



ZERO FATALITY STANDARD – ZFS No.12 WORK WITH IONIZING RADIATION

3rd Version – December 2023

PURPOSE OF THE STANDARD

This standard establishes the requirements to perform work with equipment that emits ionizing radiation and to define the minimum content that must be considered in the procedures of Colbun and its Collaborating Companies.

Ionizing radiation is defined as the type of energy released by atoms in the form of electromagnetic waves (gamma rays or X-rays) or particles (alpha, beta particles, or neutrons).

This standard applies to all use, handling, operation, and transportation of equipment that generates ionizing radiation, such as measuring instruments, industrial radiography equipment, and others.

GUIDELINES

1. PERSONNEL REQUIREMENTS

The team conducting work with ionizing radiation must meet the following certification requirements:

- Training provided by the Chilean Nuclear Energy Commission (CCHEN by its acronym in Spanish) or another body authorized by the Health Service.
- Operators of ionizing radiation-emitting equipment must hold the corresponding operator license issued by the Health Service.
- Personnel must undergo ionizing radiation dosimetry by organizations authorized by the Health Service.

2. EQUIPMENT AND WORKING TOOLS REQUIREMENTS

All equipment generating ionizing radiation must be identified, labeled, and registered.

2.1. WORK AREA REQUIREMENTS

The work area for activities involving ionizing radiation must meet the following requirements:

- Provide elements to delineate, signal, and restrict access to areas where radioactive sources are present (radioactive source signs, restricted access).
- Maintain a list of authorized personnel permitted to handle ionizing radiation-emitting equipment in the work area.
- Before leaving the area, personnel in charge must use an ionizing radiation detector to verify no mobile equipment is left behind or misplaced.
- Storage of radioactive sources must be authorized by the relevant Health Service.

2.2. EQUIPMENT AND TOOL REQUIREMENTS

Equipment and tools used in work involving ionizing radiation must be inspected for functionality and condition and meet the following requirements:

- a. All ionizing radiation-emitting equipment must have operational authorization issued by the Health Service.
- b. The transportation of radioactive equipment on public roads must be authorized by the Health Service.
- c. Storage must be conducted in accordance with the conditions specified by the Health Service.
- d. All personnel exposed to ionizing radiation are required to wear their dosimeters whenever operating, handling, or entering areas with ionizing radiation.
- e. Depending on the work, a calibrated ionizing radiation detector with a valid calibration certificate must be available.

3. REQUIREMENTS ASSOCIATED WITH ACTIVITY DEVELOPMENT

3.1. WORK PLANNING REQUIREMENTS

The development of activities must comply with applicable legal regulations and include the following planning and control requirements:

- a. Maintain an up-to-date record of exposed personnel, including dosimetry history and exposure to ionizing radiation.
- b. Define radiation safety parameters such as shielding, exposure time, and distance.

4. RECORDS

[Use Checklist No. 12 to verify compliance Zero Fatalities Standards-Colbun S.A.](#)

EXCEPTIONS

Previous to the start of work, Colbun's Facility Manager (Project, Power Plant) may authorize exceptions to this Standard in writing. Should there be a discrepancy where there is more than one Facility Manager, it must be escalated to a higher hierarchical level for definition.