SOUTH AFRICAN NATIONAL ACCREDITATION SYSTEM

SPECIALIST TECHNICAL COMMITTEE MEETING:
QA Diagnostic X-Ray Equipment

Minutes of the STC QA Diagnostic X-Ray Equipment meeting held at the SANAS Brooklyn Offices, 121 Muckleneuk Street, Nieuw Muckleneuk, Brooklyn on Friday 18 March 2016 at 09:00

Present:

Mrs L Grundlingh  Chairman. SANAS - Field Manager: Inspection
Mr E Smit  Radiation Control - Department of Health (DoH)
Mr P Wolff  AXIM
Mrs Y Bekeur  DoH - Gauteng
Mr S Bellmann  Siemens
Mr R Els  Sirona
Mr AC Harle  Siemens
Mr J Schep  Phillips
Dr N Niranjan  SADA
Mr R Pepenene  NMiSA
Mr HV Maselesele  NMiSA
Mr J Wollentine  GendentSA
Mrs H Tlhapi  Assessor - Private
Ms I Nell  Assessor - Netcare
Mr Q Harley  Assessor - Private
Mrs E Mare  Assessor - Private
Mr E Smit  Scribe - SANAS

Apologies:

Ms Z Msimang  NMiSA
Mr F Daniels  Assessor - Private
Mr H de Vos  Netcare
Mr S Jozela  NMiSA
Mr G Wollentine  GendentSA
Mr A van Heerden  Siemens
Mr G Watkins  Sirona
Mrs A Sweetlove  Assessor – Private
Mrs S Ewald  Assessor – Private

Absent:

Mr K Nortje  Wright-Millners
Mr A Nortje  Drakemed
Mr CA Hodgson  Sirona
Mr P Govan  SADA
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<td>1.</td>
<td>OPENING AND WELCOME</td>
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<td>The chairman opened the meeting, welcomed those present and asked members to introduce themselves. Health and Safety issues were highlighted.</td>
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<td>2.</td>
<td>APOLOGIES</td>
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<td>Apologies received from the members who could not attend were noted on the attendance register.</td>
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<td>3.</td>
<td>SIGNING OF ATTENDANCE REGISTER</td>
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<td>All members present signed the attendance register and the confidentiality clause was acknowledged, which implies that the participants may not disclose any information obtained to any third parties, unless required to do so in terms of South African Legislation, nor use such information obtained for private or commercial gain.</td>
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<td>4.</td>
<td>FINALISATION OF AGENDA</td>
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<td>Agenda finalized with the following items were added to the agenda.</td>
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<td>7.4 Acceptance tests versus usability</td>
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<td>7.5 Reporting of electronic submissions</td>
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<td>7.6 Testing of Sensors for Dental)</td>
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<td>7.7 Duties and Responsibilities of the Inspection Body and the Regulator</td>
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<td>APPROVAL OF MINUTES FROM THE PREVIOUS MEETING</td>
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<td>The minutes of the previous meeting of 30 October 2015 were accepted as a true reflection of the meeting after the following correction was made.</td>
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<td>8.2 – Accreditation Stats, number of accredited Dental Bodies corrected to read “03” instead of “04”.</td>
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<td>6.</td>
<td>MATTERS ARISING FROM PREVIOUS MEETING</td>
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<td>6.1</td>
<td>Calibration and Traceability – NMISA PROGRESS REPORT</td>
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<td>NMISA gave feedback on the progress with rolling-out of their calibration capability for the QA X-Ray industry.</td>
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<td>NMISA has established the calibration facility for diagnostic equipment. Presently the laboratory is able to calibrate ionization chambers and solid state detectors in terms of the following:</td>
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<td>- Air Kerma, Air Kerma rate, Dose</td>
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<td>- X-ray tube voltage measurements</td>
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<td>All the calibrations are done according to the guidelines in TRS 457. This an international code of practice for dosimetry in diagnostic radiology. TRS 457 also specifies that tube voltage be measured in terms of Practical Peak Voltage (PPV). There has been difficulties with the calibrations of old devices which still measure the tube voltage in terms of Average peak voltage. Currently calibrations can only be performed on devices that can measure the tube voltage in terms of PPV.</td>
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<td></td>
<td>NMISA is also in the process of implementing the CTDI parameter for computer tomography dose measurements. The announcement will be made as soon as this facility is functional. The calibration in terms of air-kerma-area product (KAP) is also under consideration. However the laboratory still needs to purchase the standards for this parameter and it might take some time to be implemented.</td>
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<td>The Regulator enquired whether NMiSA can estimate and report HVL values?</td>
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<td>NMiSA undertook to follow-up on the matter with their management and will report back at the next meeting.</td>
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<td>NMiSA 21 Oct 2016</td>
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<td>6.2</td>
<td>(6.2) Baselines. WG Feedback</td>
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<td><strong>Note:</strong> This item will remain on the Agenda until the Baselines issues has been concluded.</td>
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<td>All 21 Oct 2016</td>
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<td>The item is standing over as the Working Group (WG) was not able to conclude their deliberations.</td>
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<td><strong>Historic Background:</strong></td>
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<td>Inspection Bodies are required to report kV, mAs, distances, AEC settings, etc. and equipment used when establishing baselines. The Inspection Body must report the detail to the User and this information must be available at the next Routine Testing activity.</td>
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<td></td>
<td>The Regulator indicated that they intend to send a questionnaire to the Inspection Bodies on how they currently measure, establish and report baselines.</td>
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<td>Regulator 21 Oct 2016</td>
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<td>6.3</td>
<td>(6.3) Body Scanners inclusion into TR 78</td>
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The differences in reported Baselines normally come with changes in Service Providers by the Users.

