

Holistic Radiation Protection

Cameron Jeffries

46th ARPS Conference, Gold Coast Queensland



Our values



Integrity



Compassion



Accountability



Respect



Excellence



SOUTH AUSTRALIA
MEDICAL
IMAGING

A have a lot of hats



ARPS South Australia

- > New South Australian Legislation
- > The Regulator – Stakeholder information sessions
- > SA Branch – Three face to face workshops since 2018
- > Radioactive Material:
 - 0.4 Bq/cm² Surface Contamination – SCO Transport Code!
 - 1000 Bq/m³ Radon How do you even regulate it?
- > Draft testing standard that is still in Consultation

Mumbai IRPA Regional Congress

High Standard of Science in India



Air Portable



sahealth.sa.gov.au/sami

Medical Physics Hat

- > Lost Source World News
- > Skin Burns and Radiation Sickness
- > “...exposed long enough, they could also have some acute effects” – Radiation Sickness
- > What?

Main emissions (keV)								
	Gamma or X		Beta (Emax)		Electrons		Alpha	
	E	%	E	%	E	%	E	%
E1	32	6	512	95	624	8		
E2	36	1	1173	5	656	1		
E3	662	85			660	<1		
% omitted	<1		0		<1			

Exemption levels	
Quantity (Bq)	1E+04
Concentration (Bq.g ⁻¹)	1E+01

Transport (TBq)	
IAEA ST1 A ₁ value	2E+0
IAEA ST1 A ₂ value	6E-1

EXTERNAL EXPOSURE (mSv.h ⁻¹) for an activity of 1 MBq or 1 MBq.m ⁻² (as appropriate)				
Point source (30 cm)	Infinite plane source	10 ml glass vial	Contact with 50 ml glass beaker	Contact with 5 ml plastic syringe
				
Betas, electrons (skin dose) 2.13E-1	Betas, electrons (skin) 10 cm 9.0E-02 1 m 6.0E-03	100 cm 9.19E-5	3.30E-1	1.66E+0
Gammas, X rays (deep tissue dose) 1.07E-3	Photons (skin) 10 cm 3.9E-03 1 m 2.5E-03			
	Photons (deep dose) 10 cm 3.7E-03 1 m 2.4E-03			

The values above do not include Bremsstrahlung radiation.

CONTAMINATION	
Contamination skin dose (mSv.h ⁻¹)	
Uniform deposit (1kBq.cm ⁻²)	1.57E+0
0.05 ml droplet (1 kBq)	7.08E-1
	
* If no probes are indicated the recommended technique is to use a wipe test in association with a probe or liquid scintillation technique	

Detection	
Recommended probes*	
Alpha	
Beta	++
Gamma	++
X rays	++

Derived limits (Bq.cm ⁻²)	
Removable contamination	4E+1
Fixed contamination	4E+3

SHIELDING (mm)	
Betas and electrons (Total absorption)	
Glass	2.1
Plastic	3.8
Gamma and X rays (half and tenth value thickness)	
	1/2
	1/10
Lead	8 24
Steel	29 72

INTERNAL EXPOSURE FOR WORKERS				
COMMITTED EFFECTIVE DOSE PER UNIT INTAKE (Sv.Bq ⁻¹)				
Ingestion	f ₁	Inhalation		
			1 μm	5 μm
All compounds	1.000	1.3E-08	F	4.8E-09 6.7E-09
			M	
			S	
Highest d			(Bq) 20 mSv A ₁ inhalation	3.0E+06 (Bq)

RADIIATE LEVEL LABORATORIES (Bq)		
Subject to external exposure requirements which may be more restrictive		
PHYSICO-CHEMICAL STATE	Volatility	Supervised area / Controlled area



For review into disappearance of 'dangerous', tiny radioactive capsule in West Australia

9 Jan 2023 at 5:26pm, updated Thu 23 Feb 2023 at 5:59pm



ARPS23

Department of Emergency Services is searching for the radioactive capsule. (Supplied: DFES)

Dead Easy to Find

- > ARPS did some work
 - Don't eat it
- > 20 mSv/h @ 30 cm
- > 20 μ Sv/h @ 10 m
- > Get a Car, a NaI and Drive the road?
- > Instead Disaster Plan

sahealth.sa.gov.au/sami

Standing on the outside, looking in...

My impressions:

- > Did the Chief Health Officer or the Emergency Services even talk to their Subject Matter Experts?
- > Do we lack practitioners with basic Radiation Protection skills that only ANSTO/ARPANSA can save us?
- > Is there oversight of the information given to media?
- > The Thank You... The Apology



Nuclear Subs...

- > Everyone is jumping on board
- > ARPS recognises the need to develop our workforce
- > ARPS is the peak body for radiation protection

Where are we?

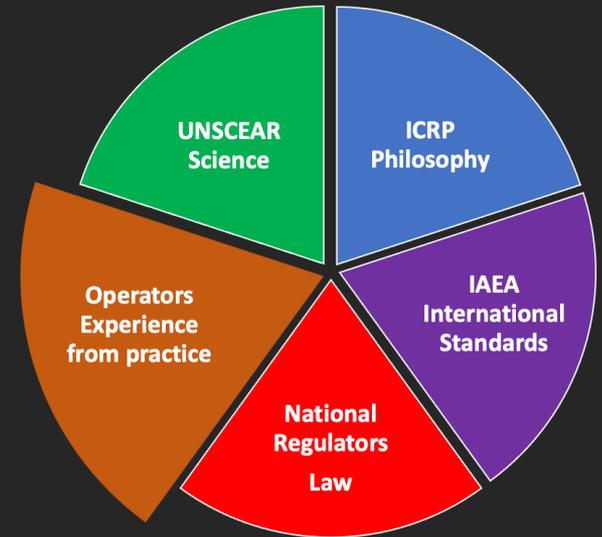
- > ICRP are developing a pure system for researchers
- > IAEA translates this into Standards
- > ARPANSA represent Australia for development of Standards
- > States develop legislation with their own particular spin
- > Where are the Practitioner Views?



Collaboration

- > The system is complex
- > Experience is vital
- > Practitioners have Experience
- > Practitioners multiply resources
- > ARPAB skills assessment
- > ARPS access to professionals
- > We need to work together

Collaborate





Government
of South Australia

SA Health



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