

No. 923

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**SOUTH AFRICAN QUALIFICATIONS AUTHORITY (SAQA)**

In accordance with regulation 24(c) of the National Standards Bodies Regulations of 28 March 1998, the Standards Generating Body (SGB) for

**Radiation Protection**

Registered by Organising Field 10, Physical, Mathematical, Computer and Life Sciences, publishes the following Qualification and Unit Standards for public comment.

This notice contains the titles, fields, sub-fields, NQF levels, credits, and purpose of the Qualification and Unit Standards. The Qualification and Unit Standards can be accessed via the SAQA web-site at [www.saga.org.za](http://www.saga.org.za). Copies may also be obtained from the Directorate of Standards Setting and Development at the SAQA offices, **Hatfield Forum West, 1067 Arcadia Street, Hatfield, Pretoria.**

Comment on the Qualification and Unit Standards should reach SAQA at the address ***below and no later than 13 October 2006***. All correspondence should be marked **Standards Setting – SGB Radiation Protection** and addressed to

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## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

### QUALIFICATION:

#### *National Certificate: Radiation Protection*

SAQA QUAL ID		QUALIFICATION TITLE	
57631		National Certificate: Radiation Protection	
SGB NAME		ORGANISING FIELD ID	PROVIDER NAME
SGB for Radiation Protection		10	
QUAL TYPE		ORGANISING FIELD DESCRIPTION	SUBFIELD
National Certificate		Physical, Mathematical, Computer and Life Sciences	Physical Sciences
ABET BAND	MINIMUM CREDITS	NQF LEVEL	QUALIFICATION CLASS
Undefined	139	Level 5	Regular-Unit Stds Based

#### **PURPOSE AND RATIONALE OF THE QUALIFICATION**

Purpose:

The purpose of this qualification includes providing recognition and credibility for competent people who have had no recognition and professionals with no formal qualifications due to a lack of access to the education and training system of the past. This qualification provides access to an NQF Level 6 qualification in Radiation Protection.

Qualified learners can increase their earning capability, and access various career pathways in Radiation Protection and associated fields. Higher levels of competence in Radiation Protection facilitate improved and safe application of radiation technology. The application of radiation technology is wide, and the potential impact on communities is vast, in that, electric power can be provided in areas where it was not available before.

Currently, there is no national standard for education and training in Radiation Protection learning programmes at this level, no formal recognition for competence, and, therefore, no transportability between organisations where learning and assessment takes place. This qualification also aims to set the minimum requirements below postgraduate level, to improve access to the Radiation Protection field. Setting this minimum standard, and regulating the quality of delivery through quality assurance processes can improve current training. The qualification ensures that providers of programmes comply with current legislative and regulatory requirements, thereby improving Radiation Protection nationally.

By placing this qualification on the NQF, Higher Education access is opened up to everybody in the Radiation Protection field. In the past, the higher paid individuals came from other fields to the Radiation Protection field, for example, from medical physics. For Radiation Protection in South Africa, only international qualifications and short courses tailor made for specific company requirements were available, and only to a select group. Locally established programmes will mean that more people can afford to enrol.

The qualification includes transferable competence, such as writing, communication, statistics, people management, legal adherence, etc. that can be applied in other contexts. Qualified learners can improve the education of the nation at large about something unknown, thus promoting radiation protection. Achievement of this qualification allows learners to contribute significantly to communicating to the general public regarding real dangers, thereby limiting misinformation.

Qualified learners are capable of:

- > Assessing and communicating technical information accurately and according to organisation-specific requirements.
- > Implementing quality management programmes according to specified procedures.
- > Designing surveillance programmes and reviewing procedures according to specified standards, policies

and guidelines.

- > Implementing radiation detection and dosimetry programmes on specified standards.
  - > Implementing operational Radiation Protection programmes and prescribing radiological requirements/limitations on prescribed standards.
  - > Implementing environmental management programmes for radiation protection according to specified limits and criteria.
- Range: programmes include environmental, waste management, and transportation programmes.
- > Supervising and managing human resources according to legal requirements.

Rationale:

This qualification is set to address need for the development of specialists whose sole responsibility is radiation protection. These specialists are usually referred to as Radiation Protection Officers (RPOs), RPO assistants, RPO supervisors, or RPO section heads. It is also meant to address the need for learners who have achieved competency in a particular field (e.g. engineering, mine environmental control, medical physics, etc.) who also require competence in the field of Radiation Protection.

Target learners generally enter this qualification after completing the Further Education and Training Certificate: Radiation Protection (NQF Level 4) or a Higher Education and Training qualification, for example, in Mine Ventilation, Medical Physics, etc. Thus, for learners whose primary activities are in Radiation Protection the qualification forms part of a learning pathway in Radiation Protection. Target learner groups are able to progress to NQF Level 6 in Radiation Protection after successful completion this Qualification.

This qualification encompasses the South African legal requirement set for radiation protection. In addition, new developments in the generation of nuclear power, for example, Pebble Bed Modular Reactors, require this area of competence. For successful learners, employment opportunities improve as they are qualified to hold a position as RPO within the South African Radiation Protection legal framework. For some learners the option of changing from an existing career pathway to a career pathway in or related to Radiation Protection is made possible.

The competence achieved by learners who qualify contributes to public protection, protection of the environment, and protection of employees against the harmful effects of ionising radiation. Organisations that employ qualified learners are able to stay in operation, as these learners then comply with important legal requirements for personnel who function within Radiation Protection environment. Qualified learners contribute to limiting the risks associated with ionising radiation to health, safety and productivity.