NMISA commented that the baselines should not be that much different between QA X-Ray Bodies if similar equipment is being used.

Baseline testing should be seen as a Qualitative test and not a Quantitative test.

Previous minutes of 31 Oct 2014:

NMISA proposed an inter-comparison and undertook to raise the issue with the training Institutions to investigate the differences in Baseline results as an academic project.

After some discussion the Committee tasked a Working Group (WG) to assist with baselines.

**Terms of Reference:**
Measurement Guidelines to align the Routine Tests with the annual QA Test with a uniform result.

WG-members:
Mr J Schep – Convenor.
Mrs H Tlhapi; Mr P Wolff; Mr G Wollentine; Mr J Schep; Mrs Y Bekeur; Mr AC Harle; Mr A van Heerden; Mrs N Ntengenyane and Mr E Smit (DoH)

The WG plan to communicate mostly by email

Baselines will be made a criterion in TR 78.

Due to the different techniques and equipment used to establish baselines it was noted that the results may vary quite a lot. One of the issues identified is the lack of information on standards and equipment used to establish the initial baselines.

It was suggested that the Regulator include the question of the establishment of baselines in the questionnaire referred to above.

DoH Gauteng requested the Committee to continue with the process and emphasised the need for good communication between all stakeholders as it will be key to the success of the WG’s activities.

A suggestion was made that the WG should look at the possibility of phantoms being supplied with new equipment to be used to establish the initial baseline and the same equipment being used to confirm the baseline information afterwards.
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<td>Note: This item will remain on the Agenda until the Body Scanner issue has been concluded. Due to the possibility that part of or all the functions of Radiation Control may be moved to SAHPRA the Body Scanner issue is on hold until further notice.</td>
<td>All</td>
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<td>Body Scanners are used mainly in the Mining Industry. The scanners will now be installed in the prisons as early as November 2015. There should be ± 30 scanners installed in total.</td>
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<td>The Regulator encouraged the QA X-Ray Bodies to add this to the scope as well.</td>
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<td>This may be an opportunity for Inspection Bodies to expand their Scope to include Body Scanners.</td>
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<td>Once Inspection Bodies apply for an Extension to Scope for Body Scanners the current DoH criteria for QA X-Ray inspection and testing, including TR 78 will have to be revised to make provision for the new scope.</td>
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<td>Once the principle is accepted, the Regulator and SANAS will put together the criteria for addition to the TR 78 for circulation to the Committee for approval and addition to the TR document.</td>
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<td>SADA members cautioned the DoH to take the number of tests, cost and Stakeholders into consideration before rolling-out the requirements for Body Scanners; we should first get right what we are currently doing before adding to the scopes.</td>
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<td>SANAS is in process of revising all the Inspection TR-documents and forms. This review should be completed in the 1st quarter of 2016 following the ILAC Inspection meeting in April 2016.</td>
<td>SANAS 21 Oct 2016</td>
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6.4  **Accreditation of facilities using NDT techniques in Industry.**

