



BUREAU OF MATERIALS MATERIALS PROCEDURES

MP NUMBER: 14-25

EFFECTIVE DATE: 03/03/2025

APPROVAL: Edward Inman

DUTIES OF PERSONNEL USING NUCLEAR TESTING EQUIPMENT

PURPOSE:

To establish uniform procedures for determining the density and moisture content of soil, soil-aggregates in place, and density of bituminous pavement by nuclear method.

SUPERSEDES:

Materials Procedure Number 14- Dated 07/01/2008

REFERENCES:

Special Provisions, Supplemental Specifications, Standard Specifications, Addenda and Attachments

AASHTO T-310-03 In place Density and Moisture Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

Manufacturer's Instruction Manual

United States Nuclear Regulatory Commission Rules and Regulations (Parts 19 & 20).

FORMS:

LB-264 - Nuclear Moisture/Density Field Test Data.

LB-296 - Notice of Non-Complying Material.

Daily Log book.

I. DEFINITIONS:

- 1.1 Authorized Personnel - Individuals designated by the Unit's Supervision, approved by the licensee's Radiation Safety Officer, and approved by the Manager, Bureau of Materials.
- 1.2 Gauge Operators - Authorized personnel trained in nuclear gauge use and operation.
- 1.3 United States Nuclear Regulatory Commission (USNRC) - The agency established by Title 11 of the Energy Reorganization Act of 1974 comprising the members of the Commission and all officers, employees and representatives authorized to act in any case or matter, whether clothed with final authority or not.
- 1.4 Nuclear Committee Chairman - That individual appointed by the Manager, Bureau of Materials to preside over and coordinate all Nuclear Committee activities.
- 1.5 ME - That individual responsible for ensuring compliance with all New Jersey Department of Transportation, Federal, State, and Bureau of Materials nuclear rules and regulations.
- 1.6 NJDOT Bureau of Materials Department Radiation Safety Officer - That individual appointed by the Manager, Bureau of Materials who is responsible for assuring compliance with all New Jersey Department of Transportation, Federal, State, and Bureau of Materials nuclear rules and regulations.
- 1.7 Regional Nuclear Safety Officer - The Department's Radiation Safety Officer will be a designated person in the Bureau of Materials. Each Region will designate an engineer as the Regional Radiation Safety Officer who will take direction from the Department's Radiation Safety Officer and will coordinate safety of all nuclear devices in the Region.

II. ASSIGNMENT:

The operator shall receive from their supervisor the following:

- 2.1 Information defining the area to be tested.
- 2.2 Type of test to be performed.
- 2.3 The depth of the area to be tested.
- 2.4 The official name of the project and job code number.
- 2.5 The necessary moisture and density data for the material to be tested.

III. DUTIES:

3.1 SAFETY

- 3.1.1 **SECURITY** - Security must be maintained during operation, transportation and storage of gauge. When not in use, the gauge must be locked and stored in an approved location with radiation warning signs and current fire safety permits posted in accordance with applicable regulations. The final rule requires a portable gauge licensee to use a minimum of two independent physical controls that form tangible barriers to secure portable gauges from unauthorized removal whenever the portable gauges are not under the control and constant supervision of the licensee.
- 3.1.2 **LOCAL AUTHORITY NOTIFICATION** - Regional Radiation Safety Officer shall ensure notification to local fire code officials.
- 3.1.3 **TRANSFERRING EQUIPMENT** - Transfer of nuclear gauges from one storage location to another will not be permitted without notifying the Regional Nuclear Safety Officer and completing the appropriate transfer documents.
- 3.1.4 **BADGES** - Radiation Dosimetry badges must be worn at belt level by all authorized personnel while in the vicinity of the gauge. Each operator must be issued their own badge. All badges will be distributed on a quarterly basis by the NJDOT Bureau of Materials Radiation Safety Officer. Each Regional Nuclear Safety Officer will be responsible for distributing each badge to the assigned operator and returning all exposed radiation dosimetry badges to the Bureau of Materials Radiation Safety Officer (BMRSO). The Bureau of Materials Radiation Safety Officer will also receive a report of the previous quarter's radiation exposure totals. With this information, the BMRSO is to maintain an exposure record on each operator. The record is to be submitted quarterly to the Regional Radiation Safety Officer for their review. This record should contain the exposure data for each quarter as well as an accumulative exposure of deep dose radiation quarter received by each operator. Operators shall have access to their exposure records when requested. Any high or unusual readings are to be reported immediately to the Regional RSO who will immediately notify the operator. The radiation dosimetry badge is for the operator's protection and should be handled very carefully. Listed below are rules to be followed when using the radiation dosimetry badge:
- A. Place the RDB badge in a safe storage location when not being used.
 - B. Do not store the badges near the gauges, in the open or near any type of radiation.
 - C. Do not place the badges near excessive heat. Keep them dry and away from moisture.
 - D. Do not store the RDB in a vehicle.

