



NIGERIAN NUCLEAR REGULATORY AUTHORITY

**CHECKLIST FOR SAFETY ASSESMENTS FOR AUTHORIZATION AND REGULAR
INSPECTION OF WEL LOGGING AND PORTABLE DEVICES FOR
GAGING, DETECTION, AND ANALYSIS**

Guidance Notes for Inspector(s):

Prepare a visit agenda to review the operating programme with details contained in the application for authorisation, the authorisation certificate, prior programme review/inspection reports and their implementation, relevant correspondence and other relevant documentation such as dosimetry reports.

Check the following for compliance with the authorisation and with the Regulatory Authority requirements.

Monitoring equipment and accessories required should be available for use as and when required.

Give entry briefing to the most senior management personnel

I IDENTIFYING INFORMATION

I-1 Name of the Institution:

I-2 Address of Facility:
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.....

I-3 Telephone/facsimile/email: Tel. #: Fax:
Email:

I-4 Authorisation Number:

I-5 Name and Qualification of the Radiation Safety Officer Name:
Degree:
Certification:.....
Experience:
.....
.....

I-6 Name and Qualification of any Qualified Experts retained Name:
Degree:
Certification:.....
Experience :.....
Name:

Degree:
Certification:
Experience:

I-7 The name and title of the Responsible representative of the legal person:
.....
.....

II VERIFICATION OF SAFETY

II-1 Equipment with Sealed Sources incorporated

Description	Radionuclide	Maximum activity	Number
Manufacturer: Radiation Type (alpha, beta, gamma, neutron): Model No. Device: Source: Serial No. Device: Source:			
Manufacturer: Radiation Type (alpha, beta, gamma, neutron): Model No. Device: Source: Serial No. Device: Source:			
Manufacturer: Radiation Type (alpha, beta, gamma, neutron): Model No. Device: Source: Serial No. Device: Source:			
Manufacturer: Radiation Type (alpha, beta, gamma, neutron): Model No. Device: Source: Serial No. Device: Source:			
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Manufacturer: Radiation Type (alpha, beta, gamma, neutron): Model No. Device: Source: Serial No. Device: Source:			
Manufacturer: Radiation Type (alpha, beta, gamma, neutron): Model No. Device: Source: Serial No. Device: Source:			

II-2 X-ray Generators

Compare sources and devices with the application descriptions and design specifications.

Manufacturer	Model Number	Serial Number	Voltage	Current
Compare the x-ray generator with application descriptions and design specifications. Note any differences and determine the standards to which devices were built:				

II-3 Neutron Generators -Accelerator

Manufacturer	Model Number	Serial Number	Neutron Energy	Target Nuclide
Compare the neutron generator with application descriptions and design specifications. Note any differences and determine the standards to which devices were built:				

II-4 Facility Design and Operating Conditions

Describe any differences or modifications from those approved by the Regulatory Authority and considered in the safety assessment (e.g. environmental factors such as heat, extreme cold or moisture; shielding design, building materials, installed fire protection and controls, etc.).....			
a) Was a safety assessment by a qualified expert performed prior to any modifications		Yes	No
b) Is protection of the sources and generators from adverse environmental conditions (heat, moisture, etc.):	Provided? Working?	Yes Yes	No No
c) Is fire detection and protection in the radiation and source storage areas:	Provided? Working?	Yes Yes	No No

II-5 Safety Controls System

a) Are the safety controls for operations and storage of radiation sources as described in the application approved by the Regulatory Authority?		Yes	No
b) If not, was a safety assessment by a qualified expert performed prior to any modifications?		Yes	No
c) Are gamma radiographic devices and x-ray generators labelled as sources of radiation	Provided? Legible? Local language?	Yes Yes Yes	No No Yes
d) Are mechanical controls to prevent unintentional source exposure (e.g., keyed locks, shutters):	Provided? Working?	Yes Yes	No No
e) Are portable radiation monitors for operations:	Needed Provided? Required? Working?	Yes Yes Yes Yes	No No No No
f) Are adequate controls of the production of radiation by x-ray neutron generators (e.g. timer, voltage, current)	Provided? Working?	Yes Yes	No No

II-6 Warning Systems

a) If appropriate, are signals (e.g. visible and/or audible) and posted for:			
i) source exposure	Provided? Working?	Yes Yes	No No
ii) generator power on	Provided? Working?	Yes Yes	No No
b) Are warning notices (e.g. written signs, poster):	Provided? Legible Local language?	Yes Yes Yes	No No No

