IAEA
International Atomic Energy Agency

Occupational Radiation Protection (GSG7)

6. Protection of workers in Special Cases
GSG7 Section 6

Introduction

Specific controls needed for:

1. Female workers during and after pregnancy, with exposure implications for not only themselves but also the embryo, foetus or new-born child
2. Workers who work on the site of another employer and may be exposed to the site operator's use of radiation… or may take their own source of radiation, with exposure implications for themselves and the employees of the site operator. These persons are referred to as itinerant workers and are often employed by contractors

FEMALE WORKERS DURING AND AFTER PREGRANCY

Protection measures

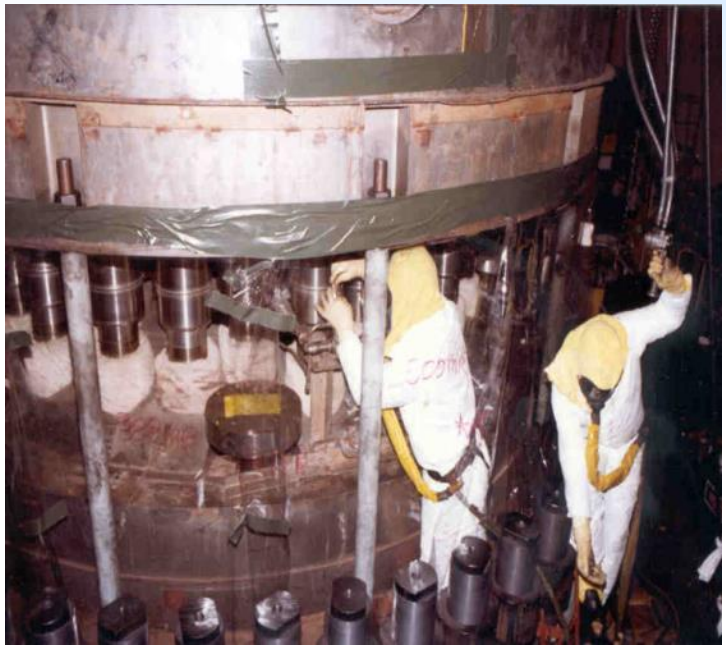
- Management should inform female workers of the importance of early notification of pregnancy or breastfeeding
- Additional protection measures must be considered for a female worker during and after pregnancy
- Employer should review working conditions to ensure that dose to embryo/foetus is <1 mSv during pregnancy and for the newborn/breastfed child thereafter (may continue to work with radiation)
- If required to enter controlled or supervised areas, or undertake emergency duties female workers must be given information on risk to the embryo, foetus, newborn or breastfed child during and after pregnancy

Monitoring

- Once pregnancy has been declared, monitoring programme should be redefined to determine that dose to embryo, foetus or newborn/breastfed child will not exceed 1 mSv
- All relevant exposure pathways should be considered
- If dose is likely to approach 1 mSv individual monitoring should be carried out (including assessment of committed dose)
- Consider frequency of monitoring / use of active dosimeters
- Wear position of dosimeters?
- Monitoring after a suspected accidental exposure

Dose assessment

- Once pregnancy has been declared, monitoring programme should be redefined to determine that dose to embryo, foetus or newborn/breastfed child will not exceed 1 mSv
- All relevant exposure pathways should be considered
- If dose is likely to approach 1 mSv individual monitoring should be carried out (including assessment of committed dose)
- Consider frequency of monitoring / use of active dosimeters
- Wear position of dosimeters?
- Monitoring after a suspected accidental exposure



ITINERANT WORKERS

Itinerant Workers

- Itinerant workers are defined as: “occupationally exposed persons who work in supervised and/or controlled areas at a variety of (one or more) locations and are not employees of the management of the facility where they are working. Itinerant workers may be self-employed or employed by a contractor (or similar legal entity) that provides services at the facility of other employers”

- Itinerant workers may themselves work with sources of radiation and/or they may be potentially exposed to radiation sources controlled by the management of facility at which they are working

Issues with itinerant workers

- Workers moving from one facility to another
- Uncertainties over allocation of management control
- Large range of work
- Responsibilities depend on type of exposure scenario:
  - Operation of facility has potential to cause exposure of contractor's employees, who do not possess a radiation source themselves
  - Contractor's employees bring their own source of radiation to a facility
  - Combination of above

Cooperation between employers

Para 3.85 of the BSS states:

"If workers are engaged in work that involves or that could involve a source that is not under the control of their employer, the registrant or licensee responsible for the source and the employer shall cooperate to the extent necessary for compliance by both parties with the requirements of [the BSS]"

Cooperation between employers

Cooperation between the employer and registrant or licensee shall include, where appropriate:

Restrictions on exposure for itinerant workers that are at least as good as for employees of the registrant or licensee
Assessment of doses received by workers
Clear allocation and documentation of responsibilities
Provision of workers occupational exposure history