| NOTE: This item will remain on the Agenda until the Industrial NDT issue has been concluded. This item is standing over to the next STC meeting. The Committee discussed the accreditation of facilities using NDT techniques in Industry. Internationally Accreditation Bodies accredit organisations as Inspection Bodies (17020) and/or as Laboratories (17025) depending on the organisations’ applications. One of the organisations providing NDT training is the Southern African Institute of Welding (SAIW) [http://www.saiw.co.za/](http://www.saiw.co.za/) | All |

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<td>SANAS, DoH, SAIW and NECSA</td>
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<td>DoH Gauteng</td>
<td>21 Oct 2016</td>
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6.5 (6.5) Optimisation of the Diagnostic Imaging Chain – General WG

**Note:** This item will remain on the Agenda until the issue of Optimisation has been concluded.

The Chair gave a brief background to the issue of optimisation as defined in IPEM 91 page 1, quote “This guidance covers the entire diagnostic imaging chain.”

The Committee acknowledge that the situation is quite complex and needs further discussion.

After some discussion the Committee decided to request information from the Users and Inspection Bodies on the situation in the form of scenarios highlighting the problems encountered with optimisation.

The issue of the QA X-Ray test and inspection activities performed by Inspection Bodies on X-Ray equipment, whole units and partially, and the optimisation of units were discussed.

The current approach and differences between Inspection Bodies i.e., procedures and equipment, makes optimisation a difficult/complex task.

Example of a possible scenario:

“License requirements indicate tests applicable per machine. E.g. 5 DDR (Tests 1, 4-8, 24-25, 27, 29-35, 75-84, 102-114, 119-122). Yet we do find IB reports showing only select tests being performed, e.g. only the detector, only the monitors or only tube& generators. I have noted this may be because suppliers only test the systems they install? I don’t have an answer for this; perhaps Radiation control can query incomplete inspections? This unfortunately burdens customers as they can in some cases end up with 3 invoices for e.g. DDR/CR machine, one for tube & generator, another for the imaging plate and last one for the reporting monitors.”
Committee members were requested to submit further examples to SANAS before the next meeting for discussion at the meeting.

No comments were received from the Committee; discussions were held on CR and DR equipment.

After some discussion it was agreed that this is a technical issue and a Working Group (WG) be formed to report back with recommendations at the next meeting.

**Terms of Reference**
WG to investigate the:
- optimisation of the diagnostic imaging chain,
- impact of the current scope and
- Make recommendations on the way forward.

WG-members:
- Mr F Daniels – Convenor.
- Mr F Daniels; Mrs H Tlhapi; Ms I Nell; Mr Q Harley and Mrs A Sweetlove

The WG plan to communicate mostly by email

**Progress - 18 March 2016**

The WG reported that the progress is slow due to the complexity of the issue of optimisation of the diagnostic imaging chain and the possible impact on the current scope of accreditation.

The WG suggested that the QA X-Ray Bodies should communicate with each other on obtaining the necessary information before inspections

Item 2 of the WG’s Terms of Reference was discussed again as a review of the current scoping appears to be one of the factors that needs to be resolved.

The committee requested that the WG get their proposals drafted so that a meeting can be arranged for a day during the period 10 to 13 May 2016 or on 24 May 2016. Mr F Daniels is to advice Ms Grundlingh which date will be suitable for the WG to meet. The Regulator plans to attend the WG meeting as well.

