



Australian Government

Australian Radiation Protection and Nuclear Safety Agency

# ARPANSA Forum on ELF Standard:

## The International Situation

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## **ELF standard: Drivers**

- **NHMRC (50 Hz Guidelines, 1989)**
- **ICNIRP guidelines (1998)**
- **IEEE C95.6 (2002)**
- **IARC classification**
- **Doll report**
- **Political and community pressure**

# Identifiable basis for differences in BRs between ICES & ICNIRP standards

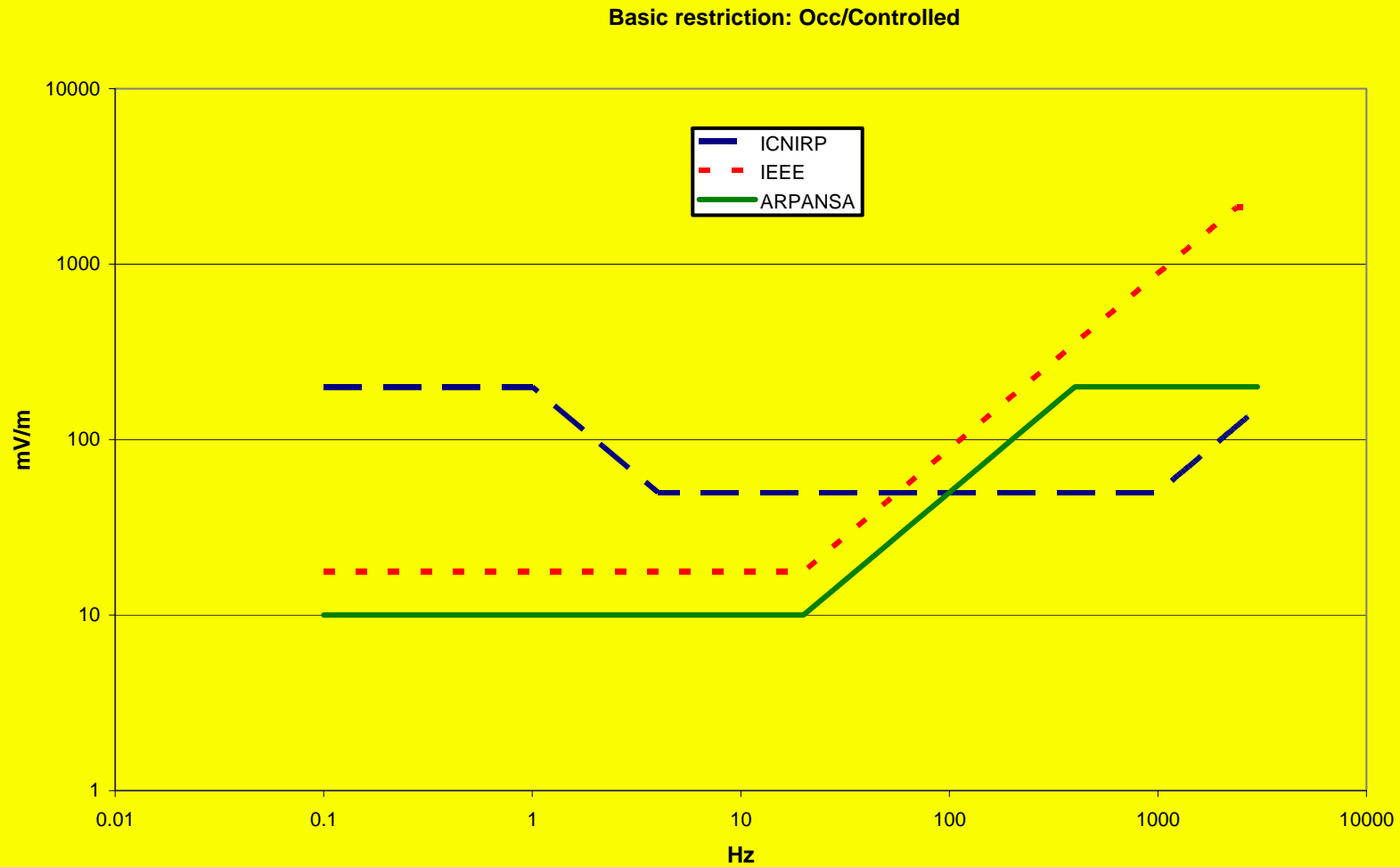
Item (basic restrictions)	ICES	ICNIRP
1. BR in situ metric	E-field	Current density
2. Median rheobase adverse threshold	$E_i=53$ mV/m	NS
3. In situ rheobase threshold to which safety factor is applied	$E_i=17.7$ mV/m	$J=100$ mA/m <sup>2</sup> ( $E_i=500$ mV/m)
4. Safety factor, $F_s$		
general public	1/3	1/50
contr. environ./occupational	1	1/10
5. Min. BR after application of $F_s$		
general public	$E=5.9$ mV/m	$J=2$ mA/m <sup>2</sup> ( $E=10$ mV/m)
contr. environ./occupational	$E=17.7$ mV/m	$J=10$ mA/m <sup>2</sup> ( $E=50$ mV/m)

