

**15 Annex - Energy**

**90. DECISION ON PROFESSIONAL QUALIFICATIONS AND  
HEALTH CONDITION REQUIRED OF PERSONS WORKING  
WITH SOURCES OF IONISING RADIATION**

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**DECISION**

**ON PROFESSIONAL QUALIFICATIONS AND HEALTH CONDITION REQUIRED OF PERSONS  
WORKING WITH SOURCES OF IONISING RADIATION**

(Official Gazette of the Federal Republic of Yugoslavia 45/97)

**I BASIC PROVISION**

1. Only persons who have acquired appropriate professional qualifications and who fulfil health condition requirements provided for in the present Decision shall be able to work with sources of ionising radiation.

**II PROFESSIONAL QUALIFICATIONS OF PERSONS WORKING WITH SOURCES OF IONISING  
RADIATION**

2. Persons who may work with closed sources of ionising radiation and devices generating ionising radiation used for medical examination (diagnostics) are as follows:

1) medical doctors specialised in radiology;

2) persons who have acquired VI (college) or IV (secondary school) degree of professional education in radiology.

3. Persons who may work with closed sources of ionising radiation and devices generating ionising radiation used for medical treatment (therapy) are as follows:

1) medical doctors specialised in radiology;

2) persons who have acquired VII (university) degree of professional education, with specialisation in medical nuclear physics;

3) persons who have acquired VII (university) degree of professional education (degrees in physics, physical chemistry and electrical engineering) and have been trained for work with these sources and for carrying out measures for protection against ionising radiation;

4) persons who have acquired VI (college) or IV (secondary school) degree of professional education in radiology.

4. Persons who may work with open sources of ionising radiation in nuclear medicine used for examination (diagnostics) and treatment (therapy) are as follows:

1) medical doctors specialised in nuclear medicine;

2) persons who have acquired VII (university) degree of professional education, with specialisation in medical nuclear physics;

3) persons who have acquired VII (university) degree of professional education (medical doctors, persons with degrees in biology, pharmacy, physics, physical chemistry and electrical engineering) and have been trained for work with these sources and for carrying out measures for protection against ionising radiation;

4) persons who acquired VI (college) or IV (secondary school) degree of professional education in radiology.

5. Persons who may work with dental x-ray machines are as follows:

1) dentists, who have been trained for work with these sources and for carrying out measures for protection against ionising radiation;

2) persons who have acquired VI (college) or IV (secondary school) degree of professional education in radiology;

3) persons who have acquired VI (college) or IV (secondary) degree of professional education in dentistry and have been trained for work with these sources and for carrying out measures for protection against ionising radiation.

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6. Persons who may work with sources of ionising radiation in veterinary medicine are as follows:

- 1) veterinarians, who have been trained for work with these sources and for carrying out measures for protection against ionising radiation;
- 2) persons who have acquired VI (college) or IV (secondary school) degree of professional education in radiology;
- 3) persons who have acquired IV (secondary school) degree of professional education in veterinary medicine and have been trained for work with these sources and for carrying out measures for protection against ionising radiation.

7. Persons who have acquired at least IV (secondary school) degree of professional education and have been trained for work with these sources and for carrying out measures for protection against ionising radiation may work with sources of ionising radiation used in scientific research, agriculture, industry, education and other non-medical activities.

Provisions from the sub-item 1 of this item shall also pertain to persons who work on installation and repair of x-ray apparatuses and other devices with closed sources of ionising radiation.

8. Authorised legal entities who conduct training of personnel for work with sources of ionising radiation and for carrying out measures for protection against ionising radiation shall adjust the training curricula to both type of work and level of radiation risk these persons are exposed to.

Curricula from the sub-item 1 of this item must include theoretical education in radiation physics, radiation biology and protection against ionising radiation, as well as obligatory practical training for work with sources of ionising radiation and for carrying out measures for protection against ionising radiation.

9. The user of a source of ionising radiation shall provide periodic renewal of education for persons working with sources of ionising radiation as follows:

- 1) for persons with at least basic university degree of professional education – every 10 years;
- 2) for persons with at least IV (secondary school) degree of professional education – every 5 years.

### III HEALTH CONDITION REQUIRED OF PERSONS WORKING WITH SOURCES OF IONISING RADIATION

10. Persons that may work with sources of ionising radiation shall be those who, apart from general health condition requirements, fulfil the following health requirements on the basis of the following medical findings:

1) number of red blood cells

- for men 4.0 to 5.5 " 10<sup>12</sup>/l

- for women 3.7 to 5.0 " 10<sup>12</sup>/l

2) amount of haemoglobin

- for men 120 do 160 g/l

- for women 110 do 150 g/l

3) number of white blood cells 4.0 to 9.0 " 10<sup>9</sup>/l

4) number of neutrophil granulocytes 2.5 do 7.0 " 10<sup>9</sup>/l

5) number of lymphocytes 1.5 do 3.0 " 10<sup>9</sup>/l

6) number of thrombocytes no less than 150 " 10<sup>9</sup>/l

(according to Cristianson or Brecher)

7) binuclear lymphocytes to 3 binuclear lymphocytes on 10<sup>4</sup> lymphocytes

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8) Chromosome aberrations normal cariotype, without (at least 200 lymphocytes of chromosome aberrations are analysed in the first *in vitro* cell division)

11. Health condition of persons working with sources of ionising radiation or who are exposed to ionising radiation in the course of their work (hereinafter referred to as the “professionally exposed personnel”) shall be determined through a medical examination, which includes as follows:

- 1) general clinical check, with detailed professional, personal and family anamnesis;
- 2) laboratory analyses, in particular as follows:
  - a) number of erythrocytes, concentration of haemoglobin in the blood, hematocrit;
  - b) number of reticulocytes;
  - c) number of thrombocytes;
  - d) number of leukocytes and leukocyte formula (and if needed, also morphological examination);
  - e) activity of alkaline phosphatase in granulocytes;
  - f) erythrocytes sedimentation rate;
  - g) basic biochemical analyses, such as glycemia, urea, transaminases, cholesterol, triglycerides, serum iron level, bilirubins;
  - h) complete check of urine and sediments;
- 3) analysis of the chromosomal aberrations in the lymphocytes of the periphery blood;
- 4) analysis of the binuclear lymphocytes;
- 5) ophthalmologic check (check of eye lenses);
- 6) gynaecological check – for women;
- 7) neuro-psychiatric and psychological examination;
- 8) if the authorised health institution finds them necessary, additional analyses that may determine disorder of metabolism of certain elements depending on the type of work with open sources of ionising radiation, in particular work with radioactive iodine, uranium, thorium and radon;
- 9) other examinations prescribed by the authorised health institution that may determine capability for conducting work and tasks, and which directly influence safety of using sources of ionising radiation (working at high elevations, in conditions of chemical harmfulness, etc.).

12. Medical examinations listed in the item 11 of this Decision shall be conducted for certain periods as follows:

- 1) checks and examinations referred to in item 11 provisions 1 and 2 – before starting work engagement and in the course of every periodical check;
- 2) checks and examinations referred to in Item 11 provision 3 – during first three months of work with sources of ionising radiation and after that upon request of authorised health institution or authorised legal entity that conducts measurements in order to assess the exposure level;
- 3) checks and examinations referred to in item 11 provision 4 – upon request of the authorised health institution;
- 4) examinations referred to in item 11 provision 5 – before starting work engagement and after that every three years;
- 5) examinations referred to in item 11 provision 6 – before starting work engagement;
- 6) examinations referred to in item 11 provision 7 – before starting work engagement and after that every six years;
- 7) examinations referred to in item 11 provisions 8 and 9 – upon request of the authorised health institution.

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13. Persons that may not work with sources of ionising radiation are those persons who

- 1) have or had a malignant disease;
- 2) have a haematological disease;
- 3) have an evolving disease of eye lenses;
- 4) have a systematic disorder of the immune system;
- 5) have a serious disorder of the endocrine system;
- 6) have a serious mental disorder or addiction;
- 7) suffer from a serious nervous diseases;
- 8) have a serious skin disease;
- 9) suffer from other functional or organic diseases determined by the doctor specialist in labour medicine appointed to conduct control of health condition of professionally exposed persons.

14. Persons suffering from pneumoconiosis, pulmonary fibrosis, severe forms of chronic bronchitis, severe pulmonary emphysema, bronchiectasis or bronchial asthma, i.e. chronic lung diseases may not work in mines and facilities in which the level of exposure to natural sources of ionising radiation exceeds prescribed action levels.

Persons that have kidney disorders must not work with nephrotoxic radioactive substances.

15. The user of sources of ionising radiation shall provide assessment of fulfilment of health condition requirements for persons working with sources of ionising radiation and for persons who are exposed to ionising radiation in the course of their work as follows:

- 1) before commencement of work engagement;
- 2) during work engagement (periodical medical checks);
- 3) in case of emergency;
- 4) after completing work engagement;
- 5) in other cases when there are medical indications.

Periodic medical checks of exposed personnel of the Category A shall be conducted once a year, whilst for the exposed personnel of the Category B they will be conducted once every three years.

16. Provisions in items 10, 11, 12, 13 and 15 of this Decision shall also pertain to persons who are currently being trained for work with sources of ionising radiation in the regular course of education.

17. Authorised legal entity who conducts measurements in the course of assessing the level of exposure to ionising radiation of persons who work with sources of ionising radiation and persons exposed to ionising radiation in the course of their work must immediately inform the user of source of ionising radiation of any need for medical examination of those persons even before the prescribed timeframe.

In the case of accidental exposure, the user of the source of ionising radiation must refer the exposed person to a medical check in an authorised health institution.

18. A health institution which conducts the medical check referred to in the item 11 hereof shall submit the report on health condition of persons working with sources of ionising radiation to the user of sources of ionising radiation.

If the health institution determines that a professionally exposed person does not fulfil health condition requirements provided for in this Decision, they shall immediately inform thereof the user of sources of ionising radiation, the authorised legal entity that conducts measurements in order to assess the level of exposure to ionising radiation and the Federal Ministry of Labour, Health and Social Policy.

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19. A health institution conducting medical examination of persons working with sources of ionising radiation shall keep the complete medical records of health condition of those persons in its archive at least 30 years upon termination of the professional exposition of those workers.

IV TRANSITIONAL AND FINAL PROVISIONS

20. In addition to persons from the items 2 and 3 hereof, persons who have been professionally trained for work with closed sources of ionising radiation and other devices generating ionising radiation used for medical examination and treatment prior to entering of this Decision into force may also work with the aforesaid sources.

21. The Rulebook on Professional Education, Health Conditions and Health Examinations of Persons That May Work with Sources of Ionising Radiation (Official Gazette of the Socialist Federal Republic of Yugoslavia 40/86) shall be repealed on the day of entry into force of this Decision.

22. This Decree shall enter into force on the eighth day following that of its publication in the Official Gazette of the Federal Republic of Yugoslavia.