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Nuclear Safety Council Instruction IS-33, of 21 November 2010, on the radiological criteria for the protection against exposure to natural radiation

Article 2.a) of the Law 15/1980, of 22 April, creating the Nuclear Safety Council, confers on this Public Body the faculty to "prepare and approve Instructions, Circulars and Guides of a technical nature relating to nuclear and radioactive facilities and nuclear safety- and radiological protection-related activities."

The Regulation on Health Protection against Ionising Radiations (RPSRI) – approved by the Royal Decree 783/2001, of 6 July, laid down in Articles 62 and 63 of its Heading VII provisions relating to natural occurring sources of radiation.

Article 62 states that the licensees of work activities – not regulated in Article 2.1 – where there are naturally occurring sources of radiation must declare these activities to the competent bodies as regards industrial practices of the Autonomous Communities in whose territory these work activities take place and conduct the necessary studies in order to ascertain whether there is a significant increase in the exposure of workers or members of the public that cannot be consider negligible from the point of view of radiation protection.

In view of the results of the studies conducted under Article 62, the Nuclear Safety Council shall identify those work activities that must be given special attention and be subject to control. Consequently, the Nuclear Safety Council shall define those work activities that must be provided with suitable exposure monitoring devices and establish, when necessary, the application of corrective actions intended to reduce exposures or of radiation protection measures in accordance, in part or in full, with other headings of the Regulation (II, III, IV, V and VI).

The Regulation does not specify the radiological criteria that would necessitate the application of corrective or protection measures; thus, their laying down is deemed necessary such that they may serve as a reference for the competent authorities and the licensees of the affected work activities.

In accordance with all that has been previously set forth, and by virtue of the legal authorisation envisaged in Section a) of Article 2 of the Law 15/1980, of 22 April, creating the Nuclear Safety Council, prior consultation of the affected sectors and after the appropriate technical reports, this Council, in its meeting of the 21st of December of 2011, has agreed the following:

First. *Purpose and Scope of application*

The purpose of this Instruction is to lay down the radiological criteria on the following aspects related to the exposure to natural radiation at the workplace:

- Values of the effective dose to workers, the exceeding of which would require the adoption of corrective measures or the installation of monitoring devices.
- Radon concentrations in workplaces, the exceeding of which would require the adoption of corrective measures or the installation of monitoring devices.
- The total or partial application of the RPSRI headings mentioned in Heading VII, in those cases where the results of the studies show that the established effective dose levels or the radon concentrations have been exceeded.

This Instruction also establishes the data to be included in the statement of activities that licensees of work activities where there are naturally occurring sources of radiation must make and in which cases these licensees must send the competent bodies as regards industrial practices of the Autonomous Communities the studies called for by Heading VII of the Regulation on Health Protection against Ionising Radiations (RPSRI).

This Instruction applies to licensees of work activities where there are naturally occurring sources of radiation that fall within the scope of application of Article 62 of the RPSRI, which are those listed on a non-exhaustive basis in the Annex.

Second. *Definitions*

The definitions of the terms and concepts used in this Instruction match those contained in the following regulations:

– Law 25/1964, of 29 April, on Nuclear Energy.

– Law 15/1980, of 22 April, creating the Nuclear Safety Council.
– Royal Decree 1838/1999, of 3 December, approving the Regulation Governing Nuclear and Radioactive Facilities.
– Royal Decree 783/2001, of 6 June, approving the Regulation on Health Protection against Ionising Radiations.

Third. ***Values of the effective dose to workers, the exceeding of which would require the adoption of corrective measures or the installation of monitoring devices***

1. The radiological criteria – in terms of the effective dose to workers due to their work activity, whose purpose is to serve as a reference threshold for the actions indicated in Article 63 of the RPSRI, must be the following:

– < 1 mSv/y: no control is needed.
– 1-6 mSv/y: a low level of control must be applied.
– > 6 mSv/y: a high level of control must be applied.

2. Control measures are considered to be those technical or administrative measures intended to reduce exposures.

3. These criteria are applicable to workers whose work activities involve the storage or handling of materials, or of waste, which are usually not deemed radioactive but contain naturally occurring radionuclides.

4. In order to estimate the effective doses, all exposure paths must be taken into account (the contribution of the natural background being subtracted), except for that of radon, which shall only be taken into consideration in those cases indicated in Point 2 of Article 5 – "Applying the principles of operational radiation protection" – of this Instruction.

5. The applicable controls – in terms of radiation protection measures – for the effective dose ranges indicated in this Article are established in Article 5 of this Instruction.

