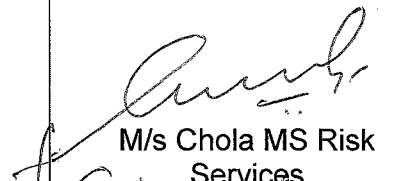
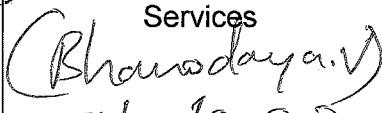
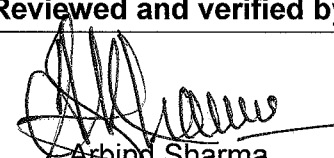
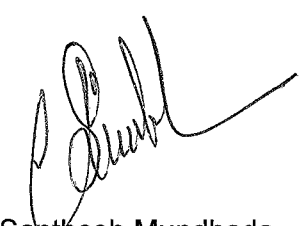
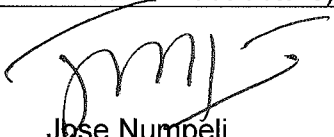



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TECHNICAL STANDARD (TS)

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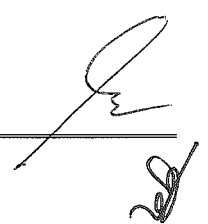
Prepared by	Reviewed and verified by	Authorized by
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Document Change Note

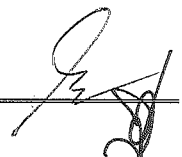
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00	15-12-2022	New Issue



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1 PURPOSE

The purpose is to provide guideline for controlling Radiography Testing on site by detailing the requirement for the safe handling, storage and monitoring of all radioactive sources used at site and for protecting personnel from potential radiation hazards.

2 SCOPE

This procedure shall apply to all AMNS project sites and related work areas including contractors to meet –

- Legal and regulatory requirements
- AMNS HSE requirements
- ISO 45001 and ISO 14001 standard requirements
- AMNS HSE Policy

3 DEFINITIONS

Film Badges: Small packets of film which are pinned to the clothing of persons to record amounts of radiation to which the wearer is exposed.

Dose: Quantity of ionizing radiation absorbed, per unit of mass, by the body or by any portion of the body.

Dosimeter: A device used to measure an accumulated dose of or exposure to radiation; in common usage it is a pencil size pocket chamber, film badge, or a solid-state type of detector.

Ionizing Radiation: Includes alpha, beta, gamma, and X-rays, but does not include sound or radio waves, visible light, or infrared or ultraviolet light.

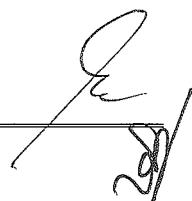
Source: Source means any radioactive material which for purposes other than storage, transport or disposal is sealed in a container or bonded wholly within any material, in such a manner as to prevent the escape of the radioactive material having regard to its intended use, and includes the immediate container or the bonding.

Radioactive Material: Material which emits by spontaneous nuclear disintegration, corpuscular or electromagnetic emanations.

Non-ionising radiation: This does not cause ionization as it passes through the body. Examples are visible, infrared, and ultraviolet light.

Radiographer: means a radiation worker who performs industrial radiography operations employing sealed sources and possesses a valid certificate duly recognized or issued by the competent authority for the specific purpose.

Radiation: is a stream of particles or electromagnetic waves emitted by the atoms and molecules of a radioactive substance as a result of nuclear decay.



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4 RESPONSIBILITIES

Project Head

Project Head shall be responsible for the overall implementation of the radiography testing program at the Project Sites.

Ensure that adequate arrangements exist on site for the receipt and storage of radioactive sources.

Project HSE Manager

All workmen are fully informed of the hazards and procedures for safe using of all hazardous materials which they may encounter in their work.

Ensure all related personnel are trained on Radiography Safety norms

Approving, and auditing the Radiography safety compliances and maintaining the records.

Engineer

- Ensure implementation of adequate dosimetry control (film badges, thermo luminescent dosimeters, finger rings or wrist badges), for the work being performed and maintenance of the relevant records.
- Provide technical assistance to all employees on radiation safety issues; Organization of comprehensive medical screening, of all workers exposed to ionizing radiation and maintenance of the relevant medical records.
- Implementation of a comprehensive system of movement control of all sources of ionizing radiation imported into the country, such that their location is always known.
- Ensuring that all sources of ionizing radiation are stored and transported in accordance with the regulations, such that they do not present a danger to the population, animal life or the environment.
- Monthly inspect installed radioactive sources in fixed process applications and create a documented inspection file.
- Stop any type of work which he deems is being performed unsafely; determine the area to be barricaded off during work operations involving radioactive sources.
- Survey the area where work involving radioactive sources is taking place to ensure that an allowable level of radiation is not exceeded.
- Maintain a record of isotopes, containers, monitors, etc.
- Maintain a register of company classified persons and keep a record of their dose.



