CPWR THE CENTER FOR CONSTRUCTION RESEARCH AND TRAINING

Radiofrequency (RF) Radiation Awareness Program for the Construction Industry

Overview

Based on information available May 2016

RF Radiation Work Group:

NRCA
National Roofing Contractors Association

United Union of Roofers, Waterproofers & Allied Workers

Union of Bricklayers and Allied International Craftworkers

ICE
INTERNATIONAL COUNCIL OF EMPLOYERS
of Bricklayers and Allied Craftworkers

PLUMBERS · UNION · PIPEFITTERS · SPRINKLERFITTERS · STEAMFITTERS · SERVICE TECHS

LABORERS'
HEALTH & SAFETY FUND
OF NORTH AMERICA

AFFILIATED WITH AMERICAN FEDERATION OF LABOR & CONGRESS OF INDUSTRIAL ORGANIZATIONS & CANADIAN LABOUR CONGRESS
INTERNATIONAL BROTHERHOOD OF ELECTRICAL WORKERS
ORGANIZED NOV. 28, 1891

IN UNION THERE IS STRENGTH
INTERNATIONAL UNION OF ELEVATOR CONSTRUCTORS

Mechanical Contractors Association
MCAA
of America

OPERATIVE PLASTERERS' AND CEMENT MASONS' INTERNATIONAL ASSOCIATION
1864

SHEET METAL OCCUPATIONAL HEALTH INSTITUTE TRUST
SMOHIT

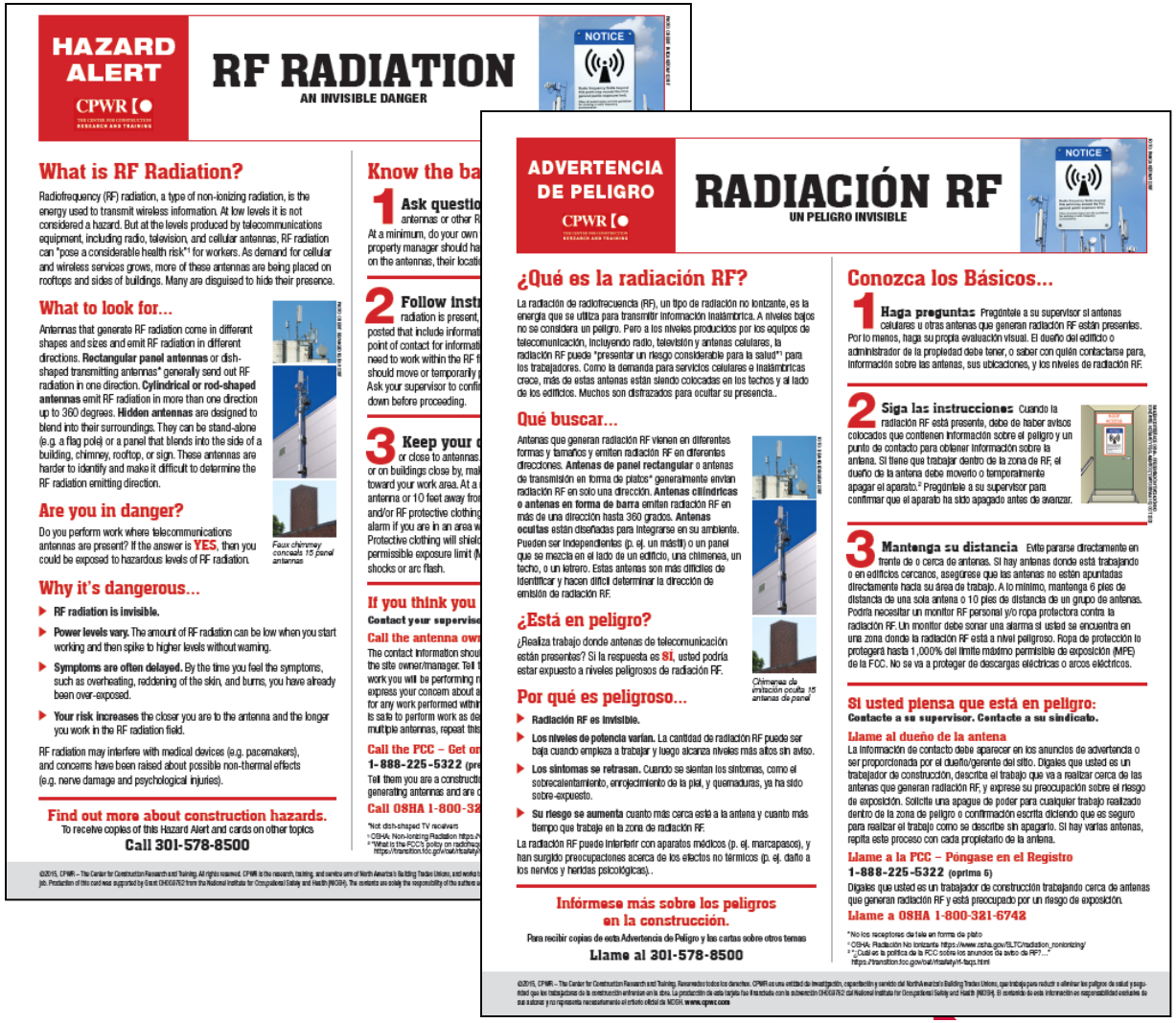
ELEVATOR INDUSTRY WORK PRESERVATION FUND

Program Materials

- Guide
- Presentation
- Video
- Toolbox Talk
- Hazard Alert Card

Program Elements: Video
(16 minutes)

Program Elements: Hazard Alert



HAZARD ALERT

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RF RADIATION

AN INVISIBLE DANGER

What is RF Radiation?

Radiofrequency (RF) radiation, a type of non-ionizing radiation, is the energy used to transmit wireless information. At low levels it is not considered a hazard. But at the levels produced by telecommunications equipment, including radio, television, and cellular antennas, RF radiation can "pose a considerable health risk"[1] for workers. As demand for cellular and wireless services grows, more of these antennas are being placed on rooftops and sides of buildings. Many are disguised to hide their presence.

What to look for...

Antennas that generate RF radiation come in different shapes and sizes and emit RF radiation in different directions. **Rectangular panel antennas** or dish-shaped transmitting antennas* generally send out RF radiation in one direction. **Cylindrical or rod-shaped antennas** emit RF radiation in more than one direction up to 360 degrees. **Hidden antennas** are designed to blend into their surroundings. They can be stand-alone (e.g. a flag pole) or a panel that blends into the side of a building, chimney, rooftop, or sign. These antennas are harder to identify and make it difficult to determine the RF radiation emitting direction.

Faux chimney conceals 15 panel antennas

Are you in danger?

Do you perform work where telecommunications antennas are present? If the answer is **YES**, then you could be exposed to hazardous levels of RF radiation.

Why it's dangerous...

- **RF radiation is invisible.**
- **Power levels vary.** The amount of RF radiation can be low when you start working and then spike to higher levels without warning.
- **Symptoms are often delayed.** By the time you feel the symptoms, such as overheating, reddening of the skin, and burns, you have already been over-exposed.
- **Your risk increases** the closer you are to the antenna and the longer you work in the RF radiation field.

RF radiation may interfere with medical devices (e.g. pacemakers), and concerns have been raised about possible non-thermal effects (e.g. nerve damage and psychological injuries).

Know the ba

1 Ask questio antennas or other R

At a minimum, do your own property manager should ha on the antennas, their locati

2 Follow inst radiation is present, posted that include informat point of contact for informati need to work within the RF f should move or temporarily Ask your supervisor to confi down before proceeding.

3 Keep your or close to antennas or on buildings close by, mai toward your work area. At a antenna or 10 feet away fro and/or RF protective clothing alarm if you are in an area w Protective clothing will shield permissible exposure limit (N shocks or arc flash.

If you think you

Contact your supervis

Call the antenna own

The contact information shou the site owner/manager. Tell t work you will be performing r express your concern about a for any work performed withi is safe to perform work as de multiple antennas, repeat this

Call the PCC – Get or

1-888-225-5322 (pr

Tell them you are a constructi generating antennas and are c

Call OSHA 1-800-32

*Not dish-shaped TV receivers

[1] OSHA: Non-Ionizing Radiation https://

** "What is the FCC's policy on radiohaz https://transition.fcc.gov/oet/rfsafety/

Find out more about construction hazards.

To receive copies of this Hazard Alert and cards on other topics

Call 301-578-8500

job. Production of this card was supported by Grant OH009762 from the National Institute for Occupational Safety and Health (NIOSH). The contents are solely the responsibility of the author(s)

ADVERTENCIA DE PELIGRO

CPWR

RADIACIÓN RF

UN PELIGRO INVISIBLE

¿Qué es la radiación RF?

