

JOB DESCRIPTION

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| **JOB DETAILS** | |
| **Job Title** | Senior Radiotherapy Engineer |
| **Reports to** | Chief Radiotherapy Engineer |
| **Band** | Band 7 *(subject to formal matching)* |
| **Department/Directorate** | Medical Physics Department, Specialist Services Division |

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| **JOB PURPOSE** |
| The Radiotherapy Engineering Service provides highly specialised scientific and technical support to the Exeter Oncology Centre covering the use of linear accelerators, a CT simulator and HDR brachytherapy unit.  The Radiotherapy Engineering Service maintains and provides technical support for radiotherapy equipment which also includes radiotherapy treatment planning systems, radiotherapy computer networks, dosimetry and laboratory equipment with a total value in excess of £10 million.  The post holder is a service and technical expert in respect of the management of the Radiotherapy Equipment maintenance and performance and is instrumental in decisions of how best practice is achieved, guided by principles of quality assurance, regulations and external references.  **K** |
| **KEY RESULT AREAS/PRINCIPAL DUTIES AND RESPONSIBILITIES** |
| * To plan, organize and execute preventative and corrective maintenance of our Linear Accelerators (LA), CT Simulators, Brachytherapy unit and their associated infrastructure. The post holder will also perform routine and ad-hoc quality control (QC) of LA, CT simulators, Brachytherapy unit and IT infrastructure associated with all these devices. The post holder will provide expert specialist knowledge in Radiotherapy Treatment linear accelerator (LA) and machine maintenance and Quality Control (QC) with an aim of minimizing unplanned downtime for patients undergoing cancer treatments & ensuring safe & optimum equipment performance. * To supervise and assist in the training of the Band 6 and Apprentice Engineers, ensuring effective clinical coverage. * To assist in the training of Radiotherapy Physics staff, Radiographers and the wider team. * To have expert knowledge of radiotherapy equipment including maintenance and repair - the post holder will be a specialist in Radiotherapy linear accelerator maintenance and quality control with regard to electronic, electrical, mechanical and computers aspects. * To discuss with the Chief Engineer and local Medical Physics Experts (MPE) the impact of any modifications or repairs that might change the performance specifications of the linear accelerator. * To work with the equipment supplier and organize planned preventative maintenance and to be a point of contact for the equipment supplier in relation to fault reporting. * To work with other members of the Radiotherapy Physics team in undertaking routine QC work on the equipment outside normal working hours when necessary. * Carry out electrical and functional safety checks. * To support the Chief engineer in promoting the collaboration with all the Peninsula Engineering teams (Torbay, Plymouth and Truro), and more widely across the South West. * To comply with all necessary Health and Safety and radiation regulations. * Coordinate electrical and functional safety checks on the radiotherapy equipment. |
| **KEY WORKING RELATIONSHIPS** |
| Areas of Responsibility: Radiotherapy engineering  No. of Staff reporting to this role: 0    The post holder is required to deal effectively with staff of all levels throughout the Trust as and when they encounter on a day to day basis.  In addition, the post holder will deal with the wider healthcare community, external organisations and the public. This will include verbal, written and electronic media.  Of particular importance are working relationships with:   |  |  | | --- | --- | | **Internal to the Trust** | **External to the Trust** | | * Physicists * Engineers * Dosimetrists * Mould Room Technologists * Radiographers * Clinicians * Administrative staff * IT support * Estates | * Equipment vendors * Equipment support | |
| **ORGANISATIONAL CHART** |
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| **FREEDOM TO ACT** |
| * The post holder is a technical expert in respect of the management of the linear accelerator maintenance and performance. The post-holder supports the Chief Engineer in deciding how best practice is achieved, working to broad occupational policies, guided by principles of quality assurance, regulations and external references. * Plans own work schedule and that of others. Produces quality system procedures and work instructions guided by principles of quality assurance, regulations and external references. |
| **COMMUNICATION/RELATIONSHIP SKILLS** |
