Toronto Medical Officer of Health for the Toronto Board of Health recommended to Health Canada that public exposure limits for RF/MW radiation be made 100 times stricter; however the recommendation was not allowed, since, as in the US, only the Canadian federal government can regulate RF/MW radiation exposure level.

World Health Organization Efforts

In 1996, the World Health Organization (WHO) established the International EMF Project to review the scientific literature and work towards resolution of health concerns over the use of RF/MW technology. WHO maintains a Web

site that provides addition information on this project and about RF/MW biological effects and research. For further information go to http://www.who.int/peh-emf/en/.

Conclusion

For decades, the International Association of Fire Fighters has been directly involved in protecting and promoting the health and safety of our membership. However, we simply don't know at this time what the possible health consequences of long-term exposure to low-intensity RF/MW radiation of the type used by the cell phone base stations and antennas will be. No one knows–the data just aren't there. The chairman of the International Commission on Non-Ionizing Radiation Protection ICNIRP), one of the leading international organizations which formulated the current RF/MW radiation exposure guidelines, has stated that the guidelines include "no consideration regarding prudent avoidance" for health effects for which evidence is less than conclusive (49)

Again, fire department facilities, where fire fighters and emergency response personnel live and work are not the proper place for a technology which could endanger their health and safety

The only reasonable and responsible course is to conduct a study of the highest scientific merit and integrity on the RF/MW radiation health effects to our membership and, in the interim, oppose the use of fire stations as base stations for towers and/or antennas for the conduction of cell phone transmissions until it is proven that such sitings are not hazardous to the health of our members.

Footnotes

[back] 1. Revised and Amended IAFF Resolution No. 15; August 2004

Study of Firefighters Exposed to Radio Frequency (RF) Radiation from Cell Towers/Masts

WHEREAS, fire stations across the United States and Canada are being sought by wireless companies as base stations for the antennas and towers for the conduction of cell phone transmissions; and

WHEREAS, many firefighters who are living with cell towers on or adjacent to their stations are paying a substantial price in terms of physical and mental health. As first responders and protectors of the general public, it is crucial that firefighters are functioning at optimal cognitive and physical capacity at all times; and

WHEREAS, the brain is the first organ to be affected by RF radiation and symptoms manifest in a multitude of neurological conditions including migraine headaches, extreme fatigue, disorientation, slowed reaction time, vertigo, vital memory loss and attention deficit amidst life threatening emergencies; and

WHEREAS, most of the firefighters who are experiencing symptoms can attribute the onset to the first week(s) these towers/antennas were activated; and

WHEREAS, RF radiation is emitted by these cellular antennas and RF radiation can penetrate every living cell, including plants, animals and humans; and

WHEREAS, both the U. S. and Canadian governments established regulatory limits for RF radiation based on thermal (heat) measurements with no regard for the adverse health effects from non-thermal radiation which is proven to harm the human brain and immune system; and

WHEREAS, the U. S. Environmental Protection Agency stated in a July 16, 2002, letter, “Federal health and safety agencies have not yet developed policies concerning possible risk from long-term, non-thermal exposures. The FCC’s exposure guideline is considered protective of effects arising from a thermal mechanism (RF radiation from cell towers is non-thermal) but not from all possible mechanisms. Therefore, the generalization by many that the guidelines protecting human beings from harm by any or all mechanisms is not justified”; and

WHEREAS, an Expert Panel Report requested by the Royal Society of Canada prepared for Health Canada (1999) stated that, “Exposure to RF fields at intensities far less than levels required to produce measurable heating can cause effects in cells and tissues. These biological effects include alterations in the activity of the enzyme ornithine decarboxylase, in calcium regulation, and in the permeability of the blood-brain barrier. Some of these biological effects brought about by non-thermal exposure

levels of RF could potentially be associated with adverse health effects"; and

WHEREAS, based on concerns over growing scientific evidence of dangers from RF radiation, an international conference was convened in Salzburg, Austria, in the summer of 2000 where renowned scientists declared the upper-most RF radiation exposure limit from a tower-mast should be 1/10th of 1 microwatt (Note that 1/10th of 1 microwatt is 10,000 times lower than the uppermost limit allowed by the U. S. or Canada.); and it should be noted this limit was set because of study results showing brain wave changes at 1/10th of 1 microwatt; and

WHEREAS, in a recently cleared paper by Dr. Richard A. Albanese of the U. S. Air Force, a highly recognized physician in the area of the impact of radiation on the human body, Dr. Albanese states, "I would ask a good faith effort in achieving as low exposure rates as are possible within reasonable financial constraints. Also I would fund targeted studies using animal subjects and human groups living or working in high radiation settings or heavy cellular phone users, emphasizing disease causations. I urge acceptance of the ideal that there should be no unmonitored occupational or environmental exposures whose associated disease rates are unknown." (The opinions expressed herein are those of Dr. Albanese, and do not reflect the policies of the United States Air Force.); and

WHEREAS, recently a study, not affiliated with the wireless industry, was conducted of firefighters exposed to RF radiation from cell towers/antennas affixed to their stations.** The study revealed brain damage that can be differentiated from chemical causation (such as inhalation of toxic smoke) suggesting RF radiation as the cause of the brain damage found on SPECT scans; and

WHEREAS, firefighters are the protectors of people and property and should be protected under the Precautionary Principle of Science and therefore, unless radiation is proven safe and harmless, cellular antennas should not be placed on or near fire stations; therefore be it

RESOLVED, That the IAFF shall seek funding for an initial U. S. and Canadian study with the highest scientific merit and integrity, contrasting firefighters with residence in stations with towers to firefighters without similar exposure; and be it further

RESOLVED, That in accordance with the results of the study, the IAFF will establish protective policy measures with the health and safety of all firefighters as the paramount objective; and be it further

RESOLVED, That the IAFF oppose the use of fire stations as base stations for antennas and towers for the conduction of cell phone transmissions until such installations are proven not to be hazardous to the health of our members.

**Note: A pilot study was conducted in 2004 of six California fire fighters working and sleeping in stations with towers. The study, conducted by Gunnar Heuser, M.D., PhD. of Agoura Hills, CA, focused on neurological symptoms of six fire fighters who had been working for up to five years in stations with cell towers. Those symptoms included slowed reaction time, lack of focus, lack of impulse control, severe headaches, anesthesia-like sleep, sleep deprivation, depression, and tremors. Dr. Heuser used functional brain scans – SPECT scans – to assess any changes in the brains of the six fire fighters as compared to healthy brains of men of the same age. Computerized psychological testing known as TOVA was used to study reaction time, impulse control, and attention span. The SPECT scans revealed a pattern of abnormal change which was concentrated over a wider area than would normally be seen in brains of individuals exposed to toxic inhalation, as might be expected from fighting fires. Dr. Heuser concluded the only plausible explanation at this time would be RF radiation exposure. Additionally, the TOVA testing revealed among the six fire fighters delayed reaction time, lack of impulse control, and difficulty in maintaining mental focus.

[back] 2. An international blue ribbon panel assembled by the National Institute of Environmental Health Sciences (NIEHS) designated power frequency electromagnetic fields (EMF) as “possible human carcinogens” on June 24, 1998. The panel’s decision was based largely on the results of epidemiological studies of children exposed at home and workers exposed on the job. The evaluation of the EMF literature followed procedures developed by the International Agency for Research on Cancer (IARC), based in Lyon, France. The working group’s report will be the basis for the NIEHS report to Congress on the EMF Research and Public Information Dissemination program (EMF RAPID). The National Radiological Protection Board (NRPB) of the United Kingdom noted that the views of its Advisory Group on Non-Ionizing Radiation are “consistent with those of the NIEHS expert panel.”

June 26, 1998 statement of the National Radiological Protection Board, sited in Microwave News, July/August 1998

[back] 3. World Health Organization; International Agency for Research on Cancer; IARC Monographs on the Evaluation of Carcinogenic Risks to Humans; Volume 80 Non-Ionizing Radiation, Part 1: Static and Extremely Low-Frequency (ELF) Electric and Magnetic Fields; 2002; 429 pages; ISBN 92 832 1280 0; See http://monographs.iarc.fr/ENG/Monographs/vol80/volume80.pdf This IARC Monograph provides the rationale for its designation of ELF/EMF as a possible human carcinogen. It states that:

A few studies on genetic effects have examined chromosomal aberrations and micronuclei in lymphocytes from workers exposed to ELF electric and magnetic fields. In these studies, confounding by genotoxic agents (tobacco, solvents) and

comparability between the exposed and control groups are of concern. Thus, the studies reporting an increased frequency of chromosomal aberrations and micronuclei are difficult to interpret.

Many studies have been conducted to investigate the effects of ELF magnetic fields on various genetic end-points. Although increased DNA strand breaks have been reported in brain cells of exposed rodents, the results are inconclusive; most of the studies show no effects in mammalian cells exposed to magnetic fields alone at levels below 50 μT. However, extremely strong ELF magnetic fields have caused adverse genetic effects in some studies. In addition, several groups have reported that ELF magnetic fields enhance the effects of known DNA- and chromosome-damaging agents such as ionizing radiation.

The few animal studies on cancer-related non-genetic effects are inconclusive. Results on the effects on in-vitro cell proliferation and malignant transformation are inconsistent, but some studies suggest that ELF magnetic fields affect cell proliferation and modify cellular responses to other factors such as melatonin. An increase in apoptosis following exposure of various cell lines to ELF electric and magnetic fields has been reported in several studies with different exposure conditions. Numerous studies have investigated effects of ELF magnetic fields on cellular end-points associated with signal transduction, but the results are not consistent.

[back] 4. The International Commission on Non-Ionizing Radiation Protection (ICNIRP) statement “Health Issues Related to the Use of Hand-Held Radiotelephones and Base Transmitters” of 1996 reads:

“Thermally mediated effects of RF fields have been studied in animals, including primates. These data suggest effects that will probably occur in humans subjected to whole body or localized heating sufficient to increase tissue temperatures by greater than 1C. They include the induction of opacities of the lens of the eye, possible effects on development and male fertility, various physiological and thermoregulatory responses to heat, and a decreased ability to perform mental tasks as body temperature increases. Similar effects have been reported in people subject to heat stress, for example while working in hot environments or by fever. The various effects are well established and form the biological basis for restricting occupational and public exposure to radiofrequency fields. In contrast, non-thermal effects are not well established and currently do not form a scientifically acceptable basis for restricting human exposure for frequencies used by hand-held radiotelephones and base stations.”

International Commission on Non-Ionizing Radiation Protection, “Health Issues Related to the Use of Hand-Held Radiotelephones and Base Transmitters,” Health Physics 70:587-593, 1996

The ANSI/IEEE Standard for Safety Levels of 1992 similarly states:

“An extensive review of the literature revealed once again that the most sensitive measurements of potentially harmful biological effects were based on the disruption of ongoing behavior associated with an increase of body temperature in the presence of electromagnetic fields. Because of the paucity of reliable data on chronic exposures, IEEE Subcommittee IV focused on evidence of behavioral disruption under acute exposures, even disruption of a transient and fully reversible nature.”

IEEE Standards Coordinating committee 28 on Non-Ionizing Radiation Hazards: Standard for Safe Levels With Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 KHz to 300 GHz (ANSI/IEEE C95.1-1991), The Institute of Electrical and Electronics Engineers, New York, 1992.

[back] 5. Drs. Czerska, Casamento, Ning, and Davis (working for the Food and Drug Administration in 1997) using “a waveform identical to that used in digital cellular phones” at a power level within our current standards (SAR of 1.6 W/Kg, the maximum spatial peak exposure level recommended for the general population in the ANSI C95.1-1991 standard) found increases in cellular proliferation in human glioblastoma cells. This shows that “acceptable” levels of radiation can cause human cancer cells to multiply faster. The authors note that “because of reported associations between cellular phone exposure and the occurrence of a brain tumor, glioblastoma, a human glioblastoma cell line was used” in their research.

E.M. Czerska, J. Casamento, J. T. Ning, and C. Davis, “Effects of Radiofrequency Electromagnetic Radiation on Cell Proliferation,” [Abstract presented on February 7, 1997 at the workshop ‘Physical Characteristics and Possible Biological Effects of Microwaves Applied in Wireless Communication, Rockville, MD] E. M. Czerska, J. Casamento Centers for Devices and Radiological Health, Food and Drug Administration, Rockville, Maryland 20857, USA; H. T. Ning, Indian Health Service, Rockville, Maryland 20857, USA; C. Davis, Electrical Engineering Dept., Univ. of Maryland, College Park, Maryland 20742, USA

[back] 6. Dr. Michael Repacholi (in 1997, currently the director of the International Electromagnetic Fields Project at the World Health Organization) took one hundred transgenic mice and exposed some to radiation for two 30 minute periods a day for up to 18 months. He found that the exposed mice developed lymphomas (a type of cancer) at twice the rate of the unexposed mice. While telecommunications industry spokespersons criticized the experiment for using mice with a mutation which predisposed them to cancer (transgenic) the researchers pointed out that “some individuals inherit mutations in other genes… that predispose them to develop cancer, and these individuals may comprise a subpopulation at special risk from agents that would pose an otherwise insignificant risk of cancer.”

Dr. Repacholi stated “I believe this is the first animal study showing a true non-thermal effect.” He repeated the experiment in 1998 using 50 Hz fields instead of the 900 MHz pulsed radiation (the type used by cellular phones) used in the original experiment and found no cancer risk. He stated that this new data had implications for his original cellular phone study: “the control groups for both our RF and 50 Hz field studies showed no statistical differences, which lessens the possibility that the RF/MW radiation study result was a chance event or due to errors in methodology.”

It is extremely important to note that Dr. Michael Repacholi was Chairman of the ICNIRP at the time its Statement on Health Issues Related to the Use of Hand-Held Radiotelephones and Base Transmitters was developed in 1996.

M. Repacholi et al., “Lymphomas in Eμ-Pim1 Transgenic Mice Exposed to Pulsed 900 MHz Electromagnetic Fields,” Radiation Research, 147, pp.631-640, May 1997

[back] 7. Dr. Ross Adey (Veterans Administration Hospital at Loma Linda University in 1996) found what appeared to be a protective effect in rats exposed to the type of radiation used in digital cellular phones. The rats were exposed to an SAR of 0.58-0.75 W/Kg 836 MHz pulsed radiation of the TDMA type two hours a day, four days a week for 23 months, with the signals turned on and off every 7.5 minutes, so total exposure was 4 hours a week. Interestingly this effect was not present when a non-digital, analog signal was used. Rats exposed developed cancer less often. This study shows that low power fields of the digital cellular frequency can influence cancer development. Whether they would protect or promote in our children is a question for further study.

Ross Adey of the Veterans Administration Hospital at Loma Linda University, CA presented the results of pulsed (digital cellular) radiation on June 13, 1996 at the 18th Annual Meeting of the Bioelectromagnetics Society in Victoria, Canada. He presented the findings of the analog cellular phone radiation effect at the June 1997 2nd World Congress for Electricity and Magnetism in Biology and Medicine in Bologna, Italy. Reviews can be found in Microwave News issues July/August, 1996 and March/April 1997.

In recognition of his more than three decades of “fundamental contributions to the emerging science of the biological effects of electromagnetic fields,” the authors of the November 2004 Report of the European Union’s REFLEX Project (Risk Evaluation of Potential Environmental Hazards From Low Frequency Electromagnetic Field Exposure Using Sensitive in vitro Methods) chose to include Dr. Adey’s personal views on Electromagnetic Field Exposure research as the Foreword to that report. To view the entire report, see: REFLEX Final Report.pdf

The following is taken from Dr. Adey's Foreword found on pages 1-3 of the REFLEX Report:

The Future of Fundamental Research in a Society Seeking Categoric Answers to Health Risks of New Technologies

In summary, we have become superstitious users of an ever-growing range of technologies, but we are now unable to escape the web that they have woven around us.

Media reporters in general are no better informed. Lacking either responsibility or accountability, they have created feeding frenzies from the tiniest snippets of information gleaned from scientific meetings or from their own inaccurate interpretation of published research. In consequence, the public has turned with pleading voices to government legislatures and bureaucracies for guidance . . .

We face the problem brought on by the blind leading the blind. Because of public pressure for rapid answers to very complex biological and physical issues, short-term research programs have been funded to answer specific questions about certain health risks.

In many countries, and particularly in the USA, the effects of such harassing and troublesome tactics on independent, careful fundamental research have been near tragic. Beguiled by health hazard research as the only source of funding, accomplished basic scientists have diverted from a completely new frontier in physical regulation of biological mechanisms at the atomic level. Not only have governments permitted corporate interests in the communications industry to fund this research, they have even permitted them to determine the research questions to be addressed and to select the institutions performing the research.

[back] 8. Dr. A. W. Guy reported an extensive investigation on rats chronically exposed from 2 up to 27 months of age to low-level pulsed microwaves at SARs up to 0.4 W/Kg. The exposed group was found to have a significantly higher incidence of primary cancers.

A. W. Guy, C. K. Chou, L. Kunz, L, Crowley, and J. Krupp, "Effects of Long-Term Low-Level Radiofrequency Radiation Exposure on Rats." Volume 9. Summary. Brooks Air Force Base, Texas, USAF School of Aerospace Medicine, USF-SAM-TR-85-11; 1985

[back] 9. Drs. Henry Lai and N. P. Singh of the University of Washington in Seattle have reported both single- and double-strand DNA breaks in the brains of rats exposed to radiofrequency electromagnetic radiation at an SAR of 1.2 W/Kg. DNA is the carrier of the genetic information in all living cells. Cumulated DNA strand breaks in brain cells can lead to cancer or

neurodegenerative diseases.

H. Lai and N. P. Singh, “Single- and Double-Strand DNA Breaks in Rat Brain Cells After Acute Exposure to Radiofrequency Electromagnetic Radiation,” International Journal of Radiation Biology, Vol 69, No. 4, 513-521, 1996

[back] 10. Dr. Stanislaw Szmigielski has studied many thousands of Polish soldiers. He has found that those exposed to radiofrequency and microwave radiation in the workplace had more than double the cancer rate of the unexposed servicemen analyzing data from 1971-1985. He has presented further data suggesting a dose-response relationship with soldiers exposed to 100-200 W/cm2 suffering 1.69 times as many cancers as the unexposed, and those exposed to 600-1000 W/cm2 suffering 4.63 times as many cancers. The level considered safe for the public according to FCC regulations is 1000 W/cm2. Occupational exposure up to 5000 W/cm2 is allowed.

S. Szmigielski, “Cancer Morbidity in Subjects Occupationally Exposed to High Frequency (Radiofrequency and Microwave) Electromagnetic Radiation,” The Science of the Total Environment 180:9-17, 1996

[back] 11. Dr. Bruce Hocking found an association between increased childhood leukemia incidence and mortality in the proximity of television towers. The power density ranged from 0.2-8.0 W/cm2 nearer and 0.02 W/cm2 farther from the towers.

B. Hocking, I. R. Gordon, H. L. Grain, and G. E. Hatfield, “Cancer Incidence and Mortality and Proximity to TV Towers,” Medical Journal of Australia 165: 601-605; 1996

[back] 12. Drs. Mann and Röschke investigated the influence of pulsed high-frequency RF/MW radiation of digital mobile radio telephones on sleep in healthy humans. They found a hypnotic effect with shortening of sleep onset latency and a REM (Rapid Eye Movement) suppressive effect with reduction of duration and percentage of REM sleep. “REM sleep plays a special physiological role for information processing in the brain, especially concerning consolidation of new experiences. Thus the effects observed possibly could be associated with alterations of memory and learning functions.”

K. Mann and J. Röschke, “Effects of Pulsed High-Frequency Electromagnetic Fields on Human Sleep,” Neuropsychobiology 33:41-47, 1996

[back] 13. Dr. Allen Frey has been researching RF/MW radiation for over 3 decades. Here is the abstract on a paper concerning headaches and cellular phone radiation. “There have been numerous recent reports of headaches occurring in association with the use of hand-held cellular telephones. Are these reported headaches real? Are they due to emissions from telephones? There

is reason to believe that the answer is “yes” to both questions. There are several lines of evidence to support this conclusion. First, headaches as a consequence of exposure to low intensity microwaves were reported in the literature 30 years ago. These were observed during the course of microwave hearing research before there were cellular telephones. Second, the blood-brain barrier appears to be involved in headaches, and low intensity microwave energy exposure affects the barrier. Third, the dopamine-opiate systems of the brain appear to be involved in headaches, and low intensity electromagnetic energy exposure affects those systems. In all three lines of research, the microwave energy used was approximately the same–in frequencies, modulations, and incident energies–as those emitted by present day cellular telephones, Could the current reports of headaches be the canary in the coal mine, warning of biologically significant effects?”

A. H. Frey, “Headaches from Cellular Telephones: Are they Real and What Are the Implications?” Environmental Health Perspectives Volume 106, Number 3, pp.101-103, March 1998

[back] 14. Henry Lai’s review of the literature concerning neurological effects of RF/MW radiation: Existing data indicate that RF/MW radiation of relatively low intensity can affect the nervous system. Changes in blood-brain barrier, morphology, electrophysiology, neurotransmitter functions, cellular metabolism, and calcium efflux, and genetic effects have been reported in the brain of animals after exposure to RF. These changes can lead to functional changes in the nervous system. Behavioral changes in animals after exposure to RR have been reported.

Even a temporary change in neural functions after RF/MW radiation exposure could lead to adverse consequences. For example, a transient loss of memory function or concentration could result in an accident when a person is driving. Loss of short term working memory has indeed been observed in rats after acute exposure to RF/MW radiation.

Research has also shown that the effects of RF/MW radiation on the nervous system can cumulate with repeated exposure. The important question is, after repeated exposure, will the nervous system adapt to the perturbation and when will homeostasis break down? Related to this is that various lines of evidence suggest that responses of the central nervous system to RF/MW radiation could be a stress response. Stress effects are well known to cumulate over time and involve first adaptation and then an eventual break down of homeostatic processes.

H. Lai, “Neurological Effects of Radiofrequency Electromagnetic Radiation Relating to Wireless Communication Technology,” Paper presentation at the IBC-UK Conference: “Mobile Phones-Is There a Health Risk?” September 16-17, 1997, Brussels, Belgium

[back] 15. Blood-Brain-Barrier: The blood-brain-barrier (BBB) is primarily a continuous layer of cells lining the blood vessels of the brain. It is critical for regulation of the brain's activity. Lai notes that "Even though most studies indicate that changes in the BBB occurs only after exposure to RF/MW radiation of high intensities with significant increase in tissue temperature, several studies have reported increases in permeability after exposure to RF/MW radiation of relatively low intensities…Pulsed RF seems to be more potent than continuous wave RF." Pulsed RF/MW is the type used in digital cellular systems. Effects on the BBB were noted at the 0.2 W/cm2 level, and even at SAR of 0.016-5 W/kg. These effects could lead to local changes in brain function.

H. Lai, Ibid

[back] 16. Cellular Morphology: RF/MW radiation induced morphological changes of the central nervous system cells and tissues have been shown to occur under relatively high intensity or prolonged exposure to the RF/MW radiation. However, there are several studies which show that repeated exposure at relatively low power intensities caused morphological changes in the central nervous system. Again here pulsed (as in digital phone use) RF/MW radiation produced more pronounced effects. Certain drugs given to nonhuman primates sensitized them, for instance allowing eye damage to occur at very low power intensities. Dr Lai notes "Changes in morphology, especially cell death, could have an important implication on health. Injury-induced cell proliferation has been hypothesized as a cause of cancer." Some of these experiments were in the range of SAR 0.53 W/kg or even 0.26 W/kg.

H. Lai, Ibid

[back] 17. Neural Electrophysiology: Changes in neuronal electrophysiology, evoked potentials, and EEG have been reported. Some effects were observed at low intensities and after repeated exposure, suggesting cumulative effect. Energy density levels were as low as 50 W/cm2.

H. Lai, Ibid

[back] 18. Neurotransmitters: Neurotransmitters are molecules which transmit information from one nerve cell to another. Early studies have reported changes in various neurotransmitters (catecholamines, serotonin, and acetylcholine) in the brain of animals only after exposure to high intensities of RF/MW radiation. However, there are more recent studies that show changes in neurotransmitter functions after exposure to low intensities of RF radiation. For example, effects were seen at 50 μW/cm2 in one experiment. U.S. and Canadian RF/MW radiation safety policies allow exposures of 1000 μW/cm2 at that frequency.

RF/MW radiation activates endogenous opioids in the brain. Endogenous opioids are neurotransmitters with morphine-like properties and are involved in many important physiological and behavioral functions, such as pain perception and motivation.

The response to RF/MW radiation depends on the area of the brain studied and on the duration of exposure. Exposure to RF/MW radiation has been shown to affect the behavioral actions of benzodiazepines (these are drugs such as Valium).

H. Lai, Ibid

[back] 19. Metabolic Changes in Neural Tissue: Several studies investigated the effects of RF/MW radiation exposure on energy metabolism in the rat brain. Surprisingly, changes were reported after exposure to relatively low intensity RF/MW radiation for a short duration of time (minutes). The effects depended on the frequency and modulation characteristics of the RF/MW radiation and did not seem to be related to temperature changes in the tissue.

Calcium ions play important roles in the functions of the nervous system, such as the release of neurotransmitters and the actions of some neurotransmitter receptors. Thus changes in calcium ion concentration could lead to alterations in neural functions. This is an area of considerable controversy because some researchers have also reported no significant effects of RF/MW radiation exposure on calcium efflux. However, when positive effects were observed, they occurred after exposure to RF/MW radiation of relatively low intensities and were dependent on the modulation and intensity of the RF/MW radiation studied (window effects). Some studies had SARs as low as 0.05-0.005 W/Kg.

H. Lai, Ibid

[back] 20. Cytogenetic effects have been reported in various types of cells after exposure to RF/MW radiation. Recently, several studies have reported cytogenetic changes in brain cells by RF/MW radiation , and these results could have important implication for the health effects of RF/MW radiation . Genetic damage to glial cells can result in carcinogenesis. However, since neurons do not undergo mitosis, a more likely consequence of neuronal genetic damage is changes in functions and cell death, which could either lead to or accelerate the development of neurodegenerative diseases. Power densities of 1 mW/cm2 were employed, a level considered safe for the public by the FCC.

RF/MW radiation -induced increases in single and double strand DNA breaks in rats can be blocked by treating the rats with melatonin or the spin-trap compound N-t-butyl–phenylnitrone. Since both compounds are potent free radical scavengers, these data suggest that free radicals may play a role in the genetic effect of RF. If free radicals are involved in the RF-induced DNA strand breaks in brain cells, results from this study could have an important implication on the health effects of RF exposure.

Involvement of free radicals in human diseases, such as cancer and atherosclerosis, has been suggested. Free radicals also play an important role in the aging process, which has been ascribed to be a consequence of accumulated oxidative damage to body tissues, and involvement of free radicals in neurodegenerative diseases, such as Alzheimer's, Huntington, and Parkinson, has also been suggested. One can also speculate that some individuals may be more susceptible to the effects of RF/MW radiation exposure.

H. Lai, Ibid

[back] 21. Dr. A. A. Kolodynski and V. V. Kolodynska of the Institute of Biology, Latvian Academy of Sciences, presented the results of experiments on school children living in the area of the Skrunda Radio Location Station in Latvia. Motor function, memory, and attention significantly differed between the exposed and control groups. The children living in front of the station had less developed memory and attention and their reaction time was slower.

A. A. Kolodynski, V. V. Kolodynska, "Motor and Psychological Functions of School Children Living in the Area of the Skrunda Radio Location Station in Latvia," The Science of the Total Environment 180:87-93, 1996

[back] 22. Dr. H. Lai and colleagues in 1993 exposed rats to 45 minutes of pulsed high frequency RF/MW radiation at low intensity and found that the rats showed retarded learning, indicating a deficit in spatial "working memory" function.

H Lai, A. Horita, and A. W. Guy, "Microwave Irradiation Affects Radial-Arm Maze Performance in the Rat," Bioelectromagnetics 15:95-104, 1994

NOTE: Dr. Lai's January 2005 compilation of published RF/MW radiation studies demonstrating biological effects of exposure to low-intensity RF/MW radiation is included as a Reference section at the end of this report.

[back] 23. Dr. Stefan Braune reported a 5-10 mm Hg resting blood pressure rise during exposure to RF/MW radiation of the sort used by cellular phones in Europe. The Lancet, the British medical journal where the report appeared, stated that "Such an increase could have adverse effects on people with high blood pressure."

S. Braune, "Resting Blood Pressure Increase During Exposure to a Radio-Frequency Electromagnetic Field," The Lancet 351, pp. 1,857-1,858, 1998

[back] 24. Dr. Kues and colleagues (of Johns Hopkins University and the Food and Drug Administration) found that placing timolol and pilocarpine into the eyes of monkeys and then exposing them to low power density pulsed RF/MW radiation caused

a significant reduction in the power-density threshold for causing damage to the cells covering the eye and the iris. In fact the power was reduced by a factor of 10, so that it entered the “acceptable, safe” level of the FCC, 1 mW/cm2! Timolol and pilocarpine are commonly used by people suffering from glaucoma. This is a very important study, as it points to the fact that laboratory experiments under “ideal” conditions are rarely what one finds in real life. The “safe” level of RF/MW radiation exposure for healthy people is likely to be very different than for those of us who suffer from illness, take medications, or are perhaps simply younger or older than those in the experiments.

H. A. Kues, J. C. Monahan, S. A. D’Anna, D. S. McLeod, G. A. Lutty, and S. Koslov, “Increased Sensitivity of the Non-Human Primate Eye to Microwave Radiation Following Ophthalmic Drug Pretreatment,” Bioelectromagnetics 13:379-393, 1992

[back] 25. The World Health Organization states that “concerns have been raised about the safety of cellular mobile telephones, electric power lines and police speed-control ‘radar guns.’ Scientific reports have suggested that exposure to electromagnetic fields emitted from these devices could have adverse health effects, such as cancer, reduced fertility, memory loss, and adverse changes in the behaviour and development of children.” Therefore, “In May 1996, in response to growing public health concerns in many Member States over possible health effects from exposure to an ever-increasing number and diversity of EMF sources, the World Health Organization launched an international project to assess health and environmental effects of exposure to electric and magnetic fields, which became known as the International EMF Project. The International EMF Project will last for five years.” “A number of studies at [frequencies above about 1 MHz] suggest that exposure to RF fields too weak to cause heating may have adverse health consequences, including cancer and memory loss. Identifying and encouraging coordinated research into these open questions is one of the major objectives of the International EMF Project.”

World Health Organization Fact Sheet N181, “Electromagnetic Fields and Public Health, The International EMF Project,” reviewed May 1998 and World Health Organization Fact Sheet N182, “Electromagnetic Fields and Public Health, Physical Properties and Effects on Biological Systems,” reviewed May 1998,

[back] 26. The U. S. Food and Drug Administration in a January 14, 1998 letter to the House Telecommunications Subcommittee stated it “believes additional research in the area of RF is needed.” In 1997 the FDA established the following priorities:

Chronic (lifetime) animal exposures should be given the highest priority.

Chronic animal exposures should be performed both with and without the application of chemical initiating agents to

investigate tumor promotion in addition to tumorigenesis.

Identification of potential risks should include end points other than brain cancer (e.g. ocular effects of RF radiation exposure).

Replication of prior studies demonstrating positive biological effects work is needed. A careful replication of the Chou and Guy study (Bioelectromagnetics, 13, pp.469-496, 1992) which suggests that chronic exposure of rats to microwaves is associated with an increase in tumors, would contribute a great deal to the risk identification process for wireless communication products.

Genetic toxicology studies should focus on single cell gel studies of DNA strand breakage and on induction of micronuclei.

Epidemiology studies focused on approaches optimized for hazard identification are warranted.

Food and Drug Administration Recommendations quoted in Microwave News, March/April, 1997

[back] 27. The International Agency for Research on Cancer (IARC) is planning a multi-country, multi-million dollar study of cancer among users of wireless phones, beginning 1998. Microwave News, January/February, 1998

[back] 28. The Swedish Work Environmental Fund initiated a new epidemiological study on cellular phone radiation and brain tumors in 1997. Microwave News, November/December, 1997

[back] 29. The National Cancer Institute announced plans for a 5 year study of brain tumors and RF/MW radiation in 1993. Microwave News, January/February, 1993

[back] 30. The European Commission (EC) Expert Group on health effects of wireless phones called for a 5 year research program with a $20 million budget, reported 1997. Microwave News , January/February, 1997

[back] 31. A report commissioned by New Zealand's Ministry of Health stated that "It is imperative that the scientific issues be clarified as soon as possible, as there is much at stake." It called for more research to examine the potential health effects of RF radiation. Microwave News, November/December, 1996

[back] 32. The National Health and Medical Research Council of Australia announced its sponsorship of a 5 year, $3.5 million project on potential health effects of mobile phone technology in 1996. Microwave News, November/December, 1996

[back] 33. The Commonwealth Scientific Industrial Research Organization (CSIRO) of Australia concluded in 1995 that the safety of cellular telephones cannot be resolved "in the near future." Dr. Stan Barnett, a principal researcher of CSIRO, states that "My goal is to establish a national committee to approach this problem by coordinating relevant and focused research." He

estimated a budget of $3 million over a 3 year period would be necessary.

Commonwealth Scientific Industrial Research Organization, “Status of Research on Biological Effects and Safety of Electromagnetic Radiation: Telecommunications Frequencies,” a report prepared by Dr. Stan Barnett, as sited in Microwave News, September/October, 1995

[back] 34. In Canada, Expert Panels are formed in response to requests from governments and other organizations for guidance on public policy issues where specialized knowledge is required. The Royal Society of Canada (RSC) is the only national academic organization, encompassing all fields of study in the sciences, arts and humanities that provides, through its Committee on Expert Panels, a service to Canadians by convening Expert Panels that produce publicly disseminated, arms-length, third party reviews. The most recent Expert Panel report addressing RF/MW radiation examines new data on dosimetry and exposure assessment, thermoregulation, biological effects such as enzyme induction, and toxicological effects, including genotoxicity, carcinogenicity, and testicular and reproductive outcomes. Epidemiological studies of mobile phone users and occupationally exposed populations are examined, along with human and animal studies of neurological and behavioural effects. All of the authoritative reviews completed within the last two years have supported the need for further research to clarify the possible associations between RF fields and adverse health outcomes that have appeared in some reports. See: http://www.rsc.ca//index.php?lang_id=1&page_id=120.

Recent Advances in Research on Radiofrequency Fields and Health: 2001-2003; A Follow-up to The Royal Society of Canada, Report on the Potential Health Risks of Radiofrequency Fields from Wireless Telecommunication Devices, 1999

[back] 35. The European Union effort to address this issue is in the study Risk Evaluation of Potential Environmental Hazards from Low Energy Electromagnetic Field Exposure Using Sensitive in vitro Methods (REFLEX). Exposure to electromagnetic fields (EMF) in relation to health is a controversial topic throughout the industrial world. So far epidemiological and animal studies have generated conflicting data and thus uncertainty regarding possible adverse health effects. This situation has triggered controversies in communities especially in Europe with its high density of population and industry and the omnipresence of EMF in infrastructures and consumer products. These controversies are affecting the siting of facilities, leading people to relocate, schools to close or power lines to be re-sited, all at great expense. The European Union believes that causality between EMF exposure and disease can never be regarded as proven without knowledge and understanding of the basic mechanisms possibly triggered by EMF. To search for those basic mechanisms powerful technologies developed in toxicology and molecular biology were to be employed in the REFLEX project to investigate cellular and sub-cellular responses

of living cells exposed to EMF in vitro.

The REFLEX data have made a substantial addition to the data base relating to genotoxic and phenotypic effects of both ELF-EMF and RF-EMF on in vitro cellular systems. While the data neither precludes nor confirms a health risk due to EMF exposure nor was the project designed for this purpose, the value lies in providing new data that will enable mechanisms of EMF effects to be studied more effectively than in the past. Furthermore, the REFLEX data provide new information that will be used for risk evaluation by WHO, IARC and ICNIRP. For further information on REFLEX see: http://europa.eu.int/comm/research/quality-of-life/ka4/ka4_electromagnetic_en.html

[back] 36. The Swedish Radiation Protections Institute (SSI) endeavors to ensure that human beings and the environment are protected from the harmful effects of radiation, both in the present and in the future. SSI has focused on epidemiological research on cancer and exposure from mobile phones and transmitters as well as experimental cancer research. In addition three selected topics were also discussed, namely blood-brain barrier, heat shock proteins, and precautionary framework. For further information on SSI see: http://www.ssi.se/forfattning/eng_forfattlista.html

[back] 37. In the United Kingdom, the National Radiological Protection Board (NRPB) was created by the Radiological Protection Act 1970. The statutory functions of NRPB are to advance the acquisition of knowledge about the protection of mankind from radiation hazards through research and to provide information and advice to persons (including Government Departments) with responsibilities in the United Kingdom in relation to the protection from radiation hazards either of the community as a whole or of particular sections of the community. The NFPB believes that there is a need for better occupational studies rather than simply for more. In particular, the studies need to be of occupational groups for whom measurements show that there is genuinely a substantially raised exposure to RF fields. If the studies are to be more informative than those so far, a key requirement will be for improved exposure measurement (or improved estimation of exposure) for individuals, or at least for occupational groups. It would be desirable, as far as practical, that the studies should measure the intensity and timing of RF field exposures, and also that they should include some assessment of major RF field exposures from sources other than the current occupation. Ideally, exposure assessment needs to be anatomical site (organ)-specific, because some sources result in greatly differing doses to different parts of the body. It is a difficulty in these prescriptions, of course, that the appropriate exposure metric is unknown. For further information on NRPB see: http://www.hpa.org.uk/radiation/

[back] 38. On January 5, 2005, the EMF-Team Finland issued the Helsinki Appeal 2005 to members of the European Parliament. In it physicians and researchers call on the European Parliament to apply the Precautionary Principle to electromagnetic fields,

especially in the radio- and microwave- frequency bands. They criticize the present RF/MW radiation safety standards that do not recognize the biological effects caused by non-thermal exposures to non-ionizing radiation [i.e., RF/MW radiation.] They also call for continued refunding of the REFLEX EMF research program. The text of the Helsinke Appeal 2005 is found at: http://www.emrpolicy.org/news/headlines/index.htm

[back] 39. On July 19, 1993 Dr. Elizabeth Jacobson, Deputy Director for Science, Center for Devices and Radiological Health, Food and Drug Administration criticized Thomas Wheeler, President of the Cellular Telecommunications Industry Association:

“I am writing to let you know that we were concerned about two important aspects of your press conference of July 16 concerning the safety of cellular phones, and to ask that you carefully consider the following comments when you make future statements to the press. First, both the written press statements and your verbal comments during the conference seemed to display an unwarranted confidence that these products will be found absolutely safe. In fact, the unremittingly upbeat tone of the press packet strongly implies that there can be no hazard, leading the reader to wonder why any further research would be needed at all…..More specifically, your press packet selectively quotes from our Talk Paper of February 4 in order to imply that FDA believes that cellular phones are “safe.” (“There is no proof at this point that cellular phones are harmful.”) In fact, the same Talk Paper also states, “There is not enough evidence to know for sure, either way.” Our position, as we have stated it before, is this: Although there is no direct evidence linking cellular phones with harmful effects in humans, a few animal studies suggest that such effects could exist. It is simply too soon to assume that cellular phones are perfectly safe, or that they are hazardous–either assumption would be premature. This is precisely why more research is needed.”