La radiación de radiofrecuencia (RF), un tipo de radiación no ionizante, es la energía que se utiliza para transmitir información inalámbrica. A niveles bajos no se considera un peligro. Pero a los niveles producidos por los equipos de telecomunicación, incluyendo radio, televisión y antenas celulares, la radiación RF puede "presentar un riesgo considerable para la salud"[1] para los trabajadores. Como la demanda para servicios celulares e inalámbricas crece, más de estas antenas están siendo colocadas en los techos y al lado de los edificios. Muchos son distrazados para ocultar su presencia..

Qué buscar...

Antenas que generan radiación RF vienen en diferentes formas y tamaños y emiten radiación RF en diferentes direcciones. **Antenas de panel rectangular** o antenas de transmisión en forma de platos* generalmente envían radiación RF en solo una dirección. **Antenas cilíndricas o antenas en forma de barra** emiten radiación RF en más de una dirección hasta 360 grados. **Antenas ocultas** están diseñadas para integrarse en su ambiente. Pueden ser independientes (p. ej. un mástil) o un panel que se mezcla en el lado de un edificio, una chimenea, un techo, o un letrero. Estas antenas son más difíciles de identificar y hacen difícil determinar la dirección de emisión de radiación RF.

Chimenea de imitación oculta 15 antenas de panel

¿Está en peligro?

¿Realiza trabajo donde antenas de telecomunicación están presentes? Si la respuesta es **SI**, usted podría estar expuesto a niveles peligrosos de radiación RF.

Por qué es peligroso...

- **Radiación RF es invisible.**
- **Los niveles de potencia varían.** La cantidad de radiación RF puede ser baja cuando empieza a trabajar y luego alcanza niveles más altos sin aviso.
- **Los síntomas se retrasan.** Cuando se sientan los síntomas, como el sobrecalentamiento, enrojecimiento de la piel, y quemaduras, ya ha sido sobre-expuesto.
- **Su riesgo se aumenta** cuanto más cerca esté a la antena y cuanto más tiempo que trabaje en la zona de radiación RF.

La radiación RF puede interferir con aparatos médicos (p. ej. marcapasos), y han surgido preocupaciones acerca de los efectos no térmicos (p. ej. daño a los nervios y heridas psicológicas)..

Infórmese más sobre los peligros en la construcción.

Para recibir copias de esta Advertencia de Peligro y las cartas sobre otros temas

Llame al 301-578-8500

Conozca los Básicos...

1 Haga preguntas Pregúntele a su supervisor si antenas celulares u otras antenas que generan radiación RF están presentes. Por lo menos, haga su propia evaluación visual. El dueño del edificio o administrador de la propiedad debe tener, o saber con quién contactarse para, información sobre las antenas, sus ubicaciones, y los niveles de radiación RF.

2 Siga las instrucciones Cuando la radiación RF está presente, debe de haber avisos colocados que contienen información sobre el peligro y un punto de contacto para obtener información sobre la antena. Si tiene que trabajar dentro de la zona de RF, el dueño de la antena debe moverlo o temporalmente apagar el aparato.[2] Pregúntele a su supervisor para confirmar que el aparato ha sido apagado antes de avanzar.

3 Mantenga su distancia Evite pararse directamente en frente de o cerca de antenas. Si hay antenas donde está trabajando o en edificios cercanos, asegúrese que las antenas no estén apuntadas directamente hacia su área de trabajo. A lo mínimo, mantenga 6 pies de distancia de una sola antena o 10 pies de distancia de un grupo de antenas. Podría necesitar un monitor RF personal y/o ropa protectora contra la radiación RF. Un monitor debe sonar una alarma si usted se encuentra en una zona donde la radiación RF está a nivel peligroso. Ropa de protección lo protegerá hasta 1,000% del límite máximo permisible de exposición (MPE) de la FCC. No se va a proteger de descargas eléctricas o arcos eléctricos.

Si usted piensa que está en peligro:

Contacte a su supervisor. Contacte a su sindicato.

Llame al dueño de la antena

La información de contacto debe aparecer en los anuncios de advertencia o ser proporcionada por el dueño/gerente del sitio. Dígales que usted es un trabajador de construcción, describa el trabajo que va a realizar cerca de las antenas que generan radiación RF, y exprese su preocupación sobre el riesgo de exposición. Solicite una apague de poder para cualquier trabajo realizado dentro de la zona de peligro o confirmación escrita diciendo que es seguro para realizar el trabajo como se describe sin apagarlo. Si hay varias antenas, repita este proceso con cada propietario de la antena.

Llame a la PCC – Póngase en el Registro

1-888-225-5322 (oprima 6)

Dígales que usted es un trabajador de construcción trabajando cerca de antenas que generan radiación RF y está preocupado por un riesgo de exposición.

Llame a OSHA 1-800-321-6742

*No los receptores de tela en forma de plato

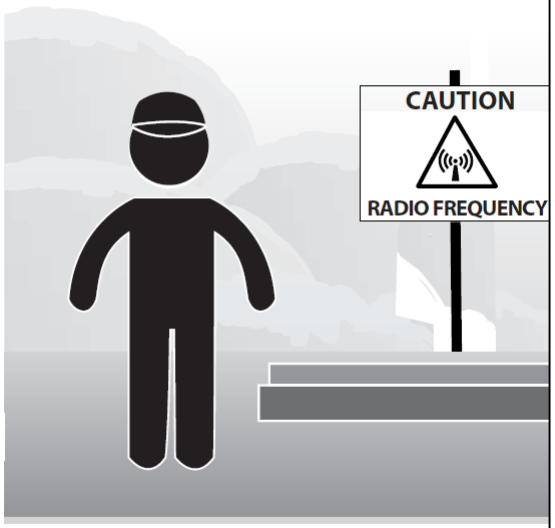
[1] OSHA: Radiación No Ionizante https://www.osha.gov/SLTC/radiation_nonionizing/

[2] "¿Cuál es la política de la FCC sobre los anuncios de aviso de RF?..." https://transition.fcc.gov/oet/rfsafety/rf-faqs.html

Program Elements: Toolbox Talk

CPWR TOOLBOX TALK

RF Radiation



- Ask your supervisor or the building manager if cellular or other RF antennas are present.
- Look for signs and/or barriers near your work area. Follow any instructions.
- Keep your distance -- stay at least 6 feet away from a single antenna or 10 feet away fro a group of antennas.

CPWR TOOLBOX TALK

RF Radiation

Radiofrequency (RF) radiation is the energy used to transmit wireless information. Cellular, television, and other antennas located on roof tops, sides of buildings, news gathering trucks, and other structures can give off levels of RF radiation that are harmful to workers.

Greg's Story

Greg, a roofer, was making repairs to the penthouse roof of an office building. He soon developed a headache, and began to feel warm and dizzy. He leaned against a panel on the side of the chimney to take a break. Later, he noticed a red, painful burn mark on his arm. The panel Greg was working in front of and touched was a cellular antenna.

1. **What steps could have been taken to prevent Greg's symptoms and the burn?**
2. **Have you or anyone you know worked near antennas and become sick or suffered a burn? If so, what happened?**

Remember this

- Before you begin work, ask your supervisor or the building manager if cellular or other RF antennas are present and for a copy of the current RF radiation survey results.
- Look around you to see if you can spot antennas in your work area or nearby. These antennas come in different shapes and sizes. They can be rectangular panels, dish-shaped, cylindrical or rod-shaped, or disguised in a stand-alone structure, such as a building chimney or flag pole.
- Look for posted signs and barriers, and follow the instructions.
- Avoid standing right in front of or close to an antenna. Stay at least 6 feet away from a single antenna or 10 feet away from a group of antennas.
- Assume the antenna is energized ("hot"). Touching a "hot" antenna can result in a serious burn.
- Know the warning signs of RF radiation exposure, such as a headache, dizziness, labored breathing, reddening of the skin, and suddenly feeling overheated. Leave the area immediately if you think you are in danger or begin to feel symptoms.

How can we stay safe today?

What will we do here at the worksite today to prevent exposure to RF radiation?

