

RIN #23 Radiation Protection for Persons Assisting During Equine Veterinary X-Ray Procedures

This RIN provides guidance for protecting persons (veterinarian and their staff, stable/track workers, horse owner) participating in an x-ray procedure in equine veterinary practice. The purpose is to help the equine veterinarian take appropriate actions to ensure participants are aware of and are effectively protected against radiation exposure during x-ray procedures. This applies to situations of one time assistance per year (e.g. by owners) or a recurrent basis (e.g. by veterinarian and their staff, stable/track workers). The practitioner needs to be aware of [Safety Code 28: Radiation Protection in Veterinary Medicine](#) and the College of Veterinarians of BC (CVBC) *Radiation Safety Manual* and its requirements. The following operating criteria are assumed.

Operating Criteria

- A portable x-ray unit is operated using standard technique factors and is equipped with a beam-limiting device.
- The x-ray workload (number of exposures) per horse is on average 20 exposures in an examination.
- The maximum film size (cassette size) is 35 cm X 43 cm (14" X 17"); smaller cassettes are normally used.
- The person assisting is no closer than 20 cm from the x-ray film cassette; normally distances are likely to be more than 50 cm.

Exposure and Protection Assessment

For a one-time procedure involving the horse owner, using the operating criteria above, the dose is estimated to be ~0.1 mSv at a distance of 20 cm. If the distance is around one (1) metre, the dose would be 0.004 mSv. This level of exposure, if received once per year, is below the Action Level of 1 mSv/year as specified in the *WorkSafeBC Occupational Health and Safety Regulation*. Under these conditions no additional personal protection is required.

For a stable/track worker assisting during five (5) x-ray examinations (or 100 exposures) per week, using the operating criteria above, the dose is calculated to be 1.1 mSv/year at one (1) meter distance and as high as 27 mSv/year at 20 cm. To prevent a stable/track worker exposure exceeding the body dose limit of 20 mSv/year, and to keep it below the Action Level of one (1) mSv/year, a protective apron and thyroid shield with a minimum lead equivalence of 0.25 mm must be worn; lead-lined gloves may be worn, if appropriate. Actual doses will be determined by workload, exposure factors, cassette size and distances.

If the workloads exceed those specified in this assessment, then greater protection for the body would likely be required. A reassessment of the likely exposure and the protection required will be necessary for such situations.

General Recommendations

- X-ray equipment must be operated only by individuals who are properly trained to use the equipment and familiar with the procedure(s) being performed. A holding device for the x-ray film-cassette must be used. Utilization of a clamp holder is a requirement of *WorkSafeBC OH&S Guideline*.
- X-ray equipment that is energized and ready to produce radiation must be supervised by a qualified individual.
- Restraining devices must be used to support animals whenever practical. If possible, the animal should be sedated. However, if this is not possible and a helper must restrain/assist with the procedure, protective aprons, thyroid shields and gloves must be worn. Exposure to the direct radiation of the x-ray beam must be avoided. Personal protective clothing includes lead aprons, gloves and thyroid shields.
- Only those persons whose presence is essential when a radiological procedure is carried out shall be allowed in the immediate area (i.e. at distances closer than 3m to the x-ray equipment).
- Those persons required to be present during an x-ray procedure must take advantage of available protective devices (i.e. lead apron, thyroid shield and gloves) to ensure their exposures are kept as low as reasonably achievable. Personnel must keep as far away from the x-ray beam as is practical at all times. Exposure of personnel to the direct x-ray beam must never be allowed.
- A pregnant client involved in a one-time x-ray procedure is entitled to information and instruction on radiation protection issues and safety concerns regarding assisting during an x-ray procedure. Adherence to workplace safety protocols as instructed to the client by the Veterinarian, and observation of the CVBC Facility Practice Standards and Safety Code 28 is recommended.
- **Children must not assist** during an x-ray procedure. Maximizing the distance between the child and x-ray equipment during its use is recommended.

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Personal Protection

- For the veterinarian and their staff participating in x-ray procedures on a regular basis, personal protection is required. Radiation badges, lead aprons, thyroid shield and gloves must be worn during an x-ray procedure – see [RIN#19: Personal Protection Guidelines for Veterinary Ambulatory X-ray Practice](#).
- Primary radiation badges must be worn beneath the lead apron at waist level to verify that body doses are below the Action Level of 1 mSv/year. Additional secondary dosimeters may be worn to determine doses to other parts of the body (e.g. head; hands). Contact your dosimetry service provider for details on appropriate dosimeter types.
- For a horse owner assisting with a one-time x-ray procedure per year, no additional personal protection is required, provided the operating criteria and general recommendations specified above are met.
- For a stable/track worker assisting with x-ray procedures on a regular basis (up to five examinations per week), personal protection is required, as indicated above. A lead apron with thyroid shield must be worn during x-ray procedures. Additional protection, such as lead-lined gloves, is a requirement of practice by the CVBC.

Radiation Protection Survey

Portable x-ray equipment and related radiation safety devices must be subject to a radiation survey at least once every three (3) years, and whenever the equipment or devices may have been damaged, jostled or affected in anyway that would adversely affect their performance, and when personal dosimetry results show doses greater than expected.

Dosimetry Service Providers

1. Global Dosimetry Solutions Inc, 2652 McGaw Avenue, Irvine CA, USA 92614
Tel: 1.800.251.3331 | Fax: 949.296.1144
Web site: www.dosimetry.com
e-mail: info@dosimetry.com
2. Landauer Inc, 2 Science Road, Glenwood IL, USA 60424
Tel: 1.800.323.8830 | Fax: 708.755.7016
Web site: www.landauerinc.com
e-mail: (See web site)
3. National Dosimetry Services (Health Canada), 775 Brookfield Road, Ottawa ON K1A 1C1
Tel: 1.800.261.6689 | Fax: 613.957.8698
Web site: http://www.hc-sc.gc.ca/ewh-semt/occup-travail/radiation/dosim/index_e.html
e-mail: NDS-SND@hc-sc.gc.ca

For further information contact:

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