Full text of letter can be found in Microwave News, July/August, 1993

[back] 40. In 1993 the Director of the Office of Radiation and Indoor Air of the Environmental Protection Agency suggested that the FCC not adopt the 1992 ANSI/IEEE standard “due to serious flaws,” among them (1) “the ANSI/IEEE conclusion that there is no scientific data indicating that certain subgroups of the population are more at risk than others is not supported by NCRP and EPA reports” and (2) “the thesis that ANSI/IEEE recommendations are protective of all mechanisms of interaction is unwarranted because the adverse effects level in the 1992 ANSI/IEEE standard are based on a thermal effect.”

Letter from Margo T. Oge, Director, Office of Radiation and Indoor Air to Thomas Stanley, Chief Engineer, Office of engineering and Technology, FCC, dated Nov 9, 1993

[back] 41. A brief sampling of the CSIRO report:

Problems in studies of human populations published to date include imprecise estimates of exposure. As a result, such epidemiological studies may underestimate any real risk. The likelihood of epidemiological studies providing useful information is questionable, particularly if the biological end point cannot be predicted. Its value in the short term (less than 10 years) must be negligible unless there was an enormous increase in the rate of cancer growth. Interestingly, the incidence of brain tumors in the EC countries has increased substantially in recent years.

RF safety cannot be assessed in the absence of reported serious effects when so little research has been aimed at the problem. It is somewhat surprising, and rather disappointing, to find that although the literature contains many hundreds of publications, there are very few areas of consensus….At low levels the absence of clear thresholds and [the] presence of intensity and frequency windows have created questions rather than provided answers.

There is no doubt that the interpretation of bioeffects data has been clouded by a preoccupation with thermally mediated processes. In fact, development of the ANSI/IEEE standard is based only on well-established thermal effects, and ignores the more subtle non-thermal processes that are more difficult to interpret and apply to human health.

Commonwealth Scientific Industrial Research Organization, “Status of Research on Biological Effects and Safety of Electromagnetic Radiation: Telecommunications Frequencies,” a report prepared by Dr. Stan Barnett, as sited in Microwave News, September/October, 1995

[back] 42. Statement from the October 25-28, 1998 “Symposium of Mobile Phones and Health – Workshop on Possible Biological and Health Effects of RF Electromagnetic Fields” held at the University of Vienna, Austria.

The preferred terminology to be used in public communication: Instead of using the terms “athermal”, “non-thermal” or “microthermal” effects, the term “low intensity biological effects” is more appropriate.

Preamble: The participants agreed that biological effects from low-intensity exposures are scientifically established. However, the current state of scientific consensus is inadequate to derive reliable exposure standards. The existing evidence demands an increase in the research efforts on the possible health impact and on an adequate exposure and dose assessment.

Base stations: How could satisfactory Public Participation be ensured: The public should be given timely participation in the process. This should include information on technical and exposure data as well as information on the status of the health debate. Public participation in the decision (limits, siting, etc.) should be enabled.

Cellular phones: How could the situation of the users be improved: Technical data should be made available to the users to allow comparison with respect to EMF-exposure. In order to promote prudent usage, sufficient information on the health debate should be provided. This procedure should offer opportunities for the users to manage reduction in EMF-exposure. In addition, this process could stimulate further developments of low-intensity emission devices.

[back] 43. Statement from the June 7-8, 2000 International Conference on Cell Tower Siting Linking Science and Public Health, Salzburg, Austria. The full report can be found at: http://new.iaff.org/HS/PDF/cell_tower_measurements.pdf

· It is recommended that development rights for the erection and for operation of a base station should be subject to a permission procedure. The protocol should include the following aspects:

o Information ahead and active involvement of the local public

o Inspection of alternative locations for the siting

o Protection of health and wellbeing

o Considerations on conservation of land- and townscape

o Computation and measurement of exposure

o Considerations on existing sources of HF-EMF exposure

o Inspection and monitoring after installation

· It is recommended that a national database be set up on a governmental level giving details of all base stations and their emissions.

· It is recommended for existing and new base stations to exploit all technical possibilities to ensure exposure is as low as achievable (ALATA-principle) and that new base stations are planned to guarantee that the exposure at places where people spend longer periods of time is as low as possible, but within the strict public health guidelines.

· Presently the assessment of biological effects of exposures from base stations in the low-dose range is difficult but indispensable for protection of public health. There is at present evidence of no threshold for adverse health effects.

o Recommendations of specific exposure limits are prone to considerable uncertainties and should be considered preliminary. For the total of all high frequency irradiation a limit value of 100 mW/m² (10 µW/cm²) is recommended.

o For preventive public health protection a preliminary guideline level for the sum total of exposures from all ELF pulse modulated high-frequency facilities such as GSM base stations of 1 mW/m² (0.1 μW/cm²) is recommended.

[back] 44. Scientists attending the September 13-14, 2002 International Conference "State of the Research on Electromagnetic Fields – Scientific and Legal Issues," organized by ISPESL (National Institute for Prevention and Work Safety, Italy), the University of Vienna, and the City of Catania, held in Catania, Italy, agreed to the following:

· Epidemiological and in vivo and in vitro experimental evidence demonstrates the existence for electromagnetic field (EMF) induced effects, some of which can be adverse to health.

· We take exception to arguments suggesting that weak (low intensity) EMF cannot interact with tissue.

· There are plausible mechanistic explanations for EMF-induced effects which occur below present ICNIRP and IEEE guidelines and exposure recommendations by the EU.

· The weight of evidence calls for preventive strategies based on the precautionary principle. At times the precautionary principle may involve prudent avoidance and prudent use.

· We are aware that there are gaps in knowledge on biological and physical effects, and health risks related to EMF, which require additional independent research.

[back] 45. The Freiburger Appeal is a German based appeal by mainly medical practitioners who are concerned about the effects, they believe, from mobile phone technology including masts that are appearing in their patients. It started in Oct 2002 and with very little international publicity has got 50,000 signatories with at least 2000 medical signatures from across the world. Mast These physicians and scientists agreed to establish an international scientific commission to promote research for the protection of public health from EMF and to develop the scientific basis and strategies for assessment, prevention, management and communication of risk, based on the precautionary principle.

Excerpt:

On the basis of our daily experiences, we hold the current mobile communications technology (introduced in 1992 and since then globally extensive) and cordless digital telephones (DECT standard) to be among the fundamental triggers for this fatal development. One can no longer evade these pulsed microwaves. They heighten the risk of already-present chemical/physical influences, stress the body–immune system, and can bring the body–still-functioning regulatory mechanisms to a halt.

Pregnant women, children, adolescents, elderly and sick people are especially at risk.

Statement of the physicians and researchers of Interdisziplinäre Gesellschaft für Umweltmedizin e. V. (Interdisciplinary Association for Environmental Medicine) IGUMED, Sackingen, Germany, September 19, 2002. The Freiburger Appeal can be found at: http://www.mastsanity.org/doctors-appeals.html.

[back] 46. Report of the European Union's REFLEX Project (Risk Evaluation of Potential Environmental Hazards from Low Frequency Electromagnetic Field Exposure Using Sensitive in vitro Methods), November 2004. The Project studied ELF and RF exposures to various animal cell types. The report is found at: http://new.iaff.org/HS/PDF/REFLEX%20Final%20Report.pdf

From the Summary: [t]he omnipresence of EMF's in infrastructures and consumer products have become a topic of public concern. This is due to the fear of people that based on the many conflicting research data a risk to their health cannot be excluded with some certainty. Therefore, the overall objective of REFLEX was to find out whether or not the fundamental biological processes at the cellular and molecular level support such an assumption. For this purpose, possible effects of EMF's on cellular events controlling key functions, including those involved in carcinogenesis and in the pathogenesis of neurodegenerative disorders, were studied through focused research. Failure to observe the occurrence of such key critical events in living cells after EMF exposure would have suggested that further research efforts in this field could be suspended and financial resources be reallocated to the investigation of more important issues. But as clearly demonstrated, the results of the REFLEX project show the way into the opposite direction.

[back] 47. From the Discussion section of the December 20, 2004 Second Annual Report of Sweden's Radiation Protection Board (SSI) entitled: Recent Research on Mobile Telephony and Health Risks: Second Annual Report from SSI's Independent Expert Group on Electromagnetic Fields. The complete report is available at: http://new.iaff.org/HS/PDF/EMF_exp_Eng_2004.pdf

To date, little is known about the levels of radiofrequency radiation exposure in the general population from sources such as mobile phones being used by oneself or other people, mobile phone base stations, and radio and television transmitters. Measurements that have been performed have usually been made as a result of public concern about base station exposures or other specific sources, and have therefore been made at locations that could be assumed to have higher fields than would be the case if measurement locations were selected randomly. Furthermore, all measurements have been stationary, and there is today no knowledge about the level of exposure that an individual will have throughout the day.

There is need for information about the personal exposure to RF fields in the general population, to enhance the understanding of the relative importance of exposure from base stations close to the home, from radio and television transmitters, and from the use of mobile phones . . . Studies with personal RF exposure measurements of randomly selected samples of the general population are strongly encouraged.

[back] 48. Released January 11, 2005, Mobile Phones and Health 2004: Report by the Board of NRPB Documents of the NRPB: Volume 15, No. 5. See: Mobile Phones and Health 2004

From the Executive Summary:

The Board notes that a central recommendation in the Stewart Report was that a precautionary approach to the use of mobile phone technologies be adopted until much more detailed and scientifically robust information on any health effects becomes available.

The Board considers that it is important to understand the signal characteristics and field strengths arising from new telecommunications systems and related technologies, to assess the RF exposure of people, and to understand the potential biological effects on the human body.

[back] 49. The ICNIRP exposure guidelines are only designed to protect against “known adverse health impacts,” according to Dr. Jürgen Bernhardt, ICNIRP’s chairman. Bernhardt reviewed the updated limits, which cover the spectrum from 1 Hz to 300 GHz, in a presentation at the 20th Annual Meeting of the Bioelectromagnetics Society in St. Pete Beach, FL, on June 10. The limits protect against “short-term, immediate health effects” such as nerve stimulation, contact shocks and thermal insults, according to the guidelines, which appear in the April issue of Health Physics (74, pp.494-522, 1998). Despite “suggestive” evidence that power frequency magnetic fields can be carcinogenic, ICNIRP has concluded that this and other non-thermal health effects have not been “established.” ICNIRP has long followed this approach to standard-setting. In his talk, Bernhardt noted that the guidelines include “no consideration regarding prudent avoidance” for health effects for which evidence is less than conclusive.

Microwave News, July/August 1998

Additional References and Studies

The following references reporting biological effects of radiofrequency radiation (RFR) at low intensities through January 2005

were compiled on 12/27/04 by Henry C. Lai PhD, Research Professor of Bioengineering, University of Washington, Seattle, WA

Balode Sci Total Environ 180(1):81-85, 1996 – blood cells from cows from a farm close and in front of a radar installation showed significantly higher level of severe genetic damage.

Boscol et al. Sci Total Environ 273(1-3):1-10, 2001 – RFR from radio transmission stations (0.005 mW/cm2) affects immune system in women.

Chiang et al. J. Bioelectricity 8:127-131, 1989 – people who lived and worked near radio antennae and radar installations showed deficits in psychological and short-term memory tests.

de Pomerai et al. Nature 405:417-418, 2000. Enzyme Microbial Tech 30:73-79, 2002 – reported an increase in a molecular stress response in cells after exposure to a RFR at a SAR of 0.001 W/kg. This stress response is a basic biological process that is present in almost all animals – including humans.

de Pomerai et al. (FEBS Lett 22;543(1-3):93-97, 2003 – RFR damages proteins at 0.015-0.020 W/kg.

D'Inzeo et al. Bioelectromagnetics 9(4):363-372, 1988 – very low intensity RFR (0.002 – 0.004 mW/cm2) affects the operation of acetylcholine-related ion-channels in cells. These channels play important roles in physiological and behavioral functions.

Dolk et al. Am J Epidemiol 145(1):1-91997- a significant increase in adult leukemias was found in residents who lived near the Sutton Coldfield television (TV) and frequency modulation (FM) radio transmitter in England.

Dutta et al.Bioelectromagnetics 10(2):197-202 1989 – reported an increase in calcium efflux in cells after exposure to RFR at 0.005 W/kg. Calcium is an important component of normal cellular functions.

Fesenko et al. Bioelectrochem Bioenerg 49(1):29-35, 1999 – reported a change in immunological functions in mice after exposure to RFR at a power density of 0.001 mW/cm2.

Hallberg O, Johansson O, (2004) concluded that continuous disturbance of cell repair mechanisms by body-resonant FM electromagnetic fields seems to amplify the carcinogenic effects resulting from cell damage caused e.g. by UV-radiation.

Hjollund et al. Reprod Toxicol 11(6):897, 1997 – sperm counts of Danish military personnel, who operated mobile ground-to-air missile units that use several RFR emitting radar systems (maximal mean exposure 0.01 mW/cm2), were significantly lower compared to references.

Hocking et al. Med J Aust 165(11-12):601-605, 1996 – an association was found between increased childhood leukemia incidence and mortality and proximity to TV towers.

Ivaschuk et al. Bioelectromagnetics 18(3):223-229, 1999 – short-term exposure to cellular phone RFR of very low SAR (26 mW/kg) affected a gene related to cancer.

Kolodynski and Kolodynska, Sci Total Environ 180(1):87-93, 1996 – school children who lived in front of a radio station had less developed memory and attention, their reaction time was slower, and their neuromuscular apparatus endurance was decreased.

Kwee et al. Electro- and Magnetobiology 20: 141-152, 2001 – 20 minutes of cell phone RFR exposure at 0.0021 W/kg increased stress protein in human cells.

Lebedeva et al. Crit Rev Biomed Eng 28(1-2):323-337, 2000 – brain wave activation was observed in human subjects exposed to cellular phone RFR at 0.06 mW/cm2.

Magras and Xenos Bioelectromagnetics 18(6):455-461, 1999 – reported a decrease in reproductive function in mice exposed to RFR at power densities of 0.000168 – 0.001053 mW/cm2. Irreversible sterility was found in the fifth generation of offspring.

Mann et al. Neuroendocrinology 67(2):139-144, 1998 – a transient increase in blood cortisol was observed in human subjects exposed to cellular phone RFR at 0.02 mW/cm2. Cortisol is a hormone involved in stress reaction.

Marinelli et al. J Cell Physiol. 198(2):324-332, 2004 – exposure to 900-MHz RFR at 0.0035 W/kg affected cell's self-defense responses.

Michelozzi et al. Epidemiology 9 (Suppl) 354p, 1998 – leukemia mortality within 3.5 km (5,863 inhabitants) near a high power radio-transmitter in a peripheral area of Rome was higher than expected.

Michelozzi et al. Am J Epidemiol 155(12):1096-1103, 2002 – childhood leukemia higher at a distance up to 6 km from a radio station.

Navakatikian and Tomashevskaya "Biological Effects of Electric and Magnetic Fields, Volume 1," D.O. Carpenter (ed) Academic Press, San Diego, CA, pp.333-342. 1994 – RFR at low intensities (0.01 – 0.1 mW/cm2; 0.0027- 0.027 W/kg) induced behavioral and endocrine changes in rats. Decreases in blood concentrations of testosterone and insulin were reported.

Novoselova et al. Bioelectrochem Bioenerg 49(1):37-41, 1999 -low intensity RFR (0.001 mW/cm2) affects functions of the immune system.

Park et al. International Archives of Occupational and Environmental Health 77(6):387-394, 2004 – higher mortality rates for all cancers and leukemia in some age groups in the area near the AM radio broadcasting towers.

Persson et al. Wireless Network 3:455-461, 1997 – reported an increase in the permeability of the blood-brain barrier in mice exposed to RFR at 0.0004 – 0.008 W/kg. The blood-brain barrier envelops the brain and protects it from toxic substances.

Phillips et al. Bioelectrochem. Bioenerg. 45:103-110, 1998 – reported DNA damage in cells exposed to RFR at SAR of 0.0024 – 0.024 W/kg.

Polonga-Moraru et al. Bioelectrochemistry 56(1-2):223-225, 2002 – change in membrane of cells in the retina (eye) after exposure to RFR at 15 μW/cm2.

Pyrpasopoulou et al. Bioelectromagnetics 25(3):216-227, 2004 – exposure to cell phone radiation during early gestation at SAR of 0.0005 W/kg (5 μW/cm2) affected kidney development in rats.

Salford et al. Environ Health Persp Online January 29, 2003 – Nerve cell damage in mammalian brain after exposure to microwaves from GSM mobile phones signal at 0.02 W/kg.

Santini et al. Pathol Biol (Paris) 50(6):369-373, 2002 – increase in complaint frequencies for tiredness, headache, sleep disturbance, discomfort, irritability, depression, loss of memory, dizziness, libido decrease, in people who lived within 300 m of mobile phone base stations.

Sarimov et al. IEEE Trans Plasma Sci 32:1600-1608, 2004 – GSM microwaves affect human lymphocyte chromatin similar to stress response at 0.0054 W/kg.

Schwartz et al. Bioelectromagnetics 11(4):349-358, 1990 – calcium movement in the heart affected by RFR at SAR of 0.00015 W/kg. Calcium is important in muscle contraction. Changes in calcium can affect heart functions.

Somosy et al. Scanning Microsc 5(4):1145-1155, 1991 – RFR at 0.024 W/kg caused molecular and structural changes in cells of mouse embryos.

Stagg et al. Bioelectromagnetics 18(3):230-236, 1997- glioma cells exposed to cellular phone RFR at 0.0059 W/kg showed

significant increases in thymidine incorporation, which may be an indication of an increase in cell division.

Stark et al. J Pineal Res 22(4):171-176, 1997 – a two- to seven-fold increase of salivary melatonin concentration was observed in dairy cattle exposed to RFR from a radio transmitter antenna.

Tattersall et al. Brain Res 904(1):43-53, 2001 – low-intensity RFR (0.0016 – 0.0044 W/kg) can modulate the function of a part of the brain called the hippocampus, in the absence of gross thermal effects. The changes in excitability may be consistent with reported behavioral effects of RFR, since the hippocampus is involved in learning and memory.

Vangelova et al. Cent Eur J Public Health 10(1-2):24-28, 2002 – operators of satellite station exposed to low dose (0.1127 J/kg) of RFR over a 24-hr shift showed an increased excretion of stress hormones.

Velizarov et al. Bioelectrochem Bioenerg 48(1):177-180, 1999 – showed a decrease in cell proliferation (division) after exposure to RFR of 0.000021 – 0.0021 W/kg.

Veyret et al. Bioelectromagnetics 12(1):47-56, 1991 – low intensity RFR at SAR of 0.015 W/kg affects functions of the immune system.

Wolke et al. Bioelectromagnetics 17(2):144-153, 1996 – RFR at 0.001W/kg affects calcium concentration in heart muscle cells of guinea pigs.

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ATTACHMENT 4

Firefighters Fighting Fires… and Now Cell Towers

SEPTEMBER 28, 2019

Firefighters are the first responders in emergencies. Every community depends upon their strength, bravery and clear quick thinking to protect lives and property. What happened when first responder cell towers were placed on fire stations to facilitate communications between police and medical personnel? Within a week of installation many firefighters developed unusual symptoms of headaches, fatigue, insomnia, memory loss, confusion, nausea and weakness. After a time, firefighters in stations with adjacent cell towers were found to have forgotten CPR or became lost responding to a fire in a city they grew up in. A neurologic study was commissioned by the International Association of Firefighters (IAFF), led by Dr. Gunnar Heuser, to determine if there was any evidence of brain dysfunction in those exposed for long periods to first responder cell towers. Firefighters then began fighting cell towers as well as fires.

Neurologic Symptoms in Firefighters Match Brain SPECT Scans

The study by Dr. Heuser was described in an **IAFF Cell Tower Resolution Health and Safety Fact Sheet. "** A pilot study was conducted in 2004 of six California fire fighters working and sleeping in stations with towers. The study, conducted by Gunnar Heuser, M.D., PhD. of Agoura Hills, CA, focused on neurological symptoms of six fire fighters who had been working for up to five years in stations with cell towers. Those symptoms included slowed reaction time, lack of focus, lack of impulse control, severe headaches,

ATTACHMENT 4

anesthesia-like sleep, sleep deprivation, depression, and tremors. Dr. Heuser used functional brain scans – SPECT scans – to assess any changes in the brains of the six fire fighters as compared to healthy brains of men of the same age. Computerized psychological testing known as TOVA was used to study reaction time, impulse control, and attention span. The SPECT scans revealed a pattern of abnormal change which was concentrated over a wider area than would normally be seen in brains of individuals exposed to toxic inhalation, as might be expected from fighting fires. Dr. Heuser concluded the only plausible explanation at this time would be RF radiation exposure. Additionally, the TOVA testing revealed among the six fire fighters delayed reaction time, lack of impulse control, and difficulty in maintaining mental focus."

Susan Foster, **who organized the 2004 pilot study,** filed a formal **affidavit** to the Federal Communications Commission (FCC) in 2013 about the study as well as research on RF radiation causing harm. This review was prompted by the overwhelming passage of **IAFF Resolution 15** introduced by California firefighters at the IAFF convention in August 2004. Resolution No. 15 called for a $1 million study of firefighters across the US and Canada living and working in stations with cell towers, and further called for a moratorium on the placement of cell towers on their fire stations until the study could be conducted. Unfortunately Telecommunications Acts in both countries trumped the spirit of the moratorium, and the IAFF failed to fund the $1 million study

She stated in the affadavit, *"The failure to protect our populations based on biological effects of exposure to RF (microwave) radiation is an inherent shortcoming of the current FCC policy with respect to cell tower emissions and cell phone absorption. The adverse biological impact of these exposures are grossly underestimated. The FCC does not have independent science that can justify the massive exposure to RF radiation that currently exists from cell towers and cell phones. The story told by our small pilot study of firefighters in California should be a warning with respect to cell phone absorption levels."* **https://ecfsapi.fcc.gov/file/7022117660.pdf**

IAFF Resolution Calls for a Moratorium on Cell Towers on or Near Fire Stations 2004

Research on health effects of radiofrequency radiation was gathered by the IAFF and presented to their Division of Occupational Health, Safety and Medicine. The extensive review included a large body of international science showing evidence of non-thermal effects of radiofrequency radiation emitted from wireless devices and cell towers. This review, along with their own observations and study, prompted the IAFF to write a detailed amended **IAFF Resolution** No. 15, dated August 2004, to prohibit cell towers from being placed on their fire stations.

The IAFF Resolution No.15 titled,

Position on the Health Effects from Radio Frequency/Microwave (RF/MW) Radiation in Fire Department Facilities from Base Stations for Antennas and Towers for the Conduction of Cell Phone Transmissions, easily passed.

The IAFF Resolution No. 15 states, *"The International Association of Fire Fighters' position on locating cell towers commercial wireless infrastructure on fire department facilities, as adopted by its membership in August 2004, is that the IAFF oppose the use of fire stations as base stations for towers and/or antennas for the conduction of cell phone transmissions until a study with the highest scientific merit and integrity on health effects of exposure to low-intensity RF/MW radiation is conducted and it is proven that such sitings are not hazardous to the health of our members."*

The IAFF resolution includes the following:

WHEREAS, the brain is the first organ to be affected by RF radiation and symptoms manifest in a multitude of neurological conditions including migraine headaches, extreme fatigue, disorientation, slowed reaction time, vertigo, vital memory loss and attention deficit amidst life threatening emergencies; and

WHEREAS, most of the firefighters who are experiencing symptoms can attribute the onset to the first week(s) these towers/antennas were activated; and

WHEREAS, RF radiation is emitted by these cellular antennas and RF radiation can penetrate every living cell, including plants, animals and humans;

WHEREAS, firefighters are the protectors of people and property and should be protected under the Precautionary Principle of Science and therefore, unless radiation is proven safe and harmless, cellular antennas should not be placed on or near fire stations; therefore be it…

RESOLVED, That the IAFF oppose the use of fire stations as base stations for antennas and towers for the conduction of cell phone transmissions until such installations are proven not to be hazardous to the health of our members.

Firefighter Stations Have Been Given Legal Exemptions for Cell Towers: AB 57

For the safety of the citizens whom they are responsible to protect, the firefighters are asking for exemptions from cell tower placement on their facilities. Armed with the 2004 IAFF Resolution, firefighters have requested and in many cases have received an exemption on cell towers on their fire stations. The firefighter exemption is codified in California's AB57 (Quirk 2015) to rapidly deploy and have a deemed granted provision for "small cell" towers and was proposed in SB649 (Hueso 2017), to further streamline placement of cell towers. SB649 passed both legislative bodies in California but was the last bill vetoed by Governor Brown in 2017.

CBS news video interviewed Dr. Heuser as well as Assembly member Bill Quirk, author of AB 57. Dr. Heuser cautioned placement of cell towers in cities. Assemblyman Quirk, admitted he did add the provision for firefighters, as they asked him to do so. He was then questioned about teachers. "So if school teachers and parents had a strong lobby and they ask you to pass something that would prevent these from going up near schools, would you do that?" He responded, "If I couldn't get the votes any other way!" **CBS News Video**

AB57- Firefighters have gotten an exemption to have cell towers on or adjacent to their facilites. **CA AB57 (2015) Legiscan Text of Bill.** " Section 65964.1. *(f) Due to the unique duties and infrastructure requirements for the swift and effective deployment of firefighters, this section does not apply to a collocation or siting application for a wireless telecommunications facility where the project is proposed for placement on fire department facilities. "*

SB649- They also received an exemption in California's SB649 (2018), a bill that was to streamline placement of cell towers on utility poles,which was vetoed by Governor Brown. **SB 649 California (2017) Wireless Telecommunications Facilities** – 65964.2. *"(a) A small cell shall be a permitted use subject only to a permitting process adopted by a city or county pursuant to subdivision (b) if it satisfies the following requirements: ….(3) The small cell is not located on a fire department facility."*

In 2014 Los Angeles Firefighters Fought Cell towers

Letters were written by the Los Angeles firefighters in 2014 to fight the cell towers over health concerns with long term exposure to close proximity radiofrequency radiation from the structures. **ABC7 News: LA Firefighters Halt Cell Towers on Fire Stations Due to Radiation Concerns**. **News Coverage Video of Los Angeles Firefighters and Cell Towers**

Health Effects in Firefighters with Nearby Cell Towers: What About Citizens?

There is a clear body of science that supports the experience of the firefighters, and points not only to neuropsychiatric symptoms (commonly referred to as Electrosensitivity) and neurologic injury, but also to cancer, hematologic abnormalities and hormonal disturbances. The **Ripon School Cell Tower** in California was shut off in 2019 due to several cases of cancer in students and teachers. The investigation is ongoing but parents and teachers across the country are concerned about placing cell towers near schools or in residential neighborhoods.

New 2019 Study Shows Nearby Cell Tower Radiation Harms Children's Brains

A recent case controlled 2 year scientific **study** examining the neurologic effects of children, aged 13-16, in schools with a nearby cell towers revealed significant decline in cognitive scores when the radiation was higher but still at non-thermal levels. The researchers found **a significant impairment in Motor Screening Task and Spatial Working Memory** among the group of students who were exposed to high RF-EMF.The FCC limit is 100 times more RF than these students experienced in the highest exposure group that showed cognitive decline and with non-thermal effects. Unfortunately the FCC exposure standards are based only on heat effects not biological effects seen at much lower exposure levels than FCC limits.

The Small Cell Antenna Are the Same Antennas as on the Macro Towers

At a Sonoma Planning Commission meeting September 12, 2019, Lee Afflerbach, a consultant from Columbia Telecommunications Corporation was explaining the difference between the radiation from a small cell tower versus a macro tower to the planning commission. He states in the **video** at time 3:10:24, "To get around the capacity issue —

it's because so many people are [wirelessly] streaming video and other services like that, they [Verizon] have to have multiple sources for this. That's why we have the smaller cells because e**ach [small] cell is capable of almost putting out the same energy as one macro cell."** Another commissioner asked the question below.

Q: "Is the higher frequency 4G always deployed by small cell or is it deployed by typical macro tower?" .

A: At time 3:13:22, Mr. Afflerbach answered, "Typically the older Macro cells are being reconfigured to add the new spectrum and are being filled in with this technology…one of the things the industry is doing is beefing up 4G…I have reviewed, **my staff has probably reviewed several hundred of these small cells the last year, year and a half, and they are all 4G equivalent. The radios that they are using are the exact same radios that are up on the macro towers. It's not a different technology…the same boxes as on macro towers**. I see them all the time."

The small cell towers are not a different technology, or for regular cell phone service, but for streaming videos, and at the same power as regular macro towers but much closer proximity to people. Instead of 100 feet in the air on a macro tower, these "small cells" can be just several feet from a bedroom window.

The Los Angeles Unified School District Banned Cell Towers on Schools in 2009

The Los Angeles Unified School District (LAUSD) unanimously adopted a resolution in 2009 opposing cell towers on or adjacent to school property until appropriate protective standards are developed. **LAUSD 2000 Resolution on Cell Towers .** This resolution highlights the Federal restrictions placed on zoning authorities to deny sitings nears schools based on health and environmental effects written into the 1996 Telecommunications Act. The resolution notes the unprecedented proliferation of cell towers in residential neighborhoods and near schools without justification or proof that there is a demand for the service, that it is safe or that there is adequate oversight of cell tower emissions. This LAUSD policy on Wireless Telecommunications Facilities endorses **1) Timely notification** of cell tower applications **2) Fiberoptic broadband technology** as a safer alternative **3) Revision of Section 704 of the 1996 Telecommunications Act** to allow consideration of health and environmental effects in the placement of cell towers. **4) Amending the California Public Utilities Code** to grant local governments authority to regulate wireless facilities in public rights of way. **LAUSD 2009 Resolution on Wireless Telecommunication Facilities**

Palo Alto Considering Strengthening Their Wireless Facilities Ordinance

In the City of Palo Alto, California, citizens are **urging amendments** to their new wireless facilities ordinance to have a larger buffer around schools for cell tower placement as well as strengthen other sections of their ordinance. Citizens suggest looking at (so far the strongest) "Small Cell" wireless ordinance that passed in Los Altos in August 2019.

Los Altos, Mill Valley and Sonoma City in California are Model Ordinances

In order to protect the health and safety, property values and privacy concerns of citizens, the **Los Altos, California Wireless Facilities Urgency Ordinance (below)** was adopted Aug 5, 2019.

- **Ordinance Wireless Facilities** https://www.losaltosca.gov/sites/default/files/fileattachments/city_council/page/48421/2019-08-05_19-460_1.pdf
- **Resolution No. 2019-35 of the City of Los Altos Adopting Design and Siting Guidelines and Standards for Wireless Facilities.**https://www.losaltosca.gov/sites/default/files/fileattachments/city_council/page/48421/resolution_no._2019-35.pdf
- **Fee Chart for Wireless Facilities in Los Altos, California. Resolution 2019-36.**https://www.losaltosca.gov/sites/default/files/fileattachments/city_council/page/48421/resolution_no._2019-36.pdf

Will Local Cell Towers Contribute to the Wave of Alzheimer's Disease and Dementia?

Susan Foster, IAFF resolution co-author, wrote a chilling and cautionary **letter** to the City of Palo Alto in 2018 regarding the firefighters experience once cell towers were in place. She noted, ***"The firefighters' most important lesson to us may be that if we allow a buildout of small cell aimed at facilitating 5G such that they are as commonplace in front of homes and schools as they are now on fire stations, we may be facing not only an immediate risk of impairment to some degree, but later a tsunami of Alzheimer's and dementia. The rate of people dying from Alzheimer's disease in the United States rose by 55% over a 15-year period according to new data from the Centers for Disease Control."***

Will citizens rise up and fight as hard as the firefighters have to protect their homes, families and environment ?

This video from Environmental Health Trust suggests they will.

International 5G and Cell Tower Protests

See also :

Cell Towers and City Ordinances: https://mdsafetech.org/cell-tower-and-city-ordinances/

Cell Tower Health Effects: https://mdsafetech.org/cell-tower-health-effects/

Electrosensitivity Science: https://mdsafetech.org/science/es-science/

Cellular Mechanisms of RFR Oxidation: https://mdsafetech.org/cellular-mechanisms-oxidation/

Cellular Mechanisms of RFR Calcium Channels: https://mdsafetech.org/cellular-mechanisms/

U.S. NTP Study – https://mdsafetech.org/ntp-study-2016/

Scientific Literature on EMR Tab: https://mdsafetech.org/

Letters

- **United Firefighters of Los Angeles Local 112**. **Cease and Desist Letter.** September 24, 2014. https://ehtrust.org/wp-content/uploads/Firefighters-Cease-and-Desist-.pdf
- **United Firefighters of Los Angeles. Local 112. To Public Safety Committee Los Angeles.** Sept 24, 2014. https://ehtrust.org/wp-content/uploads/Firefighter-letter-.pdf
- **US Department of Labor. Assistant Director for Occupational Safety and Health. Re: Increase in cell tower communications worker deaths**. Feb 10, 2014. https://ehtrust.org/wp-content/uploads/Dept-of-Labor-letter-cell-tower-deaths-.pdf
- **US EPA Letter to Janet Newman Regarding Lack of Evidence of Safety to Long Term Non-thermal Radiofrequency Radiation.** 2002. https://ehtrust.org/wp-content/uploads/EPA-Hankin-Letter-.pdf
- **Susan Foster Letter to the FCC Regarding Cell Tower Firefighter Symptoms 2013. Susan Foster filing to FCC 2013**
- **Susan Foster Letter to the City of Palo Alto regarding Wireless Facilities Ordinance. Susan Foster Letter 2018 Palo Alto Wireless Project 17PLN 031018**

News Articles

- **ConsumerWatch: 5G Cellphone Towers Signal Renewed Concerns Over Impacts on Health. Julie Watts and Abigail Sterling. Jan 25, 2018.** https://sanfrancisco.cbslocal.com/2018/01/25/consumerwatch-5g-cellphone-towers-signal-renewed-concerns-over-impacts-on-health/
- C**BS Video Piedmont 5G Opposition. Consumer Watch: 5G Cellphone Towers Signal Renewed Concerns Over Impacts on Health.** https://www.youtube.com/watch?time_continue=26&v=61h_vuBujw0
- **Cell Tower Hypocrisy: Rescuing Firefighters Not Kids.** August 27, 2017. Susan Foster

https://fearlessparent.org/cell-tower-hypocrisy-rescuing-firefighters-not-kids/

- **Residents urge more restrictions on cell antennas in Palo Alto: As city tweak rules for wireless equipment, some call for city to follow Los Altos' lead.** August 13, 2019. Gennady Sheyner. Palo Alto Weekly Online. https://www.paloaltoonline.com/news/2019/08/13/residents-urge-more-restrictions-on-cell-antennas-in-palo-alto.
- **Los Altos council to vote on ordinance that mostly keeps small cell antennas out of neighborhoods.** Aug 5, 2019. Emily Mibach. Daily Post. https://padailypost.com/2019/08/05/los-altos-council-to-vote-on-ordinance-that-mostly-keeps-small-cell-antennas-out-of-neighborhoods/
- **Los Altos council passes 5G regulations, weighs in on housing bills**. Aug 14, 2019. Melissa Hartman. Los Altos Town Crier. https://www.losaltosonline.com/news/sections/news/199-city-affairs/60610-los-altos-council-passes-5g-regulations-weighs-in-on-housing-bills
- **Could A New Cell Tower Hurt You Financially? CBS13 Investigates.** June 28, 2019. Julie Watts. https://sacramento.cbslocal.com/2019/06/28/cell-tower-hurt-financially-cbs13-investigates/
- **The inconvenient truth about cancer and mobile phones.We dismiss claims about mobiles being bad for our health – but is that because studies showing a link to cancer have been cast into doubt by the industry?** The Guardian. July 15, 2018. Mark Hertsgaad and Mark Dowie. https://www.theguardian.com/technology/2018/jul/14/mobile-phones-cancer-inconvenient-truths

Scientific Articles

- **The EUROPAEM EMF Guideline 2016 for the prevention, diagnosis and treatment of EMF-related health problems**.https://www.ncbi.nlm.nih.gov/pubmed/27454111or **FULL ARTCLE**here https://www.degruyter.com/view/j/reveh.2016.31.issue-3/reveh-2016-0011/reveh-2016-0011.xml
- **Microwave frequency electromagnetic fields (EMFs) produce widespread neuropsychiatric effects including depression. (2015)** Martin Pall. J Chem Neuroanat. 2015 Aug 21. http://www.ncbi.nlm.nih.gov/pubmed/26300312
- **Mobile Phone Base Station Tower Settings Adjacent to School Buildings: Impact on Students' Cognitive Health**. (2018) Meo SA et al. American Journal of Men's Health. December 7, 2018. **https://journals.sagepub.com/doi/10.1177/1557988318816914**
- **New Studies Link Cell Phone Radiation with Cancer.** Scientific American. March 29, 2018. https://www.scientificamerican.com/article/new-studies-link-cell-phone-radiation-with-cancer/

Other

- **Sonoma Planning Commission Meeting September 12, 2019.** Wireless Telecommunications Facilities. Small cells equivalent to macro cell tower antenna in power and Radiofrequency for 4G. https://youtu.be/HRYFXx7oNN4?t=11424

ATTACHMENT 5

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In-House Report
June 1994

RADIOFREQUENCY/MICROWAVE RADIATION BIOLOGICAL EFFECTS AND SAFETY STANDARDS: A REVIEW

Scott M. Bolen

APPROVED FOR PUBLIC RELEASE; DISTRIBUTION UNLIMITED.

