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Occupational Radiation Protection (GSG7)

Group Exercise

Selection of personal protective equipment

Group exercise – selection of PPE

- ❑ In your groups, consider the following scenarios and list the appropriate personal protective equipment:
 - Preparation of P-32 aliquots in a university research laboratory
 - Working with NORM on a contaminated site
 - Decommissioning of a disused glove box line in a facility used for studies involving alpha emitting aerosols
 - Decommissioning of a nuclear reactor pressure vessel

Group exercise – selection of PPE

- ❑ Consider both:
 - Protective clothing required
 - Whether RPE is required, and if so, what type?

University research laboratory

General purpose laboratory used for work with P-32



Working with NORM

- Remediation of a contaminated site
- Soil contaminated with NORM at low activity concentrations
- Potential for airborne contamination



Decommissioning of glove boxes



- ❑ Used for studies involving aerosols
- ❑ Due to be completely decommissioned
- ❑ Will require removal of contamination
- ❑ Primary contaminants
 - Pu-239
 - Am-241
- ❑ Contamination levels inside are unknown

Decommissioning of a nuclear reactor

- Access to highly contaminated areas required



Remember...

Objective of protective clothing is to:

- prevent transfer of radioactive contamination onto the worker
- consider protection against other hazards including chemicals and fire, if appropriate
- needs to be comfortable (especially if worn continuously)
- needs to be easy enough to be put on, use and take off (or worker may try to avoid using it)
- A graded approach is needed to match the level of risk and take into account the particular needs of the working environment and tasks undertaken

Remember...

- RPE may be needed for emergencies, repair and maintenance and in special circumstances
- Comfort and convenience of use should be considered as well as protection factor
- For long term wear, powered air respirators or helmets with face shields are preferable for comfort



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Group Exercise Suggested answers

Selection of personal protective equipment

University research laboratory

Simple basic clothing for the contamination hazard

- Laboratory coat
- Disposable gloves
- Protective eyewear
- Overshoes

Provides only partial protection

Face and head/hair at risk

Wrist may be exposed

But suitable for many **low risk scenarios**



Working with NORM

- Overalls
- Gloves
- Overshoes/boots
- Head protection
- Close fitting at wrists and ankles
- No chemical protection needed



Working with NORM

Basic RPE would be suitable – eg negative pressure respirators (dust masks)

- Designed to filter contaminated air before it is inhaled
- Various grades and protection factors (typically PF20)
- Performance dependent upon face seal being maintained
- Only suitable for relatively short wear periods
- Not to be re-used



Working with NORM



Or could use half face masks

- Fixed or detachable filters
- Can allow a better seal to the face so more reliable
- PF depends on filter type – different grades e.g. P1, P2, P3, etc (P3 = typical PF 20).
- Still only suitable for lower risks and shorter wear periods

Decommissioning of glove boxes

- *Worn with RPE*
- Disposable oversuit
- Close fitting hood with gaps around the respirator sealed with tape
- Gloves taped at wrists
- Overshoes/boots – can also be taped
- Eye protection



Decommissioning of glove boxes

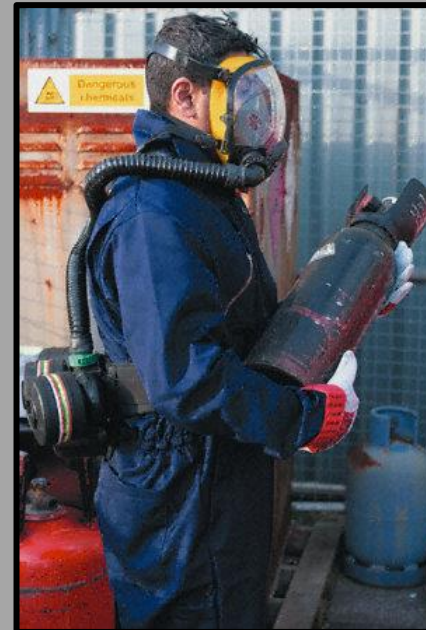
Higher quality RPE would be suitable – eg full face negative pressure respirators

- Better fit to the head is possible: maximum PF 40 (with P3 filter)
- Integral face and eye protection



RPE for longer wear periods

- Positive pressure respirators
- Similar to negative pressure types but with filter/fan unit to supply air to the mask via a hose - more comfortable - longer wear periods
- Maximum PF 40



Decommissioning of a nuclear reactor

- ❑ Complete protection required
- ❑ Clothing invariably integral to the respiratory protective equipment



Decommissioning of a nuclear reactor

- ❑ Constant flow airline fed full suit
- ❑ Fed by a constant flow of breathing air via an airline:
- ❑ For highly contaminated environments
- ❑ Designed to be decontaminated
- ❑ Recommended PF 200



Positive pressure – constant flow airline

- Air supplied by an airline from a remote clean filtered air supply
- May use half masks, full masks or hoods/helmets
- Maximum PF 40



QUESTIONS AND DISCUSSION