#### **RECOGNIZE PREVIOUS LEARNING?**

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#### **LEARNING ASSUMED TO BE IN PLACE**

- > Communication and language at NQF Level 4 in one language and at NQF Level 3 in a second language.
- > Mathematic literacy at NQF Level 4.
- > Radiation Protection at NQF Level 4.

Recognition of prior learning:

This qualification can be achieved wholly, or in part, through recognition of prior learning. Evidence can be presented in a variety of forms, including previous international or local qualifications, reports, testimonials, mentoring, functions performed, portfolios, work records and performance records. As such, evidence should be judged according to the general principles of assessment described in the notes to assessors below. Learners who have met the requirements of any Unit Standard that forms part of this qualification may apply for recognition of prior learning to the relevant Education and Training Quality Assurance body (ETQA). The applicant must be assessed against the specific outcomes and with the assessment criteria for the relevant Unit Standards. A qualification will be awarded should a learner demonstrate that the exit level outcomes of the qualification have been attained.

Access to the qualification:

Qualified learners must be 18 years or older as per government regulation, and physically able to safely achieve the outcomes within specific contexts, for example, fit for the physical demands of radiation work where necessary.

#### **QUALIFICATION RULES**

All the Fundamental Component Unit Standards are compulsory (10 credits).

All the Core Component Unit Standards are compulsory (108 credits).

For the Elective Component learners are required to attain at least 20 out of 129 credits, (at least 10 credits out of each of the 2 elective streams) as follows:

> At least 10 credits from the following unit standards:

- > Unit Standard Title: Build teams to meet set goals and objectives (15237), Level 5, Credits 3.
- > Unit Standard Title: Create and use a range of resources to effectively manage teams, sections, departments or divisions (15231), Level 5, Credits 4.
- > Unit Standard Title: Empower team members through recognising strengths, encouraging participation in decision making and delegating tasks (15224), Level 5, Credits 4.
- > Unit Standard Title: Monitor team members and measure effectiveness of performance (15230), Level 5, Credits 4.
- > Unit Standard Title: Recognise areas in need of change, make recommendations and implement change in the team, department or division (15214), Level 5, Credits 3.
- > Unit Standard Title: Implement codes of conduct in the team, department or division (15226), Level 5, Credits 3.
- > Unit Standard Title: Support the project environment and activities to deliver project objectives (10149), Level 5, Credits 14.
- > Unit Standard Title: Implement training needs for teams and individuals to upgrade skills levels (15223), Level 5, Credits 3.
- > Unit Standard Title: Apply technical knowledge and skills to align business unit performance to business goals (13949), Level 4, Credits 5.
- > Unit Standard Title: Apply the principles of situational leadership to a business unit (13953), Level 4, Credits 5.
- > Unit Standard Title: Motivate a team (13947), Level 4, Credits 6.
- > Unit Standard Title: Describe and apply the management of stock and fixed assets in a business unit (13945), Level 4, Credits 2.
- > Unit Standard Title: Manage individual careers (11911), Level 5, Credits 5.
- > Unit Standard Title: Manage the capture, storage and retrieval of human resources information using an information system (10171), Level 5, Credits 3.

> At least 10 credits from the following unit standards:

- > Unit Standard Title: Identify, suggest and implement corrective actions to improve quality (10144), Level 4, Credits 6.
- > Unit Standard Title: Plan, organise and support project meetings and workshops (10136), Level 4, Credits 4.
- > Unit Standard Title: Implement project administration processes according to requirements (10139), Level 4, Credits 5.
- > Unit Standard Title: Facilitate learning using a variety of given methodologies (117871), Level 5, Credits 10.
- > Unit Standard Title: Conduct an indoor air quality investigation and recommend appropriate remedial action (120345), Level 4, Credits 5.
- > Unit Standard Title: Determine radon and thoron progeny concentrations using the Ogden method (120343), Level 4, Credits 4.
- > Unit Standard Title: Determine the integrated beta/gamma radiation dose using a Thermoluminescent Dosimeter (TLD) (120350), Level 4, Credits 2.
- > Unit Standard Title: Determine the integrated radon gas dose (120358), Level 4, Credits 3.
- > Unit Standard Title: Measure hazardous biological agents and recommend appropriate remedial action (120364), Level 4, Credits 5.
- > Unit Standard Title: Measure radon progeny using the batch method (120367), Level 4, Credits 4.
- > Unit Standard Title: Monitor and make recommendations on the application of health and safety principles regarding hazardous substances in the working place (120370), Level 4, Credits 3.
- > Unit Standard Title: Prepare, implement and co-ordinate a personal gravimetric sampling programme and determine exposure risk (120342), Level 4, Credits 4.
- > Unit Standard Title: Use a Graphical User Interface (GUI)-based database application to solve a given problem (117927), Level 4, Credits 6.
- > Unit Standard Title: Using a Graphical User Interface (GUI)-based spreadsheet application, enhance the functionality and apply graph /charts to a spreadsheet (116943), Level 4, Credits 3.

