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RADIATION PROTECTION AUTHORITY OF ZIMBABWE

RADIATION PROTECTION ACT (CHAPTER 15:15)

INSPECTION CHECKLIST FOR INDUSTRIAL RADIATION SOURCES

A. GENERAL INFORMATION

(i) Inspection type: ……..……..……..

(ii) Date of previous inspection: ……..……...

(iii) Name of Institution: ...…….…….……

(iv) Physical address of facility:

……..……

……..……

(v) Telephone: …..……..

(vi) Fax: …...……

(vii) E-mail: ……..

(viii) Name and qualifications of radiation experts:

(a) Radiation Safety Officer

Name: ……..

Qualification: ……..

Certification: ……...

Experience: ……..

(b) Expertise: ……..……..

Name: ……..

Qualification: ……..

Certification: ……...

Experience: ……..

(c) Expertise: …….

Name: ……..

Qualification: ……..

Certification: ……...

Experience: ……..

(ix) Name and designation of the facility's representative for the inspection

…….……..

(x) Name and title of the responsible representative of the legal person:

…….....

B. VERIFICATION OF RADIATION SAFETY

i. Industrial Gauges:

Manufacturer (Country and year)	**Radionuclide**	**Radiation type**	**Licence number**	**Maximum activity**	**Device Serial No.**	**Source Serial No.**

ii. X-ray generators

Manufacturer (country , year)	Licence number	SN: Tube	SN: Generator	SN: Collimator	Max kV	Max mA	Weekly workload
Compare the x-ray generator with application descriptions and the design specifications. Note any differences and determine the standards to which the devices were built.							

iii. Neutron Generator – Accelerator

Manufacturer (country , year)	Licence number	SN: Tube	SN: Generator	SN: Collimator	Max kV	Max mA	Weekly workload
Compare the neutron generator with application descriptions and the design specifications. Note any							

differences and determine the standards to which the devices were built.

iv. 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, installed fire protection and controls, etc.) ……..….. ……..… …….

		Yes	No
a)	Was a safety assessment by a qualified expert performed prior to any modifications		
b)	Is protection of the sources and generators from adverse environmental conditions (heat, moisture, etc) — Provided?		
	Is protection of the sources and generators from adverse environmental conditions (heat, moisture, etc) — Working?		
c)	Is there fire detection and protection in the radiation source storage areas? — Provided?		
	Is there fire detection and protection in the radiation source storage areas? — Working?		

v. Safety Control Systems

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

vi. Warning Systems

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

vii. Safety Operations Management

		Yes	No
a) Is management knowledgeable about the certificate of authorization and its restrictions and requirements?			
b) Does management provide adequate staffing levels?			
c) Has management provided adequate powers to the radiation safety officer to stop unsafe operations?			
d) Does management provide adequate equipment?			
e) Does management provide adequate resources for personnel training (time, money)?			
f) Does management provide for periodic programme reviews and recommendations?	Scheduled?		
	Performed?		

(i) Date of the last program review: ……..……..……..

(ii) Status of recommendations: ……..……...……...

……

…….…….

viii. Safety Operations- Technical

		Yes	No
a) Does the Radiation Safety Officer (RSO) have adequate knowledge and expertise?			
b) Does the RSO have qualified experts available?			
c) Is the RSO knowledgeable about the requirements of RPAZ and the provisions of the certificate of authorization?			
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)?			
e) Does the RSO maintain records of activities of workers using radiation sources?			
f) Does the RSO conduct initial and periodic training of workers?			
g) Does the RSO maintain adequate records to demonstrate worker and public protection?			
h) Are the provisions for inventory of sources and accountability:	Scheduled?		
	Performed?		
i) Are locations and uses of devices recorded including site locations, serial numbers of devices, date, name of supervising radiographer?			

ix. Investigation and Quality Assurance

		Yes	No
a) Were there any incidents or accidents?			
b) If so, were they investigated and reported?			
c) Was a safety assessment and review done based on lessons learnt from any incident(s) or accident(s) at similar facilities?			
d) Is there a written Quality Assurance programme	Scheduled?		
	Performed?		
e) Is maintenance and repair work in accordance with manufacturer's recommendations?	Scheduled?		
	Performed?		
f) Are quality assurance procedures:	Scheduled?		
	Performed?		
g) Are maintenance/repair procedures	Developed?		
	Followed?		