1. _____

_____

2. _____

_____

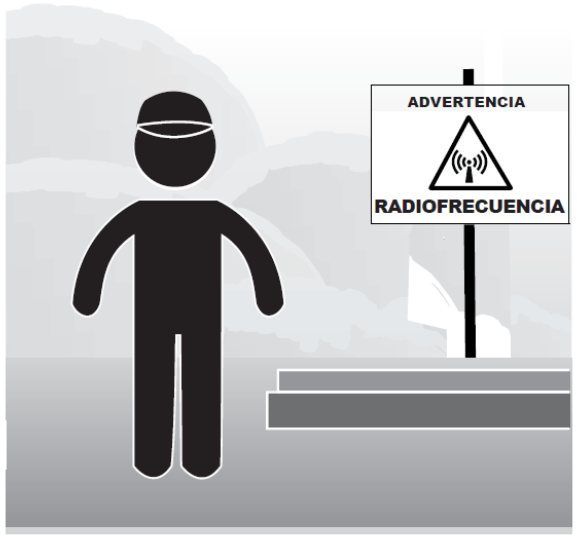
OSHA STANDARD: General Duty Clause Section (5)(a)(1) of the OSHA Act
FCC RULES & REGULATIONS: 47 CFR 1.1307(b), 1.1310, 2.1091, 2.1093; OET Bulletin 65

 Production of this card was supported by Grant OH009762 from the National Institute for Occupational Safety and Health (NIOSH). The contents are solely the responsibility of the authors and do not necessarily represent the official views of NIOSH. www.cpwr.com

CPWR THE CENTER FOR CONSTRUCTION RESEARCH AND TRAINING

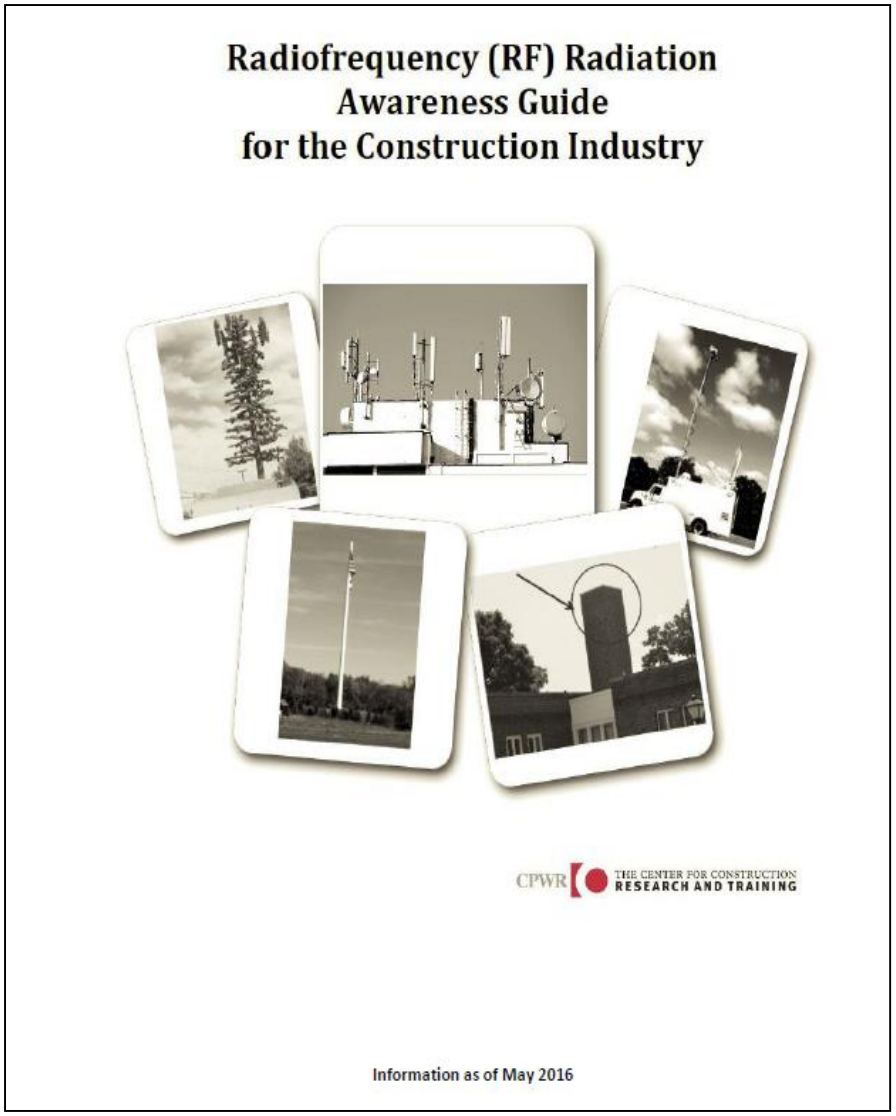
CPWR CHARLA INFORMATIVA

Radiación RF



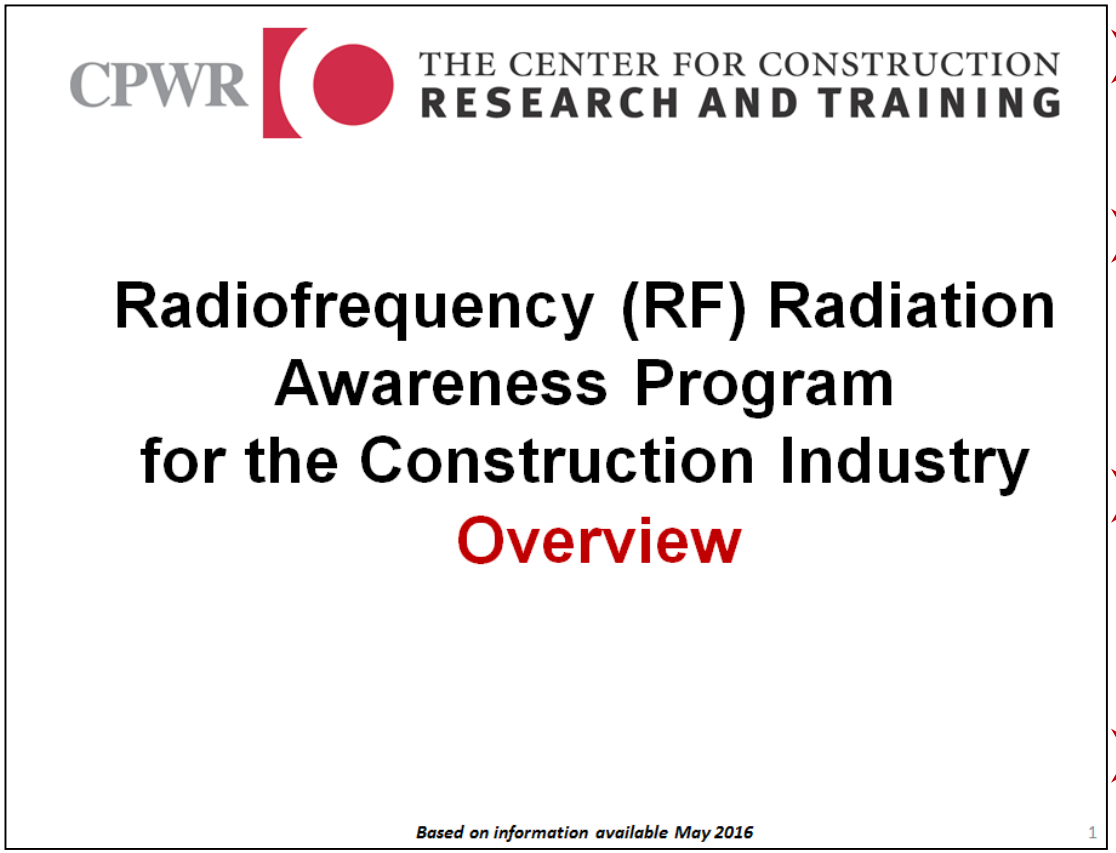
- Pregunte a su supervisor o al administrador del edificio si hay antenas celulares o otros antenas RF presentes.
- Busque señales y/o barreras cerca de su área de trabajo. Siga las instrucciones.
- Mantenga su distancia - permanecer por lo menos 6 pies de distancia de una sola antena o 10 pies de distancia de un grupo de antenas.

Program Elements: Guide



- Detailed information that responds to key questions
- Links to additional information (regulations, online resources)
- Instructions for using online resources to find antenna locations

Program Elements: Presentation



- Responds to the key questions
- Summarizes Information from the Guide
- Each slide includes notes explaining the content
- Can be tailored for different audiences

Objectives

1. Define Radiofrequency radiation and list 5 common uses of RF radiation.
2. Identify the unit of measure commonly used to measure RF radiation power density.
3. State the thermal and non-thermal health effects associated with exposure to RF radiation.

Objectives

4. List the signs of overexposure to RF radiation.
5. Define General Population/Uncontrolled exposure limits and Occupational/controlled exposure limits.
6. Name at least 2 agencies or organizations that have regulations, guideline, or programs that address RF radiation.