II-6 Safety Operations Management

a) Is management knowledgeable of the certificate of authorisation and its restrictions and requirements?		Yes	No
b) Does management provide adequate staffing levels?		Yes	No
c) Has management provided the Radiation Protection Officer authority to stop unsafe operations?		Yes Yes	No No
d) Does management provide adequate resources for personnel training (time and money)?		Yes Yes	No No
e) Does management provide adequate equipment?		Yes Yes	No No
f) Does management provide for periodic programme reviews and recommendations?	Scheduled? Performed?	Yes Yes	No No
Vii) Date of the last programme review:			
Viii) Status of recommendations:			
.....			
.....			

II-8 Safety Operations - Technical

a) Does the Radiation Safety Officer (RSO) have adequate knowledge and expertise?		Yes	No
b) Does the RSO have qualified experts available?		Yes	No
c) Is the RSO knowledgeable about the requirements of the NNRA and the provisions of the certificate of authorisation?		Yes	No
d) Is the RSO given sufficient time and resources to do the job (e.g., not kept too busy with other assignments or given insufficient technical and secretarial help?)		Yes	No
e) Does RSO maintains knowledge of activities of workers using radiation sources?		Yes	No
f) Does RSO conduct initial and periodic training of workers?		Yes	No
g) Does RSO maintain adequate records to demonstrate worker and public protection?		Yes	No
h) Are there provisions for inventory of sources and accountability?	Procedures? Performed?	Yes Yes	No No
i) Are locations and uses of devices recorded including site location, serial numbers of devices, date, name of supervising radiographer?		Yes	No

II-9 Investigation and Quality Assurance

a) Were there any incidents or accidents?		Yes	No
b) If so, were incident and accident investigation reports prepared?		Yes	No
c) Were safety assessments reviewed or made based on lessons learned from any accident or accidents at similar facilities?		Yes	No
d) Is there a written Quality Assurance programme?	Procedures? Performed?	Yes Yes	No No
e) Is maintenance and repair work in accordance with manufacturer's recommendations?	Scheduled? Performed?	Yes Yes	No No
f) Are repair/maintenance procedures?	Developed? Followed?	Yes Yes	No No

III VERIFICATION OF WORKER PROTECTION

III-1 Classification of Areas

a) Are controlled areas demarcated?		Yes	No
b) Are approved signs at access points?	Provided?	Yes	No
	Legible?	Yes	No
	Local language?	Yes	No
c) Is radiation source storage at a physically defined location		Yes	No
i) locked/secured location with key control?		Yes	No
ii) radiation warning notices?	Provided?	Yes	No
	Legible?	Yes	No
	Local language?	Yes	No
iii) proper shielding (e.g., individual containers, enclosure)?		Yes	No
iv) reserved only for radiation sources?		Yes	No
d) Are supervised areas demarcated?		Yes	No
e) Are approved signs at access points?	Needed?	Yes	No
	Provided?	Yes	No
	Legible?	Yes	No
	Local language?	Yes	No

III-2 Local rules and Supervision

a) Are rules established in writing?		Yes	No
b) Do rules include investigation levels and authorised levels and the procedure to be followed when a level is exceeded?		Yes	No
c) Are workers instructed in the implementing procedures?		Yes	No
d) Is device operation done in accordance with prescribed operating procedures and conditions?		Yes	No
e) Do workers have adequate supervision to ensure rules, procedures, protective measures and safety provisions are followed?		Yes	No
f) Specifically, are operating and working procedures for:			
i) use of personal dosimetry and use of protective equipment:	Provided?	Yes	No
	Adequate?	Yes	No
	Followed?	Yes	No
ii) performing routine maintenance:	Provided?	Yes	No
	Adequate?	Yes	No
	Followed?	Yes	No
iii) making surveys	Provided?	Yes	No
	Adequate?	Yes	No
	Followed?	Yes	No
iv) appropriate response to equipment damage:.	Provided?	Yes	No
	Adequate?	Yes	No
	Followed?	Yes	No