NOTE: Radiation Dosimetry Badges shall not be stored in a location that is exposed to any radiation (i.e. direct sunlight, televisions, x-ray equipment)

3.1.5 **STORAGE OF NUCLEAR GAUGES** -The nuclear gauge shall be stored no closer than 15 feet from a permanent work station, such as a desk or work table. Workers may be permitted closer to the storage area provided they do not occupy a permanent work station and the radiation level does not exceed 2 mrem/h.

3.1.6 **TRANSPORTING NUCLEAR GAUGES** - All gauges shall be transported in a State vehicle, and be properly secured. Only licensed personnel wearing RDB badges are permitted to transport or ride in the State vehicles carrying the gauge and must maintain appropriate documents that are easily accessible by entry through the driver's door.

3.1.7 **EMERGENCY PROCEDURES - INCIDENTS** - An incident may be defined as an event where the gauge is lost, stolen, or physically damaged to the extent that the source shielding is or could be compromised. Occasionally, portable nuclear gauges are damaged. Special care must be taken in the event of damage. In case of accident the following steps are recommended:

- A. Partition off the area for a distance of fifteen (15) feet around the instrument in question.
- B. If heavy equipment is involved, the equipment must be detained long enough to verify it is not contaminated. Use an appropriate instrument to measure radiation levels on the equipment, and visually inspect the tires, tracks, undercarriage, etc., to determine pieces of the gauge are not lodged therein.
- C. Never leave the equipment unattended. Send a helper to make the following telephone calls or use a cell phone to call.
- D. Contact the New Jersey Department of Transportation Radiation Safety Officer:
Region North – Richard Arnold – (973) -770-5042 OR (973)-476-7984
Region Central - Joe Maloney - (732) - 308-4016 OR (732) – 266 - 4862
Region South - Mark Masiello – (856) – 486 – 6661 OR (609) – 468 - 9315
Region Trenton – Mike Schillaci – (609) – 530 – 2292 OR (609) – 532 -6429

He will make a preliminary assessment of the severity of the accident and determine whether the gauge may be transported to another location. If unable to contact the R.S.O. or if so directed, contact the gauge manufacturer, as per step (5) below.

- E. Contact the Troxler 24-HOUR EMERGENCY HOT LINE - (919) 549-9539. If so directed by Troxler, activate the Emergency Response Team below:
State Police - (609) 963-6900 Prompt #1
Department Of Environmental Protection 877-927-6337 Prompt#2 or Prompt #3

NOTE: If the NJDOT Radiation Safety Officer, Troxler, or the Emergency Response Team determines that the radioactive source can be moved into a shielded position, the gauge may be transported to another location for further evaluation. If the source cannot be safely shielded, leave the instrument undisturbed and they will make the necessary arrangements to safely ship and dispose of the gauge.

In case the gauge is lost or stolen, notify local law enforcement officers and the Regional Radiation Safety Officer as soon as possible. The Regional Radiation Safety Officer will notify the appropriate regulatory agencies and the gauge manufacturer.

- 3.1.7 **WIPE TESTS** - Each Nuclear Gauge must be wipe tested in accordance with the Manufacturer's Instruction manual. The tests will be performed in January and July. It is the responsibility of the Bureau of Materials Radiation Safety Officer to ensure that this test is performed.
- 3.1.8 **SURVEY METER** - A survey meter must accompany each gauge at all times. The Regional Nuclear Safety Officer shall assure that a periodic survey to determine radiation dose rates (mrem/hr) is performed on each gauge. Measurements will be taken at distances listed on the Radiation Profile Charts which will accompany each gauge. Notify the NJDOT Radiation Safety Officer immediately if any measurements exceed those listed on the charts.
- 3.2 **STANDARDIZATION** - Standardization of equipment on the referenced standard will be performed by the operator at the start of each day's use. Refer to the Operator's Manual for specific Instructions on standardization procedures.
- 3.3 **FIELD OPERATING PROCEDURES** - Refer to the Manufacturer's Instruction Manual for complete field operating Instructions.

IV. **AUTHORITY AND RESPONSIBILITY:**

Verbally notify the RE immediately of results and follow up with a completed report (LB-264). Complete the forms LB-296 if applicable.

V. DISTRIBUTION OF FORMS:

<u>FORM</u>		<u>DISTRIBUTION</u>
LB-264	1.	Original - Bureau of Materials
	2.	Regional Materials Headquarters
	3.	RE
	4.	Field Office
LB-296	1	Original - Bureau of Materials
	2.	RE
	3.	Regional Materials Office
	4.	Regional Construction Engineer
	5.	Field Office