Objectives

7. List at least 4 ways employees and employers can identify whether an RF radiation hazard is present.
8. Identify various methods employees can use to protect themselves from RF radiation.

What is radiofrequency (RF) radiation?

RF radiation is a form of non-ionizing radiation

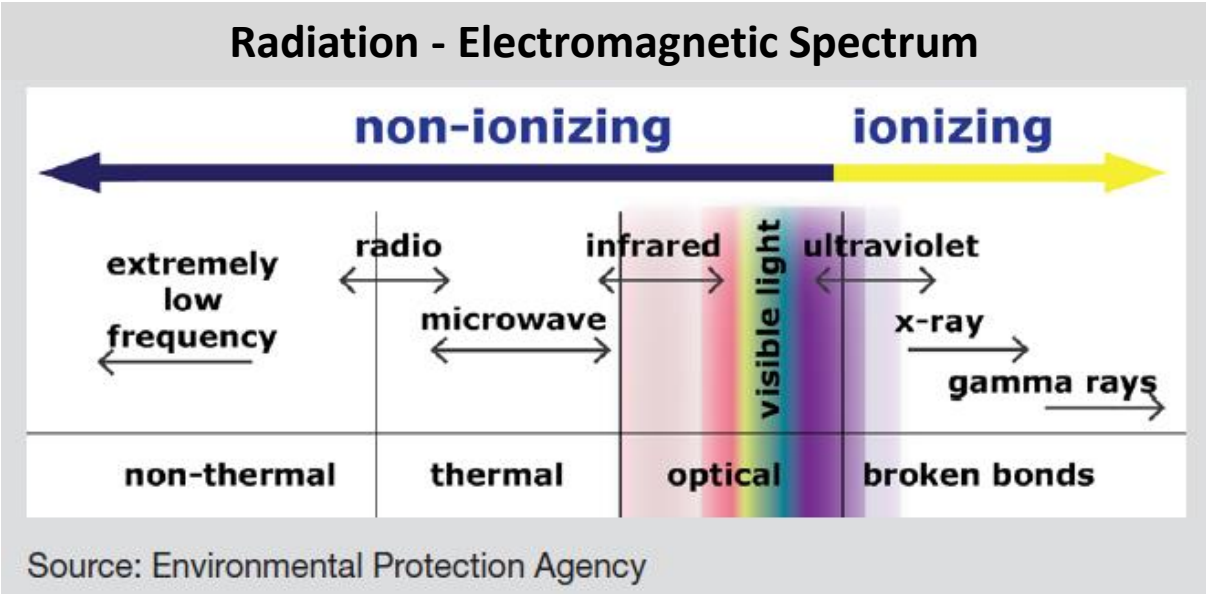
- Causes molecules to vibrate, which can generate heat

It is not ionizing radiation

- Creates enough energy to cause chemical changes by breaking molecular bonds
- X-rays and gamma rays are forms of ionizing radiation
- This type of radiation is used in health care and nuclear weapons facilities

Electromagnetic Spectrum: Common Terms

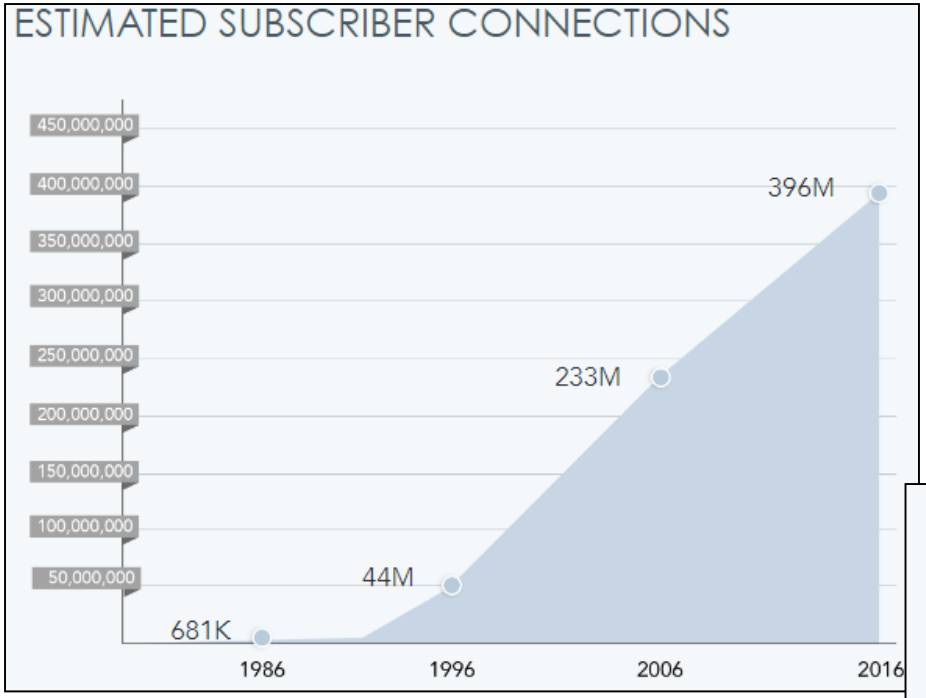
- RF radiation is a type of **energy**
- RF radiation = **radio waves** and **microwaves**
- **Waves** are characterized by wavelength and frequency
  - The **frequency** of each wave is measured in **Hertz (Hz) –** 1 cycle per second
  - **RF radiation frequencies =** 3 kilohertz (3 kHz) to 300 gigahertz (300 GHz)
  - **Different frequencies affect humans differently**
- **RF Power** is measured in **watts, and RF Power Density** is measured in milliwatts per square centimeter (mW/cm^2)



What is RF energy used for?

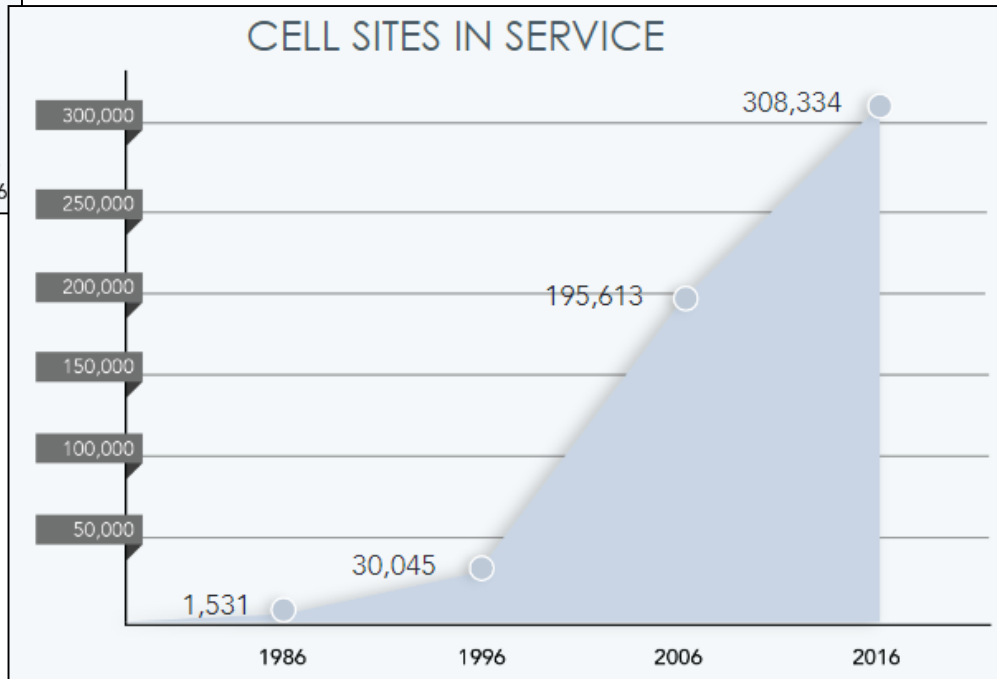
- Microwave ovens
- Radar
- Industrial heating and sealing processes
- Medical applications
- Telecommunications & broadcast services:
  - Cellular antennas/base stations
  - Radio and television broadcasting
  - Radio communications for police and fire departments
  - Microwave point-to-point radio links
  - Satellite communications

Common Uses: Growth in Cellular Antenna Sites & Subscribers



57% growth

in cell sites over the last 10 years.



Source: CTIA – The Wireless Association. Wireless Snapshot 2017

What are the potential health effects?

- **Thermal effects:** heating of tissue, blindness and sterility
- **Non-thermal effects**: alter the human body's circadian rhythms, immune system, and the nature of the electrical and chemical signals communicated through the cell membrane

  Source: *Occupational Safety and Health Administration (OSHA)*
- ***Group 2B - Possibly carcinogenic to humans***

  Source: *World Health Organization – International Agency for Research on Cancer (WHO/IARC)*
- **Pacemakers** could be susceptible to electromagnetic signals that could cause them to malfunction.