**Note:** This item will remain on the Agenda until the issue of Optimisation has been concluded.

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<td>WG General</td>
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<td>6.6</td>
<td>Mr F Daniels</td>
<td>Mid-April 2016</td>
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**Measurement of HVL (item from the DoH/IB meeting of 22 October 2014)**

Note: This item will remain on the Agenda until the issue of Optimisation has been concluded.
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<td>6.7</td>
<td>(6.7) QC results to Institutions</td>
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**No action by date provided.**

The Regulator presented a draft Guideline for HVL Measurement from 1st principles using the appropriate Aluminium sheets/filters. Refer Annexure A attached to the minutes.

SANAS requested the Technical Assessors (TAs) to peruse the proposed Guidelines and give feedback on the suitability of HVL process by 15 May 2016.

The Committee agreed to add the Guideline for HVL Measurement as an Annexure to TR 78 once finalised.

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<td>(6.7) QC results to Institutions</td>
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**No action by date provided.**

DoH Gauteng gave feedback on QA X-Ray Inspections recently conducted and the reporting/submissions to the various Institutions /Users.

Reports are often not left with the User after the inspection but only sent later or not sent at all.

Philips pointed out that some Inspectors used by the QA X-Ray Bodies are not signatories and may not finalise the inspection report on the day of the inspection as it needs to be processed through their office so that a technical signatory to sign-off on the inspections done.

DoH National reported that the information is used to verify that the QA Test were conducted. DoH may also use the information to seal a unit if required. The information is also used to scrutinise dose levels (exposure) to patients, the public and Users/Doctors.

DoH National will follow-up on the January/February 2016 submissions and will give feedback to SANAS as part of item d of the Department of Health - Radiation Control License Conditions for the 2016 assessment cycle.

SANAS requested that DoH give feedback on outstanding submissions for follow-up during assessments.

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<td>6.8</td>
<td>(6.8) Frequency of Routine Testing– Dental WG</td>
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<td>DoH</td>
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**No action by date provided.**

DoH notified the Industry and Stakeholders that routine testing will start with a phase-in process over 3-years.

A list of questions on Dental testing was discussed by the Committee. Discussions included:

- should there one long exposure or 2 or 3 short exposures
It was agreed that the first reading is never acceptable for Dental QA purposes.

Some of the Committee members felt that the number of tests done in dental are excessive and discussions followed.

The Regulator agreed to reduce the number of phantom exposures to a Child and an Adult.

The reference levels are part of the bigger problem and it was requested that Dental QA X-Ray Bodies leave the test of the reference levels until the issues are resolved.

For general xray machines for reference levels – for new installations there will be no reference levels testing.

Existing equipment – one test can be done; tests/ exposures can be bunch your together for referencing.

Regulator to send email to Dental QA X-Ray Bodies to say male / female to change to adult and child and the exposures are to be optimised for a reference results and to ignore Test 6.

After some discussion it was agreed that this is a technical issue and a Working Group (WG) be formed to report back with recommendations at the next meeting.

**Terms of Reference**

WG to investigate

1. the suitability of the current Dental QA Test required,
2. Constancy Test Piece for Intra Oral X-ray,
3. Monitor purchased before January 2014 may not be a reporting monitor spec and as such they cannot be passed and
4. Make recommendations on the way forward.

**WG-members:**

Mr Riaan Els – Convenor.
Mr F Daniels; Mrs H Tlhapi; Ms I Nell; Mr Q Harley, Mrs A Sweetlove with representatives from AXIM, Gendent; Sirona; Wright-Millners and DoH –Eljo Smit

The WG plan to communicate mostly by email

**Note:** Due to the pressing need for a resolution the Committee requested the WG to complete their work on this issue by **30 November 2015**.