C. VERIFICATION OF WORKER PROTECTION

i. Classification of areas

		Yes	No
a) Are controlled areas demarcated?			
b) Are approved signs at access points	Provided?		
	Legible?		
	Local Language?		
c) Is the radioactive material storage at a physically defined location (e.g. cabinet, safe, dedicated room?			
i. Locked/secured location with key control?			
ii. Proper shielding (e.g. individual containers, room)?			
iii. Reserved for radiation sources?			
d) Are supervised areas demarcated?			
e) Are approved signs at access points	Needed?		
	Provided?		
	Legible?		
	Local Language?		

ii. Local rules and supervision

		Yes	No
a) Are rules established in writing?			
b) Do rules include authorized levels and the procedure to be followed when a level is exceeded?			
c) Are radiation workers instructed in the implementing of procedures?			
d) Do workers have adequate supervision to ensure rules, procedures, protective measures and safety provisions are followed?			
e) Specifically, are operating and working procedures for ;			
i. Setting up controlled areas including barriers, surveillance and posting at temporary job sites.	Provided?		
	Adequate?		

	Followed?		
ii. Set-up of exposures (radiation source output beam direction, use of collimators, beam height):	Provided?		
	Adequate?		
	Followed?		
iii. Use of personal dosimetry and use of protective equipment such as alarming rate dosimeter	Provided?		
	Adequate?		
	Followed?		
iv. Performing repairs and maintenance of safety systems	Provided?		
	Adequate?		
	Followed?		
v. Making surveys	Provided?		
	Adequate?		
	Followed?		
vi. Responding to alarms	Provided?		
	Adequate?		
	Followed?		

iii. Monitoring

	Yes	**No**
a) Do radiation workers have personnel dosimeters?		
b) Are the dosimeters: i) Worn properly? ii) Calibrated? iii) Exchanged at required frequency?		
c) Are personnel exposures within limits?		
d) Area and portable survey instruments: i) Appropriate? ii) Calibrated? iii) Operational? iv) Operational check performed before use?		
e) Do the authorized organization's survey indicate that the radiation room; i) Shielding is adequate and the dose rates around the room meet authorized radiation levels?		
f) Does the authorized organization make periodic tests for leakage of radioactive materials from sealed sources?		
g) Is the instrumentation: i) Appropriate? ii) Calibrated? iii) Operational?		
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 authorized organization?	Yes	No
Document any significant differences and any agreed upon plan to resolve the different result: ……. ..... ……..		

D. VERIFICATION OF PUBLIC PROTECTION

i. Control of visitors

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

ii. Sources of Exposure

	Yes	No
(a) Is the shielding and other protective measures optimized for restricted public exposure to radiation?		

iii. Radioactive waste management

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

iv. Monitoring of public exposure

	Yes	No
a) Are routine measurements made of dose rate at places occupied by the members of the public by the RSO or qualified expert?		
b) Are the inspector-independent measurement in agreement with those made by RSO or qualified expert?		
c) Do the survey measurements indicate that adequate shielding is provided so that dose rates outside controlled and supervised areas meet authorized radiation levels?		

Type/Model/No of survey meter used: ……..
Date of last calibration: …….
Record independent measurements made during the inspection: …… …..……..... ....

E.EMERGENCY PREPAREDNESS

i. Emergency Plan

	Yes	No
(a) Is there a written plan?		
(b) Is the plan periodically reviewed and updated?		
(c) Does the plan take account of lessons learnt from operating experience and accidents at similar facilities?		

ii. Training and Exercises

	Yes	No
(a) Have workers involved in implementing the plan received training?		
(b) Have provisions been made of the plan to be rehearsed at suitable intervals (e.g. fire accident, exposure does not terminate at a present time)?		

F.VERIFICATION OF RECORDS

	Yes	No
a) Is the authorization certificate displayed?		
b) Are personal dosimetry records being kept:		
i) Current dose and analyzed?		
ii) Collective dose and analyzed?		
c) Are area Surveys records being kept?		
d) Are records for maintenance and repair being kept?		
e) Are instruments tests and calibration records being kept?		
f) Are incident /accident records and reports being kept?		
g) Are training program records being kept?		
h) Is there evidence of health surveillance records?		
i) Is there documentation on audit and review of radiation safety program		

G.INSPECTION FINDINGS

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RECOMMENDATIONS

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Name(s) of Inspector(s)……..

Signature……

Facility representative……Signature…….……

Date……..