  Source: *Federal Communications Commission (FCC)*

Symptoms of overexposure may include:

- Labored breathing
- Perspiring
- Pain
- Headache
- Numbness
- Paresthesia
- Malaise
- Diarrhea
- Skin erythema
- Burns

If you experience these symptoms, move to a new location

Who's at risk?

- Roofers
- HVAC technicians
- Electricians
- Masons
- Plasterers
- Painters
- Carpenters
- Laborers
- Maintenance staff
- Glaziers

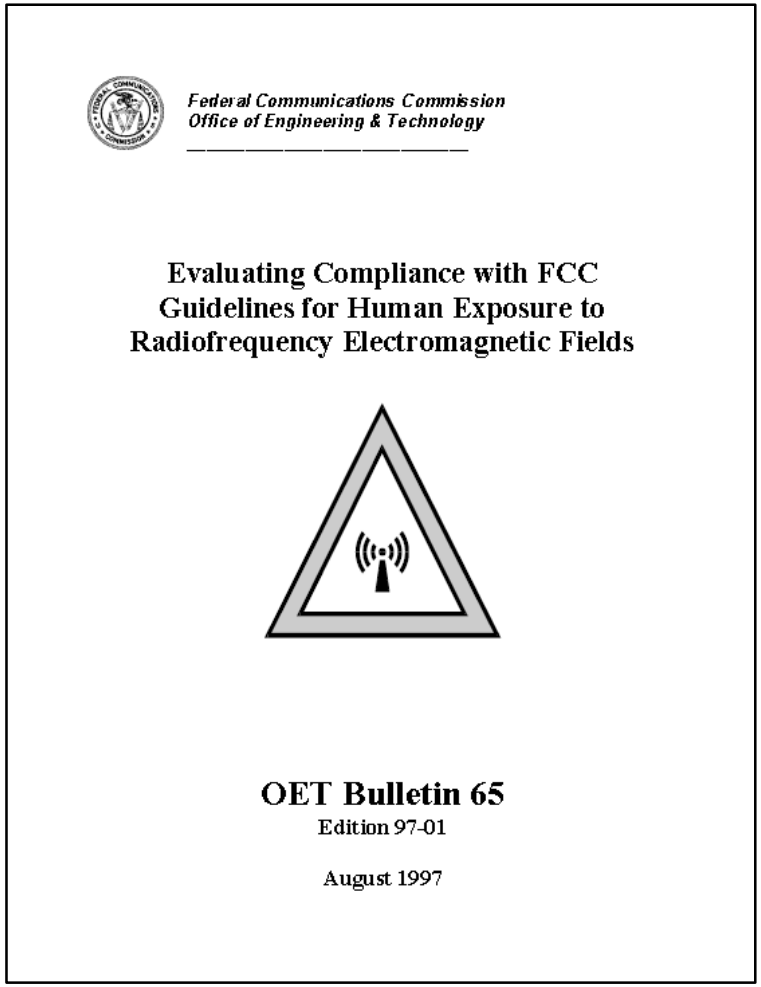
Anyone who works on rooftops, sides of buildings, in and around mobile news trucks, and other locations where RF generating antennas are located

What are the applicable regulations, guidelines, and voluntary standards?

- FCC Guidelines
- OSHA Standards
- Voluntary Standards:
  Institute of Electrical and Electronics Engineers (IEEE)
- State, Local & Other Standards & Requirements

Federal Communications Commission (FCC)

- Jurisdiction over transmitting services licensed by the FCC
- Health and safety based on the IEEE standards and the National Council on Radiation Protection and Measurements (NCRP)
- OET Bulletin 65:
  - Exposure limits
  - Methods to determine compliance
  - Signage requirements



Federal Communications Commission
Office of Engineering & Technology

Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields

OET Bulletin 65
Edition 97-01

August 1997

FCC – Maximum Permissible Exposure (MPE) Limits

Two tiers:

1. General population/uncontrolled:

- The public
- Individuals exposed as a consequence of their employment, but who **may not have been made fully aware of the potential for exposure *or* cannot exercise control over their exposure**. According to the FCC:

*"**When cellular and PCS antennas are mounted on rooftops, RF emissions could exceed higher than desirable guideline levels** on the rooftop itself, even though rooftop antennas usually operate at lower power levels than free-standing power antennas. **Such levels might become an issue for maintenance or other personnel working on the rooftop**."*

FCC Consumer Guide – Human Exposure to Radio Frequency Fields: Guidelines for Cellular and PCS Sites – 11/04/15

FCC – Maximum Permissible Exposure (MPE) Limits

2. Occupational/controlled:

- Individuals exposed as a consequence of their employment, who **have been made fully aware of the potential for exposure, *and* can exercise control over their exposure**
- "Transient" exposures

Federal Communications Commission (FCC)

Worst-Case Scenario:

- Transmitting devices operating simultaneously and continuously at maximum power
- Working in the main transmitting beam
- Working within a few feet of an antenna for several minutes

Federal Communications Commission (FCC)

- Transmitting facilities and devices regulated by the FCC are expected to comply with RF radiation exposure guidelines
- The FCC can fine licensees for violations that create unsafe conditions for workers and the public.

OSHA Standards

No specific standards for radiofrequency and microwave radiation.

- The exposure limit in the nonionizing radiation standards (1926, Subpart D, 1926.54 and 1910.97) ruled unenforceable.
- The telecommunications standards (1910.268) do not apply to construction work.

Other applicable standards:

- **General Duty Clause** –Section 5(a)(1) of the OSH Act
  Each employer shall furnish … a place of employment … free from recognized hazards … causing or are likely to cause death or serious physical harm
- **1926.28 –** Personal Protective Equipment

Voluntary Standards: Institute of Electrical and Electronics Engineers (IEEE)

- **C95.1™** Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3kHz to 300 GHz
- **C95.2™** Standard for Radio Frequency Energy and Current Flow Symbols
- **C95.3 ™** Recommended Practice for Measurements and Computations of Radio Frequency Electromagnetic Fields with Respect to Human Exposure to Such Fields, 100 kHz-300 GHz
- **C95.7 ™** *Recommended Practice for Radio Frequency Safety Programs, 3kHz to 300 GHz (revision 2014)*
  - Guidance for development of a Radio Frequency Safety Program
  - Explains how to characterize exposures and identify controls

Examples of State, Local & Other Requirements

- States
- Cities
- Owners/Universities

What does a potential hazard look like?

Challenges:

- Identifying RF generating devices where work needs to be performed
- Determining if exposure limits are being exceeded and protective measures