| Communicate with a number of service users including the following staff groups:   * Radiotherapy Engineers * Radiographers (therapy) * Clinical Scientists * Radiotherapy Clinical Technologists * Administration and Clerical Staff * Equipment manufacturers and supplies including specialist oncology suppliers * IT Department * Estates Department * Ancillary staff      * Communicate and receive highly complex information and data from many sources; this will include manufacturer updates and modifications; in-house measured dosimetry data which requires machine adjustments; safety alerts or reports from professional bodies, government organisations and manufacturers that may require action and could result in the implementation of new tests and protocols. * Communicate and liaise with staff from each section regarding equipment status and service arrangements so that the department functions efficiently, and linear accelerator availability is maximised. * Communicate and collaborate effectively with the Trust IT and estates department on issues concerning radiotherapy equipment and auxiliary equipment (e.g. servers, network, ventilation, air conditioning, etc.) * Maintain a collaborative relationship with the Trust IT and estates department so that the specialised requirements of the radiotherapy network are understood and supported. * Be a contact for the equipment manufacturers about upgrades and service schedules. * Access the manufacturers’ “help desk” to describe the problems based on a thorough understanding of the equipment and act on the advice provided. * As part of the radiotherapy physics team, work flexibly to meet the demands of the service, this may involve shift work which may include evenings and weekends. |
| **ANALYTICAL/JUDGEMENTAL SKILLS** |
| * Maintain effective technical support based on an in-depth understanding of the complex radiotherapy equipment and related IT equipment within Oncology and Radiotherapy Physics.  Diagnose and assess technical problems, requiring analysis of complex test results, technical data and information supplied by component system vendors - this may include faults beyond the scope of manufacturer supplied information and where there is conflicting information.Understand the complex relationships between the different electronic, digital and mechanical system and read and understand manufacturer and supplier circuit diagrams.  * Employ expert decision-making skills to ensure issues are rectified in a safe and timely manner, contacting manufacturers where needed for support and advice. * Ensure the equipment users are informed of the status of the equipment as appropriate. |
| **PLANNING/ORGANISATIONAL SKILLS** |
| * Responsible for planning of planned equipment servicing and response to faults/ breakdown on all radiotherapy equipment. * As down-time on equipment is critical due to capacity and clinical need, conflicting priorities have to be managed carefully, balancing safety with a need to maintain the service. This involves complicated scheduling, involving liaising with staff across departments and with manufacturers and repeatedly adjusting plans. * Work flexibility as priorities can change rapidly when unexpected and unscheduled events/faults unfold. * Assist in the coordination and facilitate the training of the Radiotherapy Engineering team |
| **PATIENT/CLIENT CARE** |
| * As a senior engineer, assist in the provision of the radiotherapy engineering specialist radiotherapy clinical technical service. * Undertake calibration and safety checks that contribute to the quality control programme for all the radiotherapy equipment, including linear accelerators, imaging systems, CT scanner and simulator, which have a direct impact on patient treatment and radiation safety. * Undertake servicing and QC, these services involve a large number of mechanical and electrical engineering tests. * Inspect and test new electronic, electrical and mechanical equipment arriving in the department for safety and conformance to national safety standards. |
| **POLICY/SERVICE DEVELOPMENT** |
| * Write and amend procedures and work instructions adhering to the local document control framework of the Quality Management System (QMS). * Make quality improvement suggestions via the QMS so that the service may be efficient and productive. * Support the maintenance of and upgrades of the CT-simulator and HDR brachytherapy in coordination with the Chief Engineer and lead medical physicists. * Assist in the activities related to testing, acceptance and commissioning of Linear Accelerators and HDR delivery system. |
| **FINANCIAL/PHYSICAL RESOURCES** |
| * Responsible for the maintenance of the assets of the oncology & radiotherapy physics service with a total value >£10m. * As a technical expert, help to advise on the selection of linear accelerators and other high value assets as required by the replacement and development programmes * Manage the spares parts required for Radiotherapy Treatment machines. Maintain adequate stocks of spares to minimise machine down time. Specify and requisition appropriate materials and spare parts within a set budget. * Manage the software and hardware components of the Radiotherapy/ Medical Physics computer network. * Operate high cost (each linear accelerator well in excess of £1 million) radiotherapy equipment safely whilst testing, fault finding and repairing. |
| **HUMAN RESOURCES** |
| * Provide training for clinical scientists, technologists and radiographers who are rotating through this department. * Instruct staff in the safe use of equipment and equipment testing procedures. * Manage the linear accelerator maintenance programme, ensuring junior staff have work allocated and are supervised when necessary, and that appropriate training is provided to develop those staff members and maintain a safe and effective service. |
| **INFORMATION RESOURCES** |