#### **EXIT LEVEL OUTCOMES**

1. Assess and communicate technical information accurately and according to organisation-specific requirements.

2. Implement quality management programmes according to specified procedures.
3. Design surveillance programmes and review procedures according to specified standards, policies and guidelines.
4. Implement radiation detection and dosimetry programmes to specified standards.
5. Implement operational Radiation Protection programmes and prescribe radiological requirements/limitations to prescribed standards.
6. Implement management programmes for radiation protection according to specified limits and criteria.  
Range: programmes include environmental, waste management, and transportation programmes.
7. Supervise and manage human resources according to given requirements.

#### **ASSOCIATED ASSESSMENT CRITERIA**

1.

- > Technical information is assessed accurately and according to review standards, and recommendations are made based on accurate trend analysis.
- > Technical information is reported according to specified format and reporting structure requirements and communicated to all required persons.
- > Technical reports are written in prescribed format according to specified procedures.

2.

- > Assessments and audits are conducted according to specified procedures and recommended actions are made in accordance with standards and specifications regarding limitations. Range: Recommended actions can be preventive and corrective.
- > Documents and records meet specified procedure requirements.
- > Review of overall system performance is justified in terms of continual improvement and optimisation of protection (ALARA).

3.

- > Surveillance programmes are designed to meet requirements of specified standards, policies and guidelines.  
> Range: standards can be regulatory, and can include standards for radiation types, levels, measurement criteria (e.g. units, correct instrumentation, advantages and limitations, and calibrated instrument), locality/distribution, etc.
- > Procedures are reviewed against specified policies and technical classification.

4.

- > Instrumentation and dosimetry are selected and are calibrated to specified standards.
- > Type of instrumentation and dosimetry is appropriate for specific programmes, facilities, and types of radiation specified in specific standards.
- > Measurement and dosimetry records are maintained according to specified standards.  
> Range: specified standards can be regulatory or organisation-specific.

5.

- > Programme implementation meets specified standards for radiation protection.
- > Area classification is based on assessment results against prescribed standards, and access control and physical security implementation, maintenance radiation protection controls and frequency of monitoring meet given specifications.
- > All required reporting systems are put in place.  
> Range: Required systems include safety/hazard assessment, operational Radiation Protection programmes (inc. zoning requirements, contamination, Personal Protective Equipment), environmental Radiation Protection programmes, waste management, transport, physical security, quality management, etc.

6.

- > All sources of radioactive materials are identified, characterised and quantified correctly and accurately, and their potential impact assessed against specified limits.
- > Programmes are implemented and comply with specified, set criteria for programmes.  
> Range: implementation includes release within authorised limitations.
- > Recommendations outside standard procedures are justified based on analysis and integration of information from all relevant disciplines.

7.

- > Relevant legal and ethical requirements are adhered to at all times.
- > Human resource application/allocation meets requirements of specific contexts and objectives.

Integrated assessment:

The assessment criteria in the unit standards are performance-based, assessing applied competence, rather than only underpinning knowledge, or only skills. The critical cross-field outcomes are also achieved in the unit standards. In addition to the competence assessed to achieve the unit standards, learners must demonstrate that they can achieve the outcomes in an integrated manner, dealing effectively with different and random demands related to occupational and learning contexts, to qualify, and assessment approaches used should be appropriate for assessing applied competence. Integrated assessment is meaningful if there are clear relationships between the purpose statement, exit level outcomes and integrated assessment of this qualification.

Learners who qualify must be able to integrate concepts, ideas and behaviours across unit standards to achieve the purpose of the qualification. Evidence (as specified in the associated assessment criteria) is required that the learner is able to achieve the exit level outcomes of the qualification as a whole and in an integrated way, and thus its purpose, at the time of the award of the qualification.

Evidence of integration may be presented by learners when being assessed against the unit standards, and separate assessment for integration may not be necessary. Workplace experience can be recognised when assessing towards this qualification. Integrated assessment should include observable performance as well as the quality of thinking behind such performance. Formative assessment can be employed during learning towards the unit standards and during integration to achieve exit level outcomes, to ensure that integration takes place when summative assessment is employed.

#### **INTERNATIONAL COMPARABILITY**

Internationally, training in radiation protection and the safe use of radiation sources distinguishes between different types and levels of learning. The International Atomic Energy Agency (IAEA) identifies eight types of learners: qualified experts, radiation protection officers, workers, qualified operators, health professionals, managers, staff of regulatory bodies and emergency response personnel. The equivalent of this qualification is radiation protection officers. The leading countries involved in radiation protection training are the United States of America (USA), Australia, the United Kingdom, Canada, France (often identified as the largest nuclear power generated electricity, with the most operating plants), and Germany.

In Africa, Ghana, Kenya, Zambia, Tanzania, and Nigeria are involved with radiation protection services and training. In Zambia, radiation protection Diplomas and Degrees are offered, mostly within the context of mining. Zambia also has a Radiation Protection Officer's Training Course, but information regarding all Zambian programmes was not publicly available. Other African countries generally use the South African programmes.

Best practice is considered to be the USA and Canada, with the largest number of radiation protection officers in the USA and the largest number of training programmes in the United Kingdom and the USA. In Canada, most training programmes focus on Medical Radiation Technology. Similarly, the focus on the Australian framework is on Medical Radiation Science. France follows a behaviour-based intervention approach, referred to as 'autoprotection', and training is not equivalent to this South African qualification. In Germany, The Federal Office for Radiation Protection (BfS) controls standards (information was not available in English).