**Progress - 18 March 2016**

The Convenor reported that the WG had a meeting on 13 November 2016 and they drafted a proposal which is under review by the WG. They plan to meet gain on 25 April 2016.
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<td>6.9</td>
<td>(6.9) Reporting of Diagnostic Reference Levels (DRLs)</td>
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<td>DoH indicated that DRLs must please be reported as found.</td>
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<td>Reporting format was questioned and the DoH undertook to give direction on the reporting format i.e.</td>
<td>DoH</td>
<td>30 April 2016</td>
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<tr>
<td>1. the number of significant digits to report</td>
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<td>2. the decimal indicator to be used to assist with pulling-in information into the DoH database</td>
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<td>• decimal “comma” reporting “1,01” or</td>
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<td>• Decimal “point” reporting “1.01”?</td>
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<td>6.10</td>
<td>(7.5) Test No 6 For Non Digital Film – Dental</td>
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<td>DoH Gauteng addressed the requirements for dental film; dental film has been standardised per site.</td>
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<td>Matter is considered closed</td>
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<td>6.11</td>
<td>(7.8) Mammography QA submission</td>
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<td>Background.</td>
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<td>A concern was raised on the mammo machine “pass” rate in South Africa when compared to other countries.</td>
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<td>Locally the pass rate is ± 80% while in other countries the pass rate is ± 60%.</td>
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<td>It is felt that the Regulator is the one that is responsible to investigate this further.</td>
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<td>DoH gave feedback:</td>
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<td>All SANAS</td>
<td>21 Oct 2016</td>
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- The Mammo machine “pass” rate may be influenced by the status of Type C Bodies doing a service/repair on a unit without reporting the event as a “fail”?  
- It may also be a case of QA X-Ray Bodies not performing the test correctly?  
- The time taken to do mammo units by some QA X-Ray Bodies appear to be short; too many units done per day?  

An option will be for SANAS to request QA X-Ray Bodies to repeat recently completed mammo units as part of the assessment to verify the process and confirm repeatability of the results.

**6.12 (8.6) Nomination of Chair for STC**

SANAS received no nomination for Chairmanship since the previous meeting; SANAS will Chair the meeting for the next 4-year period after which the Chairmanship will be up for automatic review.

**7. NEW ITEMS**

**7.1 SANAS P 07 – Management of Impartiality**

SANAS P 07 – Management of Impartiality was published 28 January 2016.

Inspection Bodies, Assessors and Stakeholders must please familiarise themselves with the contents of the document, available on [www.sanas.co.za](http://www.sanas.co.za)

Matter considered closed.

**7.2 Reposting of test shorter than 1-year by Inspection Bodies**

It appears as if the Users are not performing their tests as required by DoH. This results in QA X-Ray Bodies being put under undue pressure during their QA inspection and testing activities.

In some instances the Users are not facilitating the QA inspection and testing process.

QA X-Ray Bodies are also threatened and intimated during the process.