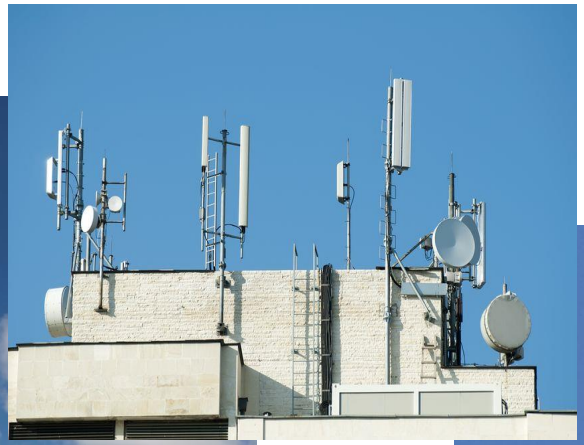


Photo credit: deyangeorgiev/123rf.com

Photo credit:: Steve Kazella/Wikimedia Commons/CC-BY-3.0

Check with the Building Owner

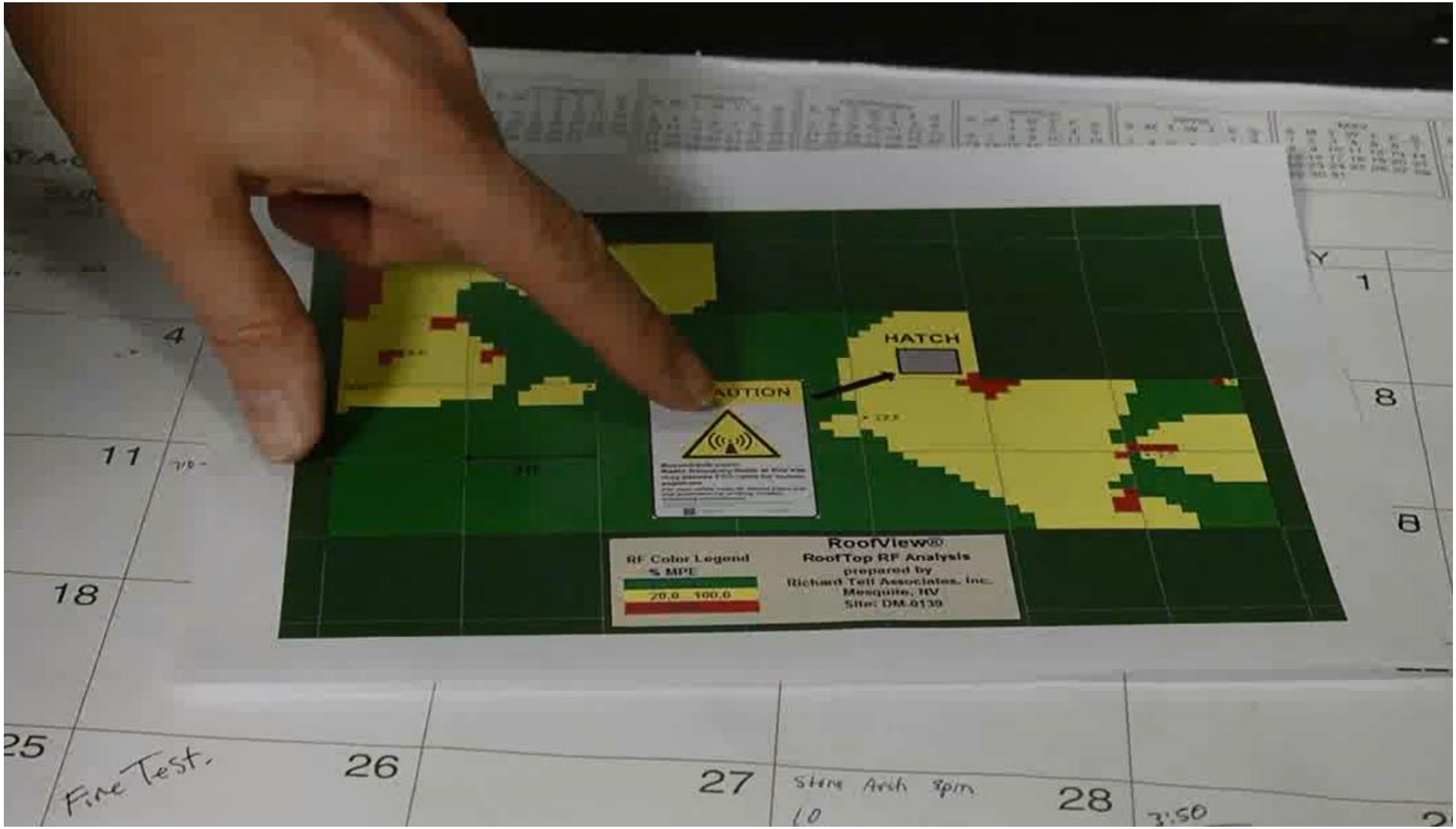
- Site evaluation required for compliance with FCC rules for human exposure
- Site safety plan – location of RF devices, restricted areas, steps to ensure a safe working environment

Current RF Signage Postings

Address	Campus	Sign Required	Qty.	Sign Required #2	Qty. #2
840 Harrison Ave.	BUMC	Warning	1	Caution	2
72. E Concord	BUMC	Notice	1		
750 Albany St	BUMC	Warning	1		

Example from Boston University: Radio Frequency Safety
http://www.bu.edu/ehs/plans/management-plans/rf-safety/current-rf-signage-postings/

Site Survey


HATCH
RF Color Legend
% MPE
20.0 100.0
RoofView©
RoofTop RF Analysis
prepared by
Richard Tell Associates, Inc.
Mesquite, NV
Site: DM-0139
Fire Test.
Store Arch 8pm

Look for Signs

- Prominently posted
- Containing information on the risk and ways to minimize the risk
- FCC recommends the ANSI C95.2-1966 format

Example of an RF Radiation sign

Photo credit: pancaketom/123rf.com

Follow the Instructions

Photo credit: FourSeasons/123RF.com

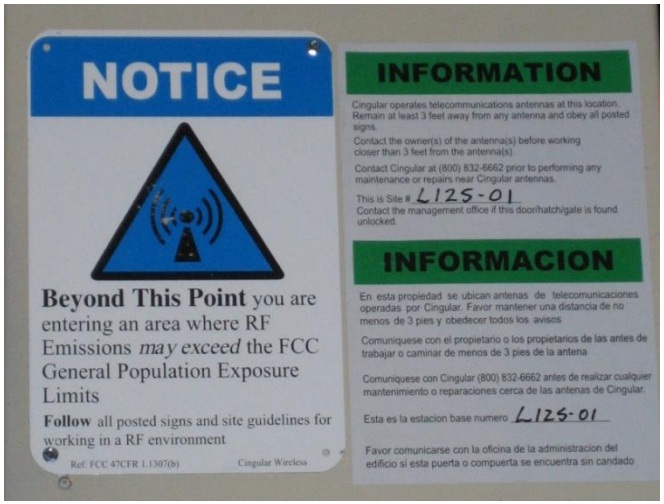


Photo credit: Robert Cooper/Wikimedia Commons/CC-BY-2.0

Photo credit: Marc Smith/
Wikimedia Commons/CC-BY-2.0

Image courtesy of OSHA Presentation "Non-Ionizing Radiation: standards and Regulations," slide 132, Oct. 2002

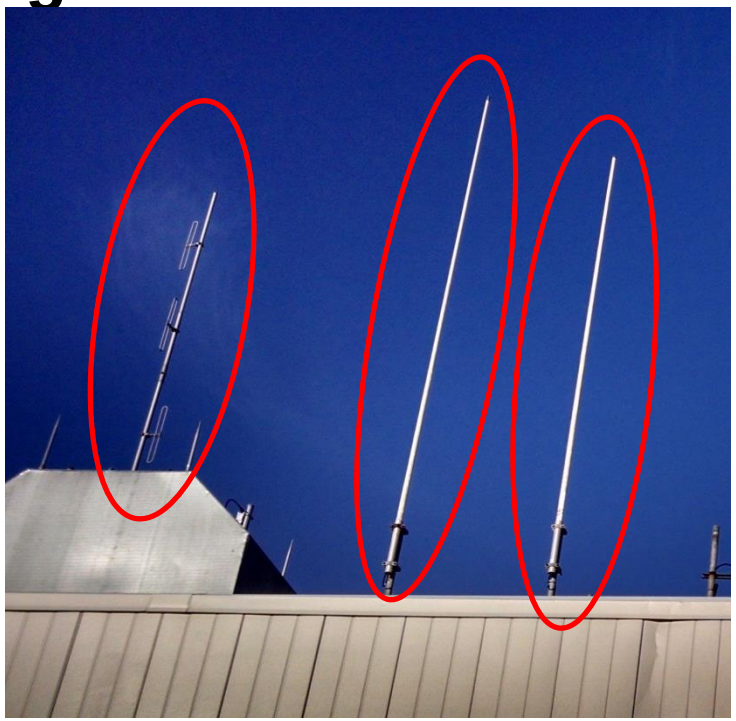
Conduct a Pre-Task Safety Assessment

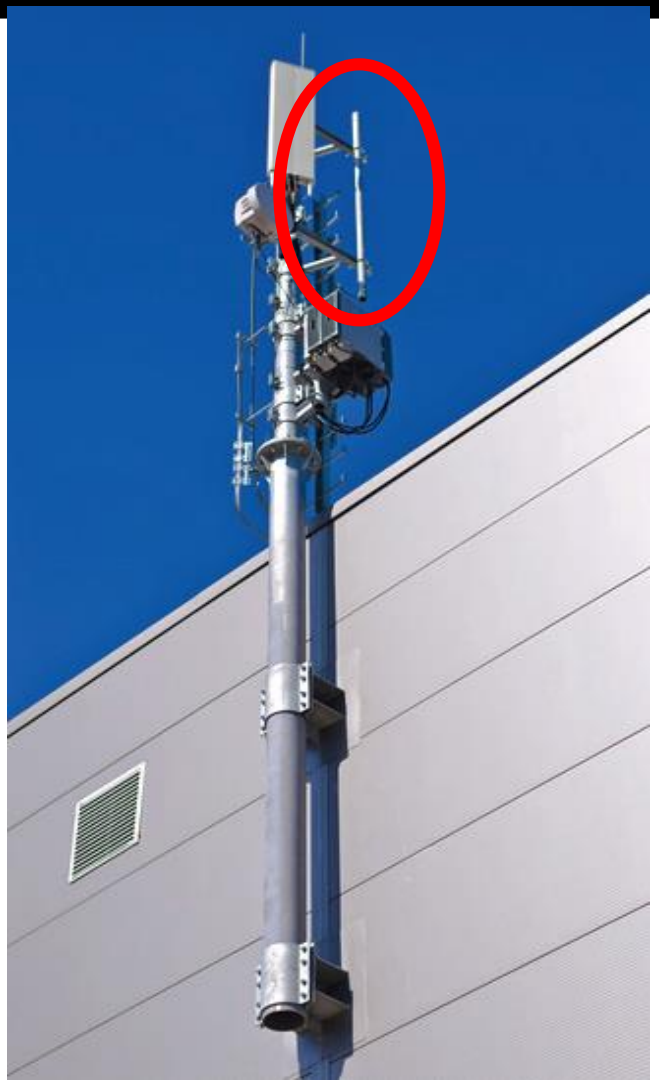
Devices of Most Concern in Construction:

- Cylindrical or rod-shaped antennas
- Rectangular panel, dish-shaped, and microwave antennas
- Hidden antennas

Cylindrical or Rod-shaped Antennas

These antennas emit RF radiation in more than one direction up to 360 degrees





Rectangular Panel Antennas, Dish-shaped, and Microwave Antennas*

These antennas send out RF radiation in one direction

Photo credit: Anton Petrov/Wikimedia Commons/public domain

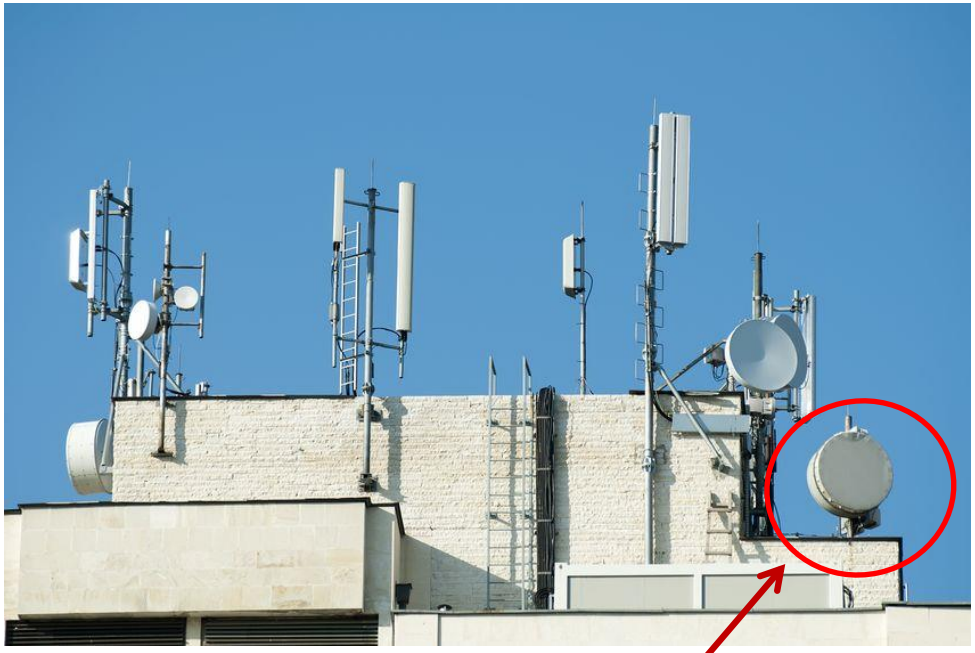


Photo credit: deyangeorgiev/123rf.com

**Dish-shaped TV receivers do not generate RF radiation*

Hidden or "Stealth" Antennas

These antennas are designed to blend into their surroundings, which makes them hard to identify and determine their RF radiation emitting direction

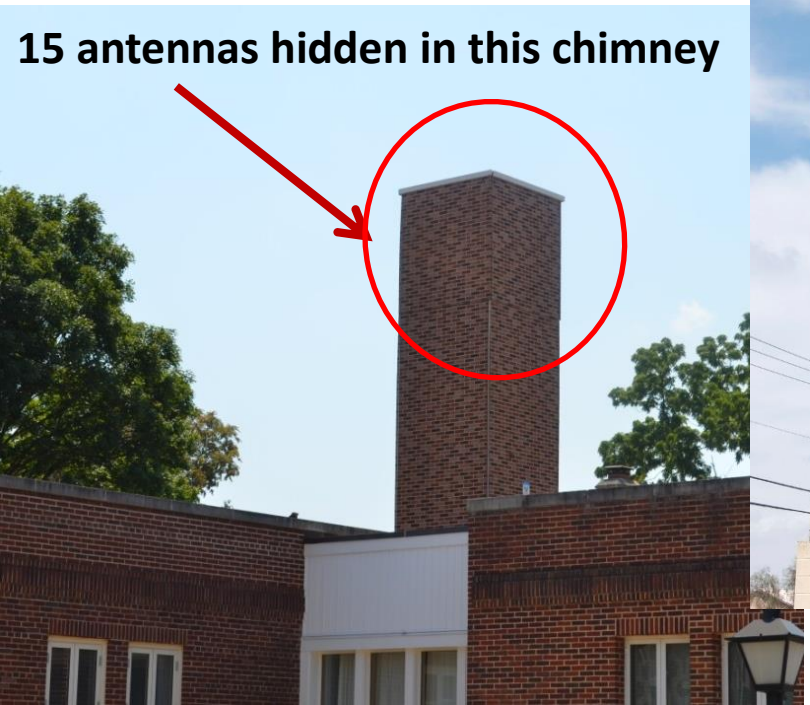


Photo credit: Steve Kazella/Wikimedia Commons/CC-BY-3.0

Antennas on ENG & SNG News Gathering Trucks

SNG Example:

Mast with antenna

Feed Horn: High RF Radiation Fields

Main Antenna Beam – RF Radiation present

Transmitting Cameras

- Transmitters operate through Ethernet, Wi-Fi, or cellular
- Covered by IEEE Std. 802® Standard for Local and Metropolitan Area Networks
- Required to comply with FCC specific absorption rates for RF.

Photo courtesy of the International Brotherhood of Electrical Workers

Access Other Sources for Antenna Locations

- AntennaSearch.com
- FCC Universal Licensing System and Antenna Structure Registration database
- FAA Obstruction Evaluation/Airport Airspace Analysis database
- Local government agencies/offices:
  - Planning, zoning, and building departments
  - Building permit, license, and inspection offices

What can be done to work safely?

What to consider:

- Distance from antennas
- Direction and angle of antennas
- Height of antennas

Exercise caution:

1. Assume all antennas are active and operating at full power
2. Stay away from the antenna
   - *Request to have the antennas powered down or moved*
3. *As part of a safety program:*
   - *Use a personal RF (field) monitor*
   - *Use RF protective clothing*

Maintain a Safe Distance

- Follow instructions on signs
- Do not cross fences/barriers set up to restrict access
- Pre-plan work tasks and travel routes
- Limit the time spent performing tasks near antennas
- Stay **at least** six feet away from a single antenna
- Stay **at least** 10 feet away from 2 or more antennas
- Do not come in physical contact with an active energized (“HOT”) antenna
- If you notice symptoms of RF Radiation exposure – move to a new location

Power-Down or Move the Antenna

- Contact the antenna owner/person listed on the warning sign(s) or provided by the site owner or manager.

  1. *Describe the work being performed near the RF radiation generating antennas*
  2. *Express your concern about an exposure hazard*
  3. *Request a site power down or written confirmation that it is safe to perform work*

  If there are multiple antennas, repeat this process with each antenna owner.