Training in the USA is mostly focused at Higher Education level, but in the form of continuing education rather than qualification programmes, and most of the USA continuing education programmes are University based. The continuing education courses compare as follows with the South African qualification:

- > USA courses: Emergency preparedness, RSA: Core.
- > USA courses: Atoms and nuclei, RSA: Lower level.
- > USA courses: Radiation and radiation units, RSA: Lower level.
- > USA courses: Biological effects of radiation, RSA: Lower level.
- > USA courses: Risk and protection, RSA: Core.
- > USA courses: Internal and external radiation protection, RSA: Core.
- > USA courses: Dose and exposures, RSA: Core.
- > USA courses: Contamination control, RSA: Core.
- > USA courses: Sampling, surveying and monitoring, RSA: Core.

- > USA courses: Handling and storage of radioactive materials, RSA: Core.
- > USA courses: Radioactive waste management, RSA: Core.
- > USA courses: Safety and contingency planning, RSA: Core.
- > USA courses: Record keeping and reporting, RSA: Core.

The National Regulator Commission (NRC) and the Department of Energy in the USA have published a qualification standard and model curriculum that includes the following, compared to this South African qualification:

- > USA Qualification Standard: Perform simple mathematical calculations, RSA: Lower level.
- > USA Qualification Standard: Solve simple problems of physical science, RSA: Lower level.
- > USA Qualification Standard: Describe the structure of the atom, RSA: Lower level.
- > USA Qualification Standard: Explain the processes of fission and fusion, RSA: Lower level.
- > USA Qualification Standard: Explain the ways an individual receives radiation, RSA: Lower level.
- > USA Qualification Standard: Describe and measure radioactivity and radioactive decay, RSA: Lower level.
- > USA Qualification Standard: Discuss the ways radiation interacts with matter, RSA: Lower level.
- > USA Qualification Standard: Explain the biological effects of radiation, RSA: Lower Level.
- > USA Qualification Standard: Explain the radiological protection standards, RSA: Lower Level.
- > USA Qualification Standard: Determine ways to control external radiation exposure, RSA: Lower Level.
- > USA Qualification Standard: Determine ways to control internal radiation exposure, RSA: Lower Level.
- > USA Qualification Standard: Explain radiation detector theory, RSA: Lower Level.
- > USA Qualification Standard: Complete a performance test on a portable hand-held instrument, RSA: Lower Level.
- > USA Qualification Standard: Complete a performance test on health physics counting equipment, RSA: Lower Level.
- > USA Qualification Standard: Perform a loose surface contamination survey, RSA: Lower Level.
- > USA Qualification Standard: Perform a radiation survey, RSA: Lower Level.
- > USA Qualification Standard: Obtain and count air samples, RSA: Lower Level.
- > USA Qualification Standard: Perform a leak test on a radioactive source, RSA: Lower Level.
- > USA Qualification Standard: Post a radiological area to reflect associated hazards, RSA: Lower Level.
- > USA Qualification Standard: Perform a radioactive material shipment survey, RSA: Lower Level.
- > USA Qualification Standard: Respond to a high airborne activity alarm, RSA: Core.
- > USA Qualification Standard: Respond to an uncontrolled release of radioactive material, RSA: Core.
- > USA Qualification Standard: Respond to an area high radiation alarm, RSA: Core.
- > USA Qualification Standard: Respond to an injured person in a radiologically controlled area, RSA: Core.
- > USA Qualification Standard: Direct and monitor personnel decontamination, RSA: Lower Level.
- > USA Qualification Standard: Perform monthly computations on total curies of radwaste received, RSA: Lower Level.
- > USA Qualification Standard: Don and remove protective respiratory equipment, RSA: Lower Level.
- > USA Qualification Standard: Don and remove protective clothing, RSA: Lower Level.
- > USA Qualification Standard: Correct for counting errors, RSA: Lower Level.
- > USA Qualification Standard: Explain the method of operation of each type of dosimetry, RSA: Lower Level.
- > USA Qualification Standard: Discuss and complete a Radiation Work Permit, RSA: Lower Level.
- > USA Qualification Standard: Explain how to maintain coverage in a radiologically controlled area, RSA: Core.
- > USA Qualification Standard: Use proper methods of personnel decontamination, RSA: Lower Level.
- > USA Qualification Standard: Describe the instruments available to perform radiation surveys, RSA: Lower Level.
- > USA Qualification Standard: Describe the principles of operation of radiation detectors, RSA: Lower Level.
- > USA Qualification Standard: Describe the instruments available to monitor contamination, RSA: Lower Level.
- > USA Qualification Standard: Describe the equipment available to perform air sampling operations, RSA: Lower Level.
- > USA Qualification Standard: Describe the operation of the counting room instruments, RSA: Lower Level.
- > USA Qualification Standard: Use facility and federal radiological protection standards, RSA: Lower Level.
- > USA Qualification Standard: Explain ALARA and the methods used for implementation, RSA: Lower Level.
- > USA Qualification Standard: Discuss radiological considerations for first aid, RSA: Lower Level.
- > USA Qualification Standard: Explain how the Health Physics Department documents work, RSA: Lower Level.
- > USA Qualification Standard: Use onsite and offsite communications systems, RSA: Lower Level.
- > USA Qualification Standard: Identify the major methods of contamination control, RSA: Core.
- > USA Qualification Standard: Discuss implementation of the airborne radioactivity control program, RSA: Core.
- > USA Qualification Standard: Discuss implementation of the facility respiratory protection plan, RSA: Lower level.
- > USA Qualification Standard: Discuss the procedure for using and storing radioactive sources, RSA: Lower

level.