QA X-Ray Bodies must please use the appropriate reporting structures as provided for in the accreditation and approval system.
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<td>The reporting should be to their management 1&lt;sup&gt;st&lt;/sup&gt; and may be elevated to SANAS and/or the Regulator.</td>
<td>DoH</td>
<td>21 Oct 2016</td>
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<td>DoH will review the requirements for the User and plan to add a requirement to perform the tests shorter that 1-year in their license conditions in order to facilitate the process.</td>
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<td><strong>7.3</strong> Permission granted by Inspection Body to use CT without permission from Radiation Control (install and use?)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A QA X-Ray Body granted permission to a User without approval from DoH Radiation Control.</td>
<td>All</td>
<td></td>
</tr>
<tr>
<td>Stakeholders are reminded that approval from DoH Radiation Control may be verbal and will be followed-up by a letter from DoH.</td>
<td></td>
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<tr>
<td>The matter is considered closed.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>7.4</strong> Acceptance Tests versus Usability?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DoH gave feedback and clarified the process when the acceptance tests were done and results submitted to radiation Control. Two (2) situations may be possible.</td>
<td>All</td>
<td></td>
</tr>
<tr>
<td>• Pre-owned unit; may only be used once acceptance tests were submitted to DoH and may only be used once Radiation Control give permission to the User.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• New unit, may be used once acceptance tests are done.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DoH undertake to clarify the process as part of their license conditions.</td>
<td>DoH</td>
<td>21 Oct 2016</td>
</tr>
<tr>
<td><strong>7.5</strong> Reporting of Electronic Submissions (ES)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DoH gave feedback on incorrect information submitted or incomplete submissions.</td>
<td>All</td>
<td></td>
</tr>
<tr>
<td>The QA X-Ray Bodies’ management system should provide for quality control checks before submission to DoH. QA X-Ray Bodies’ to check and verify all information before submission.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Committee requested DoH to give feedback and examples of the types of errors encountered at the Stakeholders meeting planned for October 2016.</td>
<td>DoH</td>
<td>21 Oct 2016</td>
</tr>
<tr>
<td>DoH was also requested to give feedback on the use (reference values) of ES information at the meeting.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NO.</td>
<td>ACTION BY</td>
<td>DATE</td>
</tr>
<tr>
<td>-----</td>
<td>-----------</td>
<td>------</td>
</tr>
<tr>
<td>7.6</td>
<td>Testing of Sensors – Dental</td>
<td>All</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>The testing of sensors only for dental purposes was discussed; the opinion of the Dental experts in attendance was that sensors may be used without QA testing as the replacement of a sensor is considered a low risk in the process.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>After some discussion the Committee asked the WG – Dental to look into the matter as part of their review process, see item 6.8 of the minutes.</td>
<td></td>
</tr>
<tr>
<td>7.7</td>
<td>Duties and Responsibilities of the QA X-Ray Body and the Regulator</td>
<td>All</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>The Chair confirmed that QA-Xray inspection bodies are accredited by SANAS and thereafter approved by the Regulator (DoH). The duties and responsibilities of the stakeholders are documented in SANAS documents as follows:</td>
<td>30 April 2016</td>
</tr>
<tr>
<td></td>
<td>SANAS and Regulator (DoH): T 53-04 QA-XRAY inspection bodies: F 147-01</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>GENERAL</td>
<td></td>
</tr>
<tr>
<td>8.1</td>
<td>(8.1) STC Membership</td>
<td></td>
</tr>
<tr>
<td></td>
<td>All members are reminded of the terms of reference as members of the STC QA X-Ray, please see P 19-04 - Terms of Reference, Registration and Responsibilities of Specialist Technical Committees on the SANAS website: <a href="http://www.sanas.co.za">www.sanas.co.za</a></td>
<td></td>
</tr>
<tr>
<td></td>
<td>All members were reminded to submit an updated CV to SANAS at least every 3-years.</td>
<td>21 Oct 2016</td>
</tr>
<tr>
<td>8.2</td>
<td>(8.2) Accreditation Statistics</td>
<td></td>
</tr>
<tr>
<td></td>
<td>See SANAS website <a href="http://www.sanas.co.za">www.sanas.co.za</a> for Accredited Organisations.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Enquiries</td>
<td>Applications</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Dental 04</td>
<td>01</td>
</tr>
<tr>
<td>8.3</td>
<td>Feedback from Assessments</td>
<td></td>
</tr>
<tr>
<td></td>
<td>None</td>
<td></td>
</tr>
</tbody>
</table>
### 8.4 (8.4) Technical Queries

#### 8.4.1 Overlapping Scopes

<table>
<thead>
<tr>
<th>Action</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>The issue of a QA X-Ray Body doing inspections on a unit and at some point needing access to equipment installed by another QA X-Ray Body/Suppliers was discussed (for the purpose of optimisation of the imaging chain).</td>
<td>All</td>
</tr>
<tr>
<td>How can this be achieved without adding cost? DoH requested the QA X-Ray Bodies for feedback on the inspection and testing activities seen as being problematic to see how the issue can be resolved without compromising the health and safety aspect of the of the Radiation Control process.</td>
<td>All</td>
</tr>
<tr>
<td>The option of generic procedures (guidelines) for all to follow was suggested. QA X-Ray Bodies are requested to participate in a process to draft General Guidance on Acceptance Tests and to forward suggestions to the General WG Convenor Mr Jacques Schep.</td>
<td>WG Baselines 21 Oct 2016</td>
</tr>
</tbody>
</table>