| * Input data into the equipment data base. * Provide regular reports on equipment when required – these may be a statistical analysis of warning and error logs from the linacs which feed into preventative maintenance, reports following intervention on the linacs, as well as routine service reports for the linacs, CT scanner and smaller items of equipment. * Adhere to Trust data protection policies |
| **RESEARCH AND DEVELOPMENT** |
| * Participate in research and development including clinical and complex dosimetry audit as appropriate to meet the requirements of the Oncology and Radiotherapy Physics services. * Assist in the design, modification and manufacture of new equipment or software. * Undertake equipment and software testing in conjunction with manufacturers and key staff. * Carry out Quality System audits when required. |
| **PHYSICAL SKILLS** |
| * Use a range of complex test equipment and tools (requiring accuracy and fine manipulation) whilst maintaining, repairing and performing quality control on radiotherapy equipment. * Repair very delicate dosimetry equipment which requires very accurate soldering and cable preparation. * Repair and modify fine electronic circuit boards using specialised tools and techniques, where there is a need for high precision and accuracy. |
| **PHYSICAL EFFORT** |
| * Service and repair radiotherapy equipment in a manner compliant with current health and safety guidelines. * This will occasionally require heavy lifting (>15 kgs) and performing tests and adjustments on heavy equipment often over extended period and working in awkward positions. |
| **MENTAL EFFORT** |
| * There is a frequent requirement for concentration where the work pattern is unpredictable, to switch quickly from planned tasks to fault-finding & providing support to clinical staff. * There is an occasional requirement for prolonged concentration, e.g. servicing or fault finding on high value radiotherapy treatment machines where machine performance and clinical uptime is critical and the equipment is highly complex. |
| **EMOTIONAL EFFORT** |
| * Frequently repair equipment under the pressure of expectations from cancer patients in distressing circumstances who may be still present in the treatment room whilst the radiotherapy equipment suspected faults are being diagnosed or equipment is being repaired. |
| **WORKING CONDITIONS** |
| * Work safely at all times being aware of the range of hazards encountered in a radiotherapy department for which there are occasional exposure routes: radiation, solvents/chemicals, dust, high voltages, exposure to body fluids whilst performing this role. * Work in accordance with Health and Safety legislation, in particular IRR99, Health and Safety at Work Act. * Act as an IR(ME)R ‘operator’ in accordance with IR(ME)R regulations * The Post-holder will be subject to instances of significant disruption to work-flow during periods of high work load, which will involve the urgent prioritising of conflicting requirements. |
| **OTHER RESPONSIBILITIES** |
| Take part in regular performance appraisal.  Undertake any training required in order to maintain competency including mandatory training, e.g. Manual Handling  Contribute to and work within a safe working environment  You are expected to comply with Trust Infection Control Policies and conduct him/herself at all times in such a manner as to minimise the risk of healthcare associated infection  As an employee of the Trust, it is a contractual duty that you abide by any relevant code of professional conduct and/or practice applicable to you. A breach of this requirement may result in action being taken against you (in accordance with the Trust’s disciplinary policy) up to and including dismissal.  You must also take responsibility for your workplace health and wellbeing:   * When required, gain support from Occupational Health, Human Resources or other sources. * Familiarise yourself with the health and wellbeing support available from policies and/or Occupational Health. * Follow the Trust’s health and wellbeing vision of healthy body, healthy mind, healthy you. * Undertake a Display Screen Equipment assessment (DSE) if appropriate to role. |
| **GENERAL** |
| This is a description of the job as it is now. We periodically examine employees' job descriptions and update them to ensure that they reflect the job as it is then being performed, or to incorporate any changes being proposed. This procedure is conducted by the manager in consultation with the jobholder. You will, therefore, be expected to participate fully in such discussions. We aim to reach agreement on reasonable changes, but if agreement is not possible, we reserve the right to insist on changes to your job description after consultation with you.  Everyone within the Trust has a responsibility for, and is committed to, safeguarding and promoting the welfare of vulnerable adults, children and young people and for ensuring that they are protected from harm, ensuring that the Trusts Child Protection and Safeguarding Adult policies and procedures are promoted and adhered to by all members of staff.  At the Royal Devon, we are committed to reducing our carbon emissions and minimizing the impact of healthcare on the environment, as outlined in our Green Plan available on our website. We actively promote sustainable practices and encourage colleagues to explore and implement greener ways of working within their roles. |

