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GENERAL PROCEDURES FOR THE USE OF  
NUCLEAR MOISTURE-DENSITY GAUGES

Hayes, Seay, Mattern and Mattern owns several nuclear moisture-density gauges manufactured by Troxler Electronic Laboratories, Inc., Research Triangle Park, North Carolina. The gauges contain a radioactive isotope material and are licensed to HSMM by the Nuclear Regulatory Commission. The radiation protection officer and the employees whose names appear on the license are the only persons authorized to use the nuclear gauges and are responsible by law for adhering to the provisions set forth in the license. Willfull violation of the license provisions is a federal offense. The license can be reviewed in the administrative office in Roanoke and copies are available for review in the Roanoke structural department and in branch offices that may be using a gauge. The overall, firm-wide responsibility for the proper use, maintenance, monitoring, and storage of the nuclear moisture-density gauges rests with the Geotechnical Discipline Partner.

The gauge shall be used only when authorized by the Structural Department Head or Branch Officer Manager. The gauge shall be operated in accordance with the following procedures:

1. Operators. An employee who is not included on the license may use a gauge only under the direct supervision and in the physical presence of an employee who is listed on the license. All employees shall read the provisions of the NRC license and the manufacturer's instruction manual before operating a gauge. If it becomes advantageous for a non-licensed employee to regularly operate a gauge, the Geotechnical Discipline Partner, upon evidence of sufficient employee training, may apply for an amendment to the NRC license to include the employee therein.
2. Hazard. The nuclear moisture-density gauge is not a radiation hazard when properly stored. The radiation level one foot from the storage case

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is less than NRC requirements for an unrestricted area, and the radiation level outside the storage room is not detectable above the natural radiation background. Outside of storage the gauge still is not a hazard so long as the index rod remains in a "safe" position. Even during use when the radioactive source is briefly extended, there is little risk to the operator so long as the manufacturer's recommended procedures are carefully followed.

3. Radiation Monitoring and Records. Each licensed operator shall wear an assigned film badge at all times that a nuclear moisture-density gauge is in his possession. It shall be the responsibility of the Structural Department Head or Branch Office Manager to assure that the film badges are changed monthly and that the exposed films are forwarded to the contract laboratory monitoring service. Infrequent users of a nuclear moisture-density gauge, or any person accompanying a licensed operator, shall wear a dosimeter in lieu of an assigned film badge. It is the responsibility of the user to obtain, wear, and read the dosimeter before and after each use.

A radiation exposure record for each operator or user shall be maintained by the firm's designated Radiation Protection Officer; copies of the records will be on file in the Structural Department or Branch Offices. The records consist of laboratory reports on film badge exposure, or docimeter readings for infrequent users. It is the responsibility of the Structural Department Head or Branch Manager to forward radiation exposure records to the Radiation Protection Officer.

4. Special Radiation Monitoring. During cleaning, wipe testing, and servicing, the index rod containing the radioactive source is exposed in a manner that may produce hazardous radiation levels. All such maintenance shall be monitored by survey meter, dosimeter, and film badge under the supervision of the firm's Radiation Protection Officer. The "wipe test" shall be performed in accordance with the manufacturer's instruction; it shall be the responsibility of the Structural Department Head or Branch Office Manager to insure the tests are performed.

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5. Office Storage. Each gauge shall be stored in the assigned space, the index rod shall be locked in the "safe" position and the gauge shall be locked in the storage case to prevent unauthorized access.
6. Field Storage. During the working day, the gauge may be temporarily stored in a locked automobile or locked contractor's office. The gauge may be safely stored overnight in a motel room. The index rod shall be locked in the "safe" position, and the entire gauge shall be locked in its storage case and placed in a remote corner. Under no circumstances shall the operator store the gauge at a job site over weekends or periods of construction inactivity; the gauge shall either remain in the possession of the operator or shall be returned to the assigned office storage space.
7. Transportation. The index rod shall be locked in the "safe" position and the gauge maintained in a vertical, upright position when transported by motor vehicle. The motor vehicle shall be marked with three radiation signs in the windows: one on the rear, and one on each side.
8. Logging. Each use, wipe test, cleaning, and servicing of the gauges shall be recorded by the operator in the log book. The log book shall be kept in the storage case with the gauge. The operator shall sign out the gauge from storage by entering in the log book the time, date, commission number, and destination of the gauge. Further, the operator shall certify by his signature in the log book that he has read and complied with NRC rules and regulations.
9. Accident. The radioactive source in the gauge is triple-sealed in Type 304 stainless steel, and is virtually indestructible. Only a serious accident could result in a radiation hazard. If the index rod is bent, crushed, or broken, a hazard may exist. In case of a serious accident, do not move, handle, or disturb the gauge until it has been monitored for radiation. Keep people away. Do not spread possible contamination from a broken index rod. A DOE decontamination team must remove all contamination from the accident site.

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Any loss or accidental damage of the gauge shall be immediately reported to the Radiation Protection Officer who shall notify the Nuclear Regulatory Commission, Region II, Office of Inspection and Enforcement, Atlanta, Georgia, phone (404) 221-4503, night or day. If the Radiation Protection Officer cannot be reached, the NRC shall be notified directly by the Operator.