WCC Safety Seminar 2025

OCCUPATIONAL SAFETY RELATED TO ELECTROMAGNETIC FIELDS (EMF)

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WORLD chlorine council®

OUTLINE

A BRIEF NOTE OF THANKS…

WHY ARE WE CONCERNED ABOUT EMF?

SHOULD WE BE CONCERNED ABOUT EMF?

WHO SHOULD BE CONCERNED WITH EMF?

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A BRIEF NOTE OF THANKS…

In the spirit of the season...

- Firstly, to you, for attending this Seminar!

- Secondly, to the Euro Chlor Health Working Group
  - Occupational physicians from across Europe
  - Decades of experience talking about health with our plant colleagues
  - Follow and advise on health-related issues relevant to our sector

…AND A WAIVER

- Much of this will be familiar but…

…always follow local rules on this topic.

- This is advice we give in the EU but…

…we are interested in learning how other regions approach this issue

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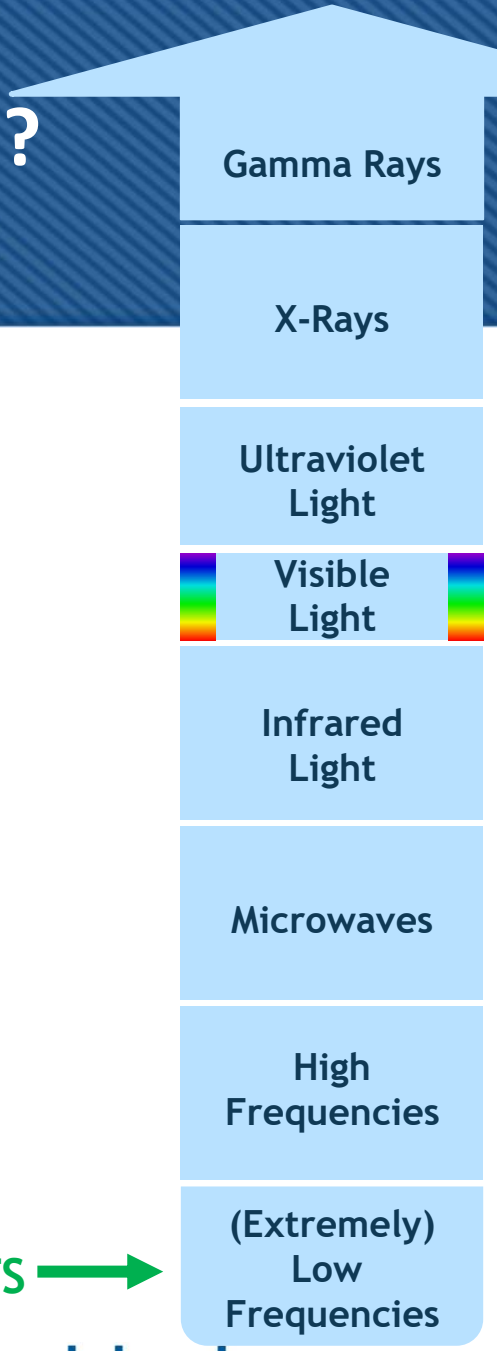
WHY ARE WE CONCERNED WITH EMF?



What are EMF?

- Electromagnetic fields
- A type of radiation which forms from electrically charged objects
- Part of the broader 'electromagnetic spectrum'
- Electricity passing through metal will generate such fields
  - Basic description of an electrolyser?
  - We should be informed about them…

ELECTROLYSIS UNITS →

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WHY ARE WE CONCERNED WITH EMF?

- European Regulations
  - EU law on ‘Minimum Health and Safety requirements regarding worker EMF exposure’
  - Set in 2013 but with regularly updated ‘guidelines’ to help implementation
  - 400 pages long!
- Reviewed & summarised by HWG
  - Key items of interest to our industry
  - Ongoing literature review

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WHY ARE WE CONCERNED WITH EMF?

- EMF in electrolysers?
  - Characterised by weak electric fields
  - Strong but static magnetic field
  - Multi-frequency magnetic field up to 2400Hz

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SHOULD WE BE CONCERNED WITH EMF?