Sources under the control of a facility

- Management of the facility responsible for applying necessary protection and safety measures
- Contractor and its employees may have little or no experience of working in radiation areas (eg cleaning, maintenance staff)
- Sharing of information
- Depending on type and complexity of work contractor may need to consult with a qualified expert
- Arrangements for dose assessment to be agreed
- Training provided by contractor and/or management of facility

Sources under the control of a facility

- In certain situations guidance may be required from a qualified expert:
  - Review of engineered controls related to protection and safety
  - Formulation of suitable local rules and procedures
  - Appropriate dosimetry arrangements
  - Requirement for PPE
  - Use of radiation monitoring equipment
  - Record keeping
  - Emergency procedures
- Suitable RPO should be appointed

Sources under the control of a contractor

- Source used by itinerant worker could cause exposure to employees of the facility
- Most commonly when industrial radiography is carried out by a contractor on site, but also applies to other work activities eg. source loading operations in irradiation facilities
- Management of facility may have no in-house expertise in the work being carried out
- Sharing of information – contractor should provide copies of relevant risk assessments, local rules, evidence of training etc.

Sources under the control of a contractor

- Site employees affected by the work should be provided with sufficient information eg security staff, people working in the area, emergency response staff
- Withdrawal of permits for other personnel in the area
- Safety audits undertaken by facility

Sources under the control of a contractor

- In the event that a source under the control of a contractor has to be taken into an area of the facility where there is also potential for exposure to a source under the control of the facility, additional cooperation is necessary
- Work carried out in accordance with contractor's local rules and procedures **AND** local rules and procedures associated with facility's sources – potential for conflict?
- Agreed arrangements to be documented
- Additional specific training may be required
- Potential impact on radiation-related instrumentation installed at the facility

Competence of itinerant workers

- Important to ensure competence of contractor's staff prior to them starting work on site
- Assessment process
  - Level and detail of assessment process dependent on type of facility and work carried out
- Provision of suitable site-specific training may be required prior to work commencing, eg use of PPE
- Contractor's should ensure that employees have necessary training and certification for the type of work
- Competence of employees to be periodically reviewed

Radiation protection programme

- Work should be conducted in accordance with a RPP
- Management of the facility and the contractor share joint responsibility for developing RPP
- Differing levels of knowledge and expertise – one party may take lead
- Use of existing RPP (with modifications)
- Each employer should have carried out a prior radiological evaluation applicable to their own sources of radiation

Records of occupational exposure

- Some itinerant workers may move regularly from one facility to another
- Doses accrued at multiple facilities during a one year period
- An up-to-date record of doses received must be maintained
  - Eg. individual radiation monitoring document
- Entry made in record by site owner
  - Estimated doses based on workplace monitoring
  - Results of electronic dosimeters
- Responsibility of employer of itinerant worker to ensure that record of occupational exposure is maintained

Training

- Level of training required will depend on duties and areas in which work is carried out
  - Cleaning, maintenance staff etc working in an area with no radiation safety issues will require only basic information
  - Itinerant workers carrying out duties inside a controlled area will require more detailed training eg access procedures, precautions to be taken, use of PPE etc
  - Itinerant workers using their own sources should be suitably trained in the safe use of these sources
- Training for staff acting as RPOs
- Training may be provided by contractor or management of facility
  - Formal training, written instructions, etc.

Review of protection and safety

- Important to periodically review arrangements and procedures for protection of itinerant workers to ensure they remain relevant
- Aim is to provide continued optimization
- Contractor and management of facility should cooperate, as necessary, when undertaking review
- Findings of review to be communicated to affected employees and relevant employer(s)

Review of protection and safety

- Changes to working environment
- Regulatory changes
- Changes in working practices
- Current level of compliance

- Effectiveness of current arrangements in keeping doses ALARA
- Adequacy of emergency plans
- Lessons to be learned

Key messages

Female workers

- ❑ Information on risk to the embryo, foetus, newborn or breastfed child during and after pregnancy
- ❑ Early notification on pregnancy and measures to control exposure
- ❑ Monitoring programme to determine that dose to embryo, foetus or newborn/breastfed child will not exceed 1 mSv
- ❑ Dose assessment using ICRP methodology

Itinerant workers

- ❑ Cooperation between employers is essential
- ❑ Individual dose records should be maintained
- ❑ Appropriate training should be provided
- ❑ RP program should be provided and regularly reviewed

QUESTIONS AND DISCUSSION

Class discussion

As a class, discuss the general issues associated with itinerant workers that may work in the following types of facility:

- Nuclear installations
- Facilities for performing medical exposures

For each type of facility consider:

- Types of itinerant workers that may be employed
- Type and level of training/competence required
- Responsibility for management and control of radiation exposure (contractor / facility)