Rome Laboratory
Air Force Materiel Command
Griffiss Air Force Base, New York

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13. ABSTRACT (Maximum 200 words)

The study of human exposure to radiofrequency/microwave (RF/MW) radiation has been the subject of widespread investigation and analysis. It is known that electromagnetic radiation has a biological effect on human tissue. An attempt has been made by researchers to quantify the effects of radiation exposure on the human body and to set guidelines for safe exposure levels. A review of the pertinent findings is presented along with the American National Standards Institute (ANSI) recommended safety standard (C95.1-1982) and the United States Air Force permissible exposure limit for RF/MW radiation (AFOSH Standard 161-9, 12 Feb 87). An overview of research conducted in the Soviet Union and Eastern Europe is also included in this report.

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Radiofrequency/Micowave Radiation Biological Effects and Safety Standards: A Review

Scott M. Bolen
June 1988

Abstract

The study of human exposure to radiofrequency/microwave radiation has been the subject of widespread investigation and analysis. It is known that electromagnetic radiation has a biological effect on human tissue. An attempt has been made by researchers to quantify the effects of radiation on the human body and to set guidelines for safe exposure levels. A review of the pertinent findings is presented along with the American National Standards Institute (ANSI) recommended safety standard (C95.1-1982) and the United States Air Force permissible exposure limit for RF/MW radiation (AFOSH Standard 161-9, 12 February 1987). An overview of research that was conducted in the Soviet Union and Eastern Europe is also included in this report.

I. INTRODUCTION

In 1956, the Department of Defense (DOD) directed the Armed Forces to investigate the biological effects of exposure to radiofrequency/microwave (RF/MW) radiation. The Army, Navy, and Air Force Departments commissioned a Tri-Service Program under the supervision of the Air Force to meet the DOD directive [14], [15]. The Rome Air Development Center and the Air Research and Development Headquarters were ultimately given responsibility to manage the program. On July 15-16, 1957 the first of four Tri-Service Conferences was held to discuss the effects of RF/MW radiation. These conferences were the first major effort put forth by the scientific community to explore the biological effects of exposure to RF/MW radiation [14]. Since then, researchers have discovered a number of biological dysfunctions that can occur in living organisms. Exposure of the human body to RF/MW radiation has many biological implications. The effects range from innocuous sensations of warmth to serious physiological damage to the eye [1], [2], [5], [6], [8], [15]. There is also evidence that RF/MW radiation can cause cancer [8].

The absorption of RF/MW radiated energy causes biological reactions to occur in the tissue of the human body. In order to determine safe exposure levels and to understand the effect of RF/MW radiation it is necessary to know the absorption characteristics of the human tissue. The National Institute for Occupational Safety and Health (NIOSH) [8] has reported several physical properties that account for energy absorption in biological materials. Factors which govern energy absorption include: (1) strength of the external electromagnetic (EM) field, 2) frequency of the RF/MW source, 3) the degree of hydration of the tissue, and 4) the physical dimensions, geometry, and orientation of the absorbing body with respect to the radiation EM field [8]. There is some disagreement among researchers in determining a specific measure for the dose of RF/MW radiation contracted by

biological materials. The most commonly accepted measure is the Specific Absorption Rate (SAR). The SAR is defined as the rate at which RF/MW radiated energy is imparted to the body - typically in units of watts per kilogram (W/Kg) [4]. The deposition of energy specified in terms of milliwatts per square centimeter (mW/cm^2) over the irradiated surface is also widely accepted [9].

Based on the known absorption rates and the inherent biological effects of RF/MW radiated energy, researchers have put forth a number of standards regarding safe exposure levels. In some instances standards recommended by different examining authorities are in conflict. For example, the USAF Standard 161-9 (enacted 12 February 1987) allows for a permissible exposure level of 10 mW/cm^2 for persons working in restricted areas and 5 mW/cm^2 for persons working in unrestricted areas [10]. The ANSI guideline specifies a maximum safe exposure level of 5 mW/cm^2 over the whole-body area for anyone in contact with RF/MW radiation [9]. These differences reflect the way in which each examining authority has interpreted the available RF/MW radiation exposure data.

II. BIOLOGICAL EFFECTS

Exposure to RF/MW radiation is known to have a biological effect on animals and humans. Damage to major organs, disruption of important biological processes, and the potential risk of cancer represent the dangers of RF/MW radiation to living organisms. Pulsed radiation appears to have the greatest impact on biological materials [8].

The response of biological materials to the absorption of thermal energy is the most perceptible effect of exposure to RF/MW radiation [7]. The energy emitted from an RF/MW source is absorbed by the human tissue primarily as heat. In this case, the radiated energy is disposed in the molecules of the tissue. Dipole molecules of water and protein are stimulated and will vibrate as energy is absorbed throughout the irradiated tissue area. Ionic conduction will also occur in the same area where the radiation is incident. It is from these two natural processes that radiant energy is converted into heat [11]. The thermal effect of continuous wave (CW) and pulsed radiation is considered to be the same [13].

Nonthermal responses can be less noticeable and are often more difficult to explain than thermal effects. These responses are related to the disturbances in the tissue not caused by heating. Electromagnetic fields can interact with the bioelectrical functions of the irradiated human tissue [8]. Research conducted in the Soviet Union and Eastern Europe suggests that the human body may be more sensitive to the nonthermal effects of RF/MW radiation [3].

There are many reported biological effects to humans and animals that are exposed to RF/MW radiation. A review of the important findings is given in the following:

A. Heating Effect on the Skin

Most RF/MW radiation penetrates only to the outer surface of the body. This is especially true for RF/MW frequencies greater than 3 GHz where the likely depth of penetration is about 1-10 mm [3]. At frequencies above 10 GHz the absorption of energy will occur mostly at the outer skin surface. Since the thermal receptors of the body are contained primarily in this region, the perception of RF/MW radiation at these frequencies

may be similar to that of infrared (IR) radiation [3], [6].

In 1937, J. Hardy and T. Oppel published an investigative paper on the thermal effects of IR radiation. Their findings were used by Om Gandhi and Abbas Riazi [6] to explain the thermal effect of RF/MW radiation on the human body (the reference for Hardy and Oppel can be found in [6]). Figure 1 shows the results obtained from the 1937 report. As described by Gandhi and Riazi, the findings presented by Hardy and Oppel show that sensations of warmth begin to occur when the whole-body is irradiated at a CW power density of about 0.67 mW/cm^2. Hardy and Oppel based their work on exposure to IR radiation. From other published reports, Gandhi and Riazi noted that there is a correlation between the radiating frequency of the incident RF/MW energy and the threshold for perception. For example, on an exposed area of the forehead of 37 cm^2 a perception of warmth was reported for incident power densities of 29.9 and 12.5 mW/cm^2 from sources radiating at 3 and 10 GHz respectively [6].

Other observations made by Hardy and Oppel showed that when smaller body areas were irradiated, larger power densities were required to stimulate the thermal receptors in the skin. Gandhi and Riazi were able to confirm this result with reports from recent papers. They found that irradiation of an exposed body area of 40.6 cm^2 to a power density of about 21.7 mW/cm^2 yielded the same thermal perception as did the irradiation of a smaller body area of 9.6 cm^2 to a power density of about 55.9 mW/cm^2. Hardy and Oppel reported that thermal sensations occurred within about 3 seconds after irradiation of the body tissue. More recent findings indicate a reaction time of closer to 1 second [6].

Gandhi and Riazi [6] have also reported that the depth of penetration of RF/MW radiation has an impact on the power density threshold needed to stimulate the perception of warmth. As a comparison, IR radiation will not penetrate the outer body surface as deeply as RF/MW radiation emitted at a frequency of 2.45 GHz. Clinical observations have shown that irradiation of the ventral surface of the arm by an RF/MW source radiation at 2.45 GHz will cause a sensation of warmth when the incident power density is about 26.7 mW/cm^2. For incident IR radiation a perception of warmth occurs at a power density of 1.7 mW/cm^2. They estimated that at millimeter wavelengths the perception of warmth may occur at a power density level of about 8.7 mW/cm^2.

Exposure to higher levels of radiation can cause serious biological effects. Because of the physical dimensions and geometry of the human body, RF/MW radiated energy is nonuniformily deposited over the whole-body surface. Some areas on the skin and outer body surface will absorb higher amounts of the radiated energy. These areas will be marked by "hot spots" of high temperatures [7], [11], [16]. Experiments conducted on laboratory animals have shown, that skin burns typically occur in the areas of hot spots. The penetration of RF/MW radiation also causes skin burns to be relatively deep [11]. In experiments sponsored by the Tri-Service Commission, it was reported that RF/MW radiation burns over the rib cages of dogs caused severe subcutaneous damage that did not visibly appear for weeks after the injury was sustained [20]. Burns can cause increased vascular permeability. This can lead to significant losses of body fluids and electrolytes. Serious burns can suffer fluid losses for a few days. Blood circulation can be altered in the effected area and other biological functions could be indirectly affected [12].

B. Whole-Body Hyperthermia

Thermal energy absorbed by the whole-body can cause a rise in body temperature. When the human body is irradiated by an RF/MW source at an incident power density of 10 mW/cm^2 there will be a rise in body temperature of about 1° C. The total thermal energy absorbed at this power density is about 58 watts. Typically, at rest the human basal metabolic rate is about 80 watts and it is about 290 watts during periods of moderate activity. Exposure of the human body to low power RF/MW radiation does not appear to impose any appreciable thermal hazard. These figures were reported by The U.S. Department of Health, Education and Welfare [3].

Adverse biological effects can occur when the body is subjected to high doses of RF/MW radiation [16]. In this instance large amounts of thermal energy can be absorbed by the body. A dramatic influx of energy can overburden thermoregulatory mechanisms. If excess heat cannot be exhausted the core temperature of the body will rise to a dangerous level resulting in hyperthermia [12], [16]. The biological response to excess heat buildup is the dilation of blood vessels at the surface of the skin and the evaporation of water through sweating. These are the primary mechanisms for heat dissipation. Hyperthermia can cause severe dehydration and the loss of electrolytes such as sodium chloride. Other harmful effects include fever, heat exhaustion, and heat fatigue. Heat stress is the most serious consequence of hyperthermia. Cardiac failure and heat stroke can result from heat stress [12].

It has also been noted that hyperthermia may cause injury to blood-brain barrier (BBB) [19]. This barrier refers to the several biological materials that separate the essential elements of the central nervous system from the blood [18]. High cerebral temperatures exceeding 43°C may damage the BBB. The result can be a disruption of blood vessel continuity or integrity and degradation of the flow of blood and other body fluids in the brain [19].

C. Local Hyperthermia

The nonuniform deposition of RF/MW radiated energy over the whole-body surface causes the body to be heated unevenly. Local areas where temperatures rise above 41.6°C can experience damage to the tissue [16]. In these areas it is possible that harmful toxins could be released as result of the high temperatures. Heating can cause cell membranes and blood capillaries to become more permeable. An increase in capillary permeability can lead to a loss of plasma proteins. The denaturation of proteins can also occur within cells [11], [16]. This can lead to changes in the physical properties and biological functions of proteins [18]. Denaturation of proteins can also cause polypeptide and histamine-like substances to become active [11], [16]. Histamines can stimulate gastric secretion, accelerate the heart rate, and cause the dilation of blood vessels resulting in lower blood pressure [18]. Areas of the body where blood circulation is poor or where thermal regulation is insufficient, are more susceptible to injury [11].

D. Carcinogenic Effects

The carcinogenic effects of exposure to RF/MW radiation are not well known. It is difficult to clinically establish a link to cancer. The problem that researchers have in linking

RF/MW radiation to cancer is that the disease itself is prevalent and can be caused by a variety of environmental factors. In fact cancer is the second leading cause of death in the United States. There are, however, published reports that reveal some insights into the carcinogenic nature of RF/MW radiation. Nonthermal effects may provide important clues to the understanding of carcinogenic reactions in the human body [8],[32].

i. Pathological Reports

In 1962, S. Prausnitz and C. Susskind reported experimental results that showed an increase in cancer among test animals exposed to RF/MW radiation. In the experiment, 100 male Swiss albino mice were irradiated by a 10 GHz RF/MW source at an incident power density of about 100 mW/cm^2. The mice were exposed for 4.5 minutes/day, 5 days/week for a total of 59 weeks. It was noted that irradiation caused the whole-body temperature of the mice to rise about 3.3°C. Upon examination, it was found that 35% of the mice had developed cancer of the white blood cells. The disease was observed as monocytic or lymphatic leucosis or lymphatic or myeloid leukemia. Only 10% of a similar control group had developed cancer [21].

There have been a few allegations that RF/MW radiation has induced cancer in humans [8], [15]. The NIOSH Technical Report [8] cites charges made in the early 1970's against Philco-Ford and The Boeing Corporation that occupational exposure to RF/MW radiation caused cancer among employees. One incident was reported at each company. At Philco-Ford it was claimed that exposure caused a rare form of brain cancer to manifest in one worker that eventually resulted in death. In each case, there was no scientific proof that RF/MW radiation had induced cancer in the company employees. There was also a report that EM fields induced cancer in an individual that worked at the U.S. Embassy in Moscow. Again, there was no scientific evidence that supported the claim [8].

Recently, the Observer Dispatch, a local newspaper published in Utica, New York, reported that a major study has just been completed in Sweden. The study concluded that children who live near high power lines have a greater risk of developing leukemia than children who live farther away from the power lines. The study involved 500,000 people and provided some evidence to link the electromagnetic fields produced by low frequency power lines to cancer. The researchers, however, cautioned against drawing firm conclusions as a result of the research [33]

ii. Effect on Chromosomes

It has been observed that disturbances in chromosomic activity can cause cancerous aberrations to occur in the human body. In 1974, a paper published by K. Chen, A. Samuel, and R. Hoopingarner (reference found in [8]) reported that chromosomal abnormalities can be linked to chronic myeloid leukemia. Serious genetic mutations can also result from such abnormalities that can lead to malignancies in the tissue [8].

In 1976, A. A. Kapustin, M. I. Rudnev, G. I. Leonskaia, and G.I. Knobecva (reference found in [17]) reported alterations in the chromosomes of bone marrow cells in laboratory animals that were exposed to RW/MW radiation. They exposed inbred albino rats to a 2500 MHz RF/MW source at incident power density levels of 50 and 500 uW/cm^2. Irradiation lasted for 7 hours/day for 10 days. Upon examination of the animals, they

observed chromosomal anomalies that appeared in forms described as polyploidy, aneuploidy, chormatic deletion, acentric fragments and chromatic gaps [17].

The NIOSH Technical Report [8] summarizes the findings of several researchers. Chromosomal and mitotic anomalies have been observed in a variety of animal and human cells for varying exposures to RF/MW radiation. Pulsed and CW radiation ranging in frequency from 15 to 2950 MHz and power densities from 7 to 200 mW/cm^2 have caused abnormalities to occur in chromosomes. The reported affects include: linear shortening of the chromosomes, irregularities in the chromosomal envelope, abnormal bridges and stickiness, translocations, chromosomal breaks and gaps, chromatid breaks, acentric chromosomes, dicentric chromosomes, deletions, fragmentation, and ring chromosomes [8].

iii. Mutagenic Effects

Reported evidence indicates that biological interaction with EM fields can cause the formation of mutagens in cells. In 1974, three Soviet researchers, Danilenko, Mirutenko, and Kudrenko (reference found in [8]) published results showing a mutagenic effect of RF/MW radiation. Mutagens were observed to form in cells that were irradiated by a pulsed RF/MW source operating at 37 GHz and 1 mW/cm^2 power intensity. They concluded that irradiation of tissue by pulsed RF/MW sources causes cell membranes to become more permeable to destructive chemical mutagens [8].

Results published in 1963 by G. H. Mickey (reference found in [8]) showed hereditary changes to occur in drosphila germ cells that were exposed to pulsed modulated RF/MW radiation for carrier frequencies between 5-40 MHz [8]. Evidence of RF/MW induced teratogenesis in animals has also been reported by researchers. The effect of exposure to CW radiation was observed by Rugh and McManaway in 1976 (reference found in [8]). They found gross congenital abnormalities in rodent fetuses that were irradiated by a 2450 MHz RF/MW source at an incident power intensity of 107.4 mW/g [8].

iv. Lymphoblastoid Transformations

Lymphoblastoid Transformations refer to changes in the physical nature of lymphoblasts. Mature lymphoblast cells (i.e. lymphocytes) participate in the immune system of the body [18]. Lymphoblastoid transformations induced by RF/MW radiation appear to be similar to transformations present in disorders contributing to abnormal growth in lymphoid tissues and in certain types of leukemia. RF/MW radiation induced transformations, however, do not appear to be malignant and are not likely to spread among healthy cells [8].

W. Stodlink-Baranska reported (reference found in [8]) lymphoblastoid transformations to occur when human lymphocyte cells were exposed to a 2950 MHz pulsed RF/MW source at power density levels of 7 and 20 mW/cm^2. In 1975, P. Czerski also reported (reference found in [8]) observing lymphoblastoid transformations after irradiation of purified human lymphocyte suspensions by an RF/MW source radiating at 2950 MHz for variable power density levels. In addition, Czerski reported acute transformations occurring in adult mice and rabbits that were irradiated by a pulsed RF/MW source radiating at 2950 MHz and at low power density levels of 0.5 and 5 mW/cm^2 respectively [8].

v. Oncogenic Effects

Oncogenic effects have been linked to imbalances in the regulatory mechanisms of the body. A 1974 report published by E. Klimkova-Deutschova (reference found in [8]) claimed that persons exposed to RF/MW radiation experience biochemical reactions. The report indicated alterations in fasting blood sugar levels, a decrease in the ability to dispose of normal metabolic waste, and depressed serum levels of pyruvate and lactate. These biochemical reactions point to the possibility of regulatory malfunctions occurring in the body. It has been suggested that certain regulatory imbalances may promote the growth of tumors. A change in hormonal levels has been observed to cause oncogenic effects in tissues that require hormonal balances to function properly. The presence of hormones in other tissue areas may effect the development of existing tumors in those areas [8].

E. Cardiovascular Effects

Most of the cardiovascular effects of RF/MW radiation have been reported by researchers in the Soviet Union and Eastern Europe. Soviet investigators claim that exposure to low levels of RF/MW radiation that are not sufficient to induce hyperthermia can cause aberrations in the cardiovascular system of the body [7].

One experiment performed on rabbits indicates that several types of cardiovascular dysfunctions could be possible. An RF/MW source radiating at 2375 MHz was used to irradiate rabbits for a test period of 60 days under varying field intensities. For field strengths ranging from 3-6 V/M researchers noted a sharp increase in the heart rate of the animals. This effect was observed to subside with time. Exposure to field strengths of 0.5-1.0 V/M caused the heart rate to become slower than normal. No effect was reported for rabbits that were exposed to EM field intensities below 0.2 V/M [17]. Other effects that have been observed by Soviet researchers, are alterations in EKG and low blood pressure [7], [17].

The NIOSH Technical Report [8] references a Soviet study published in 1974 by M. N. Sadcikoiva that suggests some connection between RF/MW radiation exposure and the potential for cardiovascular disturbances in humans. Researchers examined 100 patients suffering from radiation sickness. It was found that 71 of the patients had some type of cardiovascular problem. Most of these patients had been exposed to RF/MW radiation for periods ranging from 5-15 years. A smaller group of patients exposed for shorter time periods also experienced cardiovascular irregularities. The study concluded that there is a probable link between exposure to RF/MW radiation and cardiovascular disease [8].

F. The North Karelian Project

In response to earlier Soviet reports, the World Health Organization (WHO) decided to conduct a comprehensive study on the biological effects of exposure to RF/MW radiation. In 1976, M. Zaret published the results of the study (reference found in [8]). The WHO investigation focused on the population of North Karelia, a remote area of Finland that borders the Soviet Union. This region was selected because of its close proximity to a then Soviet early warning radar station. North Karelia is geographically located in the path of intercontinental ballistic missiles that would originate from the midwest United States. To

detect these missiles, the Soviets constructed a number of high power tropospheric scattering radar units adjacent to nearby Lake Ladoga. The operation of these units exposes the residents of North Karelia to large doses of ground and scatter radiation. The WHO investigation found evidence linking exposure of RF/MW radiation to cardiovascular disease and cancer. The North Karelian population suffered from an unusually high number of heart attacks and cases of cancer. In addition, it was found that the affliction rate of these diseases was much higher among residents living closest to the radar site [8].

G. Hematologic Effects

There is evidence that RF/MW radiation can effect the blood and blood forming systems of animals and humans. Experiments conducted in the Soviet Union have indicated changes in blood cell levels and alterations in the biological activities of hematologic elements. Other investigators have reported similar effects [7], [8], [17].

The results of an experiment reported in 1979 by V. M. Shtemier showed a decrease in the biological activity of butyryl cholinesterase in rats that were exposed to pulsed RF/MW radiation (reference found in [17]). The experiment subjected 15 rats to a 3000 MHz pulsed RF/MW source with an incident power density of 10 mW/cm^2. The rats were irradiated for 1 hour/day over several days. After 42 days, there was a loss of biological activity of the butyryl cholinesterase enzyme caused by a decrease in the concentration of the enzyme in the bloodstream of the rats [17]. Cholinesterase is a catalyst in the hydrolysis of acetylcholine into choline and an anion. Choline is a useful enzyme that prevents the deposition of fat in the liver [18].

In another experiment, 20 male rats were exposed to a 2376 MHz pulsed RF/MW source with an incident power density of 24.4 mW/cm_2. Each rat was exposed for 4 hours/day, 5 days/week for 7 weeks. Blood samples were taken periodically and examined for anomalies. After repeated exposures, it was discovered that the number of lymphocytes and leukocytes (white blood cells) in the bloodstream of the rats was lower than normal. The biological activity of alkaline phosphatase in neutrophil leukocytes was also found to increase when the rats were irradiated [17].

The results of several other experiments are summarized in the NIOSH Technical Report [8]. RF/MW radiation has been observed to cause: an increase in the amount of exudate in bone marrow, the transient disappearance of fat cells from bone marrow, destruction and loss of essential bone marrow cells, underdeveloped marrow, a decrease in the number of red blood cells, and an imbalance in the number of lymphocytes in the bloodstream [8].

H. Effect to the Central Nervous System

There is documented evidence that exposure to RF/MW radiation can cause a disturbance in the central nervous system (CNS) of living organisms [3], [8], [11], [17]. Soviet investigators claim that exposure to low-level radiation can induce serious CNS dysfunctions. Experiments conducted in the Soviet Union and Eastern Europe have exposed live subjects to radiation levels that are near or below the recommended safe levels prescribed by the ANSI Standard and the USAF AFOSH Standard [17].

i. Pathological Report

Soviet investigators claim that the central nervous system (CNS) is highly sensitive to RF/MW radiation [3], [8], [11], [17]. The NIOSH Technical Report [8] summarized the results of a pathological study published by A. A. Letavet and Z. V. Gordon in 1960. The researchers reported that several CNS related disorders were discovered among 525 workers exposed to RF/MW radiation. The symptoms were listed as: hypotension, slower than normal heart rates, an increase in the histamine content of the blood, an increase in the activity of the thyroid gland, disruption of the endocrine-hormonal process, alterations in the sensitivity to smell, headaches, irritability, and increased fatigue. Other researchers have acknowledged similar biological responses [8].

ii. Soviet Union Experimental Results

Several experiments have been performed in the Soviet Union and Eastern Europe that demonstrate a variety of biological effects that can occur in living organisms. observations of laboratory animals subjected to low power EM fields showed alterations in the electrical activity of the cerebral cortex and disruptions in the activity of neurons [17].

L. K. Yereshova and YU. D. Dumanski (reference found in [17]) exposed rabbits and white male rats to a continuous wave 2.50 GHz RF/MW source. The animals were irradiated for 8 hours/day over a period of 3 to 4 months at power density levels of 1, 5, and 10 uW/cm^2. It was observed that rabbits exposed to the 5 and 10 uW/cm^2 power density levels suffered alterations in the electrical activity of the cerebra cortex and disturbances to the conditioned reflex response. They concluded that exposure to RF/MW radiation caused perturbations in the higher functioning centers of the CNS in the laboratory animals [17].

An experiment conducted by V. R. Faytel'berg-Blank and G. M. Perevalov demonstrated the biological effects of RF/MW radiation on the activity of neurons (reference found in [17]. They subjected chinchilla rabbits to a 460 MHz RF/MW source at incident power densities of 2 and 5 mW/cm^2. Only the heads of the rabbits were irradiated and exposures lasted for 10 minutes. Exposure at the 2 mW/cm^2 power density level caused neuronal activity to increase and evoked an electroencephalogram (EEG) activation reaction. Neuronal activity was observed to decrease at the higher power density level. These results indicated that RF/MW radiation can cause neurophysiological alterations in animals. These biological responses may be dependent on the intensity of the radiation [17].

iii. Behavioral Effects

Exposure to RF/MW radiation has been observed to cause a disruption in the behavior of animals. Experiments conducted on rats and nonhuman primates indicates that conditioned responses can be altered as a result of irradiation. Researchers indicate that behavior may be the most sensitive biological component to RF/MW radiation [1], [7], [9], [29].

D. R. Justesen and N. W. King (reference found in [7]) reported experimental results that demonstrated a degenerative behavioral effect in laboratory animals that were exposed to RF/MW radiation. The results were published in 1970. They exposed rats to a 2450 MHz multimodal resonating cavity system. Exposure was periodic with irradiation times lasting for 5 minutes and recurring every 5 minutes. This cycle as sustained for 60 minutes. The

experiment tested the effect of irradiation at whole-body energy absorption rates of 3.0, 6.2, and 9.2 W/Kg. It was observed that for a SAR of 6.2 W/Kg the behavioral performance of the rats degraded significantly and activity usually terminated at the end of the 60 minute exposure period [7].

In 1977, James Lin, Arthur Guy, and Lynn Caldwell [29] reported experimental results that showed alterations in the behavioral response of rats that were exposed to RF/MW radiation. White female rats were trained to execute a "head raising" movement in return for a food pellet. The total number of such movements was counted during each exposure session in order to quantify the effect of irradiation. The animals were exposed to a 918 MHz RF/MW source at power density levels of 10, 20, and 40 mW/cm^2. Clinical observations showed that baseline responses remained unchanged for irradiation at the lower power density levels of 10 and 20 mW/cm^2. At 40 mW/cm^2, however, behavioral responses decreased rapidly after 5 minutes of continuous exposure. After about 15 minutes of exposure, behavioral activity terminated. It was determined that the peak energy absorption at 40 mW/cm^2 was about 32 W/Kg and the average absorption was 8.4 W/Kg over the whole-body surface [29].

iv. Synergetic Effect of Drugs RF/MW Radiation

In 1979, J. R. Thomas et al. reported that psychoactive drugs and RF/MW radiation may have a synergetic effect on living organisms (references for Thomas can be found in [1]). Experiments were conducted on laboratory animals. Male albino rats were administered dextroamphetamine and irradiated with a pulsed 2450 MHz RF/MW source at 1 W/cm^2 power intensity for periods of 30 minutes. It was found that the number of clinical responses observed per minute in the rats diminished more rapidly under the stimulus of both agents than in the control condition where just the drug was administered. This indicates that the effects of RF/MW radiation may be enhanced by certain drugs [1].

v. Analeptic Effect in Animals

Pulsed RF/MW radiation was reported to have an analeptic effect in laboratory animals. Experimental results presented by R. D. McAfee in 1971 showed that anethesized animals could be awakened by irradiation from a pulsed 10 GHz RF/MW source. The energy incident on the test animals was estimated to have a power density of between 20-40 mW/cm^2. Experiments conducted on rats showed that these animals were aroused from states of deep sleep by irradiation. It was observed that the blood pressure of a rat decreased simultaneously with the arousal response and that laryngeal spasms would occur when the rat was awakened. McAfee reported that the laryngeal spasms would obstruct the airway causing convulsions, asphyxiation, and eventually death. Other experiments performed on rabbits, cats, and dogs showed that these animals could also be awakened by irradiation. The larger animals, however, did not asphyxiate themselves, The blood pressure of the dogs and cats was observed to rise as they were awakened. In all cases, the arousal response was stimulated only when the head of the animal was irradiated. The body temperature of the test animals was not observed to rise as a result of irradiation. This indicates that the analeptic effect of RF/MW radiation may be nonthermal in nature [20].

I. Immunological Effect

Exposure to RF/MW radiation has been observed to cause physical alterations in the essential cells of the immune system and a degradation of immunologic responses [7], [17]. Experimental results published by Soviet and Eastern European researchers indicate that irradiation can cause injury and trauma to the internal body organs that comprise the immune system. Even exposure to low levels of RF/MW radiation can impair immunologic functions [17].

As discussed earlier, lymphoblasts can undergo physical alterations as a result of irradiation. Lymohiblastoid mutagens are similar in structure to leukemia cells [8]. Lymphoblasts are the precursors to leukocyte cells that participate in the immune system [18].

In 1979, N. P. Zalyubovskaya and R. I. Kiselev (reference found in [17]) reported that exposure to RF/MW radiation caused serious damage to the immune system of laboratory animals. They exposed mice to an RF/MW source radiating at 46.1 GHz with an incident power intensity of 1 mW/cm^2 for 15 minutes/day for 20 days, it was observed that the number of leukocytes in the bloodstream of the mice decreased as a result of irradiation. Effective quantities of enzymatic proteins in serum that combine with antigen-antibody complex and antibacterial agents such as lysozyme were also reduced. Zalyubovskaya and Kiselev reported a decrease in the phagocytic activity of neutrophils and a diminished resistance to infections caused by tetanic toxins. Immunity to typhoid and other tetanic toxins induced by vaccination or by the administration of antitoxins was rendered ineffective. Further examination of the mice revealed injury and trauma to the internal body organs. Irradiation had caused physical alterations in the thymus, spleen, and lymph nodes. The lymphoid organs suffered a total loss of mass [17].

J. Effect on the Eye

Clinical studies indicate that exposure to RF/MW radiation causes physiological damage to the eye that can result in loss of sight. It has been observed that irradiation causes the formation of cataracts in the lens of the eye. Tissue damage appears to be the result of thermal trauma induced by the heating property of RF/MW radiation. Experiments conducted on laboratory animals have demonstrated severe ocular damage as a result of exposure [30], [31].

i. Ocular Sensitivity

Exposure of the eye to RF/MW radiation causes physical duress that can lead to damage of the ocular tissue. The incident power intensity and the duration of radiation exposure are factors that determine the amount of tissue damage. The lens of the eye appears to be most susceptible to RF/MW energy radiated at frequencies between 1-10 GHz. For this frequency range, it has been observed that lens fibers will suffer irreversible damage to a greater extent than other ocular elements [30]. Lens fibers are elongated, thread-like structures that form the substance of the lens [18]. In 1979, Stephen Cleary reported [30] that cataracts are formed in the lens as a result of alterations in the paracystalline state of lens proteins. Physical, chemical or metabolic stress may be responsible for opacification of

the lens [30].

ii. Experiments on Rabbits

Severe tissue damage has been observed in rabbits that have been exposed to RF/MW radiation. Stephen Cleary [30] reports that intense radiation exposure can cause "immediate tearing, injection, pupillary constriction, and anterior turbity" in the rabbit eye. Lens opacities can occur when the eye is irradiated by a 2450 MHz RF/MW source at incident power density levels of 100-300 mW/cm^2. At this exposure level, cataracts have been observed to form 24-48 hours after irradiation [30]. In 1976, Kramer, Harris, Emery, and Guy (reference found in [30]) reported observing the formation of cataracts in rabbit eyes that were exposed to 2450 MHz RF/MW radiation at an incident power density level of 180 mW/cm^2 for an exposure time of 140 minutes [30].

Acute ocular damage and the formation of cataracts appears to be the result of local hyperthermia of the eye. It has been observed, however, that trauma induced by heating of the ocular tissue may be unique to the exposure effects of RF/MW radiation [30]. In 1975, Kramer, Harris, Emery, and Guy (reference found in [30]) reported subjecting rabbits to hyperthermia not induced by exposure to RF/MW radiation. Heating caused the intra-ocular temperature of the eye to rise above normal. The retrolental temperature was reported to be about 42°C during the test period. Hyperthermia was sustained for approximately 30 minutes. Despite heating conditions that were similar to exposure from RF/MW radiation, lens opacities did not occur in the rabbit eyes [30]. Similar results have been reported by other researchers [30]. These results indicate that hyperthermia alone may not be sufficient to cause the formation of cataracts. Direct exposure to RF/MW radiation may be necessary to induce opacities in the lens [30].

iii. Cataracts in Humans

Exposure to RF/MW radiation is known to cause cataracts in the human eye. Several cases have been documented that report RF/MW induced cataracts in humans. Typically, lens opacities have resulted from exposure levels that are greater than specified by the various safety standards. However, minimum exposure levels sufficient to cause ocular damage are not certain [30].

In 1970, Zaret, Kaplan and Kay (reference found in [30]) reported a large number of cataracts induced in humans as result of occupational exposure. This report cited 42 cases of chronic exposure to RF/MW radiation. They reported that workers suffered damage to the posterior lens capsule. In one case, exposure periods lasted about 50 hours/week for 4 years. During most of the 4 year period the incident average power density level was approximately 10 mW/cm^2. For one 6 month period, however, power density levels may have reached 1 W/cm^2 [30].

In 1966, S. Cleary and B. Pasternack (reference found in [30]) published the results of an epidemiological study of military and industrial microwave workers. It was reported that minor alterations had occurred in the ocular lenses of the workers as a possible result of chronic RF/MW radiation exposure. Defects were found in the posterior pole of the lens. Cleary and Pasternack noted that the number of minor ocular defects was related to the specific occupational duties of the workers. The greatest number of defects was found

among persons working in research and development jobs. The results of the study were based on a comparison of the microwave workers with a similar control group. The researchers concluded that exposure to RF/MW radiation had caused the lens of the eye to age faster than normal [30].

Similar cases of RF/MW radiation induced ocular damage have been reported by other researchers. In one case, a 22 year old microwave technician was exposed 5 times over a 1 month period to a 3 GHz radiation source. The incident power density level was about 300 mW/cm^2 and irradiation lasted approximately 3 minutes during each exposure time. It was reported that the technician had developed bilateral cataracts as a result of irradiation [30]. In another case, M. Zaret (reference found in [30]) reported that a 50 year old woman had developed cataracts after intermittent exposure to a 2.45 GHz microwave oven. The incident power density levels were about 1 mW/cm^2 during operation of the oven and as high as 90 mW/cm^2 when the oven door was opened [30].

K. Auditory Effect

Individuals exposed to pulsed RF/MW radiation have reported hearing a chirping, clicking or buzzing sound emanating from inside or behind the head. The auditory response has been observed only for pulsed modulated radiation emitted as a square-wave pulse train. The pulse width and pulse repetition rate are factors that appear to determine the type of sound perceived [1], [31].

James Lin [31] reports that the sensation of hearing in humans occurs when the head is irradiated at an average incident power density level of about 0.1 mW/cm^2 and a peak intensity near 300 mW/cm^2. Auditory responses have been observed for a frequency range of 200-3000 MHz and for pulse widths from 1-100 us [32].

III. RF/MW ENERGY DEPOSITION

The absorption of RF/MW radiated energy causes biological reactions to occur in living organisms. In order to understand the potential effects of RF/MW radiation, it is important to quantify the absorption characteristics of biological materials. Researchers have identified several principal factors that govern the absorption of RF/MW energy by the human body. Experimental results have indicated that clothing thickness, physical dimensions, degree of hydration, and the resonance frequency of the human body are important parameters that determine the amount of energy absorbed by the body [1], [8], [9], [16], [22].

A. Specific Absorption Rate (SAR)

The specific absorption rate (SAR) is a measure of the dose of RF/MW energy absorbed by biological materials. It is intended to give a quantitative understanding to the absorption of energy. The SAR is defined as the amount of energy that is imparted to the body as a function of body mass [4]. SAR's are usually expressed in terms of watts of incident power per kilograms of irradiated body mass (W/Kg) [4], [9].