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5 RADIOGRAPHY DESCRIPTION

5.1 GENERAL

All radiation equipment and radioactive materials shall be stored, handled, transported, or disposed of so that no person receives an unnecessary dose of radiation.

Monthly inspections shall be made of radiation apparatus, and the results shall be recorded and filed for the required period. Shield ability of the radioactive material container shall be inspected every six months.

Warning signs and posters used internationally shall be displayed.

Radiography shall be announced 24 hours in advance by letters and display on a white board by the main entrance.

5.2 SUPERVISOR

Radiography shall be performed under the direction of the radiography supervisor responsible for this work. A supervisor shall be appointed at every radiation area.

5.3 WORKERS

All workers should have extensive knowledge of the work, such as radiation procedure, operation of radiation apparatus, and the effects of radiation on the body.

All personnel performing radiography and working with radioisotopes shall be licensed and certified in accordance with the local law.

5.4 RESTRICTED AREA

The following spaces or areas shall be classified as restricted areas:

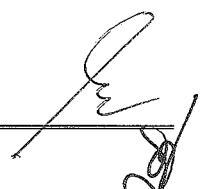
- Storage place or radioactive materials.
- Emergency storage area for radiation apparatus or radioactive material capsules.

Warning signs, labels, and safety ropes or a fence shall be provided for restricted areas to prevent trespassing.

5.5 RADIATION AREA

The area covered within a radius of 5 meter from the radiation working spot or location and subject to a dose of radiation in any one hour in excess of 50 millirems shall be called the radiation area. Trespassing in this area shall be strictly prohibited.

Warning signs, labels, and safety ropes or a fence shall be provided to prevent trespassing.



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5.6 RADIATION

Posters showing the rated power output, that radiation is taking place, no entry allowed, and the danger shall be displayed where radiation work is carried out. Before starting the radiological work, the restricted area shall be checked to confirm that no unauthorised persons are in the area and reconfirmed during the radiation work.

Radiation apparatus shall be operated by a supervisor or an assistant authorised by a supervisor.

All workers entering a restricted area shall wear film badges sensitive to radiation.

All workers who could receive a dose of radiation in excess of 100 millirems per day shall wear a pocket dosimeter, and the dose of radiation received shall be recorded every day. For work using the pocket dosimeter, the dose of radiation shall be checked by the supervisor for each radiation exposure. When the dose of radiation exceeds 100 millirems, a supervisor shall stand by or suitable alternatives, such as shortening the radiation time, reinforcing the shield plate, etc., shall be arranged.

A shield plate shall be provided around the source of radiation to reduce the dose of radiation.

During radiation work, doses of radiation at the boundary of the restricted area shall be measured and recorded.

When radiation work is scheduled at night for a lengthy time, a security guard shall be stationed.

5.7 RECORD

The radiography supervisor shall measure and record the surface dose rate of the restricted area every day. The record shall include the following items:

- Date of measurement
- Measuring method
- Description and capacity of apparatus
- Measured portion
- Measurement conditions
- Results of measurement
- Name of measurer
- Any action taken

5.8 MEDICAL EXAMINATION

Periodic medical examination shall be given to radiography workers. The period shall be 6 months for blood examination and for accumulated dose, and 3 months for skin examination and for cataracts. Persons deemed to have been overexposed to radiation shall be examined as necessary.

5.9 STORAGE OF RADIOACTIVE MATERIALS

Radioactive materials shall be stored separately from other materials or equipment. The storage place of radio-active materials shall be 10 centimetres or more above the ground and locked to prevent accidents.

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Radioactive materials shall be stored in a case made of lead of ample thickness with a lock. On the exterior surface of the case, the name of company, description of material, quantity, and danger sign shall be distinctly visible. Labels and posters must indicate the description and quantity of the radioactive material, name of responsible person, and the sign OFF LIMITS.

The radiography supervisor shall supervise the replacement and transportation of radioactive materials. He shall measure and record the dose of radiation every day at the boundary of the restricted area where the radioactive materials are stored, whether it is being used or not. That dose shall not exceed 30 millirems per week.

