

Health and Safety Standard

RADIATION STANDARD

1. PURPOSE

This standard supports the SaskPower Health, Safety and Environment Policy and specifies the requirements for managing risk associated with various types of radiation found at SaskPower.

2. SCOPE

This standard does not address hazard/aspect or risk from naturally occurring radiation, except Radon.

This standard outlines the minimum requirements that shall be met or exceeded by SaskPower workers and contractors. Failure to comply may result in injuries, damage to equipment and property, environmental harm, performance management or any combination thereof.

The use of the word “shall” within this standard denotes a mandatory action, whereas the use of the word “should” or “may” denotes a recommended action.

3. DEFINITIONS

The following definitions apply to this standard:

Ionizing Radiation - is radiation with enough energy so that during an interaction with an atom, it can remove tightly bound electrons from the orbit of an atom, causing the atom to become charged or ionized. This type of radiation includes X rays, radon and gamma rays.

Radiofrequency (RF) Electromagnetic (EMR) Radiation (Non-ionizing) –is the transfer of energy by radio waves. RF EMR lies in the frequency range between 3 kilohertz (kHz) to 300 gigahertz (GHz). RF EMR is non-ionizing radiation, meaning that it has insufficient energy to break chemical bonds or remove electrons (ionization). Radiofrequency (RF) radiation are electromagnetic waves emitted from a variety of common wireless communication devices, including cell phones, cordless (DECT) phones, Wi-Fi computer networks, smart meters, and baby monitors.

Extremely Low Frequency (ELF) Radiation (Non-Ionizing) - is at the low-energy end of the electromagnetic spectrum and is a type of non-ionizing radiation. Non-ionizing radiation has enough energy to move atoms around or make them vibrate, but not enough to directly damage DNA. ELF radiation has even lower energy than other types of non-ionizing radiation like radiofrequency radiation, visible light, and infrared. ELF includes EMF and Radiofrequency radiation types.

Naturally Occurring Radiation - exists in the earth's crust. The decay of thorium and uranium produces many different types of radioactive materials, called isotopes. Some examples of these isotopes are Radium-226, Potassium-40, and Radon-222. These isotopes of Naturally Occurring Radioactive Materials (NORM) are generally found in low concentrations.

NORM can come to the earth's surface due to natural processes (radon gas moving through cracks in rocks or dissolving and being transported by ground water flows), or due to human activities (mining, oil and gas extraction, etc.). Additionally, the human activities that bring NORM to the surface may cause NORM to become more concentrated than its natural state. For example, coal ash from coal-burning power plants contains a more concentrated form of NORM than the coal did when it was taken from the ground. Because NORM is radioactive, once it is brought to the surface or concentrated, the ionizing radiation that it emits can now interact with humans.

4. REQUIREMENTS

4.1. IONIZING RADIATION

Ionizing radiation sources are used in various processes or in equipment at SaskPower. The use, storage, handling and disposal are regulated by the federal government through the Canadian Nuclear Safety Commission. At SaskPower, the management and procedures for use, storage, handling, disposal and licensing is coordinated by SaskPower's Radiation Safety Officer (RSO) or alternate.

Radiation Safety Officer's (RSO) duties shall include, but not be limited to:

- Overseeing and managing SaskPower's compliance to its regulatory framework, including the Nuclear Safety and Control Act and applicable regulations,
- Any licence applications and/or changes,
- Discussions with the Canadian Nuclear Safety Commission on SaskPower's behalf,
- Compliance reporting and inspections including audit reporting,

- Management of SaskPower's radiation safety and protection programs including disposal.

Directors\Managers shall:

- Directors and managers shall understand the hazards if sources of ionizing radiation are present as defined under the Nuclear Safety and Control Act. Directors / Managers should contact the Radiation Safety Officer for information related to use handling storage or disposal.
- Ensure that procedures are implemented for the safe use, handling, and licensing of ionizing radiation.
- Ensure that job planning including hazard/ aspect and risk assessment process is used when sources of ionizing radiation is identified as part of a work process.
- Ensure that workers are informed of the hazard and risk of exposure to ionizing radiation.
- Ensure that emergency procedures are developed for managing a radiation leak or breach of containment and communicated to workers.

