RADIATION PROTECTION SERVICE

DEPARTMENT OF WELLBEING, SAFETY & HEALTH

UNIVERSITY OF LEEDS

RPA GENERIC RISK ASSESSMENT NO 24:
HAZARD IDENTIFICATION & RISK ASSESSMENT FOR A GE BRIVO CT385 SCANNER

DESCRIPTION

1) The GE BRIVO CT scanner emits x-rays up to 140kV and 130mA. The x-rays are highly collimated and emitted in short (1.5 second) bursts directed from the tube to detector as a sheet within the scanning gantry.

2) Scatter dose measurements taken by the manufacturer show that dose rates at 2m from the gantry along the table axis are approximately $0.8mSvh^{-1}$.

3) CT scanner and table are located in a dedicated room (7.126d) lined with code 6 (2.65mm) lead sheeting and with a lead glass door panel and viewing window. The scanning room is a temporary 'Controlled Area' whilst scans are under way.

4) The operating position is outside the scanning room and no personnel remain in the room whilst a scan is underway.

5) An arm actuated door interlock stops x-ray production when opened and then requires control panel reset.

Version	Author	Date of issue	Date of review	Risk Rating
1.0	Andrew Cowling	7th August 2015	7th August 2018	Low

HAZARD & RISK ASSESSMENT

Condition	Exposure pathway	Radiation exposure	Level of risk	Risk reduction measures
Exposure to x-radiation	***External irradiation***			
	(1) Persons external to scanner room.	Penetrating x-rays; dose rate 0.8 mSv h^{-1} @ 2m from scanner whilst operating. Scanner room is lined with code 6 (2.65mm) lead shielding and lead glass windows. Attenuation factor for code 6 lead = $2x10^{-4}$ Therefore dose rate at closest point to scanner outside the room is <0.2µSvh^{-1}.	**Health – Low** Dose rates external to the scanning room are below the university's dose constraint of 0.5µSvh^{-1}. **Collateral – Low** Potential for legislative infraction should there be a failure. However, the likelihood of such a failure is low.	The scanner room door is interlocked with the x-ray shutter and breaking the interlock terminates the x-ray beam. Users must be trained in the operation of the equipment and must follow appropriate protocols and local rules Safe working procedures ensure that no-one remains in the scanning room when scans are initiated - operator must check that there are no persons in the scanner room before x-rays are activated.
	(2) Person remaining in scanner room during operation.	Penetrating x-rays; dose rate 12 mSv h^{-1} @ 30cm. Exposure adjacent to the scanner would exceed the University dose constraint (annual dose limit) of 1 mSv in ~5 minutes.	**Health – Medium** Dose rates close to the scanner are high. **Collateral – Medium** Potential for legislative infraction should a person not follow safe working procedures.	Access to scanner room is restricted to authorised personnel and safe working procedures ensure that no-one remains in the scanning room when scans are initiated.

Condition	Exposure pathway	Radiation exposure	Level of risk	Risk reduction measures
Damage / fire				
	Damage to the equipment by impact or fire.	Penetrating x-rays; dose rate 12 mSv h^{-1}. If the equipment was damaged but still operable, and a person was exposed by standing adjacent to a leakage point, their exposure would exceed the University dose constraint (annual dose limit).	**Health - Low** It is unlikely that the equipment would remain operable after sustaining fire damage. **Collateral – Low** Potential for legislative infraction should there be a failure. Critical failure of the equipment may be reportable to the Health and Safety Executive.	If the equipment has received a significant knock, has been close to a fire, or has been damaged in any other way the user should (1) switch off and isolate the power, then (2) inform the Radiation Safety Coordinator, the Radiation Protection Service and the manufacturer to seek advice before using the equipment.
Maintenance / servicing				
	Access to an unguarded x-ray beam.	Hand accessible dose rates are high; national limits on extremity exposures would be exceeded. The University dose constraint would be exceeded.	**Health – High** Removal of the gantry covers could give access to areas where there is a high dose rate. **Collateral – Medium** Dose rates exceed internal guidelines and national dose rate limit for the designation of Controlled Areas; potential for legislative infraction.	All repairs and modifications to the equipment must only be carried out by the manufacturer or by a qualified service engineer approved by the Radiation Safety Coordinator or the Radiation Protection Service. If the equipment is serviced on site the service engineer must have sole use of the scanning room.