B. Depth of Energy Penetration

It is known that RF/MW radiated energy will be absorbed by the tissue of the human body. The depth of energy penetration into he tissue depends primarily on the wavelength of the incident radiation and the water content of the tissue [3], [6].

Energy emitted in the millimeter-wave band is not likely to penetrate to more than about 1 or 2 mm into the tissue [6]. Essentially, RF/MW energy radiated at wavelengths less than 3 centimeters will be captured in the outer skinsurface. RF/MW wavelengths from 3 to 10 centimeters will penetrate to a depth of about 1 to 10 mm. The greatest depth of penetration into the body will occur at wavelengths between 25 to 200 centimeters. At these wavelengths RF/MW radiated energy can directly effect internal body organs and cause serious injury. The human body is reported to be "transparent" to RF/MW radiated energy emitted at wavelengths greater than 200 centimeters. Also, at frequencies above 300 MHz it has been observed that the depth of energy penetration fluctuates rapidly with changes in frequency. In general, the depth of energy penetration into the body will decline as the frequency of the incident radiation increases. At 10 GHz, the absorption of RF/MW energy will be similar to IR radiation [3]. These figures were published by the U. S. Department of Health, Education and Welfare [3].

The water content of the human tissue will also influence the depth of energy penetration into the body. Millimeter-wave radiation is reported by Ghandi and Riazi [6] to penetrate less than 2 mm into the body because of the "Debye relaxation of the water molecules" in the tissue [6]. The Debye Effect was observed by a Dutch physicist named Peter Debye [23]. He discovered that EM waves are absorbed by a dielectric because of molecular dipoles present in the dielectric material [24]. Water molecules are essentially dipoles constructed from atoms of hydrogen and oxygen. Biological materials such as skin are dielectrics that consist mostly of water. Hence, these dielectrics are rich in molecular dipoles and are able to quickly absorb millimeter-wave radiation. High frequency radiation emissions are not expected to penetrate deeply into the human body [6].

C. Effect of Geometry

The orientation of the human body with respect to the incident EM field will determine the amount of RF/MW energy that is absorbed by the tissue. Experimental results published by Om Gandhi in 1980 indicate that the condition for maximum absorption occurs when the electric field is parallel to the major axis of the body and the direction of the field propagation is from arm to arm. Figure 2 shows the amount of energy absorbed versus the radiating frequency for various EM field orientations [22].

D. Effect of the Resonance Frequency

Researchers have reported that the human body will absorb the greatest amount of RF/MW energy from sources radiating at the whole-body resonance frequency [1], [9], [22], [25], [27]. The ANSI Standard [9] reports that the human body will absorb 7 times more energy from radiation emitted at the resonance frequency than at a frequency of 2450 MHz [9]. Experiments conducted on fabricated human models have been used to determine the resonance frequency of the human body [22]. Partial-body resonances have also been

observed by researchers. Computer simulation techniques have been used to estimate the resonance frequency of the human head [26].

The free space whole-body resonance frequency is reported to be between 61.8-77 MHz for a Standard Model of Man [9], [22], [25]. The standard model depicts an average man standing 175 cm tall [9]. Experimental results tend to differ somewhat from numerical calculations. The ANSI Standard [9] reports the whole-body resonance frequency to be 70 MHZ [9]. Similarly, experimental results presented by Hagman, Gandhi, and Durney [25] indicate the resonance frequency to be between 68-71 MHz. However, calculations put forth by the same researchers place the whole-body resonance at 77 MHz [25]. In 1980, Om Gandhi reported that the maximum absorption of energy will occur at frequencies where the free space wavelength (λ) of the incident radiation is about 2.50-2.77 times greater than the major length (L) of the body (i.e. $\lambda > 23.50L$-$2.77L$). This formula puts the value of the resonant frequency between 61.8-68.5 MHz for a standard model of man. When the human body is in contact with the electrical ground, the whole-body resonance frequency is reduced to about 47 MHz [22]. Figure 3 shows the SAR versus the incident EM field frequency for conditions of free space and grounding [22].

Numerical calculations have been presented by Hagman, Gandhi, D'Andrea, and Chatterjee [26] that indicate the free space resonance frequency of the human head to be about 375 MHz [26]. In a separate report, Gandhi determined that the head resonance will occur when the free space wavelength of the incident radiation is about 4 times the diameter of the head [22]. The condition for maximum energy absorption occurs when the direction of the EM field propagation is parallel to the long axis of the body. This orientation differs from the condition determined for RF/MW energy absorption by the whole-body. Figures 4 and 5 show the absorption of energy versus frequency for different EM field orientations [26].

E. Effect of Clothing

Clothing can act as an impedance matching transformer for RF/MW radiation. In 1986, Gandhi and Riazi [6] reported that the coupling efficiency of clothing may be as high as 90-95 percent for incident radiation in the millimeter-wave band. They determined that the thickness of the clothing and frequency of the incident radiation are important factors in the coupling condition. Figure 6 shows the relationship between clothing thickness and coupling efficiency as a function of frequency. The authors note that wet or damp clothing may actually reduce the amount of energy absorbed by the body because of the Debye relaxation of the water molecules [6].

IV. RF/MW RADIATION EXPOSURE STANDARDS

Exposure of living organisms to RF/MW radiation can have a potentially dangerous biological effect. To ensure the public safety and to safeguard the workplace against unnecessary RF/MW radiation exposure, protective guidelines have been adopted by the United States and several other nations. The maximum safe exposure levels recognized by individual examining authorities tends to vary as a result of differing interpretations of the

available RF/MW exposure data. There is a large distinction between permissible exposure levels observed in the United States and the Soviet Union. East Block countries have set more stringent standards than nations in the West [3], [8], [11], [22].

A. ANSI Standard C95.1-1982

In response to the need for a national RF/MW radiation protection guide, the American Standards Association commissioned the Department of the Navy and The Institute of Electrical and Electronics Engineers to cooperate in formulating an acceptable standard for safe radiation exposure levels. In 1960, the Radiation Hazards Standards Project was established to coordinate the efforts of researchers. Since then, work has progressed and in 1982 a modern RF/MW radiation protection guide was established. The American National Standards Institute (ANSI) designated this guide as C95.1-1982 [9]. Presently, a new ANSI guide is due for publication in May 1993. The new guide is entitled "ANSI/IEEE C95.1-1992". This guide will supersede C95.1-1982 when it is published.

i. Recommendations

The ANSI C95.1-1982 Standard specifies the maximum recommended RF/MW radiation exposure levels over a frequency range of 300 KHz to 100 GHz. Typically, the standard calls for an exposure of no more than 5 mW/cm^2 for frequencies between 1500 MHz to 100,000 MHz. The reader should consult with the actual ANSI publication for the detailed recommendations. In addition, the standard limits the whole-body SAR to 0.4 W/Kg and indicates that the spatial peak SAR should not exceed 8.0 W/Kg over any one gram of tissue. For both CW and pulsed EM fields the exposure time should not exceed 6 minutes at the recommended levels. These maximum safe levels are not intended to apply to the medical treatment of patients where irradiation is sometimes useful in combating diseases like cancer. The standard does pertain to the general public and to persons that work in electromagnetic environments. There are two exceptions to the recommendation: 1) at frequencies between 100 KHz and 1 GHz the maximum exposure levels may be exceeded as long as the stated SAR values are not violated and 2) at frequencies between 300 KHz and 1 GHz the exposure levels may be exceeded if the output power of the radiating device is less than 7 W [9].

ii. Philosophy

An explanation of the recommended maximum exposure levels is given as part of the protection guide. The ANSI Standard is intended to afford the best possible protection of human life against RF/MW radiation exposure. The biological effect on the human body for all RF/MW frequencies and modulation schemes is not known, therefore, investigators sought to interpret the available data in a way that would allow for the construction of the best possible RF/MW radiation protection guide. Investigators emphasized studies that reported harmful or potentially serious biological effects. Unlike past standards, researchers agreed that the modern protection guide would also account for the nonthermal effects of RF/MW radiation [9].

The safe exposure levels expressed by the ANSI guideline were determined for far field exposures. The plane wave model used to specify the maximum exposure levels may not be accurate to describe conditions in the near field. However, the power density levels expressed in the protection guide are not considered great enough to induce EM fields with sufficient energy intensities capable of exceeding the recommend SAR's [9].

In selecting a measure for the dose of RF/MW radiation, it was recognized that the SAR does not encompass all of the important factors necessary to determine safe exposure levels. The modulation frequency and peak power of the incident EM field should also be considered. Some of the investigators warned that extra care should be taken by persons that are subjected to pulsed EM fields or by fields that are modulated near the whole-body resonance frequency [9]

In assessing the biological effects, it was found that behavior was the most sensitive biological component to RF/MW irradiation. It was observed that behavioral effects were reversible for exposure to carrier frequencies between 600 MHz and 2450 MHz when whole-body SAR's were limited to between 4 and 8 W/Kg. For these SAR's, power densities were calculated or measured to range from 10 mW/cm^2 to 50 mW/cm^2. Behavioral effects were considered to be among the most serious consequences of exposure to RF/MW radiation [9].

It was established that in order to ensure an acceptable margin of safety the whole-body average SAR should not exceed 0.4 W/Kg. Most of the researchers concluded that this was a necessary and reasonable standard. The exceptions cited in the recommendations were justified on the basis of the total rate of energy absorption by the human body. The Standard reports that small radio transceivers are able to emit EM fields that exceed the prescribed power density levels. Such devices, however, are not expected to compromise the prescribed maximum SAR levels. In general, compliance with the ANSI RF/MW protection guide is the best safeguard against harmful biological effects [9].

B. USAF PEL (AFOSH Standard 161-9, 12 February 1987)

Since the early investigations of the Tri-Service Commission, the United States Air Force has recognized the need to establish an RF/MW protection standard. The USAF permissible exposure level (PEL) is specified in AFOSH Standard 161-9 enacted 12 February 1987. This standard stipulates maximum safe RF/MW radiation exposure levels over a frequency range of 10 KHz to 300 GHz. The PELs are shown in Figures 7 and 8 [10].

In general, the USAF protection guideline agrees with the ANSI Standard except that a distinction is made between exposure to persons in restricted and unrestricted areas. No explanation for this policy is given in the USAF Standard. The PEL for restricted areas shows only a slight alteration from the ANSI recommendation. For a frequency range of 1500-300,000 MHz the USAF PEL is given as 10 mW/cm^2. The PEL put forth by the USAF is intended to protect personnel from harm by limiting the whole-body SAR to 0.4 W/Kg. Exposure periods at the maximum safe levels should be limited to 6 minutes. It is also recommended that exposure in the near zone to RF/MW sources radiating at less than 30 MHz may require a separate evaluation to determine safe exposure levels of irradiation [10].

C. Canada Western Europe

Concern over safe RF/MW radiation exposure levels has sparked controversy and sharp debate in many countries around the world. The ANSI Standard is currently recognized by most countries of the Free World including Canada, the United Kingdom, Sweden, France, and West Germany [8], [22].

D. Soviet Union & Eastern European Standards

The RF/MW radiation exposure standards prescribed in the Soviet Union and Eastern Europe are more conservative than standards adopted by countries in the West [3], [8], [11]. In the Soviet Union, permissible exposure levels for whole-body irradiation are specified for various time intervals. RF/MW radiation exposures may not exceed 0.01 mW/cm^2 for 3 hours/day, 0.1 mW/cm^2 for 2 hours/day, and 1.0 mW/cm^2 for 15-20 minutes provided that safety goggles be worn [3]. Czechoslovakia has recommended a maximum exposure level of 0.025 mW/cm^2 for an average working day [8].

Investigators in the Soviet Union and Eastern Europe have placed a great emphasis on the nonthermal effects of biological exposure to RF/MW radiation. They contend that electromagnetic interactions with the bioelectrical and biochemical functions of the body constitute a more serious health risk than effects from thermal heating. Nonthermal disruptions have been observed to occur at power density levels that are much lower than are necessary to induce thermal effects. Soviet researchers have attributed alterations in the central nervous system and the cardiovascular system to the nonthermal effect of low level RF/MW radiation exposure [3], [8].

The U. S. Department of Health, Education and Welfare [3] reports that the differing standards put forth by the East and West may be attributed to philosophical differences in basic research. Soviet investigators were intent on examining the effect of RF/MW radiation on the conditioned reflex response of living organisms whereas their counterparts in the West do not view this effect as an appropriate endpoint to research [3]. Recently, however, researchers in the West have sought to account for nonthermal effects in modern permissible RF/MW radiation exposure standards [9].

V. CONCLUSION

Exposure to RF/MW radiation is known to have a biological effect on living organisms. Research conducted over the past 30 years has provided a basis for understanding the effect of irradiation of biological materials. Experimental evidence has shown that exposure to low intensity radiation can have a profound effect on biological processes. The nonthermal effects of RF/MW radiation exposure are becoming important measures of biological interaction with EM fields. Modern RF/MW radiation protection guides have sought to account for the effects of low level radiation exposure. Adherence to the ANSI Standard [9] should provide protection against harmful thermal effects and help to minimize the interaction of EM fields with the biological processes of the human body [9].

It is essentially the absorption of RF/MW energy that causes stress and trauma to biological systems. The greatest amount of energy will be absorbed when the incident radiation is emitted at the resonance frequency of biological material [9], [22]. In this regard, RF/MW radiation emitted at nonresonant frequencies should be absorbed to the

greatest extent when the radiating mode is a pulsed signal. The generation of such signals creates transient responses that will match the resonant frequencies of biological materials. Nonresonant pulsed RF/MW radiation may be more harmful to living organisms than CW radiation emitted at nonresonant frequencies.

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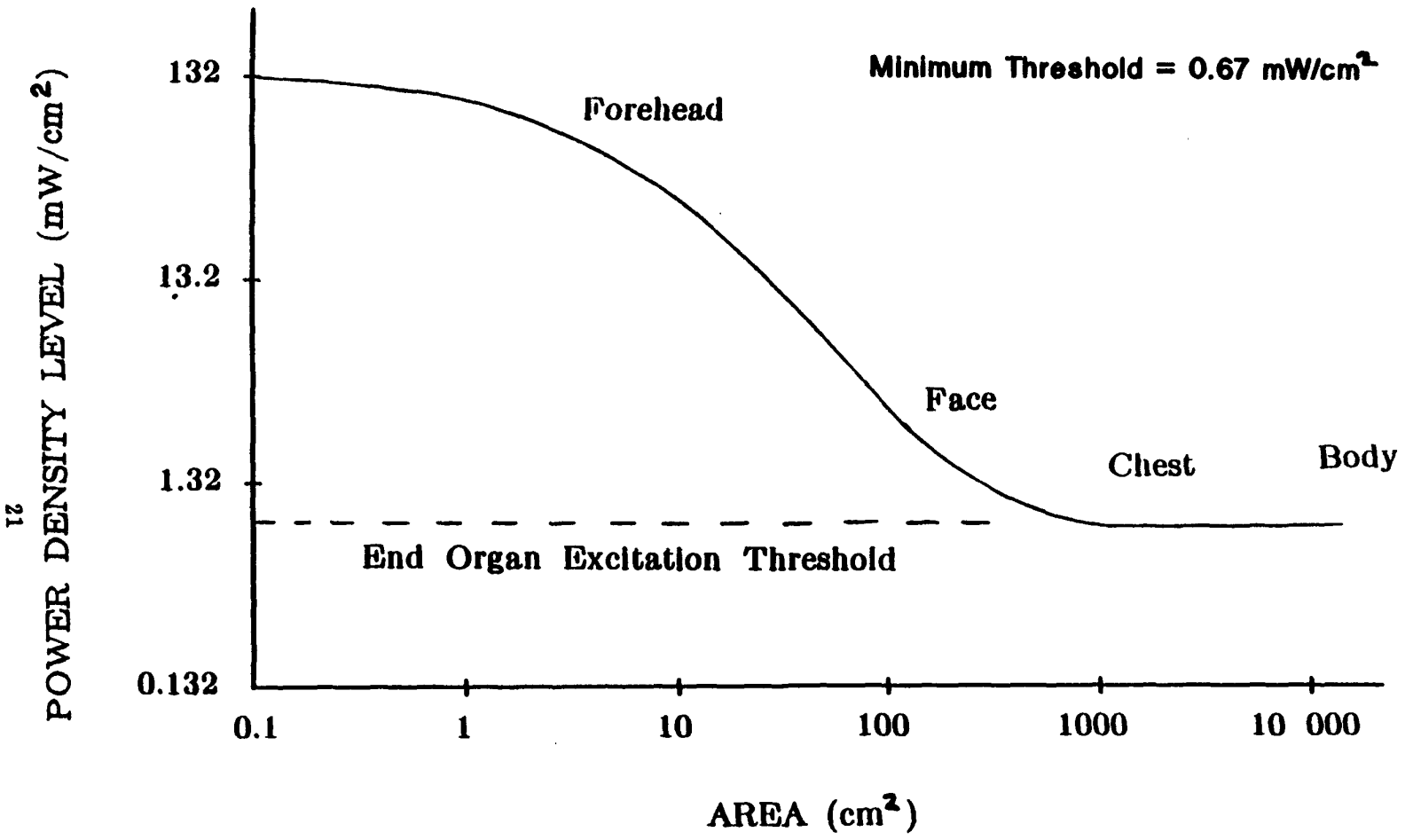

Figure 1: Observed threshold of infrared perception.
Absorbed continuous wave intensity versus exposed body area.

(ref: J. Hardy & T. Oppel, results reported by Om Gandhi and Abbas Riazi, IEEE MTT-34, pp. 228-235, Feb 1986)

ATTACHMENT 5

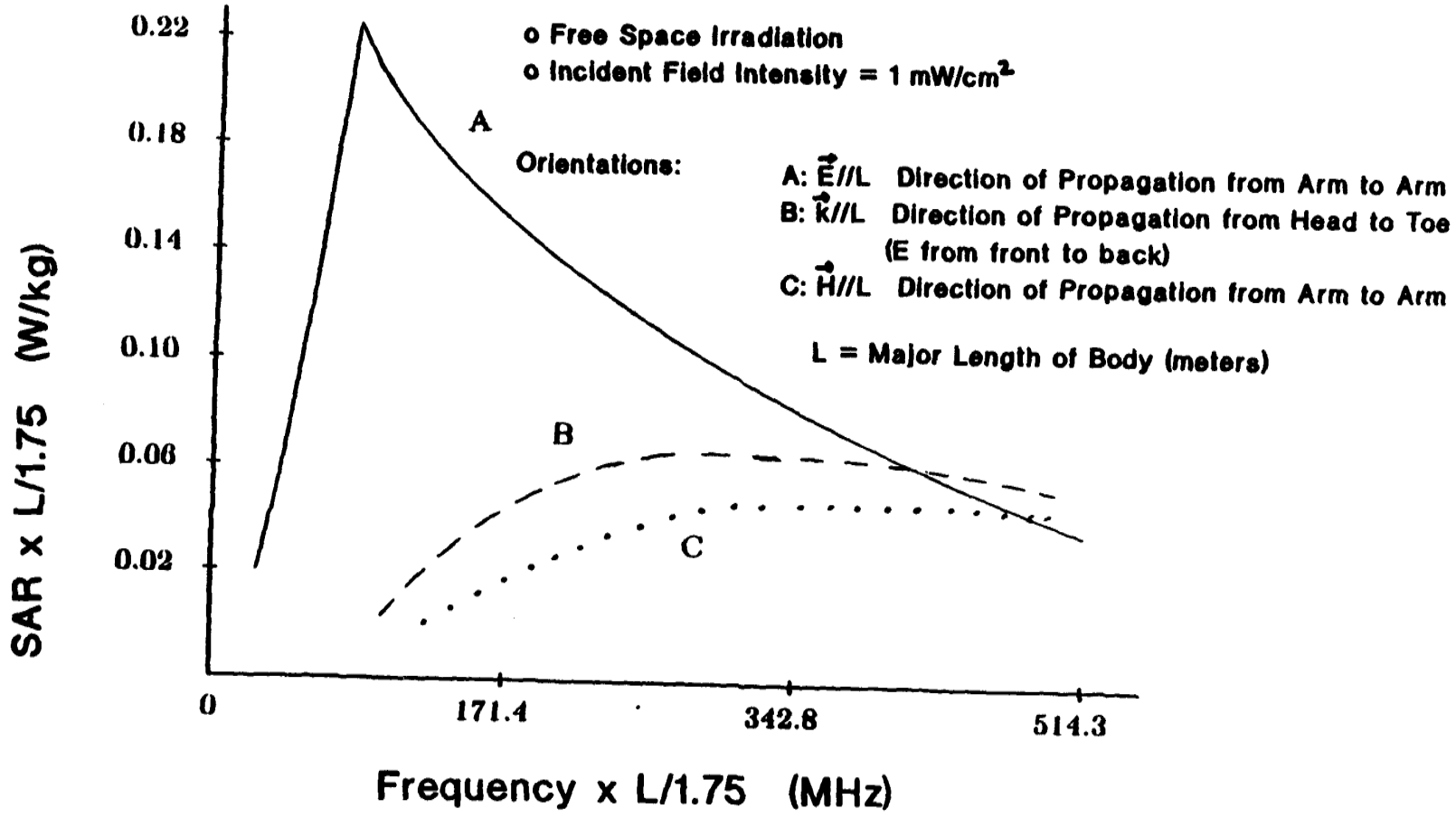

Figure 2: Comparison of field orientations for whole-body exposure of humans. Normalized SAR versus normalized radiated wave frequency.

(ref: Om Gandhi, Proceedings IEEE, Vol. 68, pp. 24-32, Jan 1980)

ATTACHMENT 5

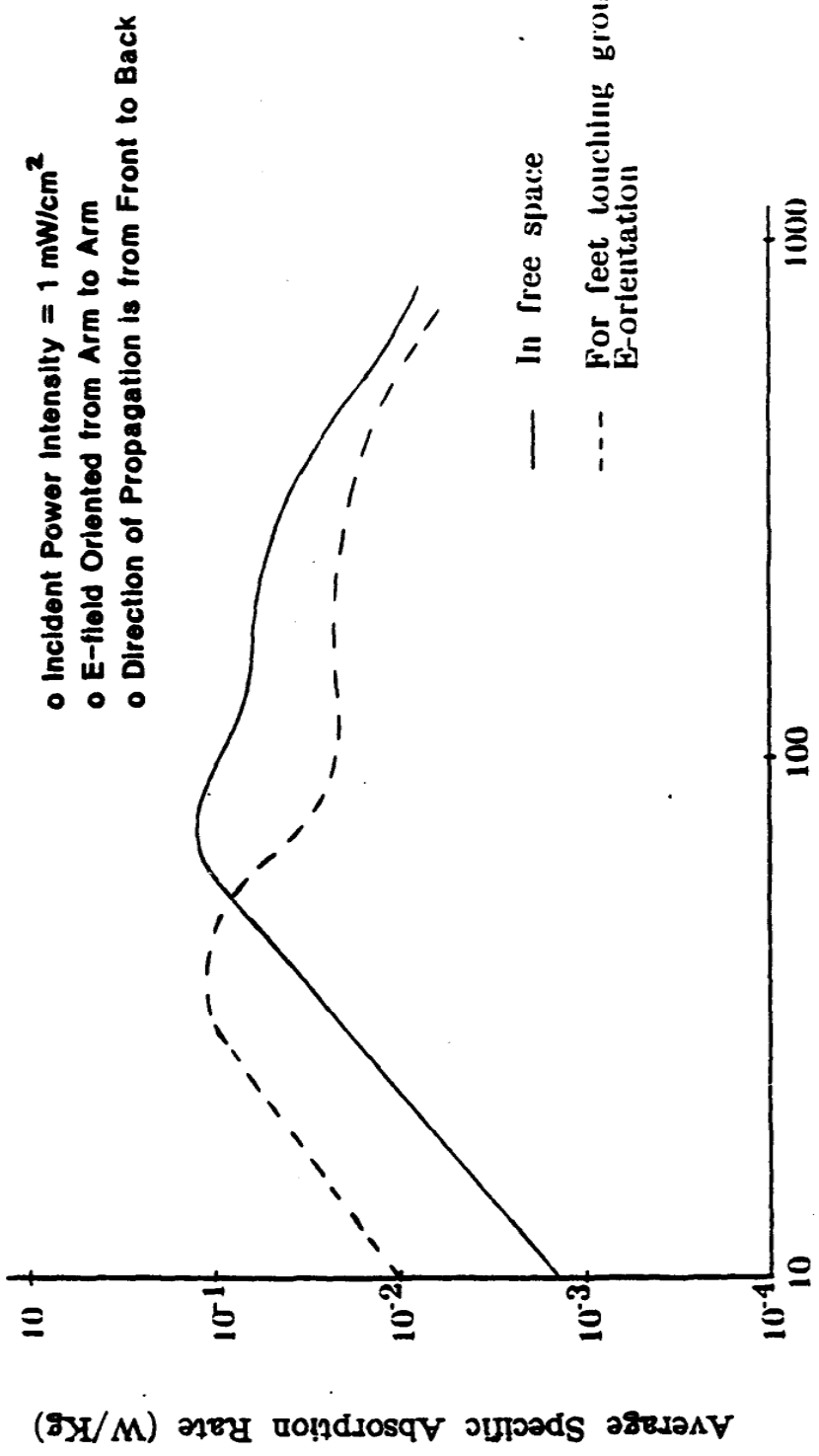

Figure 3: SAR versus frequency of incident radiation for a homogenous model of man.

(ref: OM Gandhi, Proceedings IEEE, Vol. 68, pp. 24–32, Jan 1980)

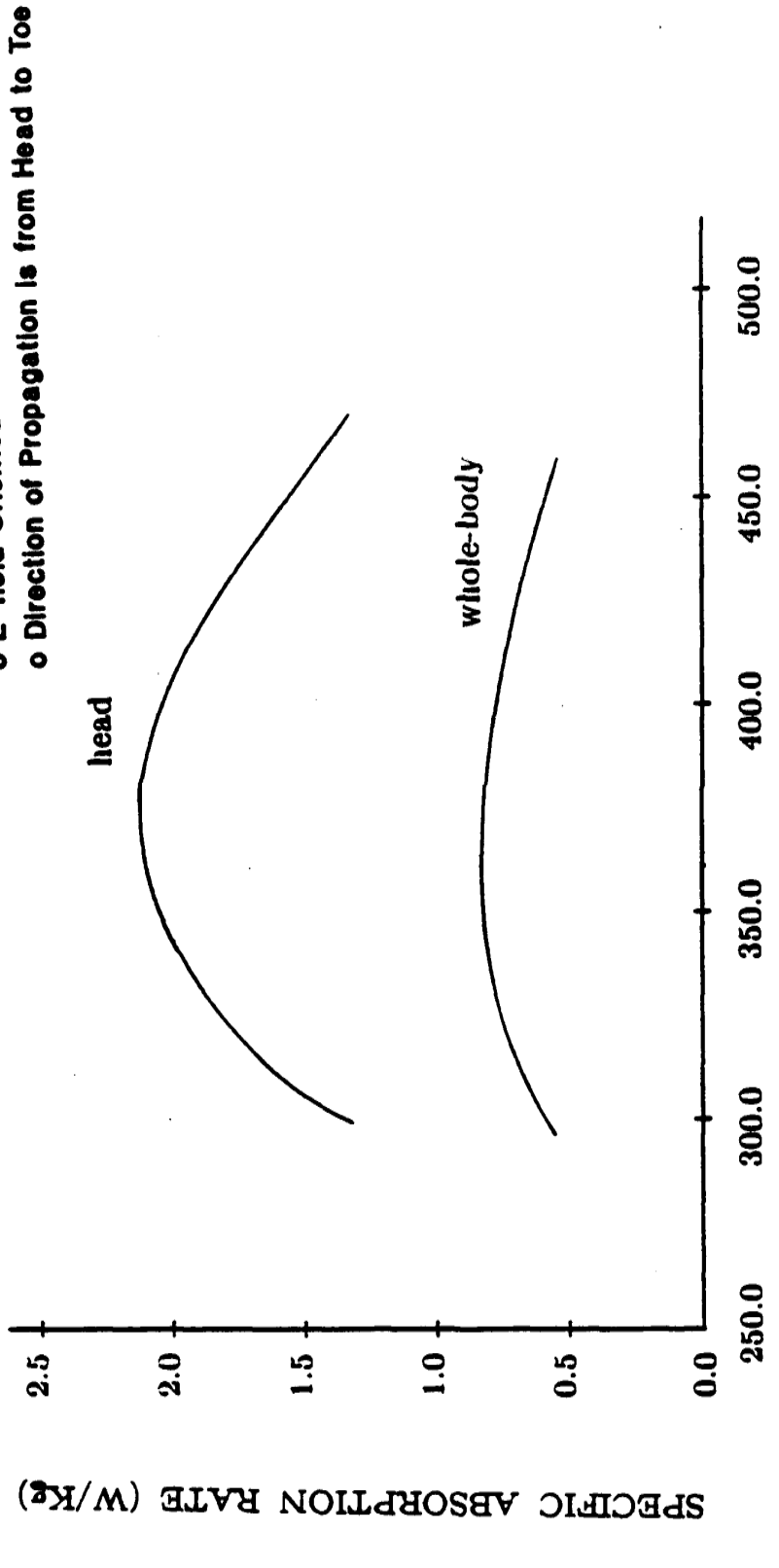

Figure 4: Head and whole-body energy absorption. SAR versus frequency of incident radiation.

(ref: Hagmann, Gandhi, D'Andera, and Chatterjee, IEEE MTT-27, pp. 809-813, Sep 1979))

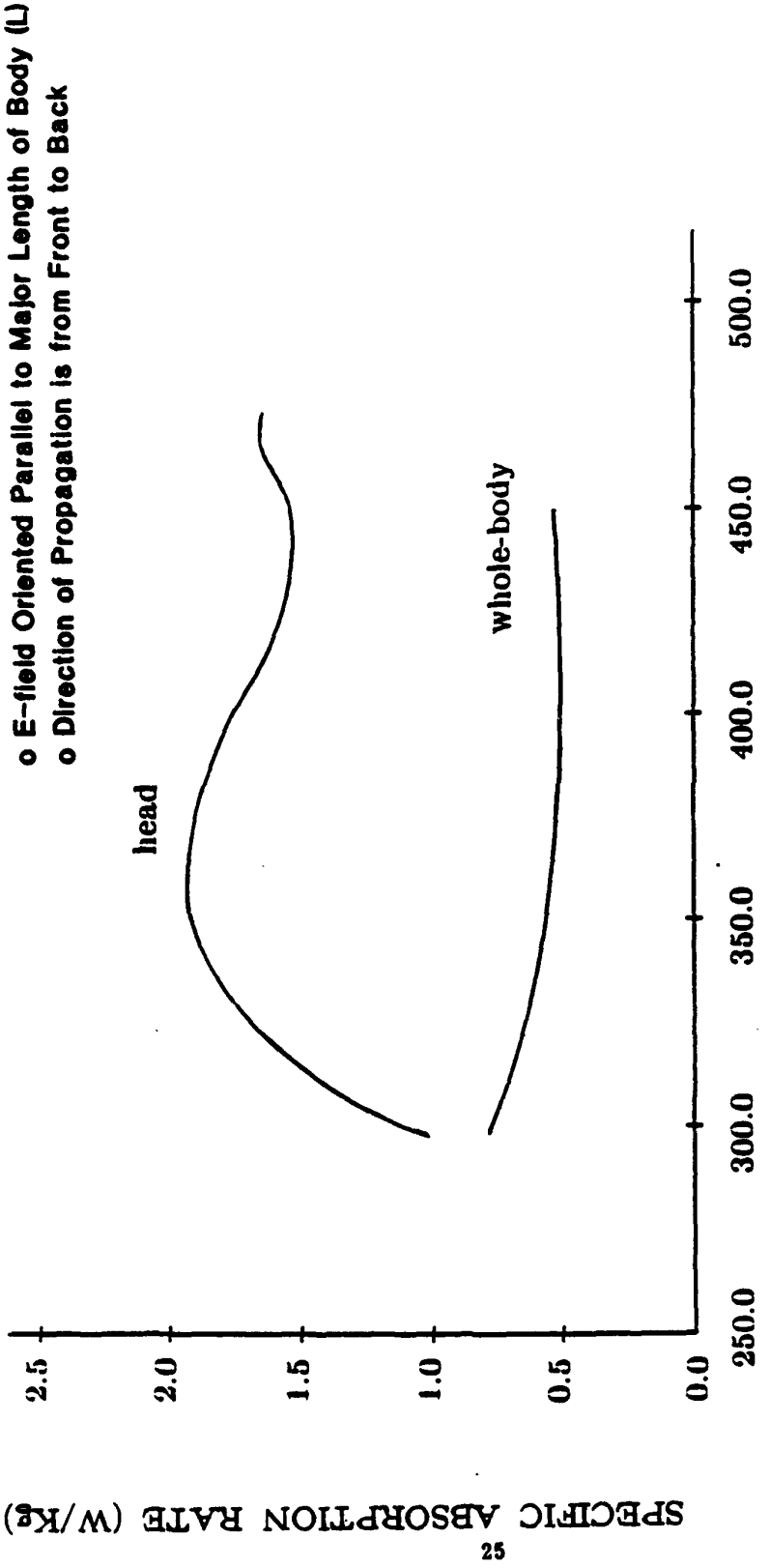

Figure 5: Head and whole-body energy absorption for $\hat{E}$//L.
SAR versus frequency of incident radiation.

(ref: Hagmann, Gandhi, D'Andera, and Chatterjee, IEEE MTT-27, pp. 809-813, Sep 1979)

ATTACHMENT 5

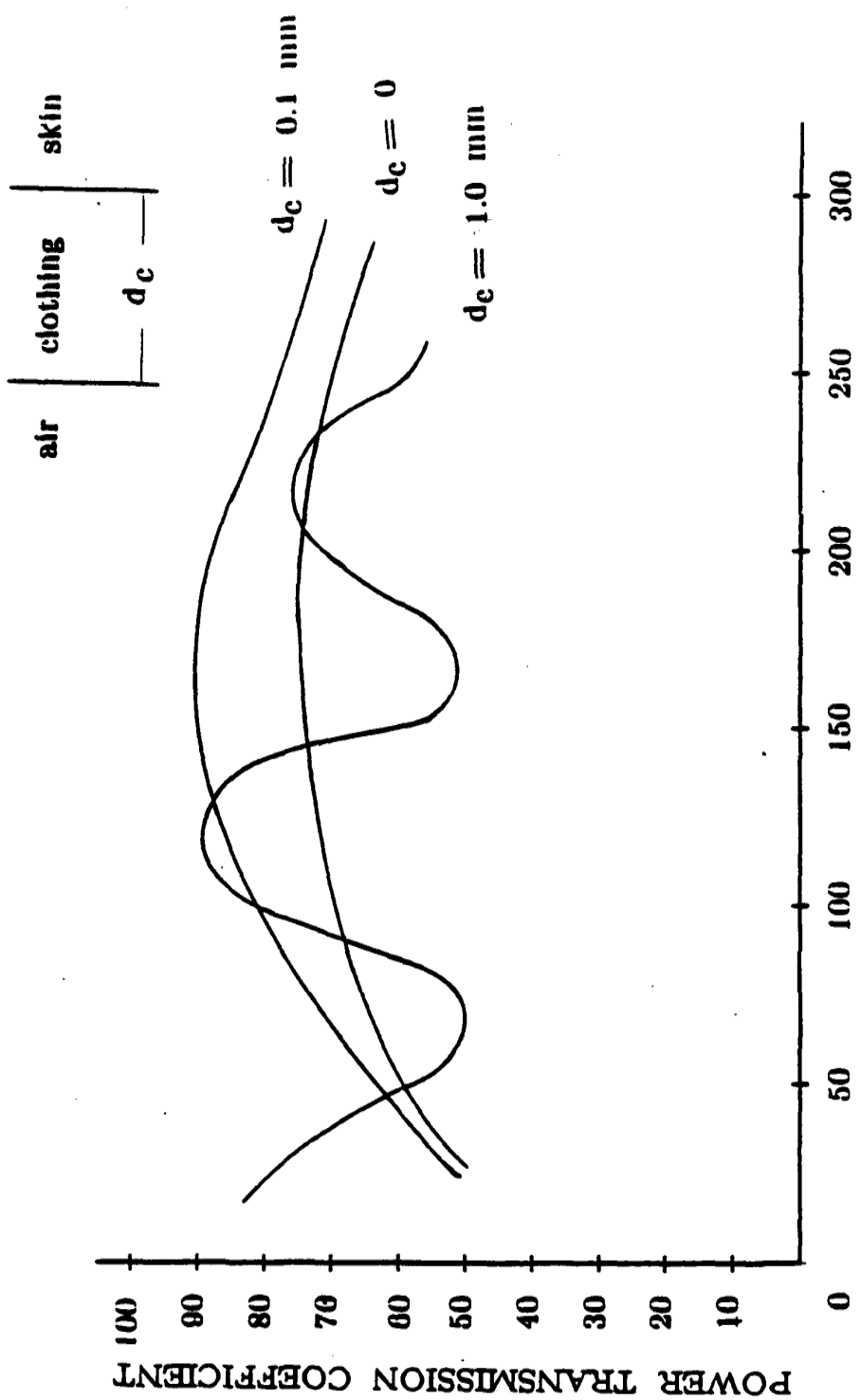

Figure 6: Comparison of transmission coefficient with and without clothing; no air gap between skin and exterior clothing.