- > USA Qualification Standard: Discuss the facility environmental monitoring program, RSA: Core.
- > USA Qualification Standard: Direct shipment/receipt of radioactive materials, RSA: Lower level.
- > USA Qualification Standard: Explain facility and Health Physics response to an incident or emergency, RSA: Core.
- > USA Qualification Standard: Emergency response to spill of toxic material, RSA: Core.
- > USA Qualification Standard: Personnel responsible for facility safety, RSA: Lower level.
- > USA Qualification Standard: Awareness of facility safety hazards, RSA: Lower level.
- > USA Qualification Standard: Use of Personal Protective Equipment, RSA: Lower level.
- > USA Qualification Standard: Work practices to minimize risk, RSA: Lower level.
- > USA Qualification Standard: Engineering controls, RSA: Core.
- > USA Qualification Standard: Symptoms of exposure, RSA: Lower level.
- > USA Qualification Standard: Managing hazardous waste operations, RSA: Core.
- > USA Qualification Standard: Procedure for handling facility emergency incidents, RSA: Core.
- > USA Qualification Standard: Methods of detecting hazardous materials, RSA: Core.
- > USA Qualification Standard: Hazards associated with use of facility chemicals, RSA: Core.
- > USA Qualification Standard: Measures employees can use to protect themselves, RSA: Core.
- > USA Qualification Standard: Details of Hazard Communications Program (Material Safety Data Sheet, etc.), RSA: Core.

An equivalent level programme example was found at Stanford Linear Accelerator Center (SLAC). This programme includes the following components, compared to the South African qualification:

- > USA: SLAC Programme: Terminology, RSA: Core (integrated).
- > USA: SLAC Programme: Types of contamination, RSA: Core (integrated).
- > USA: SLAC Programme: Contamination units measurement and conversion, RSA: Core.
- > USA: SLAC Programme: Contamination control limits, RSA: Core.
- > USA: SLAC Programme: Radioactive contamination indicators, RSA: Core.
- > USA: SLAC Programme: Sources of contamination, RSA: Core.
- > USA: SLAC Programme: Radioactive contamination areas, RSA: Core.
- > USA: SLAC Programme: Frisking instructions, RSA: Lower level.
- > USA: SLAC Programme: Entry and exit requirements for contamination areas, RSA: Core.
- > USA: SLAC Programme: Contamination monitoring equipment, RSA: Core.
- > USA: SLAC Programme: Contamination response, RSA: Core.
- > USA: SLAC Programme: Contamination control methods, RSA: Core.
- > USA: SLAC Programme: Personal protective clothing, RSA: Lower level.
- > USA: SLAC Programme: Decontamination, RSA: Core.
- > USA: SLAC Programme: Medical emergencies, RSA: Core.
- > USA: SLAC Programme: Donning and doffing protective clothing, RSA: Lower level.
- > USA: SLAC Programme: Contamination control techniques, RSA: Core.

All aspects in the USA qualification standard and comparable programme are covered, but at three different levels on the South African NQF. In terms of duration, the USA qualification is a two to three year programme. Also, the USA modules are said to be of equal duration (the equivalent of on average five South African NQF credits), whereas the South African unit standards have different weightings. Therefore, the duration of the USA programme components that are also included in this South African qualification, is the equivalent of approximately 85 credits.

In the United Kingdom two qualifications exist: one at two levels below and one at the level of this South African qualification. The one-year Level 4 NVQ in Radiation Protection is registered at Higher Education level. The South African qualification addresses all areas of competence in the core component of the United Kingdom qualification. The United Kingdom qualification includes the following (Core only) units, compared to this South African qualification:

□

- > United Kingdom: Promote a Positive Radiological Protection Culture, RSA: Core.
- > United Kingdom: Contribute to the Development, Implementation and Maintenance of the Radiological Protection Policy, RSA: Core.
- > United Kingdom: Identify and Evaluate Ionising Radiation Hazards, RSA: Core.
- > United Kingdom: Assess Ionising Radiation Risks□, RSA: Core.
- > United Kingdom: Determine and Assist in the Implementation of Ionising Radiation Risk Control Measures, RSA: Core.
- > United Kingdom: Develop and Assist with the Implementation of Inspection and Monitoring Systems and Procedures for Active Radiological Protection Performance, RSA: Core.
- > United Kingdom: Monitoring, RSA: Core.
- > United Kingdom: Develop and Assist with the Implementation of Accident and Incident Systems and Procedures for Radiological Protection, RSA: Core.



- > United Kingdom: Develop, and Assist with the Implementation and Test of, Contingency Plans for Dealing with a Release of Ionising Radiation, RSA: Core.
- > United Kingdom: Develop and Assist with the Implementation of Review and Audit Systems for Radiological Protection, RSA: Core.

Overall, the South African qualification is comparable with international examples in terms of content, although the South African qualification mostly contains more credits, and a human resource supervision component that is not included in the other qualifications.

### **ARTICULATION OPTIONS**

Vertical articulation is possible with the Bachelor of Science: (NQF Level 6); NLRD ID: 17229, a proposes National Certificate in Radiation Protection (NQF Level 6), and various first degrees in Human Resource Management (NQF Level 6); NLRD ID: 16925, 13761, 14532, 17240. Horizontal articulation on the NQF is possible with the National Diploma: Nuclear Power Plant Process Control (NQF Level 5); NLRD ID: 23734, the National Diploma/Certificate: Occupational Hygiene and Safety (NQF Level 5), and the National Diploma: Human Resources Management and Practices (NQF Level 5); NLRD ID: 49692.