5.10 TRANSPORTATION OF RADIOACTIVE MATERIALS

Radioactive materials shall be transported by two or more men. Transportation by one man shall be prohibited.

When radioactive materials are transported by automobile, the driver and any other riders shall wear film badges sensitive to radiation and pocket dosimeters.

The quantity of radioactive materials shall be checked at the time of departure, arrival, or packing.

During transportation of radioactive materials, signs showing that radioactive material is being transported shall be displayed.

5.11 GAMMA RAY WORK

Before starting radiation work, the radiography supervisor shall check that the radiation apparatus operates safely and confirm the dose to be within the following values:

- Dose at surface of case: 200 millirems per hour
- Dose at one meter from surface of case: 10 millirems per hour. When radioactive materials are transferred to another work area, the radioactive material shall be checked for any losses during a radiant ray survey meter.

Radiation apparatus and its attachments shall not be dismantled in the field.

After daily radiation work is completed, the radiography supervisor shall ensure that the radioactive material is stored safely in the capsule. The return the materials to the storage place shall be confirmed and recorded.

5.12 EMERGENCY CONDITION

In case of trouble, accident, or loss of radioactive materials, the following provisions shall apply:

- When radioactive material is in abnormal state due to mechanical fault in the radiation apparatus, the position of the radioactive materials shall be checked with a meter, and the position shall be shielded by a lead plate to prevent radiation from dispersing.
- When a capsule or holder of radioactive material is dropped, the area shall be designated a restricted zone, and this zone shall be examined by a meter.

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- c. When radioactive material is scattered from a broken capsule, the contaminated area shall immediately be declared a restricted zone.
- d. All workers shall be evacuated immediately from an area where hazardous radiation is forecast.
- e. The Radiological Safety Agency (Atomic Energy Regulatory Body) shall be informed of any accident.

6 CHECKING, CORRECTIVE AND PREVENTIVE ACTION

Periodic audits / Inspections shall be carried out to assess the compliance to the procedure and effectiveness of the controls. Any deviations shall be reported to Project Head for corrective/ preventive actions if needed.

7 TRAINING & COMMUNICATION REQUIREMENTS

- Employees shall not be permitted to operate radioactive source equipment without receiving training for the activity.
- Daily toolboxes talk to be conducted by the line management gang wise to discuss about Radiography Hazards and Safety Norms.

8 MANAGEMENT OF RECORDS

S. No	HSE MS RECORD	MAINTAINED BY	RETENTION TIME
1.	Radiography Checklist	HSE Department	Until completion of project
2.	Record Radiation Level at Storage Pit	HSE Department	Until completion of project
3.	Personnel Dose Record	HSE Department	Until completion of project

9 REFERENCE DOCUMENTS

AMNS/Project/SS/HSEM/08	HIRAC
AMNS/Project/SS/HSEM/14	OCCUPATIONAL HEALTH & HYGIENE
AMNS/Project/SS/HSEM/15	ENVIRONMENTAL MANAGEMENT
AMNS/Project/TS/HSEM/15	MANAGEMENT OF HAZARDOUS SUBSTANCE

10 ANNEXURES

AMNS/Project/TS/HSEM/16/F01

Radiography Checklist



AM/NS INDIA	RADIOGRAPHY SAFETY MANAGEMENT RADIOGRAPHY CHECKLIST	AMNS/Project/TS/HSEM/16/F01
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		Date: 15 Dec 2022
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Project Name		Name of Site Area	
Date		Location	
Name of Contractor		Name of Job Supervisor	

Sl. No.	Observations	Yes / No / NA	Remarks
1	All radiation-measuring instruments are calibrated prior to first use or after repairs.		
2	All radiation instruments are stored in dust free, dry and air conditioned rooms.		
3	Instruments are not kept in a high radiation area or contaminated area.		
4	Whether instruments are not contaminated during their use and switched off immediately after use.		
5	The calibration certificates and instructions or operating manuals of radiation instruments are available in storage room.		
6	Information Form containing periodic checks & inspections of instruments is available.		
7	All defective equipment are repaired and recalibration records are maintained.		
8	Monitoring badges and dosimeters are stored in a radiation free place.		
9	The personnel monitoring film is regularly sent to DRP (Division of Radiological Protection) for evaluation. Records are available		
11	As per AERB safety guide, radiation monitoring instruments and safe handling accessories are available.		
12	The radiography instruments / source transport records are available with radiography contractor.		

	INSPECTED BY (Competent Person)
Name	
Date	
Signature	