(ref: Om Gandhi and Abbas Riazi, IEEE MTT-34, pp. 228-235, Feb 1986)

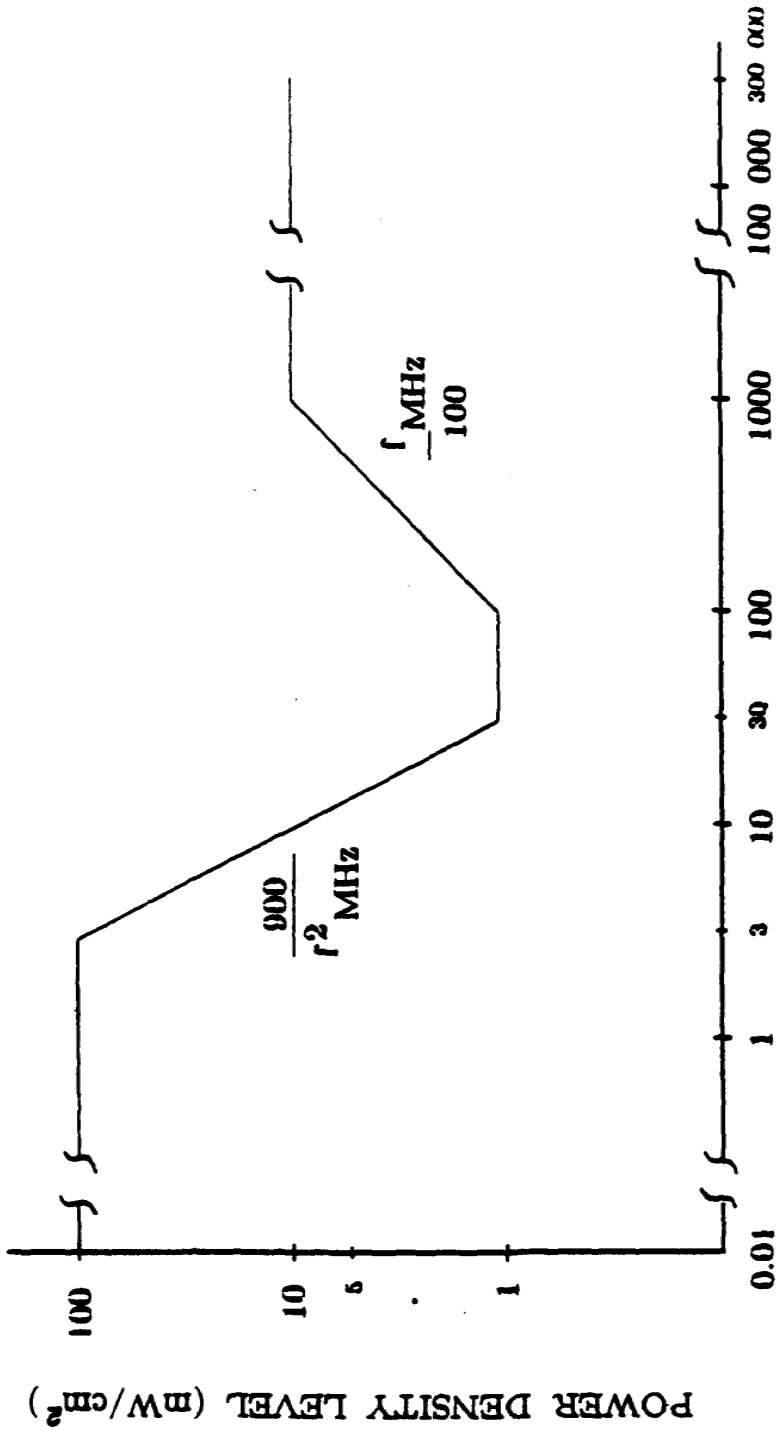

Figure 7: USAF RF/MW radiation permissible exposure limit (PEL) for humans working in restricted areas.

(ref: AFOSH Standard 161-9, 12 Feb 1987)

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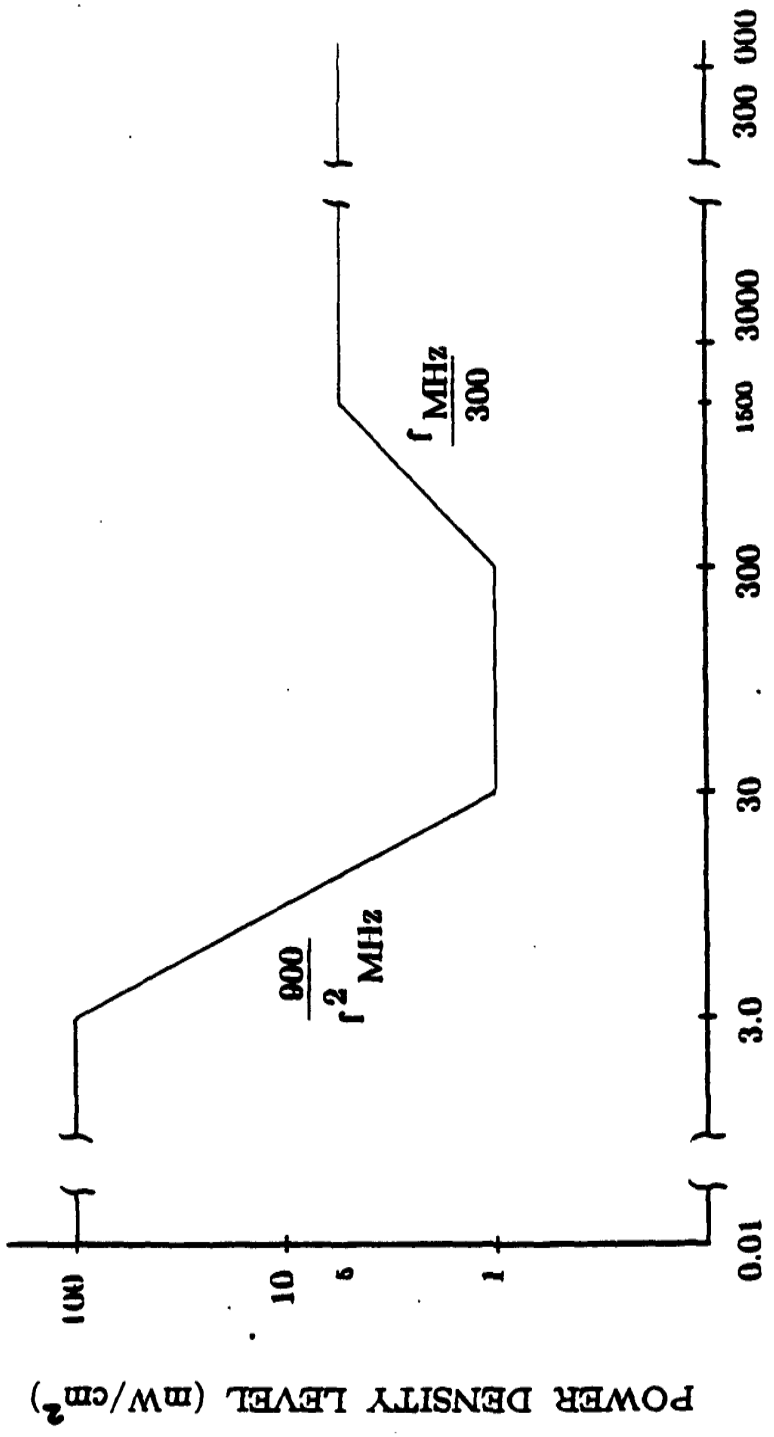

Figure 8: USAF RF/MW radiation permissible exposure limit (PEL) for humans working in unrestricted areas.

(ref: AFOSH Standard 161-9, 12 Feb 1987)

ATTACHMENT 5

MISSION
OF
ROME LABORATORY

Mission. The mission of Rome Laboratory is to advance the science and technologies of command, control, communications and intelligence and to transition them into systems to meet customer needs. To achieve this, Rome Lab:

a. Conducts vigorous research, development and test programs in all applicable technologies;

b. Transitions technology to current and future systems to improve operational capability, readiness, and supportability;

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d. Promotes transfer of technology to the private sector;

e. Maintains leading edge technological expertise in the areas of surveillance, communications, command and control, intelligence, reliability science, electro-magnetic technology, photonics, signal processing, and computational science.

The thrust areas of technical competence include: Surveillance, Communications, Command and Control, Intelligence, Signal Processing, Computer Science and Technology, Electromagnetic Technology, Photonics and Reliability Sciences.

ATTACHMENT 6

Reclaiming Local Control Over Cellular Wireless Facilities in Colorado

Version 9
October 26, 2019

Boulder 5G Action
Boulder, CO

El Paso County Citizens Against 5G
Colorado Springs, CO

Larimer County Safe Wireless Advocates
Fort Collins, CO

Concerned Citizens for 5G Health Effects
Aspen, CO

Colorado 5G Action
State of Colorado

Timothy Schoechle, PhD—Editor
National Institute for Science, Law and Public Policy

ATTACHMENT 6

> “To continue down the path the FCC is currently on, to continue to ignore the serious alarms the scientific community is raising, could lead to dangerous impacts to American national security, to American industries, and to the American people.”
>
> ***—Congresspersons Ron Wyden (OR) and Maria Cantwell (WA)***[1]

I. Executive Summary

What is HB 17-1193?

The telecom industry is seeking to roll out a new 5th generation of cellular wireless technology. In 2017 the Colorado legislature passed an industry-initiated law, HB 17-1193, to promote 5G wireless deployment by preempting and limiting local government regulation of cellular wireless facilities using the pubic rights-of-way. This new seriously overreaching law granted telecom corporations a right of access at low cost and imposed short timeframes to enable a proliferation of “small cell” sites throughout cities and communities. This 5G roll-out is being falsely framed in the media as a “race to 5G”. But, due to the lack of 5G products, is actually more about 4G antenna densification and the expropriation of the public rights-of-way under the guise of 5G.

How did this bill come about?

The law is consistent with industry-inspired model legislation from the *American Legislative Exchange Council* (ALEC) that has been passed in over 20 states. The new 5G technology has a more limited range and will require vastly greater antenna densification, with small cells situated only a few hundred feet apart and relying heavily on use of public rights-of-way at a reduced cost. This legislation was advanced quietly and strategically, often couched as simply “enhancing wired and wireless telecom services”, and it is not clear that either legislators, local governments, or the pubic had much, if any, awareness of its full purpose or implications. Since early 2019 when telecom companies began actually installing the new small cells, widespread public concern and alarm has rapidly emerged.

What is the impact on communications?

Heavily promoted by the industry, 5G promises faster wireless Internet access and a dazzling array of futuristic applications including autonomous vehicles, Internet-of-Things (IoT), virtual reality, and artificial intelligence. However, growing grassroots public opposition is emerging around a variety of concerns such as health risks of electromagnetic radiation, threats to personal privacy, cyber-security, private corporate appropriation of public property and rights-of-way, environmental disruption, loss of community rights, and loss of income by *de facto* forced subsidization of telecom providers.

Why should law be changed?

There are serious questions that need to be answered or better understood before making such a massive commitment of public resources, including questions about risks to public health and to personal privacy, data security, and surveillance. However, perhaps the greatest concern is the risk to democratic governance and the *private appropriation of public resources*. This includes the cost and public subsidization and environmental impact of small cell proliferation. Also, it may well be that rather than more wireless infrastructure, what is really much more needed is fiber-to-the-premises (FTTP) that is *locally owned and controlled as a municipal pubic utility*. HB 17-1193, and perhaps other laws, need to be reconsidered and state-wide policy should be restructured to benefit the people of Colorado rather than simply private telecom corporations.

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[1] Letter from Ron Wyden and Maria Cantwell to Ajit Pai (May 13, 2019), at: https://bit.ly/2Rsjvlk.

II. Background

There is a significant amount of misinformation about 5G. This section defines basic terms and summarizes important data and information regarding 5G and small cell networks generally.

1. **What is 5G?** The term "5G" denotes the 5th generation of wireless cellular telecom technology that is still being defined. Over the past four decades, the wireless industry has introduced a new generation of their cellular phone technology roughly every 10 years. Today's cellular networks support 2G, 3G, and 4G. 4G, though not yet fully built out, was given the nickname, LTE for "long term evolution." 5G is somewhat different in that it will augment, not replace, 4G. In the U.S., 5G only exists partially in a few trials. 5G is intended to be a short-range companion to 4G LTE that uses new, much higher frequency bands that are capable of faster data transfer and shortened latency delay. The longer-range 4G LTE will continue to provide voice service and will manage links to 5G devices. Some of the promises of 5G include increased speeds, enabling deployment of autonomous vehicles, the "Internet of Things," virtual reality, and other futuristic gadgets and services.

2. **How is 5G Different?** 5G radio signal propagation characteristics are much different and not yet fully understood. These new higher frequency bands will employ millimeter waves such as those used by airport security scanners. These waves tend to have a very short range and can be blocked by walls, buildings, moisture, leaves, or even our bodies. They are getting closer to and behave similarly to light. This means that to provide effective service, cellular sites need to cover many smaller spaces and be closer to the receivers. This necessitates saturating our urban spaces with many "small cells" on lampposts, phone poles, streetlights and the like—as close as every few hundred feet or so. As with conventional larger cells, the small cells will also still need to have optical fiber "backhaul" connections to the core network.

3. **What are Small Cells Facilities/Networks?** A small cell facility (sometimes called a "small cell wireless facility" or "small wireless facility") is a cellular network that delivers higher transmission data transfer speed at a lower range, typically 500 to 1,000 feet. The "small" in "small cell facility" refers to a device's range, not its physical size. In practice, many SCFs are the size of a picnic cooler or a refrigerator. In Colorado, per HB17-1193, SCFs are not to exceed three cubic feet for the antenna, nor seventeen cubic feet for the primary equipment enclosure, excluding some pieces of equipment. Typically, SCFs are installed in the public rights-of-way on existing and replacement utility poles and streetlights.

4. **Deployment of 5G in the United States:** Small cell infrastructure is being developed at breakneck speeds throughout the United States, including in Colorado. Experts estimate that the telecommunications ("telecom") industry could install 800,000 to 3 million small cell antennas in the United States in the next decade,[2] driven largely by 4G LTE and 5G

[2] Bob Fernandez, "Pa. Republicans Pull the Bill to Greenlight 5G Antennas as Towns say it Would Undercut Their Zoning Powers," *The Philadelphia Inquirer* (June 18, 2019).

networks. The small cell market is predicted to be worth $58 billion by 2024.[3] However, at present, due to incomplete technical standards, a lack of spectrum allocation, and a dearth of 5G phones and networking gear, what is happening is a "land rush" to obtain permits for a proliferation of small cells for 4G wireless, but hyped as a "race to 5G" that may be more "…designed to scare governments into giving companies large subsidies and consumers into paying a premium for prototype devices."[4]

5. **Fiber as an alternative to 5G:** While local governments are eager to modernize their network speeds, many are focused on deployment of fiber-optic networks (or simply "fiber") as their preferred next generation technology. Widespread deployment of local municipal fiber access networks provides extremely fast service that may mitigate much of the need for widespread 5G installation.[5] One example is Longmont's *NextLight*™ municipal broadband utility enterprise, which is a publicly-owned network that offers blazingly fast speeds—currently the fastest in the nation.[6]

III. The Colorado State Law on Small Cell Facilities: *HB 17–1193*

House Bill 17-1193 ("HB 17-1193") regulates small wireless service infrastructure at the local level. It was enacted by the General Assembly of Colorado and signed by Governor Hickenlooper on April 18, 2017 under the title *Small Cell Facilities Permitting and Installation.* HB 17-1193 expedites the permitting process for SCFs and SCNs,[7] extends presumptive right-of-way access to providers, and makes other changes to facilitate the proliferation of SCFs and SCNs in Colorado with minimal barriers.[8]

> "We are really limited in our ability to regulate these new facilities. The city can't say no to facilities in the right-of-way. To minimize the number of new poles is our priority."
>
> ***—Hector Reynoso, Manager – Real Property Services, Aurora, CO[9]***

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[3] Kendra Chamberlain, "Mobile Experts Predicts Small Cell Market to Hit $5.2B by 2024," *FierceWireless* (Apr. 10, 2019).

[4] *A Pocket Guide To 5G Hype*, Institute for Local Self-Reliance, August 2019 <muninetworks.org> or <ilsr.org>.

[5] See Timothy Schoechle, *Re-Inventing Wires: The Future of Landlines and Networks* (May 2018) at: http://electromagnetichealth.org/wp-content/uploads/2018/05/Wires.pdf.

[6] Jason Plautz, "Longmont, CO Municipal Internet has Nation's Fastest Service," *Smart Cities Dive* (June 22, 2018), at: https://www.smartcitiesdive.com/news/longmont-co-municipal-internet-has-nations-fastest-service/526391.

[7] See C.R.S. § 29-27-403(1). Note that an SCN is simply a collection of SCFs and that the Colorado definition of SCFs adopts the 1996 Act's definition of "personal wireless service facility." See C.R.S. § 29-27-402(4)-(5). Further, at the federal level, "small wireless facility" ("SWF") is used regularly. See 47 C.F.R § 1.1312(e)(2) (2018). Although these terms each include additional, technical specifics, they largely refer to the same structures.

[8] See C.R.S. §§ 29-27-403, 29-27-404; §§ 38-5.5-104, 38-5.5-104.5; § 38-5.5-105; § 38-5.5-107.

[9] John Fernandez, "Small Cell Facilities – Coming Soon to a Street Near You," *Front Porch* (Jan. 1, 2018).

How did HB 17-1193 get passed?
The initial sponsor listed on the bill was Rep. Tracy Craft-Tharp of Jefferson County HD-29. Following are the bill's additional sponsors.[10]

- Rep. Jon Becker (Republican)—telecom executive
  District and counties of, Cheyenne, Kit Carson, Logan, Morgan, Phillips, Sedgwick, Yuma. .
  https://leg.colorado.gov/legislators/jon-becker
- Senator Jack Tate (Republican)—technology, business committees.
  https://leg.colorado.gov/legislators/jack-tate.
- Senator Andy Kerr (Democrat)—teacher.
  Jefferson County "prime sponsor"

The committee summary of the bill does not include a description of the permitted "by-right" issue, and does not emphasize that local control was taken away for siting facilities. But when Sen. Kerr and Sen. Tate, co-prime sponsors, discussed the provisions in the hearing, they clearly communicated that the re-engrossed bill permits the *use by right* of small wireless service infrastructure, in any zone.[11] The industry provided testimony in favor of the bill. The record shows[12] that both the Colorado Municipal League and the Colorado Communities & Utility Alliance (CCUA)[13] (Ken Fellman) testified neutral. There was no opposing testimony. The bill passed the hearing 5–0.

Municipalities in Colorado, as in other states, were largely caught uninformed and therefore off guard when the overreaching small cell facility bills were quickly adopted. The state bills along with the new FCC rulemaking in late 2018 required local governments to draft new wireless regulations to come into compliance with both the FCC rules and the new state law. This was essentially the advice conveyed by CCUA to its members. CCUA and its law firm reported that any discussion of the bill's pending drafts were discussed in closed executive session and private legal briefs were distributed to members via their delegated individuals. According to CCUA, what the members do with those confidential briefs is up to the members and beyond CCUA's prevue.[14] There appears to have been no outreach to members warning of the impending disastrous consequences of HB 17-1193.

What are the provisions of the Bill?
The following are some of the primary elements of HB 17-1193:

1. Right to Install SCFs in Any Zone: Unlike the U.S. federal *Telecommunications Act of 1996*, HB 17-1193 explicitly annexes the authority of local governments to regulate

[10] https://leg.colorado.gov/bills/hb17-1193.

[11] testimony for the bill can be found at https://leg.colorado.gov/content/slg2017a2017-03-21t140257z1-hearing-summary

[12] 3:09 and 3:19

[13] CCUA is a volunteer organization of member cities, counties, and school districts in Colorado. It provides "resources and expertise in areas of public policy development, legislation, education, technology, and programming." Among these resources are legal and policy advice from its law firm, Kissinger & Fellman PC as part of the CCUA dues. <https://www.coloradocua.org/membership>

[14] Personal interview with CCUA President, Alan DeLollis, September 20, 2019.

rights-of-way by giving private telecom and broadband providers the ***right*** to locate SCFs upon, within, over and under public streets, as well as on structures within the streets, such as light poles and traffic signals.[15] This right extends into all zone,[16] including locations where there are schools, daycares, fire stations, hospitals, and so forth.

It is important to note that this language represents an important legal distinction—it does not simply grant a "right to install" but rather "installation by right"—a basic inalienable and inseparable right. In other words, the community cannot say "no". This grant represents a serious overreach in giving the public's right-of-way to private interests for private purposes—an action with roots in legal history known as *enclosure of the commons*.

2. No Meaningful Public Review: Public review is also abridged under HB 17-1193. Small cell applicants "are no longer subject to public hearings, review, and approval by planning commissions and city councils/town boards," although they are "subject to the regulations within zoning districts."[17] This is because HB 17-1193 *mandates* approval of small cell applications as a right provided that zoning and design standards are met, so a full administrative review process is no longer warranted. *This leaves the public with essentially no recourse—counter to the most basic principles of democratic governance.*

> "It's like we put the industry before we put regulatory common sense."
> ***—Colorado State Representative Alec Garnett*[18]***
> *(*Voted against HB 17-1193)*

3. *De facto* Forced Subsidy by Less Compensation for Government: Erecting broadband facilities or SCFs on public property should require just compensation.[19] But HB 17-1193 limits the taxes, fees, and charges that state and local governments can impose on telecom providers to those "reasonably related to the costs directly incurred" by local governments through the granting or administration of permits. So local governments can no longer charge "market rates" for leasing space for SCFs in public rights-of-way. Some communities, such as Dallas, had proposed charging almost 10 times as much as current fee limits—$2,000 instead of $250 per year—and the same may be true of Colorado communities. Additionally, aside from leasing fees, local governments are prohibited from charging other reasonable compensation fees, such as fees for disrupting view corridors or for certain disruptions during installation, and for administration and the myriad of functions city agencies will have to perform. In sum, the telecom industry has blanket immunity from having to fairly compensate communities for their impacts.

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[15] *See, e.g.,* C.R.S. § 38-5.5-103(1)(a); *see also* C.R.S. § 29-27-402(4)(b).

[16] *See* § 29-27-404(b)(3) [emphasis added].

[17] Ken Fellman, Kissinger & Fellman PC, "Small Wireless Facilities in Public Rights-of-Way: Challenges and Opportunities for Municipalities," *Colorado Municipalities*.

[18] Jon Murray, "Denver's 5G Cell-Signal Future Will Rely on Hundreds of 30-Foot Poles Spread Across Many Blocks – And That Has Rankled Some Residents," *The Denver Post* (Mar. 12, 2018).

[19] *See* C.R.S. § 38-5.5-104.

4. Creation of a Shot Clock to Sharply Limit Time to Process Applications: HB 17-1193 establishes a "shot clock" for processing SCF/SCN applications that is either 90 days (for the location, collocation, replacement, or modification of SCFs/SCNs) or 150 days (for applications involving a new structure or facility). This is largely the same as the FCC's long-standing "shot clock" established in 2009 for wireless facility siting applications.[20] However, it is longer than the shortened shot clock established by the FCC's 2018 5G Order, which is 60 and 90 days, respectively.[21] Unlike both FCC shot clocks, HB 17-1193 does not allow a local government to rebut the state shot clock's reasonableness based on the circumstances.

HB 17-1193 Summary	
Scope	HB 17-1193: Communications and broadband facilities, including Small Cell Facilities (SCFs/SCNs). Regulations apply to base stations, alternative tower structures, towers and small cells.
Right to install small cell facilities / networks	HB 17-1193: Any telecom and broadband provider "has the right" to construct, maintain, and operate SCFs and SCNs along, above, or under public rights-of-way.
"Shot clock," i.e., the time local governments have to process cell facility applications.	HB 17-1193: -90 days for location, collocation*, replacement, or modification of SCF/SCN. - 150 days for applications that involve a new structure or facility other than SCF or SCN and other than a collocation. (*Collocation is mounting or installing transmission equipment on existing eligible support structures.[22])
Penalty for missing shot clock	HB 17-1193: Does not have a "deemed granted" provision, which would approve SCF applications by default if a shot clock is missed. However, if a local government misses a shot clock period, it cannot rebut the presumption that the review length was reasonable based on the circumstances.
SCFs are permitted uses in certain areas?	HB 17-1193: Declares that small cell facilities are permitted uses in all zoning districts.

[20] 24 FCC Rcd. 13994, 13995 (2009).

[21] *See* 33 FCC Rcd. 9088, 9092 (2019).

[22] Exact definition available *at* Colorado Revised Statute § 29-27-402 (2017).

Fees	HB 17-1193 -C.R.S. § 38-5.5-107 limits fees to those reasonably related to the costs directly incurred by the political subdivision. -C.R.S. § 38-5.5-108 requires the payment for attaching SCFs to be just and reasonable.
Aesthetic limitations	HB 17-1193: Local government can impose certain aesthetic or historic requirements to camouflage SCFs/SCNs so they are not readily apparent, but cannot prevent the use of local government infrastructure such as light poles, light standards, traffic signals, or utility poles in the rights-of-way.

IV. Concerns Over Small Cell Facilities and 5G

There is increasing concern from mainstream scientists about the impacts of 5G on human health, the environment, human privacy, and technology-based services such as weather forecasting. Some of these are summarized below. Overall, the rapid deployment of 5G in the United States amounts to a giant experiment on the health and welfare of our communities.

1. **Privacy and Security Implications**: There are significant concerns about surveillance, lack of privacy, and cyber security associated with 5G technologies. "A system built on millions of cell relays, antennas, and sensors also offers previously unthinkable surveillance potential," stated a 2019 New Yorker article entitled "The Terrifying Potential of the 5G Network."[23] Another reason behind the push for 5G relates to what has become a primary motivating force behind the Internet itself—advertising and data collection. What has emerged in the IT/big tech industry (e.g., beginning with Google, Facebook, Amazon, Microsoft, etc.) is a new economy of "surveillance capitalism"—monetizing our personal lives and predicting and shaping our behavior—as characterized by Harvard Business School Professor Shoshana Zuboff.[24]

   Wireless networks, smartphones, and other wireless devices are proprietary and many are specifically equipped for gathering this surveillance and behavioral data to a far greater extent than conventional wired networks. This surveillance will likely become an ever-increasing function of 5G and is another reason that communities need locally governed fiber-to-the-premises wired access networks.

   In China, its 5G network is already fueling new levels of surveillance, with enhanced geolocation, surveillance cameras, and facial recognition technologies, which have played a role in China's subordination of eleven million minority Uighur Muslims.[25] Privacy could take a hit, as well. More data about our habits, super-charged through 5G

[23] Sue Halpern, "The Terrifying Potential of the 5G Network," *The New Yorker* (Apr. 26, 2019), at: https://www.newyorker.com/news/annals-of-communications/the-terrifying-potential-of-the-5g-network.

[24] Shoshana Zuboff. *The Age of Surveillance Capitalism: The Fight For a Human Future at the New Frontier of Power.* New York: Public Affairs/Perseus Books. 2019. (691 pages)

[25] Halpern

technologies, facial recognition, and artificial intelligence, will be gathered by large tech companies. Finally, despite cyber security risks, the Trump administration removed a limitation that 5G technical standards must be designed to withstand cyberattacks.[26]

2. **Emerging 5G Health Risks:** A growing number of experts argue that 5G presents significant environmental, human health, and other risks that warrant concern and additional research.[27] According to experts, the "high band" frequency millimeter waves used by 5G can potentially cause skin temperatures to rise and create unknown long-term health impacts.[28] This presents significant concerns considering that thousands of 5G transmitters could be placed in a single urban area.

   Note on RF Regulations: Potential 5G impacts have not been fully accounted for in current FCC regulations on radio frequency (RF) exposure safety. Current FCC regulations regarding RF radiation, not officially updated since 1996, only place specific absorption rate (SAR)[29] limits on devices operating at frequencies up to 6.0 GHz. However, 5G technology operates at frequencies of 24 GHz and higher. In 2012, the FCC itself has admitted that "SAR measurement procedures required for testing recent generation wireless devices need further examination."[30]

> "I have heard instances of these antennae being installed on light poles directly outside the window of a young child's bedroom. Rightly so, my constituents are worried that should this technology be proven hazardous in the future, the health of their families and the value of their properties would be at serious risk . . . . While I understand the importance of this technology for the future of the American economy, I believe we must also be as certain as possible that it is safe."
>
> ***—Congressman Thomas R. Suozzi, NY[31]***

3. **Financial and Aesthetic Burden**: There are also substantial economic concerns for local communities arising from small cell facilities, including 5G technologies. First, under state and federal law, communities are prohibited from charging market rate for leasing

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[26] *Tom* Wheeler, "If 5G Is So Important, Why Isn't It Secure?," *The New York Times* (Jan. 21, 2019), at: https://www.nytimes.com/2019/01/21/opinion/5g-cybersecurity-china.html.

[27] A 10-year study found evidence linking cancerous heart and brain tumors in male rats to significant levels of exposure to frequencies of RF radiation present in 2G and 3G cellular networks. However, the study did not test for 4G or 5G RF radiation, leaving the question of whether they could pose a similar health risk unanswered. In November 2018, the National Toxicology Program (NTP) released the most exhaustive study to date on RF radiation. See NIH, "High Exposure to Radio Frequency Radiation Associated With Cancer in Male Rats" (Nov. 1, 2018). http://ntp.niehs.nih.gov/results/areas/cellphones/index.html

[28] *See* e.g. comments of Suresh Borkar, senior lecturer of electrical and computer engineering at the Illinois Institute of Technology, as quoted in: Ally Marotti, "5G is Here. Is It a Technological Leap Forward — Or a Health Concern?" *Chicago Tribune* (May 1, 2019).

[29] SAR is the measurement of RF energy absorbed by the head or body that helps determine safe RF exposure levels. See Element, "RF Exposure: Specific Absorption Rate (SAR) Testing," at: https://bit.ly/2XgHuoB.

[30] *See* FCC, "Draft Laboratory Division Publications Report" (2012), at:https://apps.fcc.gov/eas/comments/GetPublishedDocument.html?id=255&tn=567064.

[31] Letter from Thomas R. Suozzi to Ajit Pai (Apr. 16, 2019), at: https://bit.ly/307Adcy.

public space to small cell facilities, depriving them of enormous revenues that could support local programs. Second, small cell facilities—which can be as large as refrigerators, not even considering much of the supplementary equipment—reduce property values when installed in very close proximity to a home. Finally, 5G networks will have a significant impact on the aesthetics and quietude of a town. 5G facilities need to be installed "on every city block, at least" and require years of digging and installation, which can be done by several different companies in the same location.

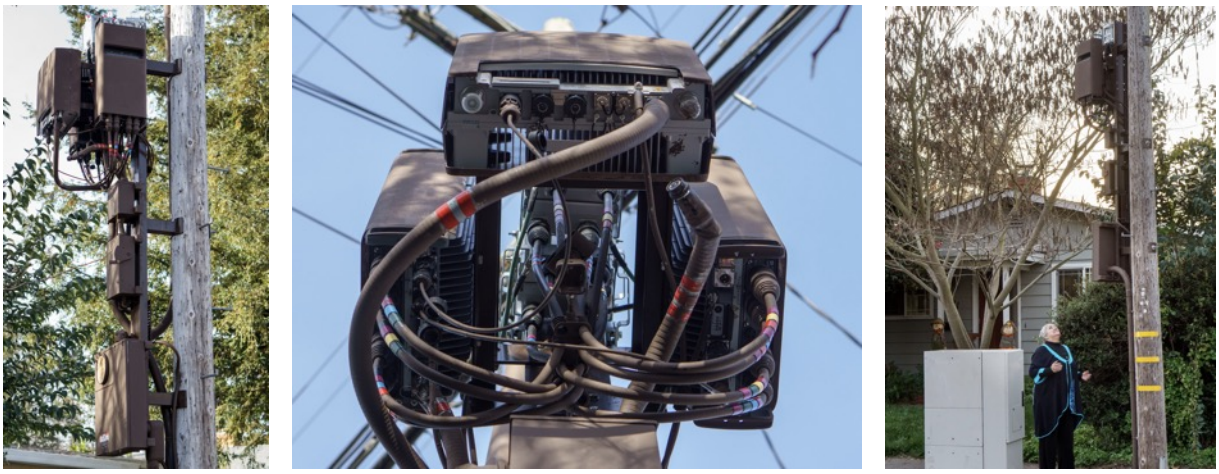
4. **Weather Forecasting Impacts:** In addition to potential health hazards, scientific organizations, including NASA and NOAA, are concerned that the frequencies used by 5G networks may interfere with meteorological water vapor data collection on a neighboring frequency band. This "self-inflicted degradation" of our weather prediction abilities would pose risks for public safety in areas facing threats of tornadoes, floods, and fires; and for national security by affecting the military's flight safety, navigation, and tactical capabilities.[32]

> "The 5G build-out, which could take more than a decade, could disrupt our commutes, festoon nearly every city block with antennas, limit what cities can charge for renting spots on their infrastructure to carriers on which to place their antennas, and result in an unequal distribution of access to high-speed wireless, at least at first."
>
> ***—Christopher Mims, The Wall Street Journal***[33]

Based on these and other concerns, many communities in Colorado want to slow or pause small cell development in order to evaluate emerging information. However, as will be described in the next section, HB 17-1193 preempts local governments from doing so. Instead, local governments are obliged by state law to approve all SCF and SCN applications within a short period of time regardless of their concerns. Repeal of HB 17-1193 and reform of federal small cell rules are now the only path to restoring local control over small cell proliferation.

[32] https://physicstoday.scitation.org/doi/full/10.1063/PT.3.4267

[33] Christopher Mims, "The Downside of 5G: Overwhelmed Cities, Torn-Up Streets, a Decade Until Completion," The Wall Street Journal (June 29, 2019), at: https://www.wsj.com/articles/the-downside-of-5g-overwhelmed-cities-torn-up-streets-a-decade-until-completion-11561780801.



Small Cell Wireless Facilities

V. State and Federal Preemption

The authority of local governments to regulate industry has been severely preempted in recent years—not just in the telecom field, but also in areas such as gas and oil, factory farms, and e-cigarettes.[34] This preemption typically occurs by passing state or federal laws that preclude local governments from deciding whether or how these industries operate in their communities. More generally, such preemption also prevents a healthy public discourse amongst concerned citizens.

Such is true for small cell development, including facilities capable of transmitting 5G. The proliferation of pro-industry small cell preemption laws is the result of an organized and well-financed strategic lobbying effort by the telecom industry. A major element of this effort has been a nationwide effort by the *American Legislative Exchange Council* (ALEC), a Koch Industries-backed political initiative, to draft model state legislation and train legislators to introduce and discreetly promote these bills in their state legislatures. Over 20 states, including Colorado, passed legislation that preempts local control over small cell networks. Typically, these state laws *require* local governments to allow small cell installation on public rights-of-way, such as on utility poles. Often the bills are carefully couched in terms of "facilitating advanced wired and wireless telecom services". Frequently couched by the media as a "race to 5G", more immediately it is a race to grab rights-of-way for 4G LTE cell densification.

With an increasing amount of concerning evidence emerging on the risks of 5G, Colorado and other states should push back against telecom lobbyists to slow down the rollout of small cell infrastructure and restore local community rights while long-term impacts are evaluated. Achieving this preemption rollback will require legal reform at both the state and federal levels, including repeal or reform of HB 17-1193.

[34] Mayors Innovation Project, "Protecting Local Control," at: https://bit.ly/2Lw1b9O.

> "Americans across the country are expressing . . . worries about possible adverse health effects from this technology, and they are understandably demanding answers from the federal government."
>
> ***—Congressman Peter A. DeFazio (OR)***[35]

VI. Federal Law and Policy Pertaining to Small Cell Facilities

Telecommunications Act of 1996: The Telecommunications Act of 1996 was adopted "to provide for a pro-competitive, de-regulatory national policy framework" to rapidly deploy advanced telecommunications.[36] In addition to recognizing the economic and social benefits of the Act, Congress underscored the importance of retaining local autonomy. For example, the Telecommunications Act maintains the authority of State or local government to manage its rights-of-way on a competitively neutral and nondiscriminatory basis.[37] On the other hand, the Act does prevent state and local government from regulating personal wireless service facilities based on environmental effects of RF emissions other than ensuring compliance with FCC regulations.

FCC 5G Order: The FCC's 5G Order on Small Cell Siting ("5G Order") entered into force on Jan. 14, 2019. The 5G Order ensures minimal local and state restrictions on small wireless facilities that support 5G. The 5G Order limits local control to aesthetics only, sets an accelerated "shot clock" for approving small cell applications, limits costs and fees charged to small cell providers, and once again prevents governments from considering health impacts from RF emissions other than ensuring compliance with FCC regulations.[38] The 5G Order has been widely opposed by mayors, local city and county governments, and other stakeholders.

> "What's now happening is we've got a rule made by federal agents that allows private companies like Verizon to go put equipment onto our poles at a price, which we estimate is approximately one-tenth of the value."
>
> ***—Mayor Paul Soglin, Madison (WI)***

Legal Challenges: There are presently two primary legal challenges to the 5G Order. First, a coalition of over 100 municipalities and associations allege the 5G Order exceeds the FCC's statutory authority, is arbitrary and capricious and an abuse of discretion, and is otherwise contrary to law. The majority of these petitions were transferred to the Ninth Circuit as *City of San Jose v. FCC* (19-70144) (filed on Jan. 15, 2019).[39]

Second, in *NRDC v. FCC* (2018),[40] the Natural Resources Defense Council (NRDC)—along with nineteen Indian tribes and others—alleged that the 5G Order violates the National Environmental Policy Act and the National Historic Preservation Act by sidestepping public

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[35] Letter from Peter Defazio to Ajit Pai (Apr. 15, 2019), at: https://bit.ly/2XiZ8rZ.
[36] *See* 142 Cong. Rec. 1145-06, 1996 WL 39800.
[37] *See e.g.,* Telecommunications Act of 1996, Section 253(c).
[38] *See generally* 33 FCC Rcd. 9088 (2018).
[39] *See* case docket *at:* https://www.courtlistener.com/docket/8502284/city-of-san-jose-v-fcc/.
[40] *See* NRDC, Federal Communications Commission Case Documents, at: https://www.nrdc.org/resources/federal-communications-commission-case-documents.

participation and environmental review. On August 9, 2019, the federal appeals court in D.C. ruled that the FCC illegally eliminated historic-preservation and environmental review—and important opportunities for public participation—for 5G wireless infrastructure projects. Emphasizing the importance of such review, the court held that that the FCC's attempted explanations for the elimination "did not meet the standard of reasoned decision-making."[41]

Either lawsuit could invalidate or limit the FCC 5G Order in the coming months. In such case, municipalities that have been persuaded to change their local codes to comply with the FCC would then find themselves stranded with codes stripping them of their own authority.