### **MODERATION OPTIONS**

Moderation of assessment and accreditation of providers shall be at the discretion of a relevant ETQA as long as it complies with the SAQA requirements. The ETQA is responsible for moderation of learner achievements of learners who meet the requirements of this qualification. Particular moderation and accreditation requirements are:

- > Any institution offering learning that will enable the achievement of this qualification must be accredited as a provider with the relevant ETQA. Providers offering learning towards achievement of any of the unit standards that make up this qualification must also be accredited through the relevant ETQA accredited by SAQA.
- > The ETQA will oversee assessment and moderation of assessment according to their policies and guidelines for assessment and moderation, or in terms of agreements reached around assessment and moderation between the relevant ETQA and other ETQAs and in terms of the moderation guideline detailed here.
- > Moderation must include both internal and external moderation of assessments for the qualification, unless the relevant ETQA policies specify otherwise. Moderation should also encompass achievement of the competence described in Unit Standards as well as the integrated competence described in the qualification.
- > Internal moderation of assessment must take place at the point of assessment with external moderation provided by a relevant ETQA according to the moderation guidelines and the agreed ETQA procedures.
- > Anyone wishing to be assessed against this qualification may apply to be assessed by any assessment agency, assessor or provider institution that is accredited by the relevant ETQA.

### **CRITERIA FOR THE REGISTRATION OF ASSESSORS**

Assessment of learner achievements takes place at providers accredited by the relevant ETQA (RSA, 1998b) for the provision of programs that result in the outcomes specified for this qualification. Anyone assessing a learner or moderating the assessment of a learner against this qualification must be registered as an assessor with the ETQA. Assessors registered with the relevant ETQA must carry out the assessment of learners for the qualification and any of the Unit Standards that make up this qualification.

To register as an assessor, the following are required:

- > Detailed documentary proof of relevant qualification/s, practical training completed, and experience gained at a NQF level above the level of this qualification.
- > NQF recognised assessor credit.

Assessors should keep the following general principles in mind when designing and conducting assessments:

- > Focus the initial assessment activities on gathering evidence in terms of the main outcomes expressed in the titles of the Unit Standards to ensure assessment is integrated rather than fragmented. The learner must be declared competent in terms of the qualification purpose and exit level outcomes.
- > Where assessment across Unit Standard titles or at Unit Standard title level is unmanageable, then focus assessment around each specific outcome, or groups of specific outcomes. Take special note of the need for integrated assessment.
- > Make sure evidence is gathered across the entire range, wherever it applies.

In particular, assessors should assess that the learner demonstrates an ability to consider a range of options by:

- > Measuring the quality of the observed practical performance as well as the theory and underpinning knowledge.
- > Using methods that are varied to allow the learner to display thinking and decision making in the demonstration of practical performance.
- > Maintaining a balance between practical performance and theoretical assessment methods to ensure each is measured in accordance with the level of the qualification.
- > Taking into account that the relationship between practical and theoretical components is not fixed, but varies according to the type and level of qualification.

All assessments should be conducted in line with the following well-documented principles:

- > **Appropriate:** The method of assessment is suited to the performance being assessed.
- > **Fair:** The method of assessment does not present any barriers to achievements, which are not related to the evidence.
- > **Manage:** The methods used make for easily arranged cost-effective assessments that do not unduly interfere with learning.
- > **Integrate into work or learning:** Evidence collection is integrated into the work or learning process where this is appropriate and feasible.
- > **Valid:** The assessment focuses on the requirements laid down in the standards; i.e. the assessment is fit for purpose.
- > **Direct:** The activities in the assessment mirror the conditions of actual performance as close as possible.
- > **Authentic:** The assessor is satisfied that the work being assessed is attributable to the learner being assessed.
- > **Sufficient:** The evidence collected establishes that all criteria have been met and that performance to the required Standard can be repeated consistently.
- > **Systematic:** Planning and recording is sufficiently rigorous to ensure that assessment is fair.
- > **Open:** Learners can contribute to the planning and accumulation of evidence. Learners for assessment understand the assessment process and the criteria that apply.
- > **Consistent:** The same assessor would make the same judgement again in similar circumstances. The judgement made is similar than the judgement that would be made by other assessors.

## NOTES

N/A

## UNIT STANDARDS

*(Note: A blank space after this line means that the qualification is not based on Unit Standards.)*

	UNIT STANDARD ID AND TITLE	LEVEL	CREDITS	STATUS
Core	15215 Identify and interpret Best Practice guidelines, and plan for and implement Best Practice within the team, department or division	Level 5	4	Reregistered
Core	15219 Develop and implement a strategy and action plans for a team, department or division	Level 5	4	Reregistered
Core	15220 Set, monitor and measure the achievement of goals and objectives for a team, department or division within an organisation	Level 5	4	Reregistered
Core	15225 Identify and interpret related legislation and its impact on the team, department or division and ensure compliance	Level 5	4	Reregistered
Core	15233 Harness diversity and build on strengths of a diverse working environment	Level 5	3	Reregistered
Core	15234 Apply efficient time management to the work of a department/division/section	Level 5	4	Reregistered
Core	15238 Devise and apply strategies to establish and maintain relationships	Level 5	3	Reregistered
Core	242687 Manage the effectiveness of radiological controls	Level 5	15	Draft - Prep for P Comment
Core	242688 Control radiological instrumentation	Level 5	10	Draft - Prep for P Comment
Core	242689 Respond to radiological emergencies and manage incidents	Level 5	12	Draft - Prep for P Comment
Core	242690 Design radiological surveillance and monitoring programmes	Level 5	15	Draft - Prep for P Comment
Core	242693 Develop radiological surveillance procedures	Level 5	15	Draft - Prep for P Comment
Core	242694 Establish radiological controls	Level 5	15	Draft - Prep for P Comment
Elective	13945 Describe and apply the management of stock and fixed assets in a business unit	Level 4	2	Reregistered