PERSON SPECIFICATION

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| **Job Title** | Senior Radiotherapy Engineer |

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| **Requirements** | **Essential** | **Desirable** |
| **QUALIFICATION/ SPECIAL TRAINING**  BSc Electrical/Electronic Engineering/Biomedical Engineering/Computer Science (or equivalent professional development) plus evidence of significant in-practice experience, formal training (e.g. HND, manufacturer’s training)  Further specialist training to masters level in Electrical/Electronic Engineering/Biomedical Engineering/Computer Science, or equivalent experience such as satisfactory completion of a full technical training for high energy linear accelerators, provided by either Varian or Elekta.  Proven experience /competence of working on Clinical Linear Accelerators.  Membership of the Voluntary Register of Clinical Technologists | E  E  E | D |
| **KNOWLEDGE/SKILLS**  Specialist knowledge of electrical / electronic / computer engineering  Advanced technical knowledge of radiotherapy linear accelerators and familiarity with their application in radiotherapy  Detailed technical knowledge and understanding of accelerators and their associated systems (MLC, MV and kV imaging), sufficient to be able to troubleshoot down to component level  Broad knowledge of all radiotherapy equipment  Understanding of radiotherapy machine quality control  Basic programming and data processing skills (e.g. C, C++, Python, Matlab)  Knowledge of computer networks, computer operating systems and databases  Able to communicate complex and technical information to other professional groups (including manufacturers)  Able to solve highly complex problems using analytical skills and professional judgement | E  E  E  E  E  E  E  E | D |
| **EXPERIENCE**  Practical experience in radiotherapy equipment servicing, workshop practices and techniques covering preventative maintenance, servicing, inspection, troubleshooting, calibration, quality control, repair and electrical safety  Able to use standard computer systems and proprietary databases as well as, Excel and Word etc. to write documentation and create spreadsheets etc. to maintain systems’ integrity, patient data and clinical records | E  E |  |
| **PERSONAL ATTRIBUTES**  Ability to make accurate measurements using sophisticated testing equipment on high precision radiotherapy treatment units  Able to lift and manoeuvre equipment, various test tools and patient equivalent phantoms and monitoring devices in excess of 15kg on an occasional basis  Use heavy lifting equipment to lift items in excess of 350 kg  Manual dexterity to use fine tools for equipment adjustment and assembly  Able to work in confined spaces and in areas with restricted/limited access to equipment components | E  E  E  E  E |  |
| **OTHER REQUIREMENTS**  Able to work effectively in and with multidisciplinary teams  Able to work under pressure diagnosing and repairing faults with patients waiting for treatment  Able to deal with complex and unpredictable situations  Able to adjust to interruptions during frequent and prolonged periods of concentration  Able to concentrate when subject to unpredictable working patterns  In depth understanding of the hazards posed by and precautions needed for working with ionising radiation and electrical hazards from: electrostatic stored charges, medium and high voltages, medium and high currents  Occasionally handle radioactive substances  Deal with and contain solvents/substances/bases hazardous to health when servicing / dismantling equipment  Safely use high pressure gas cylinders  Frequent to heavy use of computers and monitors  Occasional exposure to body fluids when working on equipment  Flexibility to undertake out of hours working, on-call and early morning ‘run-ups’ as per Agenda for Change terms and conditions | E  E  E  E  E  E  E  E  E  E  E  E |  |

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|  | | **FREQUENCY**  **(Rare/ Occasional/ Moderate/ Frequent)** | | | |
| **WORKING CONDITIONS/HAZARDS** | | **R** | **O** | **M** | **F** |
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| **Hazards/ Risks requiring Immunisation Screening** | |  |  |  |  |
| Laboratory specimens | N |  |  |  |  |
| Contact with patients | N |  |  |  |  |
| Exposure Prone Procedures | N |  |  |  |  |
| Blood/body fluids | Y | R |  |  |  |
| Laboratory specimens | N |  |  |  |  |
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| **Hazard/Risks requiring Respiratory Health Surveillance** |  |  |  |  |  |
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| Solvents (e.g. toluene, xylene, white spirit, acetone, formaldehyde and ethyl acetate) | Y |  |  |  | F |
| Respiratory sensitisers (e.g isocyanates) | N |  |  |  |  |
| Chlorine based cleaning solutions  (e.g. Chlorclean, Actichlor, Tristel) | N |  |  |  |  |
| Animals | N |  |  |  |  |
| Cytotoxic drugs | N |  |  |  |  |
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| **Risks requiring Other Health Surveillance** | |  |  |  |  |
| Radiation (>6mSv) | N |  |  |  |  |
| Laser (Class 3R, 3B, 4) | N |  |  |  |  |
| Dusty environment (>4mg/m3) | N |  |  |  |  |
| Noise (over 80dBA) | N |  |  |  |  |
| Hand held vibration tools (=>2.5 m/s2) | N |  |  |  |  |
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| **Other General Hazards/ Risks** | |  |  |  |  |
| VDU use ( > 1 hour daily) | Y |  |  |  | F |
| Heavy manual handling (>10kg) | Y |  |  |  | F |
| Driving | Y | R |  |  |  |
| Food handling | N |  |  |  |  |
| Night working | N |  |  |  |  |
| Electrical work | Y |  |  |  | F |
| Physical Effort | Y |  |  |  | F |
| Mental Effort | Y |  |  |  | F |
| Emotional Effort | Y | R |  |  |  |
| Working in isolation | Y |  |  |  | F |
| Challenging behaviour | N |  |  |  |  |