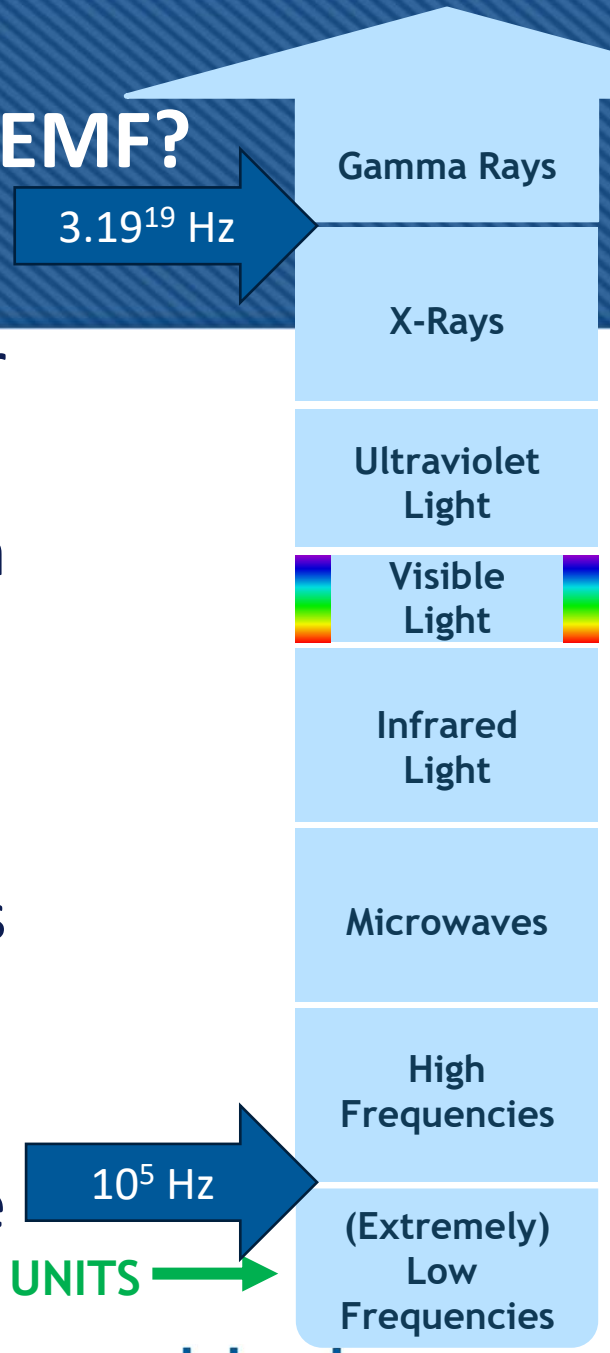
The health effect, depends on the frequency…

Cell death/ cancer

Effects to eyes/ skin

Thermal effects

Effects on nerves, only above a trigger value



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SHOULD WE BE CONCERNED WITH EMF?

- Effects on nerves?
  - What have people reported before?

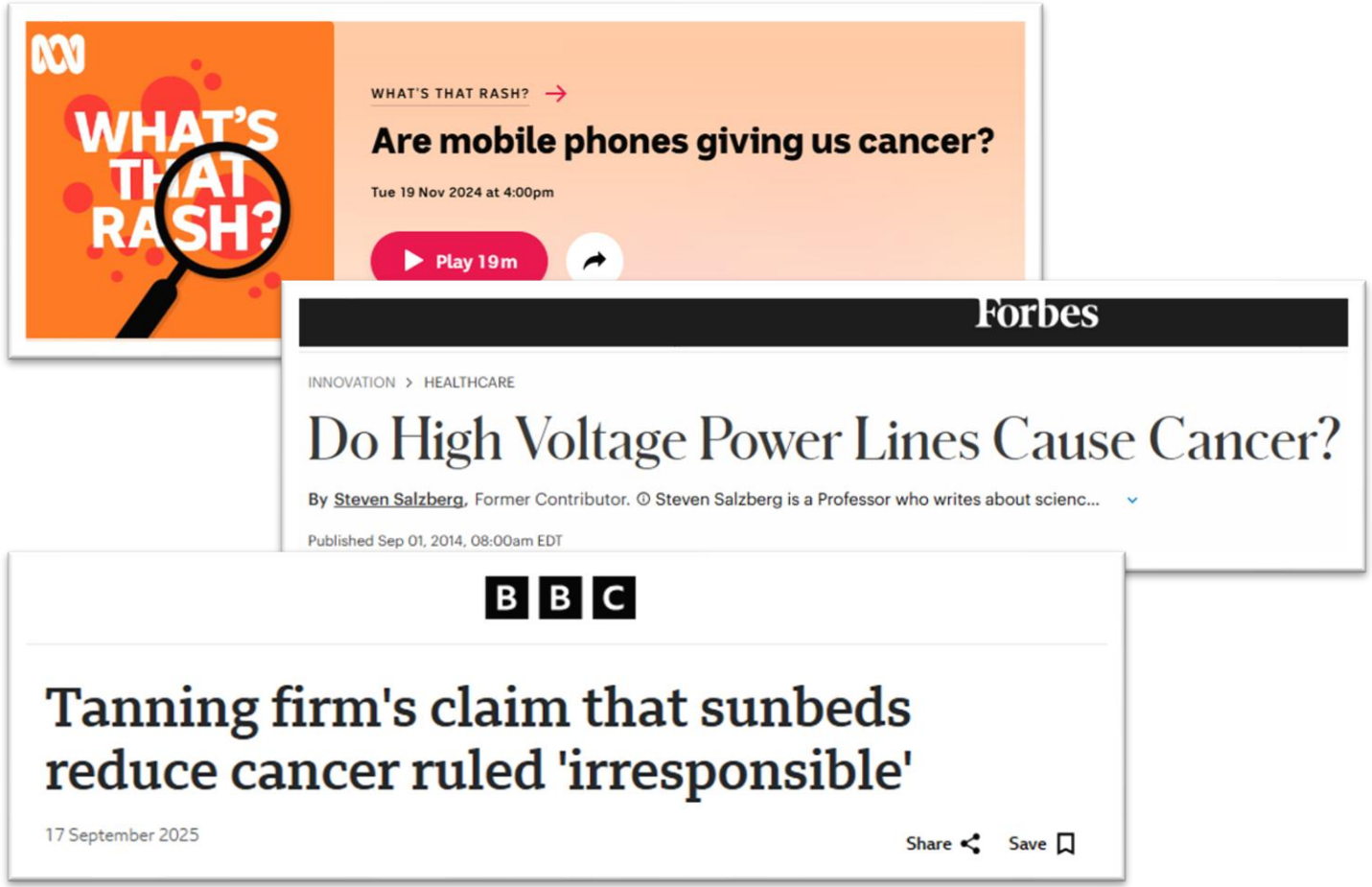
Sensory Effects	Health Effects
Vertigo Nausea Metallic taste Light ‘flashes’ (phosphenes)	Tingling in limbs Muscle twitches

