Public Health England

Protecting and improving the nation's health

Setting dose reference levels for emergency responders in the United Kingdom

UK legislation

BSSD transposition into UK law due to be completed Jan/ Feb 2018

Current relevant legislation

- Ionising Radiations Regulations 1999 (IRR99)
  - Occupational exposure
  - Defines a “radiation employer” and sets requirements for control

Radiation (Emergency Preparedness and Public Information) Regulations 2001 (REPPIR)

- Emergency exposures
- Allows disapplication of dose limits set in IRR99

Emergency services as radiation employers

- Police, Fire and Ambulance services are all separate employers but are they ‘radiation employers’?
  - Fire services – will respond to fires and rescue operations where a radiation hazard exists
    - Yes
  - Police – traditionally do not deploy into a radiation hazard environment, however
    - Dedicated CBRN response teams trained to operate in hazardous environments
    - Yes
  - Ambulance – Would not knowingly deploy staff into a known radiation hazard environment, however
    - Hazardous Area Response Teams (HART) developed to respond in hazardous environments
    - Yes

Different employers = different advisers

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Different roles = different protection advice

Common dose control levels

Various

Common personal dose meter

Thermo EPD Mk2

Common alarm settings

Alarm 1 – Dose rate

- 100 μSv/h Hp(10) alarm on, alarm off at 90 μSv/h
- Set to avoid false alarms – counting statistics
- Indication of unusual dose rate when source is unknown
  - Withdraw to alarm stop and assess
- Transport Index may exceed alarm rate – known source

Alarm 2 – Dose

- 5 mSv Hp(10)
- Withdraw from exposure situation and assess
- < 6 mSv – classified worker level

Common alarm settings

Alarm 3 – Dose

- 100 mSv Hp(10)
- Limit of exposure for life saving actions
- Threshold of detectable deterministic effects

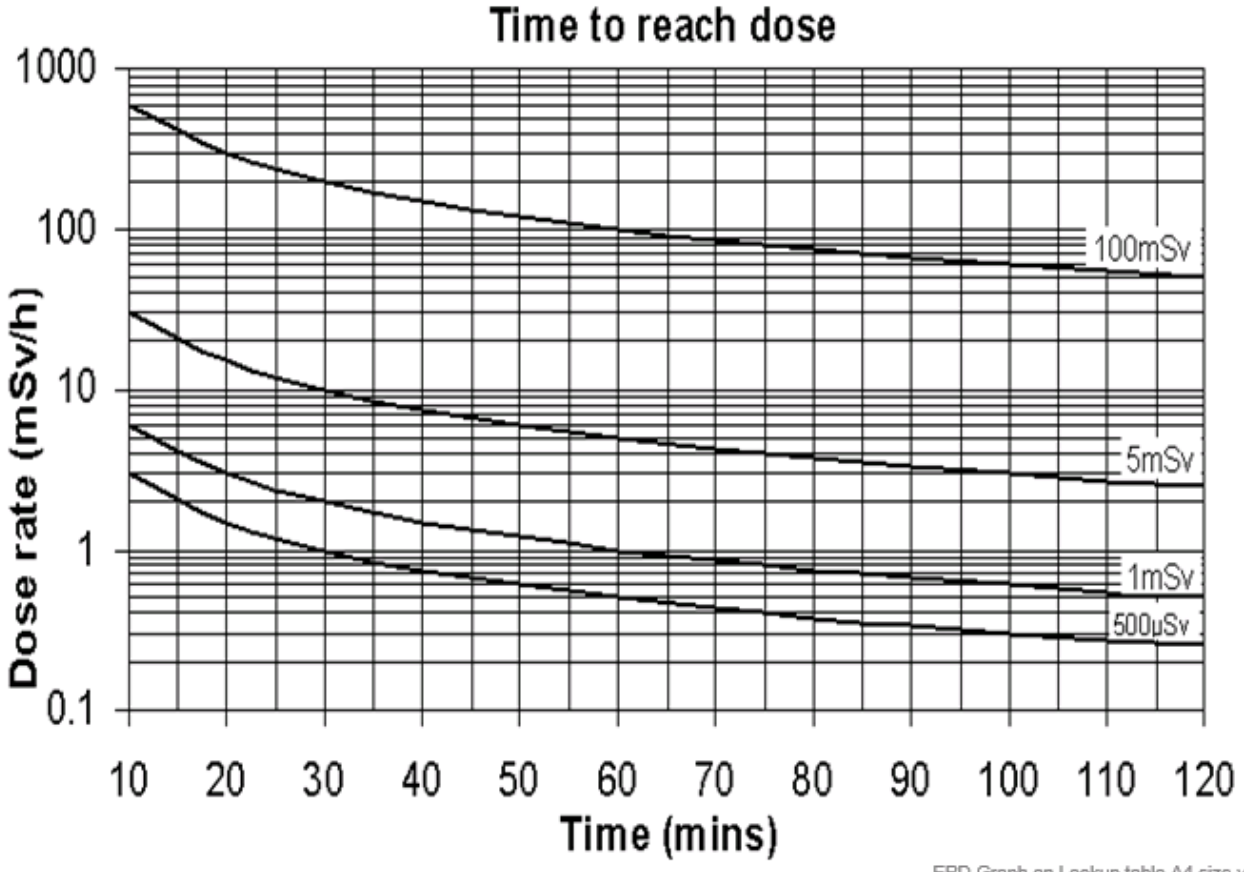
Two versions deployed

- Standard version
  - Shows accrued dose by default and ‘on’ all the time
- Responder version
  - Shows dose rate by default
  - Starts recording accrued dose only once dose rate alarm is activated