Use a Personal RF (Field) Monitor

- Portable – attach to clothing
- Monitors the level of RF radiation in real time
- Sounds an alarm when there is a risk for overexposure

Photo courtesy of Narda Safety Test Solutions http://www.narda-sts.us/index.php -- Nardalert S3 Personal Monitor

*CPWR does not endorse any specific products

Use Protective Clothing

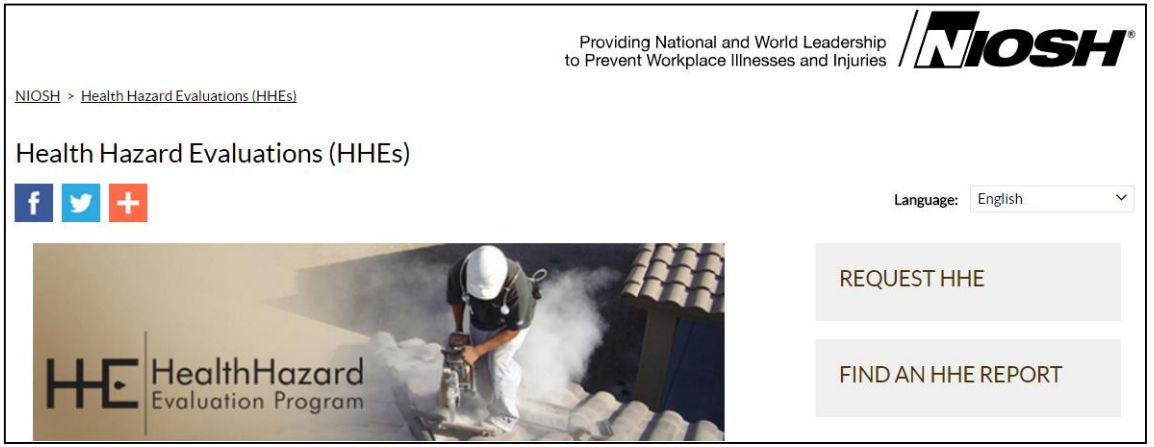
Photo courtesy of UniTech Services Group http://www.unitechus.com/services/rf-protection/ -- UniTech RF Garment

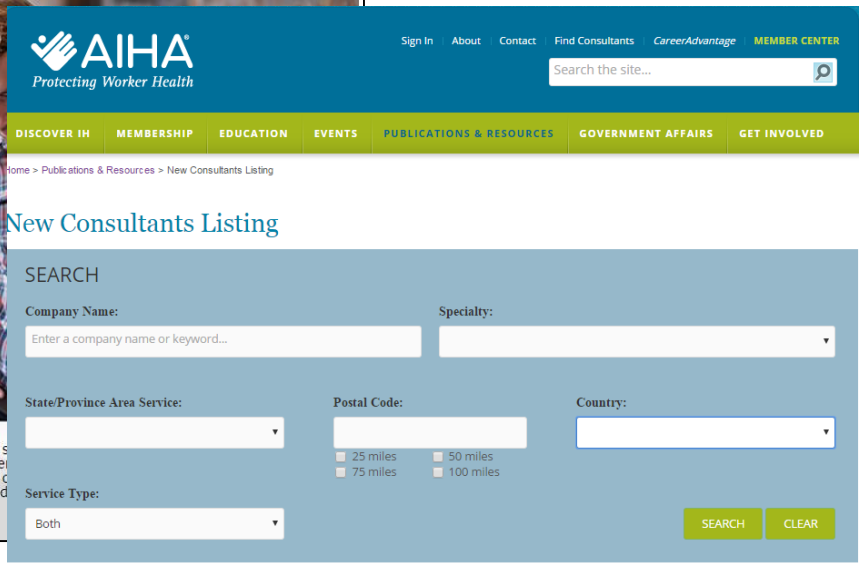
- RF protective coveralls, socks, gloves and hood should be worn and used in accordance with manufacturer instructions and limitations
- Use when you **must** work in areas above the RF MPE limits
- Personal monitors should be worn on the outside of RF protective clothing

*CPWR does not endorse any specific products

Other Measures

- NIOSH Health Hazard Exposure Assessment
- OSHA On-site Consultation Service
- AIHA Consultants





RF Video Review

https://www.youtube.com/watch?v=ulveB1c3hCs

Summary

RF radiation is a potential hazard for construction workers because:

- It is invisible
- Antennas come in different shapes and sizes and may be concealed
- Power levels generated by these devices vary
- The risk increases with the number of devices, distance, and time
- Symptoms of overexposure are often attributed to strenuousness work or a non-occupational illness
- RF radiation may interfere with medical devices
- Limited research on the long-term health effects

Summary

To determine if RF generating devices are present:

- Look for signs and/or barriers
- Ask the building owner or site manager for the RF survey(s) required by the FCC
- Conduct your own visual pre-task safety assessment

Summary

Take protective measures:

- Check the site survey (plot plan) for potential exposure levels
- Pre-plan work tasks and travel routes
- Contact the building manager and the antenna licensee to have the equipment powered down or moved
- If the device owner and building owner are unresponsive:
  1) Contact the FCC to file a complaint
  2) Use personal monitors while work is being performed and stop work if an alarm goes off
  3) Use personal monitors and protective clothing

Summary

Workers should be trained to:

- Understand the hazard
- Recognize RF generating antennas and other devices
- Follow the instructions on signs and barriers
- Stay at least 6 feet away from a single antenna and at least 10 feet away from a cluster of antennas
- Never touch an antenna, stop in front of or close to antennas, or take breaks on the rooftop where antennas are present
- Use personal monitors and protective clothing provided
- Recognize the symptoms

Summary

If you think you are in danger:

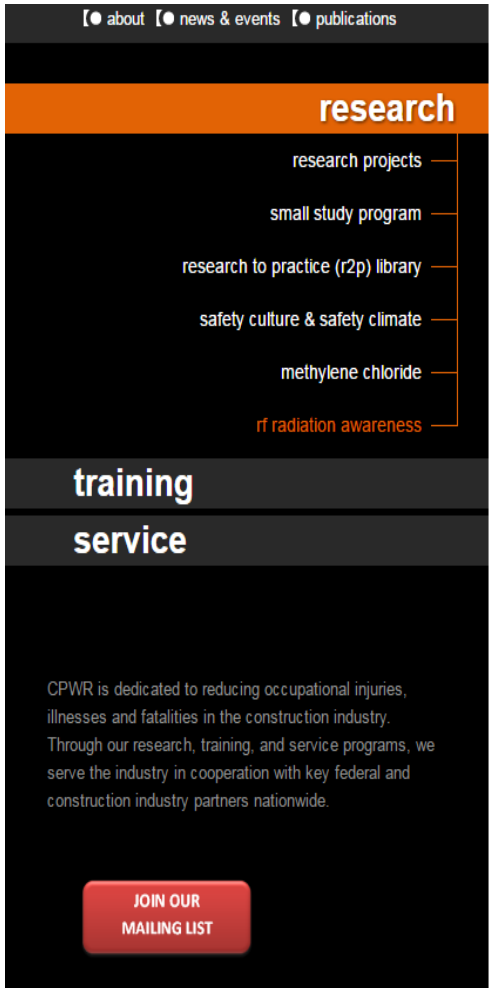
- Leave the work area immediately
- Contact your supervisor
- Contact your union
- Contact the building owner, site manager or the antenna licensee to have the equipment powered down or moved
- If they are unresponsive, contact the FCC to file a complaint

To learn more and access the rest of the CPWR RF Radiation Awareness Program, visit www.cpwr.com/research/rf-radiation-awareness

- ✓ Radiofrequency (RF) Radiation Awareness Guide for the Construction Industry
- ✓ Video: Safe Transmission: RF Awareness for the Construction Industry
- ✓ RF Awareness Toolbox Talk
- ✓ Hazard Alert Card: RF Radiation – An invisible danger

To Learn More…..

Visit: http://www.cpwr.com/research/rf-radiation-awareness



RF Radiation Awareness

Workers who perform tasks on rooftops, sides of buildings, news gathering trucks, and other structures where cellular antennas and other RF (radiofrequency) generating devices are present may be at risk of exposure to hazardous levels of RF radiation.

The **Radiofrequency (RF) Radiation Awareness Program for the Construction Industry** was developed by the **Roofing r2p Partnership*** and the multi-trade labor-management **RF Radiation Work Group***. The Program is intended to raise construction contractors' and workers' awareness of the potential risk, how to identify the hazard, and steps to work safely.

The program consists of the following:

- Presentation — Radiofrequency (RF) Radiation Awareness Program for the Construction Industry Overview
- Video — Safe Transmission: RF Awareness for the Construction Industry
- Hazard Alert Card — RF Radiation – An invisible danger (available in Spanish)
- Toolbox Talk — RF Radiation Awareness (available in Spanish)
- Guide – Radiofrequency (RF) Radiation Awareness Guide for the Construction Industry -- This Guide builds on the information covered in the presentation by providing additional details on how to assess the hazard, find regulations and guidance documents, determine if an RF generating device is present, and find protective equipment.

Click on the following for quick access to specific sections of the Guide:

Sections

1. What is Radiofrequency (RF) Radiation?
2. Common Uses
3. Health Effects
4. At Risk Workers
5. Regulations & Guidelines
6. Hazard Identification
7. Protective Measures
8. Summary

Appendices

A. States with Their Own RF Requirements – Examples
B. How to Use FCC & FAA Database
C. Local Resources to Access Antenna Locations
D. Additional Resources

QUESTIONS?

For more information contact Gary Gustafson: ggustafson@cpwr.com or Eileen Betit: ebetit@cpwr.com

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