III-3 Monitoring

a) Does the authorised organisation provide personal dosimeter?		Yes	No
b) Are the dosemeter:			
i) Worn properly?		Yes	No
ii) Calibrated		Yes	No
iii) Exchanged at required frequency?		Yes	No
c) Are personnel exposures within limits?		Yes	No
d) Area and portable survey instruments			
i) Appropriate?		Yes	No
ii) Calibrated?		Yes	No
iii) Operational?		Yes	No
iv) Operational check performed before use?		Yes	No

e) Do the authorised organization's surveys indicate that the device shielding is adequate and the dose rates in the immediate vicinity and normally occupied areas meet authorised radiation levels?	Yes	No
f) Does the authorised organisation make periodic tests for leakage of radioactive materials from sealed sources?	Yes	No
) Does the authorised organisation use an outside qualified expert to perform		
h) If not is the authorised organisation's instrumentation:		
i) Appropriate?	Yes	No
ii) Calibrated?	Yes	No
iii) Operational?	Yes	No
Record independent measurements made during the inspection:		
.....		
.....		
Type/Model No. of Survey Meter:		
Date last calibrated:		
Do the inspector's independent surveys agree with the survey results of the authorised organisation?	Yes	No
Document any significant differences and any agreed upon plan to resolve the different results:		
.....		
.....		

IV VERIFICATION OF PUBLIC PROTECTION

IV-1 Control of Visitors

a) Are visitors accompanied in controlled area?	Yes	No
b) Is adequate information provided to visitors entering controlled areas?	Yes	No
c) Are there adequate control over entries into supervised areas and appropriate postings?	Yes	No

IV-2 Sources of Exposure

a) Are the shielding and other protective measures optimised for restricting public exposure to external sources of radiation?	Yes	No
b) Are the floor plans and arrangement of equipment as described in the application and appropriate considering any public areas adjacent to the installation?	Yes	No
c) Have provisions been made to detect and control contamination in the event of a leaking source?	Yes	No

IV-3 Radioactive Waste and Discharges

a) Have provisions been made to transfer sources to an appropriate registrant or licensee or to an authorised waste disposal facility at the end of use?	Yes	No
b) If sources are no longer in use and being stored, does the authorised organisation have a plan for timely transfer or disposal of the sources?	Yes	No

IV-4 Monitoring of Public Exposure

a) Are routine periodic measurements of exposure rates in public areas adjacent to controlled and supervised areas made by the staff or qualified expert?	Yes	No
b) Do surveys shows that the device shielding is adequate and the dose rates outside the controlled and supervised areas meet authorised radiation levels?	Yes	No

c) Record independent measurements made during the inspection.	Yes	No
Type/Model No. of Survey Meter:		
Date last calibrated:		
Are the inspector's independent measurements in agreement with the organisation routine measurements?	Yes	No
Document any significant differences and any agreed upon plan to resolve the different results:		

V EMERGENCY PREPAREDNESS

V-1 Emergency Plan

a) Is there a written plan?	Yes	No
b) Is the plan periodically reviewed and updated?	Yes	No
c) Does the plan take into account lessons learned from operating experience and accidents at similar facilities?	Yes	No
d) Do the procedures include isolation and radiation surveys of damaged radiation sources, source holders or operating mechanism?	Yes	No

V-2 Training and Exercises

a) Have workers involved in implementing the plan received training?	Yes	No
c) Date of the last rehearsal:		

V1 VERIFICATION OF RECORDS

i) Is a copy of authorisation certificate available for inspection?	Yes	No
ii) Are personal dosimetry records being kept?	Yes	No
iii) Dosimetry		
a) current dose and analyzed?	Yes	No
b) collect dose and analysed?	Yes	No
iv) Area surveys records being kept?	Yes	No
v) Are instrument tests and calibrations records kept?	Yes	No
vi) Are tests for leakage of radioactive material from sources records kept?	Yes	No
vii) Are inventory of sources and accountability records kept?	Yes	No
viii) Are audits and reviews of radiation safety programmes records kept?	Yes	No
ix) Are incident and accident investigation reports kept?	Yes	No
x) Are maintenance and repair work records kept?	Yes	No
xi) Are facility modifications records kept?	Yes	No
xii) Are training provided		
a) initial	Yes	No
b) fresher	Yes	No
xiii) Are evidence of health surveillance records kept?	Yes	No
xiv) Are waste disposals programme and records kept?	Yes	No
xv) Are transportation of radioactive material records kept?		
a) package documentation?	Yes	No
b) package surveys?	Yes	No
c) transfer/receipt documents?	Yes	No
d) details of shipments dispatched?	Yes	No
xvi) Patient discharge surveys	Yes	No
xvii) Clinical dosimetry records	Yes	No

VII INSPECTION FINDINGS,

IV RECOMMENDATIONS

Name of Inspector:.....

Signature :.....Date.....