The 5G Order could be overturned by legislation currently proposed in the U.S. House of Representatives: H.R. 530, the Accelerating Broadband Development by Empowering Local Communities Act of 2019.[42] A related Senate bill, S.2012, the *Restoring Local Control Over Public Infrastructure Act of 2019*, was also introduced in June by Senators Feinstein, Schumer, Harris, and Blumenthal.[43]

Finally, in addition to the two legal challenges and the proposed Congressional legislation to overrule the 5G order, Montgomery County, Maryland is suing the FCC to update RF exposure limits.[44] Other litigation is also likely to emerge in the coming months and years as local communities and elected officials discover what has occurred and how their rights have been appropriated by the telecom industry.

In sum, due to a flurry of legal challenges, new proposed legislation, and possible new FCC policies that would follow the 2020 U.S. presidential election, there is a significant chance that the FCC Order will no longer be effective at some point in the near future. Colorado governments should plan ahead with this in mind rather than assuming they will continue to be bound by the 5G Order.

> "It is not a very pretty picture when you see all these cell towers going down the road, especially how close they can be together… The federal government is now all the way down in the city telling us how we use all of these rights of way …Loveland is a beautiful city, and we want to maintain that."
>
> ***—Moses Garcia, City Attorney of Loveland, CO[45]***

[41] https://www.nrdc.org/court-battles/nrdc-v-federal-communications-commission

[42] H.R.530 - Accelerating Broadband Development by Empowering Local Communities Act of 2019, at: https://www.congress.gov/bill/116th-congress/house-bill/530.

[43] https://wearetheevidence.org/5g-leading-senators-feintein-schumer-harris-blumenthal-submitted-bill-restoring-local-control-abolishing-fcc-regulations/

[44] *See* Montgomery County Council, "Council President Riemer's statement on new lawsuit challenging FCC small cell order," at: https://www2.montgomerycountymd.gov/mcgportalapps/Press_Detail.aspx?Item_ID=22601.

[45] *See* Julia Rentsch, "Before 5G Wireless Takes Cellular Speed to a New Level, Loveland Wrestles With Policy," *Loveland Reporter-Herald* (Feb. 23, 2019).

VII. Governments Are Pushing Back Against Telecommunications Industry Excesses

At least 22 states have passed laws and other regulatory policies pertaining to small cell facilities, including 5G.[46] Some common characteristics of these laws are that they provide public rights-of-way and utility poles for deploying wireless hardware, cap fees local governments can charge, streamline permitting processes for small cell infrastructure, establish design standards, and set "deemed granted" provisions or a missed shot clock.

But some states have fought back. California Senate Bill 649 was a wireless facility management preemption bill approved in 2017. But Governor Jerry Brown vetoed the law followed a significant campaign by many environmental, health, community planning, and social justice-oriented groups.[47] After the veto, he issued a statement indicating that while there is merit in developing efficient and innovative technologies, the bill failed to honor "the interest which localities have in managing rights of way."[48]

> "There is something of real value in having a process that results in extending this innovative technology rapidly and efficiently. Nevertheless, I believe that the interest which localities have in managing rights of way requires a more balanced solution than the one achieved in this bill."
>
> ***—Governor Brown, California***[49]

Other states have rejected similar laws outright. Maryland canceled a bill that would have limited local control over small cell facilities due to strong opposition and uncertainty from local governments and other stakeholders.[50] Speaking to the *Washington Post*, Montgomery County Council President Hans Riemer said that "We're going to spend the next year dealing with whether this proposal to take away our control is needed or not. It's far from over."

For Colorado, although it passed HB 17-1193, it is not too late to repeal the law. Colorado has repealed other misguided laws in the past. In fact, there are two examples from this year alone of Colorado statutes that were repealed in order to restore local control over some regulatory regime. First, on March 29, 2019, HB 19-1033 was repealed.[51] HB 19-1033 was a law from the 1970s that made it much more difficult for counties and cities to enact their own tobacco

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[46] See*, e.g.,* Kendra Chamberlain, "5G Small Cell Deployment: Every Current State Law", *Broadband Now* (2018).

[47] *See* EMF Safety Network, "Governor Brown Vetoes SB 649!" (last visited June 27, 2019), http://emfsafetynetwork.org/sb-649-vetoed.

[48] See California State Association of Counties, "Governor Vetoes SB 649" (last visited June 27, 2019), https://www.counties.org/post/governor-vetoes-sb-649.

[49] Statement of Governor Brown, available at: https://bit.ly/2XgSbrf.

[50] Katherine Shaver, "Maryland Lawmaker Cancels Bill to Limit Local Control Over New Cellular Facilities," *The Washington Post* (Mar. 21, 2018), at: https://www.washingtonpost.com/local/trafficandcommuting/maryland-lawmaker-cancels-bill-to-limit-local-control-over-new-cellular-facilities/2018/03/21/91243428-2d2c-11e8-8688-e053ba58f1e4_story.html

[51] *See* Statement of Matthew L. Meyers, President, Campaign for Tobacco-Free Kids, "Colorado Repeals Decades-Old State Law that Blocked City and County Efforts to Combat Tobacco Use" (Mar. 29, 2019), https://www.tobaccofreekids.org/press-releases/2019_03_29_colorado_preemption.

regulations. Second, on May 28, the governor signed a repeal of HB 1210.[52] Passed in 1999, HB 1210 preempted cities and counties from setting their own higher minimum wage laws.

> "I am committed to bringing 5G to the residents of Los Angeles…. The rent we agreed to [with Verizon and AT&T for 5G] provides for a reduced monetary fee and a cooperative deployment of smart city and digital inclusion technology and services. The proposed [FCC] Order would jeopardize all these benefits."
>
> ***—Mayor Garcetti, Los Angeles***[53]

In summary, Colorado, along with numerous other states, has been saddled with private corporate laws that expropriate the public right-of-way and public property to serve private telecom corporate interests—for the benefit of their shareholders and management. The public has essentially been robbed of its basic rights by through an abuse of the legislative process. Communities have been unfairly deprived of the following rights:

- **The right to say "no"**—to exercise their liberty to control their own lives and environment, and property
- **The right to public review** of the actions of private interests—to transparency
- **The right to fair compensation for their property**—forced to subsidize private corporations and a form of private taxation.
- **The right to reasonable time** to carry out public democratic deliberation

This expropriation represents an abuse of basic democratic rights, due process, law, and justice. It is part of a growing pattern of unchecked corporate power and a private taking of the public space and the common interest. It needs to be reversed immediately.

> "We hold these public right-of-way assets in trust for the public and it's our duty to fight for the right to manage these assets."
>
> ***—Mayor Ted Wheeler, Portland (OR)***

VIII. Colorado Should Repeal and Replace HB 17-1193

Reclaiming local control over SCFs in Colorado requires two legal changes: first, the FCC's 5G Order being overturned in court, overruled by Congress, or withdrawn by the FCC; and second, repeal and replacement of HB 17-1193. (Note that amendment of HB 17-1193 or a simple repeal of HB 17-1193 are options, as well, both of which are discussed in the subsequent section.) Advocates are pursuing both avenues simultaneously.

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[52] *See* National Law Review, "Colorado Lifts Ban on Local Minimum Wage Ordinances – With Restrictions" (Mar. 31, 2019), https://www.natlawreview.com/article/colorado-lifts-ban-local-minimum-wage-ordinances-restrictions.

[53] Letter from Eric Garcetti to Ajit Pai (Sept. 18, 2018), https://ecfsapi.fcc.gov/file/1091933119375/Ex%20Parte_City%20of%20Los%20AngelesCA.pdf (emphasis added).

With that background in mind, here are five major reasons to repeal and replace HB 17-1193:[54]

1. <u>Repealing and Replacing HB 17-1193 Allows Cities to Promote Fiber and Other Wired Broadband Alternatives as a Primary Option</u>

What HB 17-1193 Does: Gives the telecom industry a right to install their SCFs with scant government regulation, allowing 5G or other technology to be deployed quickly in Colorado, and essentially enabling a mandated land grab of the taxpayer-owned public right-of-way while restricting local governments options to regulate deployments through local zoning.

What Colorado Should Do Instead: Promote wired broadband alternatives, particularly fiber-to-the-premises (FTTP), as the primary means of ushering in the next generation of Internet to Colorado communities. Meanwhile, give communities *the right to say no* to 5G until it is fully understood.

At the same time, <u>repeal SB 05-152 *Competition in Utility and Entertainment Services.*</u> This is another corporate law that prohibited or restricted the rights of cities, towns, and communities in Colorado to install their own municipal fiber networks or to compete with private interests in providing Internet access. This is another case of industry-backed model legislation having been stealthily adopted in over 20 states to serve private interests. Internet access via FTTP has become a necessity of modern urban life—a basic public utility—comparable to access to water, sewer, electricity, and streets.

Why: A growing number of communities are investing in municipal fiber networks as their preferred method of modernizing their Internet networks. Fiber is lower impact and extremely fast. The telecom industry should not be allowed to dictate to local communities that 5G is a preferable—or even a reasonable—alternative to fiber networks.[55] Local governments should be allowed to weigh the pros and cons of fiber versus 5G and other technologies, particularly fiber, and decide for themselves what sort of Internet infrastructure meets their needs. A new bill could promote fiber networks and other 5G alternatives in accordance with community desires. Longmont, Colorado and Chattanooga, Tennessee are two cities that offer good models of community-owned fiber.

(**Note*: Many of these changes also require federal reform, particularly overturning the FCC's 5G Order, which severely limits local control over 5G.)

2. <u>Repealing and Replacing HB 17-1193 Allows Communities to Charge Fair Market Value to Providers</u>

What HB 17-1193 Does: HB 17-1193 forces the government to lease out public land to private interests so that they can profit, with local governments unable to charge fair market rate leases. This creates what is essentially a forced *de facto* subsidy to private corporations.

What Colorado Should Do Instead: Allow local governments to charge fair market rate leases for installing SCFs on public property. The funds would go towards the funding local programs.

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[54] Amending HB 17-1193 is another feasible option; see below.

[55] Fiber is the basic medium and wireless access should be regarded as adjunct service. 5G and other wireless access media suffer from certain basic drawbacks such as proprietary service/equipment and obsolescence, surveillance and a lack of security and privacy, exposure to radiation and other environmental issues, etc..

Why: HB 17-1193 requires local governments to lease out public property located on rights-of-way to the telecoms industry without being allowed to charge fair market rates. In effect, this means that corporations get discounted access to public equipment without any requirement to pass these savings along to customers. Meanwhile, *5G has an estimated economic value of $2.2 trillion over the next 15 years*[56]—almost six times Colorado's 2018 GDP.[57] Communities take all the risk yet get a limited amount of the reward, while corporations profit immensely. Local governments, if they choose to move forward with 5G at all, should be able to charge fair market value for renting out public property funded by taxpayers.

Case study: Dallas had planned to charge $2,000 per year *or more* for small cell towers.[58] Now, the rent they can charge is capped at about $250, or about 12.5% of their original price. With some estimating that 10,000 small cell towers will be installed in Dallas, this means they could be missing out on at least $17,500,000 *per year* once the network is fully built out—money that will now be in the pockets of telecom providers.

*(*Note:* Many of these changes also require federal reform, particularly overturning the FCC's 5G Order, which also limits how much money local governments can charge to providers.)

> "We never saw this new infrastructure as a cash cow. [...] But they're using rights of way that belong to the public, and we deserve to be fairly compensated for it."
> ***—John Davis, Borough Manager of Doylestown***[59]

3. <u>Repealing and Replacing HB 17-1193 Gives Communities More Time to Consider Applications</u>

What HB 17-1193 Does: HB 17-1193 gives local governments 90 or 150 days to process applications, even batch applications. (Note: the 5G Order creates an even shorter shot clock.)

What Colorado Should Do Instead: Give local government more time to process applications, particularly large batch applications. Also, the reasonableness of any "shot clock" should be rebuttable based on circumstances.

Why: Given the increasing deployment of SCFs, many applications are being filed in "batches" or "consolidated applications." Other applications are very complicated. These take extra time to process. Furthermore, considering the unknown impacts of 5G, communities should have extra time to weigh all available information. Therefore, Colorado should revisit its reliance upon a strict shot clock and, if it deems that a shot clock is still appropriate, instill flexibility so that local governments can have extra time when needed.

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[56] *See* Anna Tobin, "5G Will Account For 15% Of Global Mobile Market By 2025." *Forbes* (Feb. 25, 2019).

[57] FRED Economic Data, "Total GDP for Colorado," at: https://fred.stlouisfed.org/series/CONGSP.

[58] Ken Kalthoff, "New Small Cell Towers Spark Controversy," NBC DFW (Jan. 2, 2019), at: https://www.nbcdfw.com/news/local/New-Small-Cell-Towers-Spark-Controversy-503819121.html.

[59] Letter from Eric Garcetti to Ajit Pai (Sept. 18, 2018), https://ecfsapi.fcc.gov/file/1091933119375/Ex%20Parte_City%20of%20Los%20AngelesCA.pdf (emphasis added).

(**Note*: Many of these changes also require federal reform, particularly overturning the FCC's 5G Order, which also establishes a shot clock for acting on applications.)

4. <u>Repealing and Replacing HB 17-1193 Allows for Meaningful Public Review and Input</u>

What HB 17-1193 Does: HB 17-1193 essentially eliminates public review, with small cell applicants no longer being subject to a public hearing and approval process.

What Colorado Should Do Instead: Allow local residents, schools, and businesses to have a say over the character of their own community through a robust public review and input process.

Why: In deciding whether to permit SCFs and under what conditions, local government should be able to weigh the concerns of local residents, schools, and businesses, amongst others, against potential economic benefits, wireless infrastructure needs, available alternatives, and so forth. As described above, there are many legitimate concerns with SCFs and 5G in particular—human health impacts, weather forecasting interference, security and privacy implications, economic impacts, and others. Considering all of these factors allows local government to reach a thoughtful, balanced decision. Public review is a staple of local democracy that was eliminated in practice by HB 17-1193. This right to local review should be restored.

Additionally, a replacement law for HB 17-1193 could replace many of the current law's shortcomings with new provisions to inform and empower local communities. These could include, for example, requirements to notify public about SCF applications, robust guidelines on aesthetic requirements for SCFs, "dig once" rules for installing multiple networks from different carriers, guidelines as to fair market value fees local governments can charge, etc.

(**Note*: Many of these changes also require federal reform, particularly overturning the FCC's 5G Order, which limits the ability of local governments to exercise their local police power.)

5. <u>Repealing and Replacing HB 17-1193 Clears the Way For Federal Reform</u>

What HB 17-1193 Does: HB 17-1193 mirrors many federal requirements for SCFs established by the FCC, including a shot clock, fee limits, and so forth.

What Colorado Should Do Instead: Repeal HB 17-1193 so that Colorado is ready if and when the 5G Order is invalidated and/or other legal changes occur at the federal level.

Why: The FCC's 5G Order is being challenged in the courts by dozens of local governments, the NRDC, and others. There is a high likelihood that it will be overturned. Furthermore, proposed national legislation—H.R. 530, introduced on Jan. 14, 2019 by Representative Anna G. Eshoo—would eliminate its effects. With the additional possibility of a new administration taking office after the 2020 election, the legal paradigm for small cell infrastructure could change dramatically in the near future. Colorado would be wise to put into place the best possible framework, or to eliminate its current framework, to prepare for the future.

IX. Which Option: Repeal, Replace, or Amend HB 17-1193?

Bills introduced to the Colorado General Assembly generally do one of three things: create a new law, amend an existing law, or repeal an existing law.[60] Amendments are typically suitable for smaller changes to a law. But "[w]hen amendments are extensive, [an] existing law is repealed and reenacted or entire new sections are added in capitalized letters."[61]

Which option is best for Colorado?

Option 1 - Repeal (without Replacement): A repeal without replacement would put Colorado in the company of the approximately 28 states who have not passed laws or other regulatory policies pertaining to small cell facilities, including 5G.[62] Some of these, such as California, have come close to enacting small cell legislation but decided against it. While a repeal means a clean slate for 5G regulation, it also means greater deference to the FCC's regulatory regime. Furthermore, some experts believe that Colorado's HB 17-1193 is less restrictive for local communities than similar laws passed in other states, so repeal could also leave Colorado susceptible to passage of an even less desirable law in the future.

Option 2 - Repeal and Replace: Repealing and replacing HB 17-1193 could be a better option. It would allow lawmakers, community leaders, the telecom industry, and concerned citizens to make another attempt at passing a fair, equitable, and forward-thinking legal regime that meets the needs of all Coloradans. It could also take a more cautious approach to small cell facilities, including 5G technologies, until consensus emerges as to the best way forward.

Option 3 - Amend: The final option, amending HB 17-1193, would depend on whether the amendments are significant enough such as to warrant a full repeal and replacement. If only certain undesirable provisions are adjusted of the de facto right to install small cell facilities on rights-of-way, allowing local communities to charge fair market value for leasing public space to the telecom industry, etc.—then perhaps an amendment would be sufficient. However, if the entire character of the law is changed, or if Colorado wishes to take a bold stance in support of community rights over corporate financial interests, then a repeal and replacement strategy would be preferable.

X. Conclusion

Colorado has the opportunity to create a new state model for the regulation SCFs and SCNs, including those capable of transmitting 5G. To do so, Colorado should repeal HB 17-1193 and, if it wishes to replace it, pass a law that is protective of community interests. At the same time, Colorado can still promote common-sense advancements in the telecommunications industry—including fiber and, only if proven safe and desirable, 5G. Through these actions, communities across Colorado will become empowered to protect community interests, which must take priority over short-term profits of the telecom industry. This is an opportunity to reshape

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[60] *See* "The Legislative Process," Colorado General Assembly, p. 1, at: https://www.colorado.gov/pacific/sites/default/files/The%20Legislative%20Process_3.pdf.

[61] *Id.*

[62] See, e.g., Kendra Chamberlain, 5G Small Cell Deployment: Every Current State Law, Broadband Now (2018).

telecommunications policy, priorities, and technology in Colorado to the benefit of the people and to stimulate economic growth and social equity.

> “Because of limitations imposed by State and Federal legislation, the City has very little leeway in its ability to regulate the presence of telecommunication facilities.”
>
> ***—Glenwood Springs CO: Background Report on Wireless Communications Facilities***[63]

[63] Glenwood Springs - Background Information on Wireless Communications Facilities, available at: https://www.gwsco.gov/DocumentCenter/View/4166/8-Work-Session-Wireless-Information.

MODEL WIRELESS TELECOMMUNICATIONS ORDINANCE
for Siting of "Small Cell" Telecommunication Infrastructure
in Public Rights-Of-Way

This document is intended for use by towns and villages that have existing code for cell towers and other wireless communications infrastructure developed and adopted prior to the introduction of "small cell" wireless equipment and its widespread deployment on public rights-of-way.

We note that the proposed deployment of small cell infrastructure for 5G will result in the installation of a large number of additional wireless antennas in every community, many of which could be located in close proximity to homes and apartments, impacting many more residents and resulting in greater citizen concern about placement and potential impact on property values.

Moreover, as technology improves, the need for locating antennas in close proximity to homes and apartments may decline; therefore, municipalities should retain the flexibility to limit, to the extent possible, the deployment of small cells in close proximity to residential dwellings.

DISCLAIMER: This document is provided for informational purposes only, and is not intended to substitute for legal advice regarding zoning regulations or code compliance with local, state or federal law. Americans for Responsible Technology makes no assurances or guarantees regarding the applicability or suitability of this language for any municipality, and shall not be held responsible for any legal action arising from the use of language or concepts contained herein. Local municipalities should be aware that sample ordinances offered by wireless telecommunications companies, their subcontractors or the organizations they sponsor are generally not protective of the rights, welfare and property of local municipalities, their homeowners and other residents.

Section 1: FINDINGS

The Town of _____ hereby finds:

1.1 The wireless telecommunications industry has expressed interest in submitting applications to place antennas and associated equipment on new or existing structures in the Town's public rights-of-way for deployment of "small cell" wireless telecommunications facilities (hereinafter "small cell installations").

1.2 The deployment of small cell installations may have both positive and negative impacts on our community. Multiple small cell installations within the public right-of-way can impact property values; pose a threat to the public health, safety and welfare; create traffic and

pedestrian safety hazards; impact trees where proximity conflicts may require trimming of branches or require removal of roots; create visual and aesthetic blights and potential safety risks from excessive size, height, weight, noise or lack of camouflaging which negatively impact the quality and character of the Town.

1.3 The Town currently regulates all wireless telecommunications facilities in the public right-of-way through a zoning and permit process. The Town's existing code has not been updated to reflect current telecommunications trends or necessary legal requirements. Further, the existing code provisions were not specifically designed to address the unique legal and practical issues that arise in connection with multiple small cell installations deployed in the public rights-of-way.

1.4 Federal regulations have changed substantially since the Town last updated its code regarding wireless telecommunications facilities. A recent Federal Communications Commission (FCC) Order requires that all local jurisdictions comply with various rules and recommendations on the exercise of local aesthetic, zoning, public works, and fee schedules when dealing with small cell installations. Thus the Town is in clear need of its own updated regulations for small cell installations in the public right-of-way given the number of anticipated applications and new legal timelines during which the Town must act.

1.5 The Town recognizes its responsibilities under the federal Telecommunications Act of 1996 and state law, and believes that it is acting consistent with the current state of the law in ensuring that development activity does not endanger public health, safety, or welfare. The Town intends this Ordinance to ensure that the installation, augmentation and relocation of small cell installations in the public rights-of-way are conducted in such a manner as to lawfully balance the legal rights of applicants under the federal Telecommunications Act and (*insert applicable State code*) with the rights, safety, privacy, property and security of residents of the Town.

1.6 This chapter is not intended to, nor shall it be interpreted or applied to: (1) prohibit or effectively prohibit any wireless telecommunications service provider's ability to provide wireless services; (2) prohibit or effectively prohibit any entity's ability to provide any interstate or intrastate telecommunications service; (3) unreasonably discriminate among providers of functionally equivalent services; (4) deny any request for authorization to place, construct or modify wireless telecommunications service facilities on the basis of environmental effects of radio frequency emissions so long as such wireless facilities comply with the FCC's regulations concerning such emissions; (5) prohibit any collocation or modification that the Town may not deny under federal or state law; or (6) otherwise authorize the Town to preempt any applicable federal or state law.

1.7 Based on the foregoing, the Town (*Board, Selectmen or other governing body*) finds and determines that the preservation of public health, safety and welfare requires that this Ordinance be enacted and be effective immediately upon adoption.

NOW, THEREFORE, the Town of [*insert name of municipality*] does ordain as follows:

Section 2: DEFINITIONS

"Co-Located Small Cell Installation" means a single telecommunication tower, pole, mast, cable, wire or other structure supporting multiple antennas, dishes, transmitters, repeaters, or similar devices owned or used by more than one public or private entity.

"Exempted Telecommunications Facility" includes, but is not limited to, the following unless located within a recognized Historic District:

a. A single ground or building mounted receive-only radio or television antenna including any mast, for the sole use of the tenant occupying the residential parcel on which the radio or television antenna is located; with an antenna height not exceeding twenty-five feet;

b. A ground or building mounted citizens band radio antenna, including any mast, if the height (post and antenna) does not exceed thirty-five feet;

c. A ground, building, or tower mounted antenna operated by a federally licensed amateur radio operator as part of the Amateur Radio Service, if the height (post and antenna) does not exceed thirty-five feet;

d. A ground or building mounted receive-only radio or television satellite dish antenna, which does not exceed thirty-six inches in diameter, for the sole use of the resident occupying a residential parcel on which the satellite dish is located; provided the height of said dish does not exceed the height of the ridgeline of the primary structure on said parcel.

e. Mobile services providing public information coverage of news events of a temporary nature.

f. Hand-held devices such as cell phones, business-band mobile radios, walkie-talkies, cordless telephones, garage door openers and similar personal-use devices.

g. Government-owned and operated receive and/or transmit telemetry station antennas for supervisory control and data acquisition (SCADA) systems for water, flood alert, traffic control devices and signals, storm water, pump stations and/or irrigation systems, with heights not exceeding thirty-five feet.

h. Town-owned and operated antennae used for emergency response services, public utilities, operations and maintenance if the height does not exceed seventy feet.

i. Telecommunication facilities less than fifty feet in height, in compliance with the applicable sections of this chapter, located on a parcel owned by the Town and utilized for

public and/or quasi-public uses where it is found by the Town Board to be compatible with the existing uses of the property and serving the public interest.

j. Telecommunication facilities, including multiple antennas, in compliance with the applicable sections of this chapter, located on an industrial parcel and utilized for the sole use and purpose of a research and development tenant of said parcel, where it is found by the planning director to be aesthetically compatible with the existing and surrounding structures.

"Major Telecommunications Facility" means telecommunication towers, poles or similar structures greater than 50 feet in height, including accessory equipment such as transmitters, repeaters, microwave dishes, horns, and other types of equipment for the transmission or receipt of such signals, as well as support structures, equipment buildings and parking areas.

"NEPA" is the National Environmental Policy Act.

“Public Right of Way” means the area on, below, or above property that has been designated for use as or is used for a public roadway, highway, street, sidewalk, alley or similar purpose, and for purposes of this Chapter shall include Public Utility Easements, but only to the extent the Town has the authority to permit use of the area for this purpose. The term does not include a federal interstate highway or other areas that are not within the legal jurisdiction, ownership or control of the Town.

"Related Third Parties" shall include any entity contracting with applicant for the design, construction, maintenance, use or operation of the proposed small cell installation, including such entity's officers, employees, contractors, subcontractors, volunteers and agents or any subsidiaries, affiliates, successors in interest or legal assigns.

"Small Cell Installation" means all equipment required for the operation and maintenance of so-called "small cell" wireless communications systems that transmit and/or receive signals but are not "Major Telecommunications Facilities," including antennas, microwave dishes, power supplies, transformers, electronics, and other types of equipment required for the transmission or receipt of such signals.

Section 3: PERMITTING PROCESS

3.1 Permit Required. No small cell installation shall be constructed, erected, modified, mounted, attached, operated or maintained within the Town on or within any public right-of-way without the issuance of a permit. No approval granted under this chapter shall confer any exclusive right, privilege, license or franchise to occupy or use the public right-of-way of the Town for delivery of telecommunications services or any other purpose.

3.2 Application Content. All permit applications must include:

A. Detailed site and engineering plans for each proposed small cell installation, including full address, GIS coordinates, a list of all associated equipment necessary for its operation, as well as a proposed schedule for the completion of each small cell installation covered by the application;

B. A master plan showing the geographic service area for the proposed small cell installation(s), and all of applicant's existing, proposed and anticipated installations in the Town;

C. A traffic control plan demonstrating the protective measures and devices that will be employed to prevent injury or damage to persons or property, and to minimize disruptions to efficient pedestrian and vehicular traffic. If it is claimed that no traffic control plan is necessary, a statement setting forth the basis of such claim must be submitted;

C. Photographs of proposed facility equipment;

D. Visual impact analyses with photo simulations including both "before" and "after" appearances;

E. Certification by an independent certified radio-frequency (RF) engineer that the small cell installation will be in compliance with the FCC standards for RF emissions as they relate to the general public, including aggregate emissions for all co-located equipment;

F. Certification that the applicant has a right under state law to install wireless telecommunications facilities in the public right-of-way;

G. Documentation demonstrating a good faith effort to locate the small cell installation in accordance with the preferred provisions of this chapter;

H. Documentation that owners of all properties within 500 feet of the proposed small cell installation have been notified in writing via certified mail of the proposed installation, including its exact location;

I. An executed indemnification agreement as set forth in section 3.6 hereof;

J. All required documentation to demonstrate full compliance with NEPA requirements as set forth by the Federal Communications Commission, unless exemption is claimed. If exempt, applicant must state the basis is for such exemption and provide proof, including all supporting documents, that each exempt installation meets prescribed requirements;

K. A disclosure of all related third parties on whose behalf the applicant is acting, including contracting parties and co-locaters;

L. If the small cell installation is proposed to be attached to an existing utility pole or wireless support structure owned by an entity other than the Town, sufficient evidence of the consent of the owner of such pole or wireless support structure to the proposed colocation;

M. Performance specifications and data that identify the maximum and minimum amount or level of radio-frequency emissions that are produced by the equipment when it is in full operating mode, and a monitoring plan for the Applicant's equipment capable of tracking and recording the daily amounts or levels of radio-frequency emissions that are produced by the equipment in order to verify that the average and peak emissions do not exceed the applicable FCC regulations.

3.3 Application Fee. The Town shall assess a per-installation fee of _____*(See Note 1*) to cover the Town's costs of processing, reviewing, evaluating, conducting a public hearing, and other activities involved in consideration of the application, and conducting oversight of the construction of the small cell installation to ensure compliance with zoning requirements.

3.4 Consultant Fee. The Town shall have the right to retain an independent technical consultant to assist the Town in its review of the application. The reasonable cost of the review shall be paid by the Applicant.

3.5 Compliance Bond. Upon approval of the application, the Permittee shall be required to post a bond in the amount of $50,000 for each small cell installation, such bond to be held and maintained during the entire period of Permittee's operation of each small cell installation in the Town as a guarantee that no such installation, including any co-located equipment, exceeds or will exceed the allowable FCC limits for radio frequency radiation exposure to the general public as determined by a qualified independent radio frequency engineer under Section 3.7.2 hereof.

3.6 Indemnification. Permittee shall provide an executed agreement in the form provided by the Town, pursuant to which Permittee and any related third parties agree to defend, hold harmless and fully indemnify the Town, its officers, employees, agents, attorneys, and volunteers, from (i) any claim, action or proceeding brought against the Town or its officers, employees, agents, or attorneys to attack, set aside, void, or annul any such approval of the Town or (ii) a successful legal action brought against the Town for loss of property value or other harm caused by the placement or operation of a small cell installation. Such indemnification shall include damages, judgments, settlements, penalties, fines, defensive costs or expenses, including, but not limited to, interest, attorneys' fees and expert witness fees, or liability of any kind related to or arising from such claim, action, or proceeding whether incurred by the Permittee, the Town and/or the parties initiating or bringing such proceeding.

The agreement shall also include a provision obligating the Permittee to indemnify the Town for all of the Town's costs, fees and damages which the Town incurs in enforcing the indemnification provisions of this Section.

3.7 Annual Recertification.

3.7.1 Each year, commencing on the first anniversary of the issuance of the permit, the Permittee shall submit to the Town an affidavit which shall list all active small cell wireless installations it owns within the Town by location, certifying that (1) each active small cell installation is covered by liability insurance in the amount of $2,000,000 per installation, naming the Town as additional insured; and (2) each active installation has been inspected for safety and found to be in sound working condition and in compliance with all federal regulations concerning radio frequency exposure limits.

3.7.2 The Town shall have the right to employ a qualified radio frequency engineer to conduct an annual random and unannounced test of the Permittee's small cell wireless installations located within the Town to certify their compliance with all FCC radio-frequency emission limits as they pertain to exposure to the general public. The reasonable cost of such tests shall be paid by the Permittee.

3.7.3 In the event that such independent tests reveal that any small cell installation or installations owned or operated by Permittee or its Lessees, singularly or in the aggregate, is emitting RF radiation in excess of FCC exposure guidelines as they pertain to the general public, the Town shall notify the Permittee and all residents living within 1500 feet of the small cell installation(s) of the violation, and the Permittee shall have forty-eight (48) hours to bring the small cell installation(s) into compliance. Failure to bring the small cell installation(s) into compliance shall result in the forfeiture of all or part of the Compliance Bond, and the Town shall have the right to require the removal of such installation(s), as the Town in its sole discretion may determine is in the public interest.

3.7.4 Any small cell wireless installation which is no longer in use shall be removed by the Permittee within 30 days of being taken out of use.

3.7.5 Any small cell wireless installation which is not removed within 30 days after being listed as no longer in use in the annual recertification affidavit shall be subject to a fine of $100/day until such installation is removed.

3.7.6 Where such annual recertification has not been properly or timely submitted, or equipment no longer in use has not been removed within the required 30-day period, no further applications for small cell wireless installations will be accepted by the Town until such time as the annual re-certification has been submitted and all fees and fines paid.

3.8 Non-Permitted Installations Any small cell installation constructed, erected, modified or enhanced prior to the issuance of a site-specific permit from the Town shall be removed prior to the submission of any other application. No application for a small cell installation shall be considered, and no so-called "shot clock" for approval shall commence, while such unauthorized installations remain.

Section 4: LOCATION AND CONFIGURATION PREFERENCES

4.1 Siting Guidelines. The purpose of this section is to provide guidelines to applicants and the reviewing authority regarding the preferred locations and configurations for small cell installations in the Town, provided that nothing in this section shall be construed to permit a small cell installation in any location that is otherwise prohibited by this ordinance or any other section of the Town code.

4.2 Order of preference - Location. The order of preference for the location of small cell installations in the Town, from most preferred to least preferred, is:

1. Industrial zone
2. Commercial zone
3. Mixed commercial and residential zone
4. Residential zone

(*See Note 2*)

Section 5: INSTALLATION SPECIFICATIONS

5.1 The Permittee must construct, install and operate the small cell installation in strict compliance with the plans and specifications included in the application.

5.2 Where feasible, as new technology becomes available, the Permittee shall replace larger, more visually intrusive facilities with smaller, less visually intrusive facilities, after receiving all necessary permits and approval required by the Town.

5.3 The Permittee shall submit and maintain current at all times basic contact and site information on a form to be supplied by the Town. The Permittee shall notify the Town of any changes to the information submitted within seven days of any change, including the name or legal status of the owner or operator.

5.4 At all times, all required notices and signs shall be posted on the site as required by the FCC and state law, and as approved by the Town. The location and dimensions of a sign bearing the emergency contact name and telephone numbers shall be posted pursuant to the approved plans.

5.5 The Permittee shall maintain current at all times liability and property insurance for each small cell installation in the Public Right of Way in the amount of $2,000,000 (two million dollars) naming the Town as additional insureds.

5.6 The proposed small cell installation shall have an adequate fall zone to minimize the possibility of damage or injury resulting from pole collapse or failure, ice fall or debris fall, and to avoid or minimize all other impacts upon adjoining properties.

5.7 Every effort shall be made to locate small cell installations no less than 1500 feet away from the Permittee's or any Lessee's nearest other small cell installation, or within _____ feet of any permanent residential dwelling. (*See Note 3*)

5.8 Single or co-located small cell installations must be mounted on an existing structure such as a utility or lighting pole that can support its weight and the weight of any existing co-located equipment. All new wires needed to service the small cell installation must be located within the width of the existing structure so as to not exceed the diameter and height of the existing utility pole.

5.9 All equipment not to be installed on or inside the pole must be located underground, flush to the ground, within three (3) feet of the utility pole. Each installation is to have its own dedicated power source to be installed and metered separately.

5.10 If a Permittee proposes to replace a pole in order to accommodate a small cell installation, the pole shall match the appearance of the original pole to the extent feasible, unless another design better accomplishes the objectives of this section. Such replacement pole shall not exceed the height of the pole it is replacing by more than seven feet.

5.11 Each small cell installation facility shall be designed to be resistant to, and minimize opportunities for, unauthorized access, climbing, vandalism, graffiti and other conditions that would result in hazardous situations, visual blight, or attractive nuisances. The Town may require the provision of warning signs, fencing, anti-climbing devices, or other techniques to prevent unauthorized access and vandalism when, because of their location or accessibility, a small cell installation has the potential to become an attractive nuisance.

5.12 The Permittee shall repair, at its sole cost and expense, any damage including, but not limited to, subsidence, cracking, erosion, collapse, weakening, or loss of lateral support to Town streets, sidewalks, walks, curbs, gutters, trees, parkways, street lights, traffic signals, improvements of any kind or nature, or utility lines and systems, underground utility line and systems, or sewer systems and sewer lines that result from any activities performed in connection with the installation or maintenance of a small cell installation in the public right-of-way. The Permittee shall restore such areas, structures and systems to the condition in which they existed prior to the installation or maintenance that necessitated the repairs. In the event the Permittee fails to complete such repair within the number of days stated on a written

notice by the permitting authority, the permitting authority shall cause such repair to be completed at Permittee's sole cost and expense.

5.13 Prior to issuance of a building permit, the applicant shall obtain the permitting authority's approval of a tree protection plan prepared by a certified arborist if the small cell installation will be located within the canopy of a street tree, or a protected tree on private property, or within a 10-foot radius of the base of such a tree. Depending on site specific criteria (e.g., location of tree, size, and type of tree, etc.), a radius greater than 10 feet may be required by the permitting authority.

5.14 Applicant shall abide by all local, state and federal laws regarding design, construction and operation of the small cell installation, including all state and federal Occupational Safety and Health Administration (OSHA) requirements for worker safety in, around and above power lines.