Elective	13947 Motivate a team	Level 4	6	Reregistered
Elective	13949 Apply technical knowledge and skill to align business unit performance to business goals	Level 4	5	Reregistered
Elective	13953 Apply the principles of situational leadership to a business unit	Level 4	5	Reregistered
Elective	116943 Using a Graphical User Interface (GUI)-based spreadsheet application, enhance the functionality and apply graph /charts to a spreadsheet	Level 4	3	Registered
Elective	117927 Use a Graphical User Interface (GUI)-based database application to solve a given problem	Level 4	6	Registered
Elective	120342 Prepare, implement and co-ordinate a personal gravimetric sampling programme and determine exposure risk	Level 4	4	Registered
Elective	120343 Determine radon and thoron progeny concentrations using the Ogden method	Level 4	4	Registered
Elective	120345 Conduct an indoor air quality investigation and recommend appropriate remedial action	Level 4	5	Registered
Elective	120350 Determine the integrated beta/gamma radiation dose using a Thermoluminescent Dosimeter (TLD)	Level 4	2	Registered
Elective	120358 Determine the integrated radon gas dose	Level 4	3	Registered
Elective	120364 Measure hazardous biological agents and recommend appropriate remedial action	Level 4	5	Registered
Elective	120367 Measure radon progeny using the batch method	Level 4	4	Registered
Elective	120370 Monitor and make recommendations on the application of health and safety principles regarding hazardous substances in the working place	Level 4	3	Registered
Elective	120377 Identify, suggest and implement corrective actions to improve quality of project work	Level 4	7	Registered
Elective	120381 Implement project administration processes according to requirements	Level 4	5	Registered
Elective	120382 Plan, organise and support project meetings and workshops	Level 4	4	Registered
Elective	10171 Manage the capture, storage and retrieval of human resources information using an information system	Level 5	3	Reregistered
Elective	11911 Manage individual careers	Level 5	5	Registered
Elective	15214 Recognise areas in need of change, make recommendations and implement change in the team, department or division	Level 5	3	Reregistered
Elective	15223 Implement training needs for teams and individuals to upgrade skills levels	Level 5	3	Reregistered
Elective	15224 Empower team members through recognising strengths, encouraging participation in decision making and delegating tasks	Level 5	4	Reregistered
Elective	15226 Implement systems to meet the flow of information in a team, department or division	Level 5	3	Reregistered
Elective	15230 Monitor team members and measure effectiveness of performance	Level 5	4	Reregistered
Elective	15231 Create and use a range of resources to effectively manage teams, sections, departments or divisions	Level 5	4	Reregistered
Elective	15237 Build teams to meet set goals and objectives	Level 5	3	Reregistered
Elective	117871 Facilitate learning using a variety of given methodologies	Level 5	10	Registered
Elective	120378 Support the project environment and activities to deliver project objectives	Level 5	14	Registered
Fundamental	242695 Manage radiation protection information	Level 5	10	Draft - Prep for P Comment



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

1

## Manage the effectiveness of radiological controls

SAQA US ID	UNIT STANDARD TITLE		
242687	Manage the effectiveness of radiological controls		
SGB NAME	ORGANISING FIELD ID	PROVIDER NAME	
SGB for Radiation Protection	10		
UNIT STANDARD TYPE	ORGANISING FIELD DESCRIPTION	SUBFIELD DESCRIPTION	
Regular	Physical, Mathematical, Computer and Life Sciences	Physical Sciences	
ABET BAND	CREDITS	NQF LEVEL	UNIT STANDARD TYPE
Undefined	15	Level 5	Regular

**SPECIFIC OUTCOME 1**

Design evaluation processes relevant for effectiveness of controls.

**SPECIFIC OUTCOME 2**

Obtain data regarding effectiveness of controls for specified evaluation processes.

**SPECIFIC OUTCOME 3**

Identify possible control shortcomings by means of relevant data analysis.

**SPECIFIC OUTCOME 4**

Recommend and monitor the implementation of corrective action.



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

2

## Control radiological instrumentation

SAQA US ID	UNIT STANDARD TITLE		
242688	Control radiological instrumentation		
SGB NAME	ORGANISING FIELD ID	PROVIDER NAME	
SGB for Radiation Protection	10		
UNIT STANDARD TYPE	ORGANISING FIELD DESCRIPTION	SUBFIELD DESCRIPTION	
Regular	Physical, Mathematical, Computer and Life Sciences	Physical Sciences	
ABET BAND	CREDITS	NQF LEVEL	UNIT STANDARD TYPE
Undefined	10	Level 5	Regular

**SPECIFIC OUTCOME 1**

Recommend instruments for surveillance and monitoring in specific contexts.

**SPECIFIC OUTCOME 2**

Compile operational procedures for effective use of monitoring instruments.