6. The limits of Article 9 of the RPSRI are applicable to workers exposed to natural radiation.

7. Licensees of work activities with exposures to natural radiation must apply the optimisation principle.

Fourth. ***Radon concentrations in workplaces, the exceeding of which would require the adoption of corrective measures or the installation of monitoring devices***

1. The level of the protection of workers against exposure to Rn-222 at their jobs must be 600Bq/m^3 of annual average concentration of Rn-222 during the work day. This is considered to be a reference level, below which the optimisation principle must be applied. This level is also taken to be a level above which the corresponding radiation protection measures must be applied, in case the concentration of radon cannot be decreased after remedial actions have been carried out.

2. It is understood by remedial actions those actions intended to reduce the concentration of radon.

3. In the case of workplaces where members of the public stay for a long time, the intervention level shall be 300Bq/m^3 of annual average concentration of Rn-222.

It is understood by workplace where members of the public stay for a long time that workplace where members of the public might stay for more hours than workers themselves (hospitals, prisons, and so on). Child, primary and secondary education centres fall into this category.

4. The reference levels for the actions indicated in Article 63 of the RPSRI must be the following:

– < 600Bq/m^3: no control is needed.
– 600-1000Bq/m^3: a low level of control must be applied.
– > 1000Bq/m^3: a high level of control must be applied.

5. The limits of Article 9 of the RPSRI are applicable to workers exposed to radon.

Fifth. ***Criteria on the total or partial application of the RPSRI headings mentioned in Heading VII in those cases where the results of the studies show that the established effective dose levels have been exceeded***

Headings II and III of the RPSRI are generally applicable, with the following considerations.

5.1 Basic criteria

The application of control measures is not necessary in those activities where it is not foreseeable that worker exposure exceeds any of the values indicated below:

- Activities involving an exposure to radon: an annual average concentration of Rn-222 of 600Bq/m^3.
- Other activities: a dose of 1mSv/y above the background level.

The licensee of the activity must reassess the exposure every 5 years in order to ensure that it remains below the conditions indicated in the preceding paragraph.

Likewise, the licensee must perform that reassessment when it makes changes to the activity that might significantly alter the exposure and whenever it has evidence that the latter has changed due to any other circumstance.

The exposure shall be reassessed by using the same methodology that was used for the original evaluation or the methodology established by the CSN. In those cases where there are changes with respect to the previously calculated worker exposure estimates, the results shall be made available to the CSN Inspection and reported to the competent body, the protection measures, if any, that have been adopted being indicated.

5.2 Applying the principles of operational radiation protection.

Prior to the application of operational radiation protection measures, the licensee of the activity must show that it has adopted all reasonably feasible measures for reducing the exposure in the existing circumstances. This justification must be in written form and made available to the CSN Inspection.

In those activities involving the storage or handling of materials, or waste, which are usually not deemed radioactive but contain natural radionuclides, where the effective dose level of 1mSv/y is exceeded, the exposure to radon shall be controlled as if it were an occupational exposure regardless of whether it exceeds 600Bq/m^3 of annual average concentration of Rn-222 or not.

The licensee of the activity shall be responsible for ensuring that the application of the operational radiation protection measures and the periodic check of their effectiveness, as well as the calibration, verification and check of the good state of operation of the measurement equipment, are carried out under the supervision of a radiation protection-qualified technician.

5.2.1 Activities requiring a low level of control.

Those activities where – the values set in Point 1 having been exceeded – it is not foreseeable that the increase in worker exposure exceeds any of the following values are considered to be included in this Article:

- Activities involving an exposure to radon: an annual average concentration of Rn-222 of 1000Bq/m^3.
- Other activities: 6mSv/y above the background level.

The following control measures shall be applied:

- The radiological monitoring of the work environment in accordance with that indicated in Article 26 of the RPSRI.
- An annual estimate of individual effective doses. This estimate may be calculated from the results of the radiological monitoring of the work environment.
- The licensee of the activity must inform workers about the existing radiological risks and the precautions they must take during their activity in general and at the work destinations and jobs they might be appointed to. Female workers must be informed of the need to report pregnancy or breastfeeding situations as soon as possible.
- In relation to the recording and notification of worker dose results, the provisions of Articles 34 to 38 of the RPSRI shall be observed. Instead of the time periods set in Article 38.1 of the RPSRI, the corresponding documentation must be kept in file for at

least one year after the workers subjected to dose monitoring have stopped working at the corresponding workplace.