Section 6: APPLICABILITY

This chapter shall apply to all small cell installations and co-located small cell installations in the Town, and shall not apply to any Exempted Telecommunications Facility or Major Telecommunications Facility.

* * *

Note 1: In its *Declaratory Ruling and Third Report and Order* issued in September, 2018, the FCC suggests (but does not require) that application fees be no more than $500 per application, which can include up to five small cell installations, with an additional $100 per installation after five. The FCC also suggests a fee limitation of $270 per year for each small cell installation to cover any recurring fees, including rights-of-way. However, municipalities may charge their actual costs for processing such applications.

Note 2: The town may also wish to include preference for the *configuration* of small cell installations, from most-preferred to least-preferred. Configuration preferences might be:

(1) Co-located with existing wireless facilities,
(2) Mounted on existing utility poles,
(3) Mounted on new poles or towers.

Considerations include the structural integrity of existing utility poles, the fact that mandating co-located equipment could result in an unfair esthetic burden on some residents or neighborhoods, and the possibility that new poles might be bigger, heavier and more obtrusive than existing poles.

Note 3: Every effort should be made to avoid placement of small cell installations in close proximity to residences, particularly from sleeping and living areas. Viable and defendable setbacks will vary based on zoning.

AGENDA ITEM #9

TOWN HALL PO Box 10 | 201 N. Railroad Street | Ridgway, Colorado 81432 | 970.626.5308 | www.town.ridgway.co.us

To: Ridgway Town Council
From: Shay Coburn, Town Planner
Date: March 4, 2020
RE: **Preserve Planned Unit Development (PUD) Preliminary Plat Extension Request**

ACTION BEFORE COUNCIL

Council is asked to consider a two-year extension for the Preserve PUD Preliminary Plat approval granted March 14, 2018 and to consider allowing another two years to meet the conditions assigned with that Preliminary Plat approval.

PROPOSED MOTION

"I move to [*approve/deny*] an extension for the Preserve PUD Preliminary Plat, Savath Subdivision part of Outlot A and the Woodford Addition, for a period of [*two*] years with the [*same or edited as follows*] conditions assigned as the March 14, 2018 approval and to allow for up to [*two*] years to meet those conditions.

SUMMARY

Background

The Preserve PUD previously received Preliminary Plat approval by the Commission and Council in 2006. At that time some of the infrastructure improvements were completed and a one-year extension was granted by the Council in September 2007. After that, the project was put on hold, likely due to the recession and the Town worked with the owner to essentially close up the project ensuring the site was safe.

In 2017 the Town began working on the creation of the Uncompahgre River Overlay District which would affect this PUD property. In an effort to retain the investment made in the development to date, the land owner at the time reapplied for Preliminary Plat as the previous Preliminary Plat approval had long expired.

The Sketch Plan and Preliminary Plat hearings were held with the Planning Commission on February 23, 2018. The Commission approved the Sketch Plan and recommend approval of the Preliminary Plat to Town Council subject to the conditions in the staff report with a few additional conditions including a 2-year period, rather than the 90 days allowed by the code, to meet the conditions. The Preliminary Plat hearing was then held with Town Council on March 14, 2018. Council approved the Preliminary Plat subject to all of the conditions listed in the staff report which included the conditions added by the Planning Commission. All conditions were to be met by March 14, 2020.

This property was sold in October 2018 to Dalwhinnie Group LLC. The Town met with the new owner just before closing in October 2018 and then again in September 2019. It appears as if the owner had made some progress in that year like coordination with the USACOE on wetlands and floodplain issues, assessing what infrastructure improvements had been made, and beginning to work on the CDPHE lift station permits.

The owner is now requesting a two-year extension to the Preliminary Plat approval and an additional two years to meet the conditions assigned with the approval from March 14, 2018. The Municipal Code allows

for extension of Preliminary Plat approval for good cause and allows for Council to grant additional time to meet conditions, see Applicable Code Sections below.

Applicable Municipal Code Sections

7-4-5(B) Preliminary Plat

(10) Except as otherwise expressly provided by the Town Council, all conditions of approval shall be met within 90 days of such approval or the plat shall be deemed disapproved.

7-4-5(C) Final Plat

(1) (c) No final plat may be scheduled for a Planning Commission hearing more than two years after approval of the preliminary plat, without resubmitting the preliminary plat for review pursuant to 7-4-5(B) unless;

(i) within two years of approval of a final plat of a previous filing, or

(ii) the Town Council authorizes an extension for good cause shown, such as adverse market conditions, in conjunction with substantial progress on infrastructure and approval of a final plat of previous filings in accordance with an approved phasing plan.

ATTACHMENTS

1. Letter dated March 2, 2020 from Alpine Planning, LLC, on behalf of Dalwhinnie Group LLC
2. Staff Report dated March 9, 2018 to Town Council regarding Sketch Plan and Preliminary Plat

Attachment 1

Alpine Planning, LLC
P.O. Box 654 | Ridgway, CO 81432 | 970.964.7927 | chris@alpineplanningllc.com

Town of Ridgway
Town Council
P.O. Box 10
Ridgway, CO 81432-0010

Sent via Email to: scoburn@town.ridgway.co.us

March 2, 2020

Dear Town Council Members,

Please accept this letter on behalf of the Dalwhinnie Group LLC ("**Applicant**") requesting an extension to the Preserve Preliminary Plat and PUD that is located on the Savath Subdivision Part of Outlot A and Woodford Addition ("**Property**"). The Town Council approved the sketch plan and preliminary plat for the Preserve Planned Unit Development on March 14, 2018 subject to specific conditions ("**Town Approval**"). The Town Approval was valid for two years and will expire on March 14, 2020. Applicant respectfully requests a two-year extension that would expire on March 11, 2022.

Applicant bought the Property in October 2018, and has been working on addressing the Town Approval conditions. The biggest task to-date has been completing the required United States Army Corps of Engineers permit work around the Uncompahgre River. The team has also made progress on some of the other Town Approval conditions.

Applicant is seeking an extension because it is committed to creating a great neighborhood community that is planned, designed and constructed correctly. Since closing on the Property 16 months ago, Applicant has been establishing its brand; establishing and growing its business; seeking and obtaining input from its consulting teams; establishing the floodplain areas; and creating an overall vision and plan for all of its properties. Applicant also spent significant time and effort analyzing, clarifying and confirming the "as-built" conditions for the prior completed work on the project in the Property. Applicant is also exploring if it is possible to provide a gravity-fed sewer system, which again will take more time to work with property owners and the Town staff. Applicant understands that it will take time to do things correctly, and hopes the Council concurs by approving the requested extension.

We sincerely look forward to working with the Town and community on creating a great neighborhood community.

Thank you for considering the requested extension.

Respectfully,

Chris Hawkins, AICP
Alpine Planning, LLC

Attachment 2

STAFF REPORT

To:	**Town Council**
Request:	Sketch Plan / Preliminary Plat
Subdivision:	Preserve PUD
Legal:	Savath Subdivision Part of Outlot A and Woodford Addition SW ¼ S: 16 T: 45 R: 8
Address:	TBD County Road 23
Parcel #:	430516400007
Zone:	Residential
Applicant:	Del-Mont Consultants
Owners:	Ridgway River Development, LLC (RRD, LLC)
Initiated By:	Jen Coates, Town Manager
Date:	March 9, 2018

BACKGROUND:

See attached staff report dated February 23, 2018 with sketch plan/preliminary plat packet for the Planning Commission public hearing on February 27, 2018.

As part of the Planning Commission recommendation, the following conditions were to be completed before any preliminary plat public hearing with the Town Council:

1. Confirm water and sewer usage figures – *emailed to Town Staff on March 5, 2018.*
2. Resolution on Affordable Housing notes to propose to Town Council – *emailed to Town Staff on March 7, 2018 with review ongoing at time of this report.*
3. Incorporate into the subdivision approval file:
    a. Final drainage and storm water calculations – approved on 10/2008; staff pulled from file on March 9, 2018
    b. Final hydraulic calculations – approved on 4/9/2008; staff pulled from file on March 9, 2018
    c. Final cut and fill calculations – Town does not have these on file; need from Applicant.

PLANNING COMMISSION RECOMMENDATION

The Planning Commission unanimously recommended approval of the Sketch Plan. The Commission also unanimously recommended approval of the preliminary plat with all of the conditions listed in the February 23, 2018 staff report, with the following modifications:

1. Verbiage on plat note 4 on page 8 of staff report be changed to include language regarding a significant event that may have altered the previously surveyed highw-water mark would trigger a revised survey of the high-water mark, as follows (modification underlined):

    All lots have an 8' rear setback from the property line abutting the Uncompahgre River (Lots: 1, 6, 7, 8, 9, 10, 12, 13, 14, 15, 16, 17, 18, 19, 20). In addition, there is a 10' setback from the high-water mark for these same lots. Whichever setback is greater applies. The high-water mark line shown on this plat map was surveyed on _____ _____, _____. An updated survey of the high-water mark is required with any building permit submittal received at Ridgway Town Hall 2 years past this survey date, or after a significant event that may have altered the location

of the previously surveyed high-water mark. HIGH-WATER MARK is defined as follows: The boundary dividing a river bed from a river bank and defined as the line on the bank up to which the presence and action of water are so usual and long-conditioned as to impress on the bed a character distinct from that of the bank with respect to the nature of the ground surface, soil and vegetation.

2. Town Council allow applicant to have 2 years instead of 90 days to complete the conditions of preliminary plat approval;

3. Recreation path along County Road 23 is to be concrete;

4. Accessory Dwelling units are allowed on any lot larger than 9500 sf that is not a multi-family lot.

The final conditions, as recommended from the Planning Commission, are as follows (*underlined text represents changes from the staff report dated Feb 23, 2018 for the Planning Commission hearing*):

1. Approval of deviation for front yard setback on each lot to be 10' as opposed to the required 15' identified in RMC §7-3-10;

2. Approval of lot frontage deviations to be less than the 50' required by RMC §7-3-10, but not less than 35' as defined on the preliminary plat, as provided for in RMC 7-3-11(D)(1);

3. Approval of increased residential densities pursuant to RMC 7-3-11(D)(2) considering the significant public benefit through the dedication of deed-restricted affordable housing and the off-site public infrastructure improvements through the paving of CR 23 and Chipeta Drive;

4. Approval of deviations to dimensional requirements for roadway width and front setbacks as provided for in RMC 7-3-11(D)(1);

5. Identity a location for the bus stop on the engineering plans in conformance with School District requirements;

6. Specifications and design calculations for the lift station, approved by the Town Engineer;

7. A site application for the lift station approved by the Town Engineer and CDPHE and a final permit issued by CDPHE. This permit should be one of the first components to be completed with this development before re-starting any work as the site may need to be moved if the required mitigation cannot be met;

8. Add 2 streetlights to engineering plans where the south legs of Heron Court and Preserve Drive intersect CR 23;

9. Completion of the recreation path along CR 23 as concrete sidewalk.

10. The south end of Preserve Drive (outside of the town boundary) requires access approval from the County as it is their jurisdiction (certificate on plat map as indicated in this report) as well as an access/utility easement from the property owner (Ridgway River Development LLC). This road section of Preserve Drive from the Town boundary to CR 23 will need to be dedicated to the Town,

as well as dedication of the continuation of the recreational path along CR 23 to continue to the south road. Staff recommends securing written approval from both the BOCC and RRD LLC at this time and prior to final plat filing.

11. Related to Completion of requested edits to the General Road and Utility Easement Agreement, inclusive of a dedication of a recreation path easement to continue along CR 23 through Preserve Drive. Staff recommends securing this easement agreement soon, and before Final Plat.

12. Completion of 3-inch asphalt road on Chipeta Drive from Lena Street to County Road 23, then on County Road 23 to the south access on the south loop of the subdivision. Approval needs to be obtained from the County to pave County Road 23 to where the south end of Preserve Drive connects with County Road 23.

13. Sidewalks on Herron and Preserve Streets shall be constructed only on the east side of the street.

14. SMPA Powerline easement resolution and any correction made on plat map: undergrounding of three phase powerline for San Miguel Power Association shall run through the Preserve PUD property heading south. Formal abandonment of that easement will be needed for any reasonable construction envelope on Lot 4.

15. Determination by Town Council, with any recommendation from the Planning Commission, to waive excise taxes on 4 deed-restricted affordable housing units;

16. Accessory Dwelling Units are allowed on lots in the subdivision that are larger than 9500 sq. ft., with update to the affected plat note(s), as follows:

    "Each lot is limited to the number of dwelling units, as indicated on this plat map and up to a total of 33 dwelling units, for which applicable excise tax has been paid. In addition each single unit lot larger than 9500 square feet may have an "accessory dwelling unit" if compliant with Town code provisions as in effect from time to time, for which no excise tax has been paid."

17. Revised topo map showing completed cut and fill work and any updated gravity sewer options for lots along the east side of the development;

18. An updated geotechnical report, supplement to the report, or other documentation from a geologist or a licensed qualified engineer describing current soils conditions as required by RMC 7-4-5(B)(6)(g), and including a letter from Lambert (the author of the original 2006 geotechnical study) indicating drain lines were installed according to plan;

19. Certificate of Ownership and Dedication and other Plat Certificates: revised and/or added as indicated in this report;

20. Plat Notes: revised and /or added as indicated in this report, including but not limited to:
    a. Updating notes 4 and 5: Geotech Study References and Gravity Sewer
    b. Addition of a definition for high water mark and a 10' setback from the high water mark*
    c. Addition on note regarding completion of improvements and construction within 75' of the high-water mark and ecological survey exemption
    d. Driveway access note

e. On street parking
f. Natural Hazards and Mitigation
g. Excise tax and number of residential units
h. Reference to prior easements and including the proposed General Road and Utility Easement Agreement
i. Note referencing all covenants and associations
j. Irrigation Easement Note
k. Shared Driveways Note
l. Clarification on Slope Easements A, B and C located in unincorporated Ouray County and the ownership and maintenance therefor, and reconciliation of Slope Easement D on pages 1 and 2 of the plat map
m. Common Elements, duplexes and multi-unit parcels
n. Others plat note updates/additions referenced in this report

** All lots have an 8' rear setback from the property line abutting the Uncompahgre River (Lots: 1, 6, 7, 8, 9, 10, 12, 13, 14, 15, 16, 17, 18, 19, 20). In addition, there is a 10' setback from the high-water mark for these same lots. Whichever setback is greater applies. The high-water mark line shown on this plat map was surveyed on _____ _____, _____. An updated survey of the high-water mark is required with any building permit submittal received at Ridgway Town Hall 2 years past this survey date, or after a significant event that may have altered the location of the previously surveyed high-water mark. HIGH-WATER MARK is defined as follows: The boundary dividing a river bed from a river bank and defined as the line on the bank up to which the presence and action of water are so usual and long-conditioned as to impress on the bed a character distinct from that of the bank with respect to the nature of the ground surface, soil and vegetation.*

21. Letter of completion of work from the Army Corps of Engineers (ACOE) for completion of 404 permit as required by the ACOE, or other ACOE closure of the permit and work;

22. Clarification on Lot 19 as a duplex lot instead of "1 unit" shown on the submitted plat map (*this was a condition of approval from the prior approval and will make for 33 units total*);

23. Recreation path easement 10' wide along the north boundary of Lot 20 dedicated to the Town of Ridgway;

24. Agreement on a number of trees and shrubs as well as species, and memorializing this on the engineering plans;

25. Revisions to the Bylaws, CCRs as recommended by the Town Attorney;

26. Satisfactory completion of terms and requirements of annexation agreement "Agreement and Declaration of Covenants" recorded at Reception No. 191629 on May 25, 2006, and including but not limited to good-faith negotiations on Dallas Ditch irrigation water rights as described in this Agreement; and

27. Estimated costs of construction and financing of infrastructure and utilities, and Developer and Town meet prior to any restart of the work and establish a re-start construction plan, scope of work to be completed and tested, and an inspection schedule;

28. Applicant has 2 years from the date of the Town Council approval of the preliminary plat to complete the conditions of approval for the preliminary plat;

29. Cut and fill calculations submitted to Town Hall; and

30. Work with Town Staff on Affordable Housing notes to propose to Town Council.

AGENDA ITEM #10

TOWN HALL PO Box 10 | 201 N. Railroad Street | Ridgway, Colorado 81432 | 970.626.5308 | www.town.ridgway.co.us

To: Ridgway Town Council
From: Shay Coburn, Town Planner
Date: March 6, 2020
RE: **Alpenglow Cohousing Subdivision - Request for additional time to meet condition of approval for Preliminary Plat**

ACTION BEFORE COUNCIL

Council is asked to consider allowing additional time for the Alpenglow Cohousing Subdivision to meet the condition of finalizing the stormwater plan with the Town and CDOT for the Preliminary Plat approval.

PROPOSED MOTION

"I move to [*approve/deny*] up to ___ months for the Alpenglow Cohousing subdivision to meet one of the conditions of approval to finalize the stormwater system with the Town and CDOT."

SUMMARY

On October 9, 2019 Town Council approved the Preliminary Plat for the Alpenglow Cohousing with multiple conditions. Per the Municipal Code, conditions are to be met within 90 days unless otherwise approved by Council. All conditions were met within the 90-day period except two conditions that the Council allowed for more time to complete. Council granted up to six months for the development team to finalize the stormwater drainage plan with CDOT and the Town to obtain necessary permits from CDOT. The deadline to do so was set for March 9, 2020. The development team has been working on this with CDOT and the Town but the plan and permits have not yet been finalized. The development team is requesting additional time to meet this condition of approval. Staff predicts that this will be finalize in one to two months but believes granting up to 6 months is appropriate to allow for unforeseen delays.

Applicable Municipal Code Sections

7-4-5(B) Preliminary Plat

> *(10) Except as otherwise expressly provided by the Town Council, all conditions of approval shall be met within 90 days of such approval or the plat shall be deemed disapproved.*

ATTACHMENTS

1. Letter from Alpenglow Cohousing [will be a late addition to the packet]

AGENDA ITEM #11

TOWN HALL PO Box 10 | 201 N. Railroad Street | Ridgway, Colorado 81432 | 970.626.5308 | www.town.ridgway.co.us

To: Honorable Mayor Clark and Ridgway Town Council
From: Preston Neill, Town Manager
Date: March 6, 2020
Agenda Topic: **Direction on Participation in San Miguel Power Association's Totally Green Program**

ACTION BEFORE COUNCIL:
Council is asked to provide direction on whether the Town should sign-up for 100% of our electricity to be sourced from renewable resources for our various San Miguel Power Association (SMPA) accounts by way of SMPA's Totally Green Program. Terry Schuyler, Energy Services and Key Account Executive with SMPA, will attend Wednesday's meeting to deliver a brief PowerPoint presentation and to answer any questions from members of Council.

BACKGROUND:
Totally Green Program
SMPA's Totally Green Program is an easy way for the Town's municipal operations, and other SMPA account holders for that matter, to go 100% renewable. To be more specific, through the Totally Green Program, the Town has the option of paying a premium for 100% renewable electricity, which is accounted for by retiring Renewable Energy Certificates (RECs) from solar, wind and hydro-electric projects. The Program uses RECs to provide account holders who opt in the program 100% renewably sourced electricity.

According to SMPA's website, RECs are the legally recognized method of accounting for renewable power generation. RECs are the means by which power generators comply with the State Renewable Portfolio Standard requirement. When account holders participate in the Totally Green Program, they own the RECs. The RECs represent the clean environmental attributes from those renewable power sources. They are essentially the certificates that prove a given quantity of power SMPA supplies comes from 100% renewable sources.

The cost to participate in the Totally Green Program is $0.01 per kilowatt-hour (kWh) and the bill adjustment automatically tracks electricity use and makes the appropriate investment in renewable energy each month. The net proceeds from the Totally Green Program are exclusively used by SMPA to support new, local renewable power generation. This Program would make it possible for the Town of Ridgway to achieve 100% renewable electricity for municipal operations without any large upfront costs. Appended to this report as Attachment 1 is an information flyer about the Totally Green Program. Also included with this report is SMPA's January 2020 Newsletter, labeled as Attachment 2.

Energy Generation Mix
Approximately 70 % of the RECs come from SMPA's local hydroelectric and solar power plants (like Coal Creek Hydro, Pandora Hydro, and the Norwood Solar array) as well as from the nearly 300 SMPA members that have their own home solar systems. The other 30% come from solar, wind and hydro projects that feed the supply grid from afar.

Renewable Movement
The Totally Green Program is a relatively new program that SMPA has created in attempt to encourage the development and usage of more renewable energy. According to SMPA's website, one of the key objectives in the SMPA Strategic Plan, adopted in 2019, reads as follows: "Develop an all-encompassing program to

expand energy efficiency and local renewables." To balance varying levels of electric demand while ensuring reliability, SMPA and other local cooperatives require a variety of generation sources. That is why more and more utilities are offering renewable energy purchasing programs for their commercial and residential account holders.

Since the Totally Green Program launched in the summer of 2019, over 120 SMPA members have subscribed. One of those members is San Miguel County. The San Miguel County Board of County Commissioners recently voted to participate so that 100% of the County organization's annual electricity consumption is covered by renewable energy. They view the investment as a first step toward achieving their adopted goal of becoming carbon neutral as soon as possible.

House Bill 19-1261 Climate Action Plan to Reduce Pollution

The Town's support and participation in the Totally Green Program can help meet the statewide goals to reduce greenhouse gas (GHG) emissions. The reduction targets set forth in HB19-1261 are a 26 percent cut in GHG emissions by 2025, as well as a 50 percent cut by 2030 and a 90 percent cut by 2050. These statewide goals are based on the levels of GHG emissions that existed in 2005.

FINANCIAL IMPLICATIONS:

Terry Schuyler, Energy Services and Key Account Executive with SMPA, recently ran a Customer Profile and Billing History Report for the Town of Ridgway's account and it provides a comprehensive look at the Town's electric use and billing over the last three years. The table below summarizes the Town's energy use and billing history from the beginning of 2017 to the end of 2019:

Month/Year	Energy Usage (kWh)	Payment ($)
January 2017	34,116	4,174.67
February 2017	32,491	3,978.65
March 2017	32,919	4,172.51
April 2017	43,006	4,857.14
May 2017	40,849	4,644.66
June 2017	44,807	4,974.20
July 2017	43,139	4,892.14
August 2017	43,690	4,919.92
September 2017	43,219	4,844.89
October 2017	42,031	4,757.10
November 2017	44,251	4,984.41
December 2017	38,176	5,222.55
2017 TOTAL	**482,684 kWh**	**$56,422.84**
January 2018	33,148	4,137.10
February 2018	33,255	4,156.90
March 2018	30,229	3,828.17
April 2018	51,307	5,553.57
May 2018	25,833	3,607.02
June 2018	44,043	5,097.57
July 2018	42,483	4,932.54
August 2018	44,079	5,105.41
September 2018	43,197	5,015.76

October 2018	44,290	5,067.42
November 2018	43,151	5,016.09
December 2018	44,035	5,202.98
2018 TOTAL	**479,050 kWh**	**$56,720.53**
January 2019	44,235	5,232.33
February 2019	40,460	4,941.46
March 2019	36,389	4,513.91
April 2019	42,259	4,981.13
May 2019	39,163	4,639.47
June 2019	40,080	4,694.96
July 2019	43,612	5,081.31
August 2019	50,308	5,601.35
September 2019	38,638	4,658.18
October 2019	45,471	5,375.85
November 2019	49,779	5,902.79
December 2019	36,253	4,704.77
2019 TOTAL	**506,647 kWh**	**$60,327.51**
ANNUAL AVERAGE	**489,461 kWh**	**$57,823.63**
MONTHLY AVERAGE	**40,789 kWh**	**$4,818.64**

Over the last three years, the Town used an annual average of 489,461 kWh of electricity. That equates to an annual average electric bill of approximately $57,824 per year. With the premium to participate in the Totally Green Program set at $0.01 per kWh, opting for 100% renewable would cost the Town an average of **$4,894.61 per year**. That amount would be in addition to our regular annual energy bill. If the Town had participated in the Totally Green Program for the entirety of FY 2019, the Town would have paid an additional premium of $5,066.47 on top of the total annual energy bill of $60,327.51.

It's worth noting that the Town's Water Treatment Plant account with SMPA currently has 10 shares or panels from the Paradox Community Solar Garden. According to SMPA, in 2013 the Town paid an upfront cost of $750 per panel, totaling $7,500. The shares were purchased by the Sewer Enterprise Fund.

In the 2020 Budget, the budgeted figures for electric costs are based on 2019 actuals. If Council is interested in moving forward now, staff does not anticipate that the budget will be able to accommodate the additional premium without a supplemental budget and appropriation for FY 2020.

OPTIONS:

- Direct staff to sign up for 100% renewably sourced electricity by way of SMPA's Totally Green Program for the remainder of FY 2020. This option would require a supplemental budget and appropriation for FY 2020.
- Direct staff to plan accordingly for participation in the Totally Green Program in FY 2021.
- Request more information
- Take no action

ATTACHMENTS:

Attachment 1 – Totally Green Flyer
Attachment 2 – SMPA January Newsletter

IT'S RENEWABLY-SOURCED ELECTRICITY, DUDE!

TOTALLY GREEN

PARTICIPATION GUARANTEES THAT ELECTRICITY YOU USE COMES FROM 100% CARBON-FREE SOURCES.

- **SOLAR**
- **WIND**
- **HYDRO**

San Miguel Power Association is an equal-opportunity provider and employer.

WHAT IS IT, DUDE?

TOTALLY GREEN

Totally Green is San Miguel Power's simplest way for you to use electricity from 100% renewable sources. Sign up once. The ***voluntary*** 1¢ per kilowatt-hour bill adjustment automatically tracks your electricity use and makes the needed investment.

RENEWABLE ENERGY IS AWESOME!

When you power your building with a mix of ***Solar***, ***Wind*** and ***Hydroelectric*** power, you...

- lessen your own ***carbon footprint***.
- invest in SMPA's ***Carbon Clear fund*** which helped build a community solar array in Paradox as well as the IQ Solar array in Norwood, CO. *(More local projects to come.)*
- promote renewable energy production ***nationwide***, and help move the needle on climate change ***worldwide***. Sweet!

...IT'S TOTALLY AFFORDABLE!...

If your average bill is...	$50	$100	$150
Totally Green will cost an additional...	$1.94	$5.37	$8.80

More detailed charts available on the web page below.

Sign up at:
www.smpa.com/content/sign-totally-green

Totally Green is brought to you by the awesome dudes at

EcoAction Partners

ROCC
The Ridgway/Ouray Community Council Clean Energy Committee

San Miguel Power Association
A Touchstone Energy® Cooperative

ENERGYWISE

Touchstone Energy® Cooperatives
The power of human connections®

YOUR SAN MIGUEL POWER MEMBER NEWSLETTER

SAN MIGUEL POWER ASSOCIATION

Touchstone Energy® Cooperatives
The power of human connections®

CONTACT INFORMATION

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Ridgway
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Ridgway, CO 81432
(970) 626-5549
Toll Free: (877) 864-7311

Both Offices Open:
M - TH, 7:00a.m. - 5:30p.m.

www.smpa.com
www.facebook.com/SanMiguel Power

In the event of a power outage, contact your local SMPA office to reach our 24-hour dispatch.

QUESTIONS OR COMMENTS
energywise@smpa.com
(970) 626-5549 x212

SAFETY TIPS

FOR THE HOLIDAY

- ☑ **Inspect electrical decorations for damage before use**
- ☑ **Avoid overloading electrical outlets**
- ☑ **Never connect more than three strings of incandescent lights**

Look Who's Totally Green

A MOVEMENT HAS BEGUN IN THE SAN MIGUEL POWER ASSOCIATION (SMPA) SERVICE TERRITORY. AN INCREASING NUMBER OF MEMBERS ARE EXPRESSING A DESIRE TO SEE THEIR ELECTRICITY GENERATED FROM RENEWABLE SOURCES LIKE SOLAR, WIND AND HYDROELECTRIC. ALREADY, ABOUT 1/3 OF THE RETAIL ELECTRICITY THAT SAN MIGUEL POWER DISTRIBUTES IS SOURCED FROM THESE TYPES OF GENERATORS, 10% OF WHICH HAIL FROM SMALL FACILITIES OUR LOCAL TERRITORY. EVEN SO, MANY MEMBERS HAVE ASKED WHAT THEY CAN DO TO COVER THEIR ENTIRE MONTHLY ELECTRICITY USE WITH RENEWABLE POWER.

The journey toward this goal has several paths and, for many, the most attainable is SMPA's new "Totally Green" program. This program allows organizations and individual members to set up a small monthly automatic investment (1¢/kWh). Then, utilizing Renewable Energy Certificates, the state-sanctioned instrument for Renewable Portfolio Standards (RPS), SMPA covers each participating member's electricity use with "green" power, allowing that member to identify as "Totally Green."

The idea has caught on. Since the program launched in July of 2019, over 120 members have subscribed. Among them are some businesses and organizations you may recognize:

THE TELLURIDE / MOUNTAIN VILLAGE GONDOLA – Totally Green since 2008

Owned and operated by the Town of Mountain Village, and largely funded by the Telluride Mountain Village Owners Association, this unique transportation system has been operating on 100% renewable power for over a decade thanks to its purchase of SMPA Green Blocks (the program forerunner of Totally Green)

TELLURIDE SPORTS – Totally Green since June 4, 2018

All 11 Vail Resorts retail locations in Telluride participate in the Totally Green program. The 100% coverage of their electricity use helps fulfill the Vail Resorts' "Epic Promise for a Zero Footprint." All stores have also converted to LED light bulbs to reduce overall energy use.

CLARK'S MARKET – Totally Green since September 18, 2019

With 3 locations in Telluride and Norwood, Clark's Market has committed to cover 100% of their local electricity use with investments into Totally Green.

MOUNTAIN CHILL (KRKQ) Radio at 95.5 – Totally Green since November 5, 2019

When Mountain Chill founders, Eric and Ethan Funk found out about Totally Green, they saw an opportunity to complete what they had started years earlier by utilizing efficient design and optimized antenna polarization to achieve a highly efficient radio transmitter.

Combined with their self-generated solar power, Mountain Chill's Totally Green investment brought the station's renewable power balance to 100% of station needs.

SAN MIGUEL COUNTY – Totally Green since November 20, 2019

SMPA is pleased to welcome San Miguel County as the first county government to join the Totally Green program. The county sees Totally Green as a first step toward their officially-adopted goal (in 2017) to be carbon neutral as soon as possible. The county has also made lighting upgrades and other energy efficiency improvements and is considering self-generation with battery backup, not only for environmental, but for safety and security reasons as well.

Totally Green continued...

Although Totally Green is a relatively new campaign, many local organizations have been offsetting their electricity use with renewable energy for years. Here's a special shout out to some of the pioneers of green power subscription in our territory.

Notable Purchasers of SMPA Green Blocks:

- Town of Telluride
- Ouray County
- Mountainfilm
- Telluride Angler
- Colorado Boy
- Telluride Association of Realtors (TAR)

Notable Participants in the Paradox Community Solar Array:

- Town of Ophir
- Alpine Bank
- Telluride Housing Authority
- Ridgway Public Library
- Town of Ridgway
- Telluride School District R-1

As of this writing, a total of 323 members purchase Green Blocks on a monthly basis. If you currently purchase Green Blocks and would like to upgrade to a more accurate, full-offset solution, contact Key Accounts Executive, Terry Schuyler, terry.schuyler@smpa.com and ask what it would take for you to go Totally Green.

Want to know more about Totally Green? Get your questions answered at smpa.com >Renewable Energy>Totally Green.

For Financial Stability and Growth

Congratulations to the 2019 Sharing Success Economic Development Grant Recipients

For the past five years, San Miguel Power Association, in conjunction with national cooperative partners, CoBank has sought to stimulate and enhance our local economies by offering the "Sharing Success" matching grants to selected applicants.

This year, the grant monies from SMPA and CoBank were bolstered with matching dollars from wholesale power provider, Tri-State Generation and Transmission (Tri-State) and wholesaler, Basin Electric Power Cooperative. Over the past several months, Member organizations and businesses applied for up to $10,000 in $1,000 increments in dollar-for-dollar matching funds depending on the costs of their initiatives. Initiatives varied in size and scope but all awarded projects were selected based on their projected benefit to the entire business community of a region, not just individual businesses.

Our congratulations go out to these grant recipients:

- Ouray Ice Park: $6,000 – Securing Permanent Water Supply
- Telluride Mountain Club: $6,000 – 2020 Trails Project
- Ridgway Chautauqua Society: $2,250 – Marketing and Audience Expansion
- Unaweep – Tabeguache Interpretive Center: $2,250 – UTIVC Façade Upgrade
- San Juan Development Association: $6,000– Relocation & Growth Initiative

Look in future issues of EnergyWise to see coverage of these projects and their impacts on communities like yours.

We thank our partners, CoBank, Tri-State and Basin Electric for helping us financially support projects and programs that are actively working to improve the financial stability of our local businesses.

Oh, What fun it was...

Thanks to Naturita, Norwood and Ridgway for hosting parades of light. We were thrilled to join in with our Christmas floats. We'll see you again, next year!

SMPA POWER PLAY

This Month's Puzzle: AT ENERGY TOLL

Hint: An awesome way to help wipe away your carbon footprint.

SUBMIT YOUR ANSWER and be entered into a drawing for a fun prize to:

EnergyWise
PO Box 1150
Ridgway, CO 81432

Last Month's Scramble Answer: SINGLE PHASE POWER

AGENDA ITEM #12

TOWN HALL PO Box 10 | 201 N. Railroad Street | Ridgway, Colorado 81432 | 970.626.5308 | www.town.ridgway.co.us

To: Town Council
From: Shay Coburn, Town Planner
Date: March 3, 2020
RE: **Introduction of an Ordinance of the Town of Ridgway, Colorado Revising Section 7-3-12 of the Ridgway Municipal Code Regarding Sign Regulations**

ACTION BEFORE COUNCIL

The Council is asked to review the attached Ordinance amending the Sign Regulations. If the revisions are desired, Council can then introduce the Ordinance as is or with modifications.

PROPOSED MOTION

"I move to introduce the Ordinance revising Section 7-3-12 of the Ridgway Municipal Code regarding Sign Regulations *[with or without modifications]*."

SUMMARY

In the Town's 2020 Strategic Plan, item 4 under Well-Managed Growth states "Sign Code Updates." These updates are needed to comply with the 2015 ruling in the case of Reed v. Town of Gilbert which contemplates content-based restrictions on signage. The proposed edits shown below are not a comprehensive update to the Sign Regulations and should not substantively change the meaning of the regulations. Staff has incorporated a few administrative edits as well, like clarifying confusing or contradicting language.

The Planning Commission reviewed the proposed edits at the February 25, 2020 meeting and recommend that staff draft an ordinance for Council to consider introducing. The one edit that the Commission recommended was to increase the size limitation of a temporary sign in the Residential and Historic Residential districts from 3 square feet to 4 square feet. This change is reflected in these documents. An Ordinance is attached to this memo while the full Sign Regulations section is included below showing all edits in track changes.

PROPOSED EDITS TO THE SIGN REGULATIONS

Proposed edits are shown in track changes. Comments are also included to help explain the reasoning for the proposed edit.

7-3-12 SIGN REGULATIONS.

(A) Compliance Required: It shall be unlawful to erect or maintain any sign except in conformity with the requirements of this Subsection. Signs not in conformity with the provisions of this Subsection are hereby declared to be a nuisance which may be abated by the Town in any lawful manner.

(B) Signs Allowed Without a Permit: The following may be erected, maintained and used without a sign permit as long as they are properly maintained in accordance with the requirements of this Paragraph (B) and Paragraph (F) and with other applicable requirements of this Subsection, State law and Town ordinances and regulations, and are not prohibited by Paragraphs (C) or (D):

(1) Official traffic control devices, signs, and notices erected, owned and maintained by the United States, the State of Colorado, the Town of Ridgway or any of their political subdivisions for official governmental purposes.

(2) Any pennant, motto, or insignia of any nation, state, political subdivisions, religious, civic, or fraternal organization, or school except devices which are used to promote business activity.

(3) Works of art unless they are used to promote business activity.

(4) Temporary decorations, displays and banners which are customarily displayed and associated with holidays or celebrations and banners associated with Town endorsed civic events.

(5) Scoreboards, unless used to advertise business activity.

(6) Public utility warning signs, construction warning signs, and signs warning of other hazards, with no sign face larger than 10 square feet in area.

(7) Identification signs incidental to the use of vehicles attached to the vehicle.

(8) Traffic control devices with no sign face larger than 3 square feet.

(9) One or more temporary signs with an aggregate sign face area of no more than ~~43~~ square feet in the Residential and Historic Residential Zoning Districts and 16 square feet in all other zoning districts, for the premises upon which they are located. Signs identifying a project and contractors involved therein shall only be allowed during the construction period. All "For Sale" signs shall be taken down when the sale of the premises is closed.

~~(10) One temporary sign with no sign face more than 12 square feet in area identifying a project and the contractors involved therein during the construction period.~~

~~(11)~~(10) One bulletin board per street frontage not over 20 square feet in area for the purpose of announcing events of civic interest, which is owned and maintained by a charitable or religious institution.

~~(12)~~(11) Memorial signs and tablets, or cornerstone signs identifying the building and its date of construction. Such signs shall be cut into masonry surface, inlaid so as to be part of the building or constructed of incombustible materials.

~~(13) Temporary real estate "For Sale" or "For Rent" signs.~~

~~(14)~~(12) Signs upon vending machines, gasoline pumps, or packages of goods which relate to the contents thereof.