**SPECIFIC OUTCOME 3**

Recommend calibration requirements for specific instruments.

**SPECIFIC OUTCOME 4**

Maintain instrument supplier relationships for effective service.

**SPECIFIC OUTCOME 5**

Maintain radiological instrumentation functionality and inventory according to specified requirements.



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

**UNIT STANDARD:**

3

**Respond to radiological emergencies and manage incidents**

<b>SAQA US ID</b>	<b>UNIT STANDARD TITLE</b>		
242689	Respond to radiological emergencies and manage incidents		
<b>SGB NAME</b>		<b>ORGANISING FIELD ID</b>	<b>PROVIDER NAME</b>
SGB for Radiation Protection		10	
<b>UNIT STANDARD TYPE</b>		<b>ORGANISING FIELD DESCRIPTION</b>	<b>SUBFIELD DESCRIPTION</b>
Regular		Physical, Mathematical, Computer and Life Sciences	Physical Sciences
<b>ABET BAND</b>	<b>CREDITS</b>	<b>NQF LEVEL</b>	<b>UNIT STANDARD TYPE</b>
Undefined	12	Level 5	Regular

**SPECIFIC OUTCOME 1**

Describe incident classifications according to organisation-specific requirements.

**SPECIFIC OUTCOME 2**

Establish communication response protocols for incidents and emergencies.

**SPECIFIC OUTCOME 3**

Investigate incidents and report according to given protocols.

**SPECIFIC OUTCOME 4**

Analyse incidents and make recommendations for corrective actions.



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

## UNIT STANDARD:

4

## Design radiological surveillance and monitoring programmes

SAQA US ID	UNIT STANDARD TITLE		
242690	Design radiological surveillance and monitoring programmes		
SGB NAME	ORGANISING FIELD ID	PROVIDER NAME	
SGB for Radiation Protection	10		
UNIT STANDARD TYPE	ORGANISING FIELD DESCRIPTION	SUBFIELD DESCRIPTION	
Regular	Physical, Mathematical, Computer and Life Sciences	Physical Sciences	
ABET BAND	CREDITS	NQF LEVEL	UNIT STANDARD TYPE
Undefined	15	Level 5	Regular

**SPECIFIC OUTCOME 1**

Evaluate environments and processes based on operational experience.

**SPECIFIC OUTCOME 2**

Compile procedures in line with surveillance.

**SPECIFIC OUTCOME 3**

Allocate adequate resources to specific surveillance and monitoring programmes.

**SPECIFIC OUTCOME 4**

Disseminate programme requirements to all responsible persons.

**SPECIFIC OUTCOME 5**

Supervise and monitor programme implementation against plans.



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

5

## Develop radiological surveillance procedures

SAQA US ID	UNIT STANDARD TITLE		
242693	Develop radiological surveillance procedures		
SGB NAME	ORGANISING FIELD ID	PROVIDER NAME	
SGB for Radiation Protection	10		
UNIT STANDARD TYPE	ORGANISING FIELD DESCRIPTION	SUBFIELD DESCRIPTION	
Regular	Physical, Mathematical, Computer and Life Sciences	Physical Sciences	
ABET BAND	CREDITS	NQF LEVEL	UNIT STANDARD TYPE
Undefined	15	Level 5	Regular

**SPECIFIC OUTCOME 1**

Identify organisation standards for radiation protection relevant for specific contexts.

**SPECIFIC OUTCOME 2**

Interpret general standards for specific conditions.

**SPECIFIC OUTCOME 3**

Document specific procedures that meet organisation requirements.

**SPECIFIC OUTCOME 4**

Evaluate contextualised procedures against organisation standards.





## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

6

## Establish radiological controls

SAQA US ID	UNIT STANDARD TITLE		
242694	Establish radiological controls		
SGB NAME	ORGANISING FIELD ID	PROVIDER NAME	
SGB for Radiation Protection	10		
UNIT STANDARD TYPE	ORGANISING FIELD DESCRIPTION	SUBFIELD DESCRIPTION	
Regular	Physical, Mathematical, Computer and Life Sciences	Physical Sciences	
ABET BAND	CREDITS	NQF LEVEL	UNIT STANDARD TYPE
Undefined	15	Level 5	Regular

**SPECIFIC OUTCOME 1**

Develop classification schemes for relevant radiation protection controls.

**SPECIFIC OUTCOME 2**

Evaluate results using developed classification scheme.

**SPECIFIC OUTCOME 3**

Select controls appropriate for specific contexts.

**SPECIFIC OUTCOME 4**

Disseminate information for control implementation to all relevant persons.



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

7

## Manage radiation protection information

SAQA US ID	UNIT STANDARD TITLE		
242695	Manage radiation protection information		
SGB NAME	ORGANISING FIELD ID	PROVIDER NAME	
SGB for Radiation Protection	10		
UNIT STANDARD TYPE	ORGANISING FIELD DESCRIPTION	SUBFIELD DESCRIPTION	
Regular	Physical, Mathematical, Computer and Life Sciences	Physical Sciences	
ABET BAND	CREDITS	NQF LEVEL	UNIT STANDARD TYPE
Undefined	10	Level 5	Regular

**SPECIFIC OUTCOME 1**

Design and establish information databases.

**SPECIFIC OUTCOME 2**

Analyse trends in terms of potential impact and risks.

**SPECIFIC OUTCOME 3**

Report regarding programme implementation.

**SPECIFIC OUTCOME 4**

Recommend changes to effect future trends.