4.2. RADON

- Radon is a radioactive gas that occurs naturally when the uranium in soil and rock breaks down. In enclosed spaces such as basements, radon gas can accumulate to levels which can be a risk when inhaled long periods of time. The highest risk environments would be in living quarters in locations where radon is known to exist. The current Canadian guideline for radon in indoor air for dwellings is 200 Becquerels per cubic metre (200Bq/m³).
- Where conditions exist that may result in radon levels may be above the Canadian Guideline and works are provided living accommodation, Radon levels should be tested to determine exposure.
- Control the exposure by ventilating and/or sealing basements and limiting amount of time in areas of concerns.

4.3. RADIO FREQUENCY AND EXTREME LOW FREQUENCY RADIATION

Radiofrequency and electromagnetic radiation are by-products of equipment or systems used at SaskPower. Occupational risk from exposure to these types of radiation has not been established. Emerging research and/or regulatory change is being monitored by SaskPower. SaskPower is taking a precautionary approach and will provide information

and guidelines on best practice when using or working in proximity to these types of radiation as information is available.

Directors\Managers shall:

- Identify equipment or operations that pose a risk.
- Use procedures and safe guards to protect safety of workers, public and the environment.
- Provide information on hazard/aspect and risk, when available, to workers.
- Report incidents in the management system software including regulatory inspections as per Incident Reference Chart.

Radio Frequency

- Equipment at SaskPower has been measured and known. Examples are, antennas, satellite stations, and other communications equipment.
- Safety Code 6 provides guidance on exposure limits (3 kHz – 300 GHz).
- Exposure limits shall be below 1 Watt/m².
- SaskPower has identified two facilities that exceed the limits and include the satellite stations at GCC and Saskatoon Maintenance Centre (SMC). Identified controls are in place to mitigate these hazards. Safe work practice shall be used for this equipment.

Electromagnetic Frequency EMF (below 0.3kHz):

- EMF radiation is present whenever electricity is flowing. This radiation is made up of electric and magnetic fields.
- American Conference of Governmental and Industrial Hygienists provide guidance on exposure levels. Exposure limits vary and are based on frequency of the radiation emitted. The allowable limit is 2 Tesla (20,000 Gauss).
- Transmission and Distribution levels are typically below 10 mG (milliGauss).
- Workers with implanted ferromagnetic or electronic medical devices should not be exposed to static magnetic fields exceeding 5 Tesla (50,000 Gauss)

5. RESOURCES

5.1. INTERNAL RESOURCES

Related Policies:	<ul style="list-style-type: none"> • SaskPower Health, Safety and Environment Policy • Hazard /Aspect and Risk Assessment (HARA) Policy
Related Standards:	<ul style="list-style-type: none"> • Hazard/Aspect and Risk Assessment (HARA) Standard
Additional Information:	<ul style="list-style-type: none"> • Health, Safety and Environment Rule Book • Radiography Safe Work Procedure (Control and Protection)

5.2. EXTERNAL RESOURCES

Related Legislation:	<ul style="list-style-type: none"> • <i>Saskatchewan Employment Act, 2014</i> • <i>The Occupational Health and Safety Regulations, 2020</i> • <i>The Radiation Health and Safety Act, 1985</i> • <i>The Radiation Health and Safety Regulations, 2005</i> • Safety Code 6, 2014 • <i>Nuclear Safety and Control Act</i>
Additional Information	<ul style="list-style-type: none"> • Health Canada – Radon: Is it in Your Home? • Electric and Magnetic Fields from Power lines and electrical appliances

5.3. OWNERSHIP

Division:	Health and Safety
Department:	Safety Performance & Planning
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5.4. DOCUMENT HISTORY

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