~~(15)~~(13) Temporary signs advertising Town approved civic events during the period of the event. All such signs may be erected only with the approval of the Town Council except for those displayed in Town Parks which may be approved by Town Administrative Staff.

~~(16)~~(14) Signs within buildings which are located no closer than 6 inches to any window or which are not legible from distances of 5 feet or more.

~~(17)~~(15) Repealed by Ordinance 7-2006

~~(18)~~(16) Temporary signs on the Ridgway School Ball Field fence, provided they do not face Highway 62, that they are only up during baseball season, and that all such signs be controlled and administered by the Ridgway School Administration.

~~(19)~~(17) Signs devoted to non-commercial~~ideological or political~~ speech which do not exceed 10 square feet in area.

Commented [SC1]: The Commission recommended that this be increased from 3 to 4 square feet.

Commented [SC2]: Removed specific restrictions on real estate signs and contractor signs in this subsection as that could be considered a content-based restriction. These types of signs would just fall in to this category for temporary signs.

Commented [SC3]: Moved from below.

Commented [SC4]: See comment on item B(9) above.

Signs identifying a project and contractors involved would no longer be allowed to be 12sf in all districts but rather 3sf in the R and HR districts and 16sf in all other districts

Commented [SC5]: See comment on item B(9) above and F(7) below.

Commented [SC6]: "Ideological or political" could be considered content-based.

(C) Prohibited Signs and Devices: The following are hereby prohibited within the Town:

(1) Animated or flashing signs visible outside any building.

(2) Balloons, or pennants, or other wind-powered devices designed to attract attention, except they may be used for civic events up to a maximum of seven days.

(3) Repealed by Ordinance 2-2010

(4) The operation of search lights to promote business activities.

(D) Off Premise Signs Restricted: A sign may identify or advertise only that activity or use conducted upon or related to the premises upon which the sign is located except in the following circumstances:

(1) Directional signs owned by the Town. The expense of construction and maintenance shall be charged to the businesses or organizations advertised.

(2) Signs authorized pursuant to Subsection 7-3-12(G).

(3) Signs allowed by Paragraphs (B)(1), (4), (10~~1~~), and (13~~5~~).

(4) Signs with a message devoted solely to non-commercial~~ideological or political~~ speech.

(5) Tourist oriented directional signs owned and erected by the Colorado Department of Transportation pursuant to C.R.S. 43-1-420(3), which meet conditions set out in Town resolutions as in effect from time to time.

(E) Permits:

(1) Except for the signs specified in Subsection (B), no sign may be erected and maintained until a Sign Permit has been issued by the building official. Applications for a standard sign permit issued pursuant to this subsection 7-3-12(E) shall be submitted to the Town on forms supplied by the Town accompanied by an application fee of $35.00. Applications for permits issued pursuant to Ridgway Municipal Code Section 7-3-12(G), for signs erected over Town-owned streets and alley rights-of-way pursuant to a revocable right-of-way permit, shall be submitted to the Town on forms supplied by the Town accompanied by an application fee of $75.00.

(2) The Building Inspector shall grant a permit only for signs which will be in compliance with the requirements of this Subsection.

(3) The total sign face area of signs required to have a permit per property~~building~~, other than those restricted by Subsection (6), shall not exceed the lesser of one square foot per foot of lineal street frontage of the property~~premises~~ abutting Town streets or 150 square feet. When more than one building and/or business is on the property~~premises~~, the property~~premises~~ street frontage shall be allocated among the buildings and/or businesses accordingly, unless otherwise approved through a Master Sign Plan. ~~A minimum of 32 square feet of sign area shall be allowed for each separate business, as defined by lot, unit, lease, or other legally created property interest, subject to the total sign face area limitation of 150 square feet per building.~~ Total sign face area in excess of 150 square feet shall not be allowed for any property~~building~~ unless approved through a Master Sign Plan applicable to that property~~building~~. ~~No single business may have a sign with any face area larger than 32 square feet.~~

(4) A Building Permit is also required for any sign with a cost or value over $1,000.

(5) No permit for a sign shall be allowed in the Residential Districts.

Commented [SC7]: Same comment as B(17) above.

Commented [SC8]: Clarified language

Commented [SC9]: There is an inequity in our code with this language. Propose to delete this sentence.

Commented [SC10]: Deleted. This is stated in F(7) below.

Commented [SC11]: Clarification. It was not clear if "value" means the cost of the sign's construction, or the value placed on it (and if the latter, by whom?).

(6) The total sign face area of signs required to have a permit for businesses within the Downtown Services Zoning District shall not exceed 12 square feet per business. All signs within said District shall be non-illuminated and attached to the building structures, no higher than the roof line.

(F) Performance Criteria: All signs shall meet the requirements of this paragraph (F) whether a permit is required or not.

(1) All signs shall be maintained in good, legible and safe condition.

(2) No sign shall be erected or maintained which creates a traffic or other safety hazard.

(3) All signs shall be constructed and maintained in accordance with any applicable provisions of the Town's building codes.

(4) All signs shall be erected and maintained in accordance with applicable requirements of State law.

(5) No part of any sign shall be above the roof or parapet of the highest building on the property and no higher than 35 feet. No part of any freestanding sign shall be higher than 20 feet above finished grade.

(6) No sign may be erected or maintained which creates a public or private nuisance, or which unreasonably interferes with the reasonable enjoyment of the adjacent property by reason of unreasonable light, shade or other effects.

(7) No sign shall be larger than 32 square feet in area, except a freestanding sign with more than one business advertised may have a sign face up to 56 square feet, unless approved through a Master Sign Plan applicable to the building. No sign shall have more than 2 sign faces. ~~No sign face on a temporary "For Sale" or "For Rent" sign shall exceed 7 square feet in area including riders. All "For Sale" signs shall be taken down when the sale of the premises is closed.~~

(8) Signs may be erected only on property which the sign owner has a legal right to erect such sign.

(9) All temporary signs must comply with the size restrictions set forth in Section 7-3-12(B)(9). Portable or wheeled signs displayed outside of buildings must be located so as to not impede with vehicular or pedestrian traffic, or create a traffic hazard or safety hazard or other nuisance, and must be removed at times when the advertised use or activity is not open for business.

(10) No more than 50% of any sign face may be internally illuminated.

(11) Materials – Signs lit with a dark-skies compliant external source are recommended over internally lit signs. A "halo" type sign, which uses solid letters with a light source behind them, illuminating the wall around the letters, are acceptable. If internally illuminated signs must be used, illumination of letters and graphics is allowed; however, illumination of the background is prohibited.

(G) Signs, other than signs belonging to the Town or sponsored by the Town, conforming to size limits of this Subsection 7-3-12, may be erected over Town-owned streets and alley rights-of-way pursuant to a revocable right-of-way permit issued pursuant to either Paragraph (1) or (2) of this Subsection only on the following conditions, in addition to other applicable requirements of this Subsection:

(1) Projecting signs:

Commented [SC12]: This could be considered content based so it was deleted. These signs will default to the temporary sign size restriction in B(9) above.

Real estate signs would no longer be limited to 7sf in all districts but rather 3sf in the R and HR districts and 16sf in all other districts

(a) The sign must be supported and attached to a building.

(b) The sign may extend no more than 5 feet from the building.~~, 10 feet for a~~ If the sign is printed on a retractable awning, the awning may extend no more than 10 feet from the building. A sign may extend no more than 5 feet across the Town-owned right-of-way.~~,~~ If the sign is ~~10 feet for a sign~~ printed on a retractable awning, the awning may extend no more than 10 feet across Town-owned right-of-way.

Commented [SC13]: Clarified language.

(c) No part of the sign may be less than 10 feet above the ground over Town right-of-way, except for a sign printed on an awning, the awning shall be at least 7 feet above the ground.

(d) That portion of any sign face located over the Town right-of-way shall be no larger than 20 square feet in area.

(e) No more than one sign per business may extend over the Town right-of-way.

(f) No sign with its face parallel to the wall of the building to which it is attached, except for those printed on an awning, may extend more than 12 inches from the building, nor more than 12 inches over public property.

(g) Plans for signs over Town rights-of-way must be submitted with applicable fee, reviewed and approved by the Town Administrative Staff.

(h) The revocable permit may be revoked by the Town at any time for any reasonable reason.

(i) Proof of insurance shall be provided to the Town.

(j) The sign may identify or advertise only that activity or use conducted upon or related to the abutting premises.

(2) Portable signs:

(a) The sign may identify or advertise only that activity or use conducted upon or related to the abutting premises.

(b) No more than one sign per business may be placed on Town right-of-way.

(c) The proposal for a portable sign on Town right-of-way must be submitted with applicable fee, reviewed and approved by the Town Administrative Staff.

(d) The revocable permit shall specify the authorized location, and may be revoked by the Town at any time for any reasonable reason.

(e) Proof of insurance shall be provided to the Town.

(f) The sign must be located so that it does not interfere with Town use, impede vehicular or pedestrian traffic, or create a traffic or safety hazard or other nuisance.

(g) The sign must be removed at times when the advertised use or activity is not open for business.

(H) General Provisions:

(1) The area of a sign face shall include the surface area of a sign, including non-structural trim and decoration, but excluding supports or uprights. The face area of a sign painted or hung on a wall of a building, or on an awning, shall include all the area within a perimeter surrounding all words, symbols, designs and coloring, distinctive from the wall upon which it is painted.

Only one side of double-faced signs that convey the same message on both faces shall be included for purposes of this calculation.

(2) As used in this Subsection, "sign" means and includes any object, device, or message which is used to advertise, identify, display, direct, attract attention, or convey any message concerning any object, person, institution, organization, business, products, service, event, or location by any means, including words, letters, figures, designs, symbols, fixtures, colors, motion, illumination, or projection, and anything else commonly known as a "sign".

(I) Nonconforming Signs:

(1) All signs shall at all times be maintained in strict conformity with the performance criteria of Paragraphs (F)(1), (2), (3), (4), (6) or (8). All Master Sign Plans previously approved by the Town under Section 7-3-12(J) prior to April 15, 2019 shall be maintained in strict conformity with such Town approval. Any signs not in compliance with these specific performance criteria and/or Master Sign Plans approved prior to April 15, 2019 shall be removed.

(2) All signs shall at all times be maintained in strict conformity with the performance criteria of Paragraph (F). Any sign not in compliance with Paragraph (F) shall be removed.

(3) The right to maintain a nonconforming sign shall be terminated and the sign removed or brought into full compliance with this Subsection under the following conditions:

(a) Abandonment of the sign, abandonment or termination of the related business, an interruption in continuance of the business for 6 months.

(b) A violation of any of the performance criteria of Paragraph (F) (1), (2), (3), (4), (6) or (8).

(c) The destruction of the sign, removal of the sign or damage of the sign, such that the cost of replacement or repair is greater than 50 percent of the replacement cost of the original sign.

(d) The creation of any additional violation of or nonconformity with these regulations.

(4) A list of nonconforming signs shall be developed and maintained by the building inspector with owners notified and given a copy of Paragraph (I).

(J) Master Sign Plans:

(1) Purpose: To provide flexibility for the amount of signage and size of signs for multi-tenant buildings and developments to ensure signage is available for business and facility wayfinding and identification. To protect the health, safety and welfare of the community while preserving Town aesthetics.

(2) Applicability:

(a) A Master Sign Plan shall be encouraged for all properties with multi-tenant buildings and/or multiple buildings in which three or more non-residential tenants or businesses are present.

(b) Any property with multiple-tenant buildings or multiple buildings in which ~~trees~~three or more non-residential tenants existing at the time of adoption of this section that does not have a Master Sign Plan is encouraged to apply for a Master Sign Plan at the time of application for a new sign at the site.

(c) Any property owner with multi-tenant and/or multiple buildings in which two or more non-residential tenants or businesses are present, may apply for a Master Sign Plan.

(3) General Regulations:

(a) All signs subject to a Master Sign Plan shall apply for and receive a sign permit before any sign may be installed.

(b) All signs on the site shall conform at all times to the approved Master Sign Plan and other applicable sign regulations.

(c) Master Sign Plan shall run with the property for which it was issued and not with individual tenants or businesses.

(d) Applications for a Master Sign Plan shall be submitted to the Town on forms supplied by the Town accompanied by the fee per Ridgway Municipal Code Section 7-3-20. At a minimum the applicant shall submit the following information to the Town:

(i) Identification of the property for which the Master Sign Plan application shall apply;

(ii) Proof of property ownership, or partial ownership, and signatures from all property owners included in the proposed Master Sign Plan;

(iii) Total sign area allowed per Ridgway Municipal Code Section 7-3-12 and the total sign area requested with the Master Sign Plan;

(iv) Site plan showing location of all existing and proposed signs on property, with distance from property lines;

(v) Building elevations/pictures showing location of all existing and proposed signs on property, with height of all signs from the ground;

(vi) Dimensions and type of all existing and proposed signs, including the unit number/address for each;

(vii) Any proposed lighting for the signs, including location, type, kelvin and lumens for each fixture;

(viii) Proof that the criteria for approval have been met.

(e) Through these Master Sign Plan regulations the following deviations from the specified dimensional requirements may be considered.

(i) A free standing sign may be up to 30% larger than the 56 square feet limitation of 7-3-12(F)(7).

(ii) Up to 30% more than the allocated square footage per 7-3-12(E) (3) of sign area may be allowed.

Deviations shall not be considered for any other sign regulations in the Ridgway Municipal Code.

(4) Criteria for Approval:

The proposed Master Sign Plan:

(a) will not be contrary to the public health, safety or welfare;

(b) will not create traffic hazards;

(c) provides for adequate assurances of safety from natural conditions such as wind, snow and ice as it relates to the proposed signs;

(d) will not unreasonably interfere with neighboring commercial businesses or properties;

(e) provides for signs that are reasonably necessary to operate the business or businesses on the property;

(f) the burden shall be on the applicate to show that these criteria have been met.

(5) Review Procedure:

(a) Within 14 days of receipt of ~~the~~ a completed application accompanied by the applicable fee for a Master Sign Plan, or a minor change to an existing Master Sign Plan, the Town will administratively approve or deny the application according to the Criteria for Approval. It shall not be necessary for the Town to provide written findings or conclusions, except upon request of the applicant.

(i) To the extent an application for a Master Sign Plan or minor change is denied in whole or in part, the requesting party may appeal to the Planning Commission as set forth in subsection (5)(b) of this section. Such appeal shall be in writing and submitted within 7 days of the Towns decision and review shall be de novo.

(b) Within 14 days of receipt of a completed application accompanied by the applicable fee for a major change to a Master Sign Plan, or an appeal of a denial of a Master Sign Plan, or minor change to a Master Sign Plan, the Planning Commission will set a hearing:

(i) The hearing shall be heard at the next regularly scheduled Planning Commission meeting for which proper notice of the hearing can be made, and no later than 40 days after receipt of a completed application accompanied by the applicable fee for a major change to a Master Sign Plan, or an appeal of a denial of a Master Sign Plan, or minor change of a Master Sign Plan. A hearing that must be continued due to time constraints or other delays, may be continued for an additional 7 days beyond the 40 day deadline, assuming the hearing was commenced within the 40 day deadline. By mutual agreement, the applicant and the Planning Commission may also extend the 40 day and 7 day deadlines set forth in this subsection.

(ii) At the scheduled hearing, the applicant and other interested parties may appear and present such evidence and testimony as they may desire. Anyone presenting evidence or testimony shall be subject to cross-examination by other interested parties, although the Planning Commission may limit testimony, evidence and cross-examination which is merely cumulative and is not required to follow any set procedure during the hearing, nor strictly follow the Rules of Evidence as applied by the Court. The hearing should be tape recorded or otherwise electronically recorded. The application, or other interested party may, if so desires, have the hearing recorded by a court reporter, at the ~~applicants~~ applicant's sole expense. The burden is upon the applicant in all cases to establish that the applicable criteria for any action are met.

(iii) Notice of the hearing shall be posted at Town Hall at least 10 days before the hearing, and posted visibly for each street frontage abutting the property for at least 10 days prior to the hearing, in addition to any other notice required by Town regulations.

(iv) The Planning Commission shall announce its decision according to the Criteria for Approval within 14 days of completion of the hearing. It shall not be necessary for the Planning Commission to provide written findings or conclusions, except upon request of the applicant, or other party appearing or participating in the in the hearing. The decision of the Planning Commission with respect to an application for major change of to a Master Sign Plan, or an appeal of a denial of a Master Sign Plan or minor change to a Master Sign Plan shall be final, subject only to review under Rule 106 of the Colorado Rules of Civil Procedure. Upon the filing of an appeal under Rule 106, the Town shall cause a transcript of any tape recording of the hearing to be made and certified to the court, and the party filings such appeal or such review, shall pay the Town the reasonable cost incurred in producing such transcript, unless such party has a transcript produced by a court reporter at the applicants expense.

(v) The Planning Commission may approve the requested action only upon finding that all applicable criteria and requirements of these Master Sign Plan regulations or other Town ordinances have been met. If it determines such criteria have not been met, the application shall be denied. The application may be granted upon conditions or limitations which the Planning Commission determines are necessary in order to ensure that the applicable criteria are met. Such conditions or limitations shall be provided to the applicant and interested parties in writing as part of the decision, subject only to review under Rule 106 of the Colorado Rules of Civil Procedure.

(6) Amendments to Approve Master Sign Plans:

(a) Minor Changes: Minor changes are those changes that do not alter the overall characteristics of the existing Master Sign Plan and that create no adverse impacts on adjacent uses, infrastructure, or public safety. Examples of what may be considered a minor change include, but are not limited to, 1) changes in the location of a signs 2) replacement of existing signs that are the same size or smaller than the existing sign, and 3) changes in the number of signs, as long as the aggregate square footage remains the same.

(b) Major Changes: Major changes are those that can alter the overall character of the Master Sign Plan and which could create adverse impacts on adjacent uses or public infrastructure. Examples of what may be considered a major change include, but are not limited to, 1) changes in the total square footage of the Master Sign Plan, and 2) requests for deviations per 7-3-12(J)(3)(e).

ATTACHMENT

An Ordinance of the Town of Ridgway, Colorado Revising Section 7-3-12 of the Ridgway Municipal Code Regarding Sign Regulations

ORDINANCE NO. 2020-XX

AN ORDINANCE OF THE TOWN OF RIDGWAY, COLORADO REVISING SECTION 7-3-12 OF THE RIDGWAY MUNICIPAL CODE REGARDING SIGN REGULATIONS

WHEREAS, the Town of Ridgway (the "Town"), is a duly organized and existing home rule municipality of the State of Colorado; and

WHEREAS, the Town of Ridgway Municipal Code (the "Code") contains certain sign regulations further enumerated under Section 7-3-12, Sign Regulations; and

WHEREAS, the 2015 ruling in the case of Reed v. Town of Gilbert contemplates content-based restrictions on signage and the Town desires to better align current regulations with this ruling; and

WHEREAS, the Town desires to clarify language that has proven unclear in the current Sign Regulations; and

WHEREAS, the Planning Commission reviewed and recommended the follow revisions to the Sign Regulations at the February 25, 2020 Planning Commission meeting.

NOW THEREFORE BE IT ORDAINED BY THE TOWN COUNCIL OF THE TOWN OF RIDGWAY, COLORADO, AS FOLLOWS:

Section 1. **Section 7-3-12(B) Signs Allowed Without a Permit, subsection (9)** of the Ridgway Municipal Code is amended, as follows:

(9) One or more temporary signs with an aggregate sign face area of no more than 4 ~~3~~ square feet in the Residential and Historic Residential Zoning Districts and 16 square feet in all other zoning districts, for the premises upon which they are located. Signs identifying a project and contractors involved therein shall only be allowed during the construction period. All "For Sale" signs shall be taken down when the sale of the premises is closed.

Section 2. **Section 7-3-12(B) Signs Allowed Without a Permit, subsections (10) and (13)** of the Ridgway Municipal Code, are hereby repealed.

Section 3. **Section 7-3-12(B) Signs Allowed Without a Permit, subsection (19)** of the Ridgway Municipal Code is amended, as follows:

(19) Signs devoted to non-commercial ~~ideological or political~~ speech which do not exceed 10 square feet in area.

Section 4. **Section 7-3-12(D) Off-Premise Signs Restricted, subsections (3) and (4)** of the Ridgway Municipal Code are amended, as follows:

(3) Signs allowed by Paragraphs (B)(1), (4), (10 ~~11~~), and (13 ~~15~~).

(4) Signs with a message devoted solely to non-commercial ~~ideological or political~~ speech.

Section 5. **Section 7-3-12(E) Permits, subsections (3) and (4)** of the Ridgway Municipal Code are amended, as follows:

(3) The total sign face area of signs required to have a permit per property ~~building~~, other than those restricted by Subsection (6), shall not exceed the lesser of one square foot per foot of lineal street frontage of the property ~~premises~~ abutting Town streets or 150 square feet. When more than one building and/or business is on the property ~~premises~~, the property ~~premises~~ street frontage shall be allocated among the buildings and/or businesses accordingly, unless otherwise approved through a Master Sign Plan. ~~A minimum of 32 square feet of sign area shall be allowed for each separate business, as defined by lot, unit, lease, or other legally created property interest, subject to the total sign face area limitation of 150 square feet per building.~~ Total sign face area in excess of 150 square feet shall not be allowed for any property ~~building~~ unless approved through a Master Sign Plan applicable to that property ~~building~~. ~~No single business may have a sign with any face area larger than 32 square feet.~~

(4) A Building Permit is also required for any sign with a cost or value over $1,000.

Section 6. **Section 7-3-12(F) Performance Criteria, subsection (7)** of the Ridgway Municipal Code is amended, as follows:

(7) No sign shall be larger than 32 square feet in area, except a freestanding sign with more than one business advertised may have a sign face up to 56 square feet, unless approved through a Master Sign Plan applicable to the building. No sign shall have more than 2 sign faces. ~~No sign face on a temporary "For Sale" or "For Rent" sign shall exceed 7 square feet in area including riders. All "For Sale" signs shall be taken down when the sale of the premises is closed.~~

Section 7. **Section 7-3-12(G)(1) Projecting signs, subsection (b)** of the Ridgway Municipal Code is amended, as follows:

(b) The sign may extend no more than 5 feet from the building.~~, 10 feet for a~~ If the sign is printed on a retractable awning, the awning may extend no more than 10 feet from the building. A sign may extend no more than 5 feet across the Town-owned right-of-way.~~,~~ If the sign is ~~10 feet for a sign~~ printed on a retractable awning, the awning may extend no more than 10 feet across Town-owned right-of-way.

Section 8. **Severability**

The provisions of this Ordinance are severable, and the invalidity of any section, phrase, clause or portion of this Ordinance as determined by a court of competent jurisdiction shall not affect the validity or effectiveness of the remainder of this Ordinance.

Section 9. Effective Date

This Ordinance shall take effect 30 days after adoption.

Section 10. Publication of Notice

Pursuant to Article III, Section 3-8 of the Charter, the Town Clerk shall publish this Ordinance by title upon adoption by the Town Council.

Section 11. Public Hearing

A public hearing on this Ordinance was held on the __ day of _____, 2020, in the Town Council Chambers, 201 N. Railroad Street, Ridgway, CO 81432.

INTRODUCED by the Town Council of the Town of Ridgway, Colorado this ____ day of _____, 2020.

TOWN OF RIDGWAY, COLORADO, A HOME-RULE MUNICIPALITY

By:_____
John I. Clark, Mayor

ATTEST:

_____
Pam Kraft, MMC, Town Clerk

Approved as to Form:

_____
Bo James Nerlin, Town Attorney

HEARD AND FINALLY ADOPTED by the Town Council of the Town of Ridgway, Colorado, this ____ day of _____, 2020.

TOWN OF RIDGWAY, COLORADO, A HOME-RULE MUNICIPALITY

By:_____

John I. Clark, Mayor

ATTEST:

_____
Pam Kraft, MMC, Town Clerk

Approved as to Form:

_____
Bo James Nerlin, Town Attorney

CERTIFICATE OF TOWN CLERK

The foregoing Ordinance was introduced at a meeting of the Ridgway Town Council on _____, 2020, published by title and posted thereafter, and adopted by the Town Council on _____, 2020.

(SEAL)

_____
Pam Kraft, MMC, Town Clerk

AGENDA ITEM #13

TOWN HALL PO Box 10 | 201 N. Railroad Street | Ridgway, Colorado 81432 | 970.626.5308 | www.town.ridgway.co.us

WRITTEN REPORT

To: Honorable Mayor Clark and Ridgway Town Council
From: Preston Neill, Town Manager
Date: March 6, 2020
RE: **Town Manager's Report**

INTRODUCTION

This report serves as an update to Council on key projects, activities and community issues.

CORONAVIRUS DISEASE 2019 UPDATE

Ouray County Public Health and Ouray County Emergency Management called a Multi-Agency Coordination Group meeting on Thursday, March 5th to discuss the local response to the Coronavirus Disease 2019 (COVID-19). We recognize that everyone has a role to play in getting ready and staying healthy. Our community should be ready to implement strategies to protect our community members from COVID-19 while ensuring continuity of services and operations.

In the coming days, the Town will work with Ouray County Public Health Department and other local government entities to communicate, through our various communication channels, updated information about COVID-2019 and current response efforts. We will post information on the Town's website and social media platforms, and we will post flyers on our community bulletin boards. Ouray County Public Health plans to send out regular updates to the agencies in the Multi-Agency Coordination Group. Another update meeting is scheduled for the week of March 16th.

The Centers for Disease Control and Prevention (CDC) is closely monitoring and responding to the COVID-19 outbreak. Their website, https://www.cdc.gov/coronavirus/2019-ncov/index.html, is chalk full of information and resource documents about COVID-19. They are providing updated information as it becomes available, in addition to updated guidance. The CDC recommends the following everyday preventative actions to help prevent the spread of respiratory diseases, including:

- Avoid close contact with people who are sick.
- Avoid touching your eyes, nose, and mouth.
- Stay home when you are sick.
- Cover your cough or sneeze with a tissue, then throw the tissue in the trash.
- Clean and disinfect frequently touched objects and surfaces using a regular household cleaning spray or wipe.
- Follow CDC's recommendations for using a facemask.
    - CDC does not recommend that people who are well wear a facemask to protect themselves from respiratory diseases, including COVID-19.
    - Facemasks should be used by people who show symptoms of COVID-19 to help prevent the spread of the disease to others. The use of facemasks is also crucial for health workers and people who are taking care of someone in close settings (at home or in a health care facility).

- Wash your hands often with soap and water for at least 20 seconds, especially after going to the bathroom; before eating; and after blowing your nose, coughing, or sneezing.
    - If soap and water are not readily available, use an alcohol-based hand sanitizer with at least 60% alcohol. Always wash hands with soap and water if hands are visibly dirty.

CLERK'S DEPARTMENT UPDATE

From Pam Kraft, Town Clerk/Treasurer:

Update on Annual Events

The Love Your Valley Festival will be held on May 30, 2020. The festival, which began in 1997 as a fund raiser for the Valley Land Conservancy (I was a member of the board at that time), donates all proceeds to the concert series. This event could not take place without the support of Box Canyon Lodge, which continues to provide lodging to all the brewers and band members. Orvis Hot Springs, another sponsor of the concert series, provides day passes for the brewers. The festival runs from 1:00 to 6:00 p.m. and is free, with a $20 fee to purchase a glass for microbrew tasting. The band this year will be Elder Grown, from Durango.

The free concert series, held every Thursday in July, will have five shows this year. We have a number of bands lined up, providing a spectrum of genres. I am currently recruiting food vendors. We have a commitment from the Chautauqua Society to operate the alcohol tent, and also from the people who worked the children's area last year.

Townie Tuesdays, free movie nights held at the stage in Hartwell Park, will begin on June 23, 2020. There will be six nights of films, ending on July 28, 2020. The following weekend there will be two nights of Telluride Mountain Film on Tour.

This year's Clean Up Day will be held on Saturday, April 25, 2020. The location will again be in the parking lot at the Athletic Park, with four dumpsters available. The event will begin at 8:00 a.m. and end after all containers are full. Alpine Bank will hold an Electronics Recycling event from 10:00 a.m. to 2:00 p.m.

Clerks' Department

The annual election will be held on Tuesday April 7, 2020 for the Mayor and three Councilors. This is a polling place election, which will be held in the Community Center. Voters who wish to vote prior to election day can contact me to request an absentee ballot.

ROCC will host a Candidates Forum on Monday, March 16, 2020 in the Community Center. Additionally, the Plaindealer will publish information about each candidate in the local paper.

We are preparing for an organizational inventory of tools, equipment, supplies, vehicles and assets, along with preparation of depreciation schedules.

Finance Department

Last month we undertook a major update to the utility billing program.

A loan the Town has had for forty years with the Colorado Water Conservation Board was paid off in January.

The final numbers for 2019 marijuana sales tax remittances have been compiled. Local tax was $322,443 and the share of state tax (15% of the 10% state tax) was $135,362. These receivables are placed into the sales tax line item of the General Fund.

STORMWATER MASTER PLAN UPDATE

From Chase Jones, Public Works Services Administrator:

The Town has received all final deliverables from RESPEC for the Stormwater Master Plan project. The project consisted of a Master Plan portion as well as creation of Standards and Specifications for stormwater infrastructure. The Master Plan is very intensive and based on computer modeling, local storm history and public input. A computer program will now be able to predict maximum flow rates at various locations throughout town to aid in planning and development. Staff is doing a final review and plans to present this plan for adoption during the April 8, 2020 Town Council meeting. Final additions and edits are also being performed on the Standards and Specs documents. These documents will be combined and presented to Town Council with the new Water and Sewer Standards and Specifications when they are finalized.

BUILDING UPDATE

From Mike Gill, Building Official:

We are approving our first single family dwelling under the new 2018 code and it is a strawbale construction. In the 2018 IRC, there is an Appendix S that deals exclusively with this type of construction. Never before have we had a portion of the code that dealt with this alternate means of construction. The energy code will take some time to fully understand and enforce. I tell our builders that this will require their input as we try to understand the intent of these provisions. We have a great group in our building community. Their efforts to 'get it right' make my job easier. We will all continue to learn and improve our understanding of these new codes.

PLANNING UPDATES

From Shay Coburn, Town Planner:

Ouray County Multi-Hazard Mitigation Plan

Back in December, Council approved Resolution No. 19-19 adopting the Ouray County Multi-Hazard Mitigation Plan, Comprehensive Update 2019. The resolution specified that the plan was adopted as approved by FEMA. On February 18, 2020, the Town was notified that the plan was approved by FEMA and the State and received the final document with a few minor changes. The plan will be on our website soon under Plans, Documents and Studies.

Park Pavilion

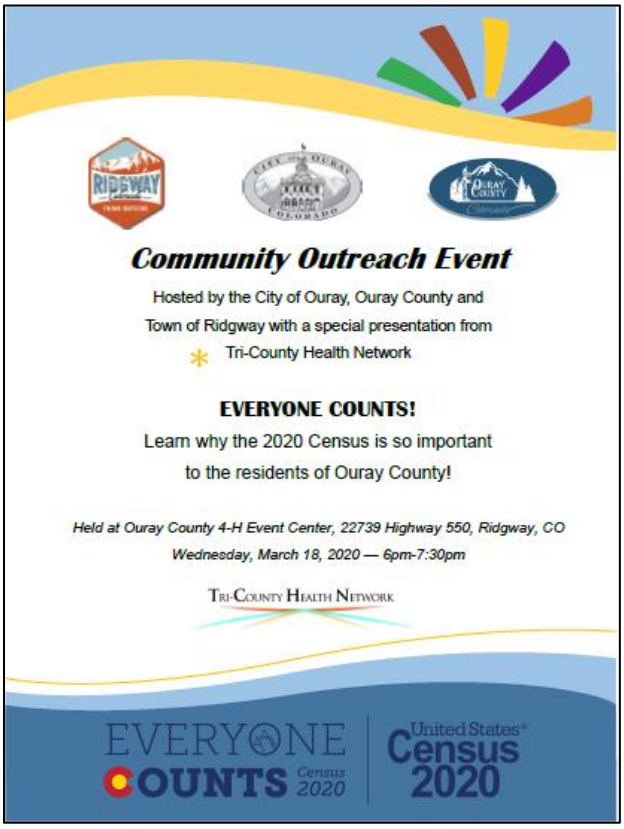
Thanks to our generous community, we have raised the funds needed to build a stunning pavilion in the Athletic Park! In addition to the $300,000 donated by the anonymous donor, we raised a total of $84,060

from various community members and organizations. The Town has also committed to providing $25,000 of in-kind support.

The Request for Bids to build the pavilion has been published. The RFB documents are on our website so feel free to send it along to anyone you think might be interested. A recommended contractor and draft contract should be prepared for the Council to review at the regular April meeting.

2020 Census

In an effort to get a complete count of our region's population, the Town is helping to promote the upcoming 2020 Census. Please help spread the word that the Census is important, easy, and safe. For more information visit https://2020census.gov/en.html.



Ouray County, the City of Ouray, and the Town of Ridgway are planning a forum to provide information and answer questions that the community may have. It is scheduled for March 18, 2020 at 6:00 p.m. at the 4H Events Center. Check out the invitation for more information.

Remaining Key Milestones for the 2020 Census:

- **March 2020**—The public can begin responding to the 2020 Census online at 2020census.gov. Replying by mail or phone will also be an option.
- **April 2020**—Every 10 years, we observe Census Day on April 1.
- **June 2020 through July 2020**—Census takers go door to door to count people who have not responded to the 2020 Census. Census takers are Census Bureau employees and will provide proof that they are official government personnel.
- **December 31, 2020**—By this date, as required by law, the Census Bureau reports to the President of the United States the population count and the apportionment of seats in the U.S. House of Representatives to each state.
- **2021**—Initial 2020 Census data are made available to the public on census.gov.

Master Plan Implementation – Land Use Code Updates Phase 1, Address Housing

A Joint Workshop with Town Council, Planning Commission, and the public was held on February 10, 2020. There were about 35 community members in attendance as well as most of the Council and Commission. The proposed edits to the Municipal Code were generally well received with some finer details discussed. All participants at the workshop and those unable to attend were to submit their comments by Monday, February 24, 2020. The Town received about 10 very detailed written comments which have been

compiled and sent to the consultant team for consideration. Staff will work with the consultant team to reconcile the comments and bring a revised draft of edits to the next Planning Commission meeting on March 31, 2020.

LENA STREET INFRASTRUCTURE IMPROVEMENTS PROJECT

As you all may know, the Town submitted an Energy and Mineral Impact Assistance Grant application to DOLA for the Ridgway Lena Street Infrastructure Improvements Project. ***I'm excited to announce that we were recently notified by DOLA that we have been offered a grant award in the amount of $125,000 for the Project!*** The Town had requested a grant of $145,250. The project was reviewed based on a variety of factors such as its connection to energy impact, degree of need, measurable outcomes, amount of request, relationship to community goals, level of local match and community support, management capacity, and readiness to go. Competition for these limited funds was intense and DOLA had many more requests than they had funds available.

The Project will replace approximately 700 ft. of water main and 700 ft. of sewer main under Lena St. between Charles St. and Otto St. The water main's thin walled piping will be replaced to meet current standards and lowered by a minimum of 1 ft. to prevent freezing. Additionally, the present sewer line has multiple sags, flow inconsistencies, obstructions and some ovaling present. A new sewer main would resolve the flow issues and provide full bodied wyes to each current and anticipated service to minimize future alterations and maintenance issues. The Project is slated to take place this summer and the total cost is estimated at $290,500.

We have been in contact with our DOLA Regional Manager, Patrick Rondinelli, to discuss the Scope of Project and how to proceed.

STATE LEGISLATION TO REDUCE SINGLE-USE PLASTICS

During the current legislative session, several bills have been introduced with the aim of reducing single-use plastics. The status of each bill is provided below:

- HB20-1162 recently passed the House Energy & Environment Committee and was referred to the House Appropriations Committee. If approved and signed by the Governor as currently written, the bill would prohibit a retail food establishment from distributing an expanded polystyrene product for use as a container for ready-to-eat food in this state. The proposed effective date is January 1, 2022.
- HB20-1163 recently passed the House Energy & Environment Committee and was referred to the House Finance Committee. If approved and signed by the Governor as currently written, the bill would prohibit stores and retail food establishments, on and after July 1, 2021, from providing single-use plastic carryout bags, single-use plastic stirrers, single-use plastic straws, and expanded polystyrene food service products (collectively "single-use products") to customers at the point of sale.
- SB20-010, which was introduced in the Senate Local Government Committee, was postponed indefinitely earlier this month. The bill would have repealed the local government preemption in Section 25-17-104, C.R.S. More specifically, it would have removed that language that currently prohibits local governments from banning the use or sale of specific types of plastic materials or restricting or mandating packaging or labeling of any consumer products.

UPCOMING MEETINGS AND EVENTS

- **Town Council Candidates Forum, hosted by ROCC** – March 16, 2020 in the Ridgway Community Center (Time TBD)
- **2020 Census Community Outreach Event** – March 18, 2020 at 6:00 p.m. at the Ouray County 4-H Events Center
- **Joint Workshop Meeting of the Ridgway Town Council, Ouray County Commissioners, and Elected Officials from the City of Ouray to discuss the Ouray County Housing Advisory Committee** – March 25, 2020 at 5:30 p.m. in the Ridgway Community Center
- **Planning Commission Regular Meeting** – March 31, 2020 at 5:30 p.m. in the Ridgway Community Center
- **Regular Municipal Election** – April 7, 2020
- **Regular Town Council Meeting** – April 8, 2020 at 5:30 p.m. in the Ridgway Community Center
- **New Town Council Member Training/Elected Officials 101 Workshop** – TBD

JOKE OF THE DAY

What's that Nevada city where all the dentists visit?

Floss Vegas.