### 8.5 DoL Stakeholders feedback from 22 October 2015

#### 8.5.1 The next DoL Stakeholders meeting is planned for 20 October 2016. Venue to be confirmed at a later date. | 21 Oct 2016 |

### 8.5.2 South African Health Products Regulatory Authority (SAHPRA) – Progress

Part of or all the functions of Radiation Control may move to SAHPRA - South African Health Products Regulatory Authority or to the NNR – National Nuclear Regulator. No further information was available at the time of the meeting. | DoH |

### 10. CLOSURE

| Date of next meeting: **21 October 2016** | All |
| A Friday is suitable and the dates are approved as suggested. Dates for 2016: 18 March 2016 - STC 20 October 2016 – DoH Inspection Body Meeting **21 October 2016 – STC – VENUE TO BE CONFIRMED** | 21 Oct 2016 |
The meeting adjourned at 14:30
APPENDIX 1: Guideline for HVL Measurement (Aluminium sheets/filters)

MEASUREMENT OF HVL / FOR ASSESSMENT OF X-RAY TUBE OUTPUT TOTAL FILTRATION

1. Place a small chamber (ionization) at approximately 1 m from the focal spot and at least 30 cm away from any material that can cause back-scatter (e.g. 30 cm above x-ray couch).
2. Make two exposures at ~80 kVp, and approx. 40 mAs. Record the exposures (80 kV is the recommended energy for HVL measurements).
3. Place a 1mm Al plate between the X-ray tube and chamber. Make two exposures and record results. If, from experience, you know that 3 mm Al will provide an exposure just more than half the exposure without filtration, start with 3 mm Al, etc.
4. Add another 1mm Al plate to the previous filtration, repeat the exposures and record the results.
5. The procedures above are repeated until the recorded exposure is less than half the exposure without additional filtration.
6. Repeat the first exposure (with no Al plate) and record the exposure (this is to check that the machine parameters have not drifted during the measurements). Take the mean of the first and last measurements as +0mm Aluminium.

For the formula below:
- \(Y_0\) is the mean exposure without added filtration.
- \(Y_1\) is the mean exposure for the total added filtration \(X_1\), where \(Y_1\) divided by \(Y_0\) is > 0.5
- \(Y_2\) is the mean exposure for the total added filtration \(X_2\), where \(Y_2\) divided by \(Y_0\) is < 0.5 (see par 5 above)
- Use the values above to calculate HVL below.

\[
HVL = \frac{X_1 \times \ln\left(\frac{2Y_2}{Y_0}\right) - X_2 \times \ln\left(\frac{2Y_1}{Y_0}\right)}{\ln\left(\frac{Y_2}{Y_1}\right)}
\]

7. Compare calculated HVL with measured HVL.
8. Should be repeated for different energies.
<table>
<thead>
<tr>
<th>Added Al (mm)</th>
<th>Set kV (e.g. 80)</th>
<th>mAs (e.g. 40)</th>
<th>Measured exp</th>
<th>Exp decr (%)</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>+ 0 mm Al</td>
<td>80</td>
<td>40</td>
<td></td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>+ 0 mm Al</td>
<td>80</td>
<td>40</td>
<td></td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>+ 3 mm Al</td>
<td>80</td>
<td>40</td>
<td></td>
<td>Just &lt; 50</td>
<td>Could be 2 or 4 mm Al</td>
</tr>
<tr>
<td>+ 3 mm Al</td>
<td>80</td>
<td>40</td>
<td></td>
<td>Just &lt; 50</td>
<td>Could be 2 or 4 mm Al</td>
</tr>
<tr>
<td>+ 4 mm Al</td>
<td>80</td>
<td>40</td>
<td></td>
<td>Just &gt; 50</td>
<td>Could be 3 or 5 mm Al</td>
</tr>
<tr>
<td>+ 4 mm Al</td>
<td>80</td>
<td>40</td>
<td></td>
<td>Just &gt; 50</td>
<td>Could be 3 or 5 mm Al</td>
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<tr>
<td>+ 0 mm Al</td>
<td>80</td>
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<tr>
<td>+ 0 mm Al</td>
<td>80</td>
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