*'NS' – not stated in guidelines*

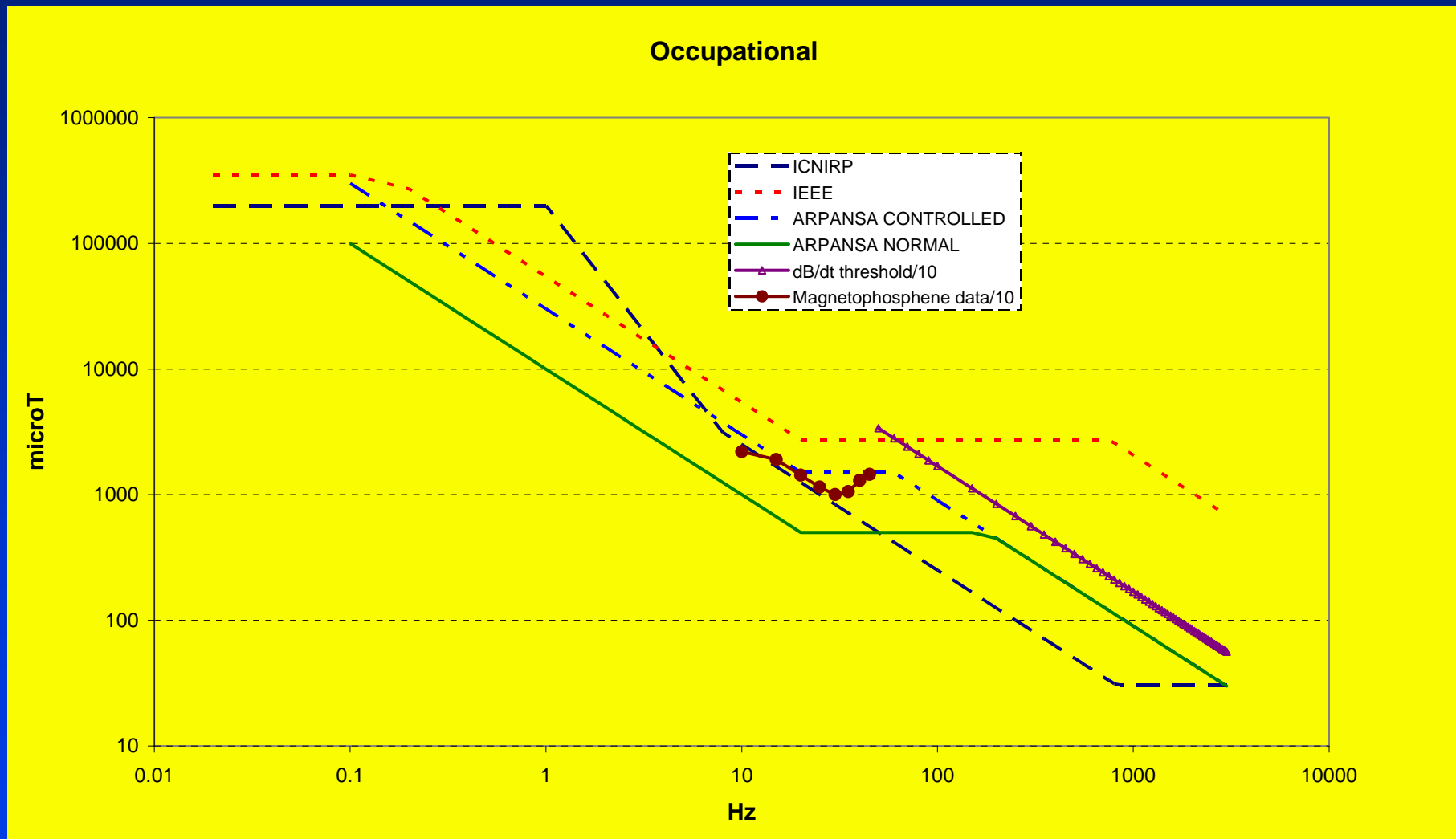
# Differences in BRs between ICES & ICNIRP

Item (basic restrictions)	ICES	ICNIRP
6. Upper transition frequency in S-F curve for CNS effects	20 Hz	1000 Hz
7. Lower transition frequency in S-F curve for CNS effects	None	4 Hz
8. Mechanism for min. CNS effect	Synapse potential alteration	NS
9. Distinct BRs for different tissue type	Yes	No
10. Applicable area of min. BR in CNS	Brain	Head & torso