5.2.2 Activities requiring a high level of control.

The principles of operational radiation protection set in Heading IV of the RPSRI shall be generally applied in those activities where the increase in worker exposure exceeds any of the values indicated in the preceding Point 5.2.1. In practice, this application shall be gradual, the exposure level, the number of affected workers and the existing protection alternatives being taken into consideration. In particular:

- When, according to the activity, the provisions on the signposting of areas or on the restriction of the access thereto set in Article 18 of the RPSRI are not appropriate, the licensee shall adopt other measures for the same protection purposes. These measures must be described in the studies that are sent to the competent body and shall be included in the procedures called for in Article 21 of said Regulation.
- The documentation to which Article 38.1 of the RPSRI refers must be kept in file by the licensee of the activity for at least one year after the workers subjected to dose monitoring have stopped working at the corresponding workplace.

When the individual dose monitoring measures set in Articles 27 to 31 of the RPSRI are not feasible or are inappropriate, licensees shall propose other measures, which must be described in the studies that are sent to the competent body.

Sixth. *Statement of activities*

1. The statement of activities called for by Article 62 of Heading VII of the RPSRI must at least include the following data:

a) The licensee's ID and, where appropriate, the name of the company, as well as its purpose and address.
b) The known type and characteristics of the naturally occurring sources of radiation that are present.
c) Where appropriate, the processes that might lead to the concentration of radioactive substances or those workplaces where radon might accumulate.
d) The number of workers in the different areas of the facility which might be potentially affected.
e) The maximum amounts of materials that are handled or stored and the amount of waste that is generated and, where appropriate, managed.
f) The protection measures that have been introduced, if any.

2. In the case of work activities that fall within the scope of application of this Instruction and start after the latter is published, the statement must be made within three months from the start of the activity.

Seventh. *Sending the required studies to the competent body*

1. The licensees of the work activities regulated in Articles 62 and 63 of Heading VII of the RPSRI must send the studies called for in them to the competent bodies as regards industrial practices of the Autonomous Communities in whose territory these activities take place, whenever their results exceed any of the following values:

- Activities involving the exposure of workers to radon: an annual average concentration of Rn-222 of 600Bq/m^3.
- Other activities: 1mSv/y above the background level for workers, and 0.3mSv/y above the background level for members of the public.

Otherwise, the results shall be made available to the Nuclear Safety Council Inspection.

2. In the case of work activities that fall within in the scope of application of this Instruction and start after the latter is published, the studies must be conducted within one year from the submission of the statement.

Eighth. *Infractions and sanctions*

This Instruction is binding in accordance with that established in Article 2.a) of the Law 15/1980, of 22 April, creating the Nuclear Safety Council, such that the failure to comply with it shall be

punished in accordance with the provisions of Articles 85 to 93 of the Law 25/1964, of 29 April, on Nuclear Energy.

Sole Repealing Provision. *Statutory Repeal*

Any rule of equal or lower level that opposes this Instruction is repealed.

Sole Final Provision. *Entry into force.*

This Instruction shall come into force on the day following that of its publication in the “Official State Gazette”.

In Madrid, on the 21st of December of 2011.–Carmen Martínez Ten, the President of the Nuclear Safety Council.

ANNEX

Work activities for which their licensees must conduct the studies called for by the Regulation on Health Protection against Ionising Radiations

The work activities for which their licensees must conduct the studies called for by the RPSRI are those which are carried out at the following workplaces:

1. Underground workplaces, such as:
   - Caves and tunnels.
   - Mines other than uranium mines.
2. Thermal establishments.
3. Facilities where groundwater is stored and treated.
4. Workplaces, underground or not, in areas identified for having high radon values.
5. The extraction of rare earths.
6. The production and use of thorium and its compounds.
7. The production of niobium and ferroniobium.
8. The extraction of gas and crude oil.
9. The production of cement and the maintenance of clinker ovens.
10. The manufacture of titanium dioxide pigments.
11. The phosphate industry (production of phosphoric acid and phosphate fertilisers).
12. The zirconium industry.
13. The production of tin, copper, aluminium, iron, steel, zinc and lead.
14. Coal-fired power plants.

Workplaces 1 to 4 are those places where annual average values of radon concentration are likely to exceed reference levels.

The other workplaces are associated with work activities that involve the storage of or the handling of materials or the generation of waste which are usually not deemed radioactive but contain natural radionuclides that could bring about a significant increase in the exposure of workers and, where appropriate, members of the public.