SHOULD WE BE CONCERNED WITH EMF?

- Sometimes, metal objects can ‘charge up’ in fields
  - Minor static shocks where objects are not grounded
  - Annoying, but not ‘life-threatening’

SHOULD WE BE CONCERNED WITH EMF?

- What about the ‘experts’ on social media?
- What do newspapers have to say about it?
- Can lead to questions from colleagues so good info is key!



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SHOULD WE BE CONCERNED WITH EMF?

- Do the EMF associated with chlor-alkali plants cause cancer?

No conclusive scientific evidence for this

SHOULD WE BE CONCERNED WITH EMF?

Does the type of field found in an electrolyser make a difference?

- Static fields…?
  - No change to blood flow observed
  - No DNA damage observed
  - No change in foetal development observed
  - No carcinogenic effects observed

- Multi-frequency fields…?
  - Only issue still being investigated here, childhood leukaemia

SHOULD WE BE CONCERNED WITH EMF?

Are different groups of colleagues impacted in different ways?

- In Europe we recommend consideration is given for pregnant colleagues
  - Despite no scientific proof from 30 years of study
  - There is an EU legal obligation remains to 'keep EMF exposure low'
  - So, as a precautionary measure…?

- Continue monitoring the literature to confirm there no link to other issues
  - ALS (Lou Gehrig's)/ Parkinson's/ Alzheimer's
  - Not reported in colleagues to date...

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WHO SHOULD BE CONCERNED WITH EMF?

- Implanted metallic materials should not heat up/ move due to EMF in chlor-alkali including…
  - Metal rods, plates, screws, pins or nails
  - Artificial limb or joint
  - Surgical clips or staples
  - Leads associated with devices such as pacemakers
  - Aneurysm clip or coil
  - Intra-vascular coil, filter or stent
  - Heart valve prosthesis (artificial valve)
  - Any foreign metallic body, shrapnel, bullet
  - Patches for drug delivery with an aluminium foil layer (e.g. HRT, angina, nicotine)
  - Diaphragm/ IUD (‘coil’)
  - Metallic body piercings

No effect in electrolysers

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WHO SHOULD BE CONCERNED WITH EMF?

- Implanted medical devices, particularly older models
- Functioning *may*be impacted at high frequencies/ field strengths
  - Recommend determining the limit values in these locations
  - Measure when electrolyser is running at 100%

- Cardiac pacemakers/ defibrillators
- Insulin/ drug infusion pumps
- Continual glucose monitors
- Spinal cord stimulators for back pain
- Cochlear implants
- Neuro stimulators
  (e.g. for epilepsy/ Parkinson's/ incontinence)

Maybe **assess on a case-by-case basis…**

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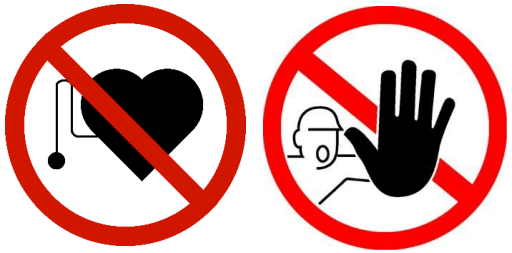
SUMMARY (OR, AT LEAST, WHAT WE ADVISE IN EUROPE…)

- Inform
  - Provide information, much as you do for any hazard
  - For site visitors/ contractors/ future mothers & younger people for when they age

- Identify
  - Monitor in those areas where levels may be highest (e.g. rectifier)
  - Use appropriate signs

- Restrict
  - Areas for pregnant colleagues/ medical device wearers
  - If necessary



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THANK YOU

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