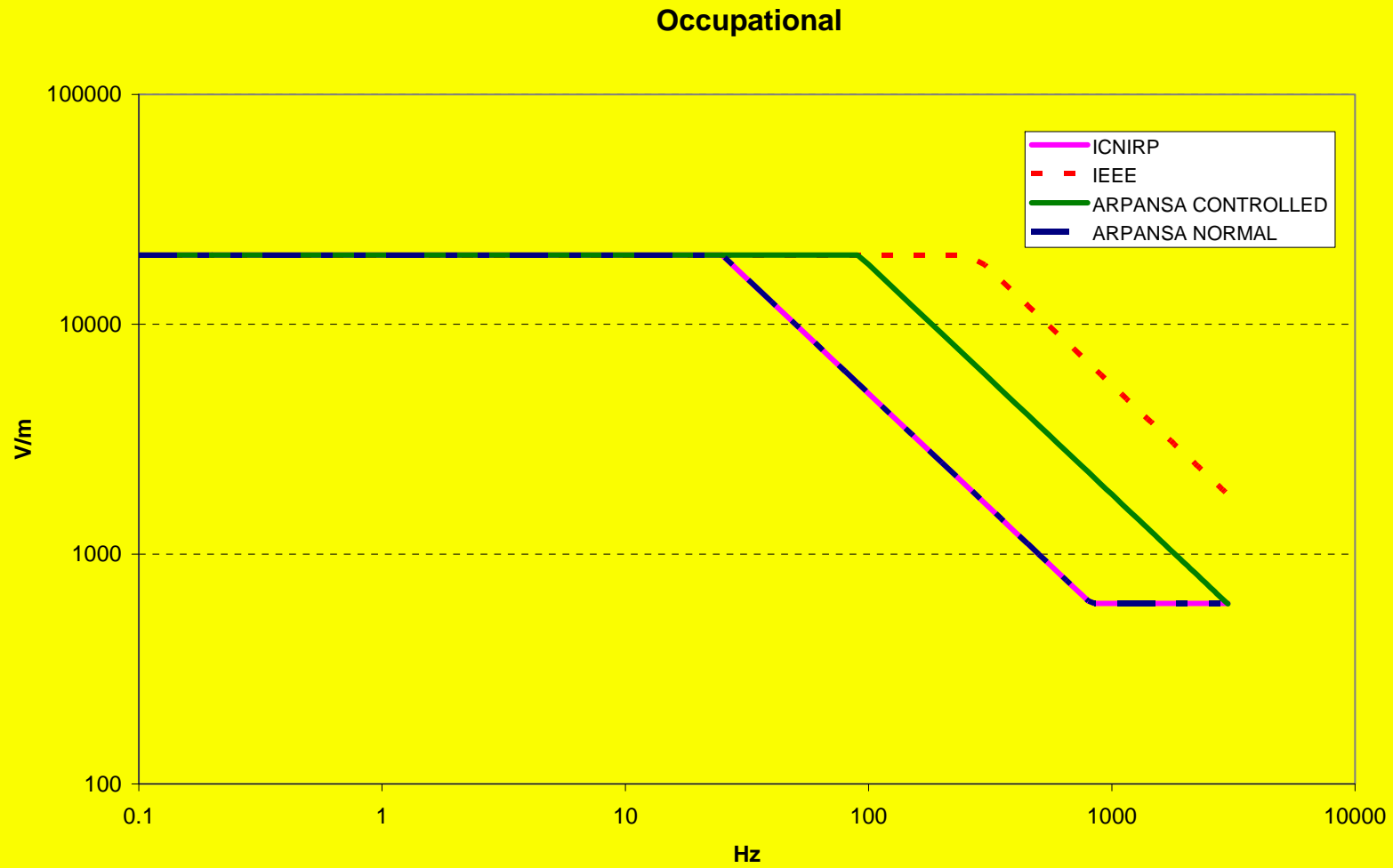
# BR: Occ/Controlled



# RL: Occup MF



# RL: Occup EF





## Comparison of 50 Hz RLs for EF (kV/m)

	IEEE (2002)	ICNIRP (1998)		NHMRC Guidelines (1989)	Proposed Standard (2008)
<b>Occupational</b>					
Normal	20	10		10	10
Special	>20 when not in reach of grounded conductor	20 when contact with electrically charged conductors is excluded		10-30 for few hours	20
<b>Gen Public</b>					
Normal	5	5		5	5
Special	10####	-		10#	10

# few hours per day

## can be higher subject to approval

### within ROW



## Comparison of 50 Hz RLs for MF ( $\mu\text{T}$ )

	IEEE (2002)	ICNIRP (1998) <sup>a</sup>		NHMRC Guidelines (1989)	Proposed Standard (2008)
<b>Occupational</b>					
Normal	2710	500		500	1500 <sup>b</sup>
Special				5000 for two hours per day	NA
<b>Gen Public</b>					
Normal	904	100		100	300
Special		-		1000 few hours	NA

<sup>a</sup> Provided that BRs are met and adverse indirect effects can be excluded field strength values can be exceeded

<sup>b</sup> 1800 torso

<sup>c</sup> can be higher subject to approval



## Possible Approach to exceeding RLs

- Activities associated with extremely high exposure ....above occupational limits...may be justified in special situations subject to approval by the responsible authority.
- This might be associated with an increased health risk for the worker acceptable only, if the worker is well aware of the situation and specific work procedures be set up to ensure safety in such cases.
- This includes, but is not limited to, the exclusion of sensitive people from such activities as well as the prevention of any effects (e.g. transient or cognitive) that may hazardously impact work performance.

**Thank you**