Dose reference levels

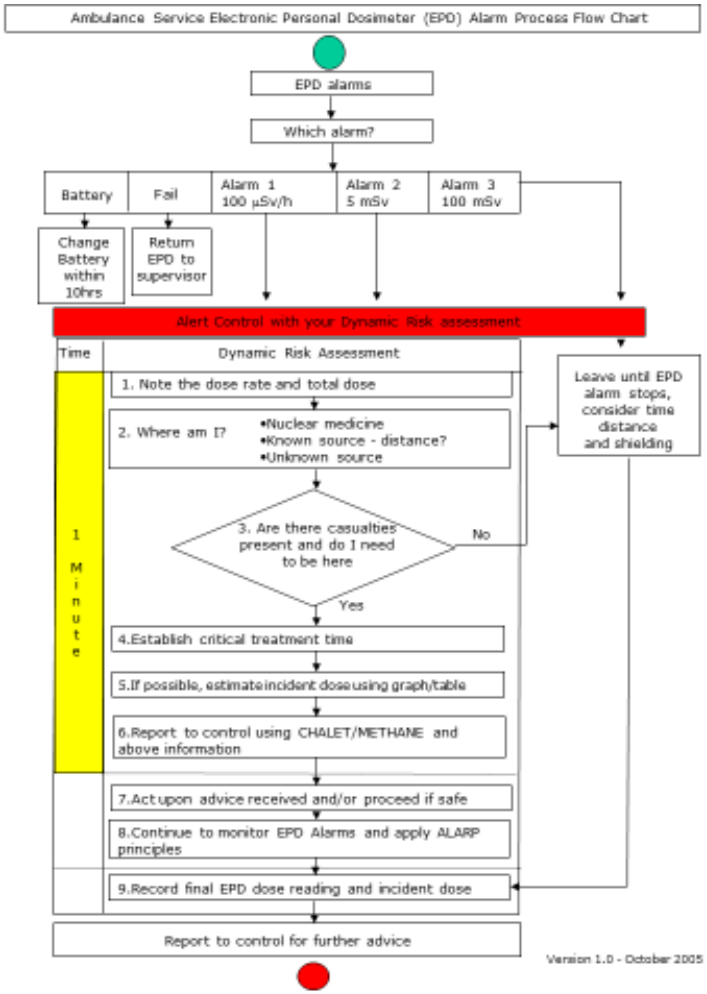
Reference Level One: Total per event	1 mSv
Reference Level Two: CBRN decontamination providers	5 mSv
UK Occupational Dose Limit	20 mSv
Reference Level Three: Maximum dose to informed volunteers for life saving actions	100 mSv

Practical tools for responders



Look-up graph – time to dose – for front line responders and control room staff

Practical tools for responders



Ambulance service decision flow-chart – for control room staff

Protection from internal exposure

Ambulance – Hazardous Area Response Team (HART)

Powered Respirator Protective Suit (PRPS)

Protection from internal exposure

Fire Service – Self-Contained Breathing Apparatus (SCBA) and Gas-tight suit

Protection from internal exposure

Police – CBRN responder

Civil Responder suit (CR1)

Operational considerations

- Gamma radiation is not always present and so use of the EPD as the only trigger is limited – E.g. ^{210}Po

- Balance of 100 mSv limit for life-saving action and the need to save life – E.g. proximity of a high dose rate source to a trapped casualty

- False alarm triggers caused by RF interference E.g. shop security barriers

Additional arrangements

- Reach-back to RPAs
  - On-call RPAs to provide over-the-phone advice

- National Arrangements for Incidents involving Radioactivity (NAIR)
  - Fall-back arrangements or situations where no plans exist

- ECOSA – Emergency Coordination of Scientific Advice
  - Rapid access to coordinated advice from scientists (including RPAs) for counter terrorist operations

Current issues

- No single RPA for Fire and Rescue Service
  - Each service is under a separate employer

- Disapplication of dose limits permitted under REPPIR only applies to fixed sites
  - Does not apply to terrorist incidents, transport incidents
  - Guidance being developed as part of the BSSD transposition process will address all emergency scenarios

In conclusion

- Reference Levels or dose limits reflect the balance of operational needs and radiation protection

- By using a low initial dose rate trigger followed by a dose alarm control steps can be taken progressively to minimise dose.

- Controls for internal contamination need to have specialised response teams trained in their use to be effective

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