State of Illinois
Department of Transportation
Bureau of Materials and Physical Research
Springfield

POLICY MEMORANDUM

Revised: January 1, 2008	15-08.0
This Policy Memorandum supersedes number 07-05 dated January 1. 2007	

TO: REGIONAL ENGINEERS AND HIGHWAY BUREAU CHIEFS

SUBJECT: RADIATION SAFETY REQUIREMENTS AND ACCIDENT PROCEDURES

I. Licensing

The Bureau of Materials and Physical Research has been licensed by the Illinois Department of Nuclear Safety to use licensed material sealed sources and will act as correspondent for all Districts. The Illinois Department of Nuclear Safety requires the registration of all gauges as noted above. (See 32 Illinois Administrative Code: Chapter II; Section 320.10) The Illinois Department of Nuclear Safety also provides an inspection of all Districts using the 32 Illinois Administrative Code: Chapter II and the Radioactive Materials License as a guide.

II. Radiation Safety Practices

a. Individual gauge users will be trained in practices common to radiation safety and proper procedures for gauge use in a course (Specific Task S-34), conducted by the Bureau of Materials and Physical Research.

b. All gauges are to be kept locked during storage and transportation. Locks are to be removed only for actual testing or for reference counts.

c. The bottom plate assembly should be cleaned with source rod, locked in the safe position and the bottom of the gauge facing away from the user.

d. No maintenance on the gauge (other than fuse replacement) will be done by the user. All repairs will be done by the central repair service or the manufacturer.

III. Personnel Monitoring

The Department of Transportation is required to furnish some means of personnel monitoring for all persons engaged in handling or operating devices containing radioactive sources (32 Illinois Administrative Code: Chapter II; Section 340.520.

Generally, personnel monitoring will be accomplished by film badges worn at the waist, chest, or lapel area. (32 Illinois Administrative Code: Chapter II; Section 340.530)

a. Film badges are for personnel monitoring and not area monitoring and should only be exposed to radiation when attached to the individual to which they are assigned. This precludes storage of film badges in areas containing radioactive sources and in or near any restricted area (defined 32 Illinois Administrative Code: Chapter II; Section 310.20) Film badges should not be stored in vehicles (heat from the sun will damage the film) at any time.

b. Film badges should be identified as to the name of the individual and exposure period.

c. Film badges shall be sent to the film badge monitoring supplier at the end of the monitoring period whether or not they have been used.

d. Film badges, once assigned to an individual, will not be transferred or used by another individual without permanent reassignment by the film badge supplier.

IV. Storage

When not in use or in transit, sources shall be kept in protective enclosures of such material and wall thickness as may be necessary to insure that no person is subjected to more than the applicable maximum permissible dose. (See 32 Illinois Administrative Code: Chapter II; Section 340.310) This enclosure should be locked to prevent unauthorized access to the source. The door or doors to such an enclosure shall be labeled with the standard warning signs. (See 32 Illinois Administrative Code: Chapter II; Section 340.910): This restricted area should be located as far removed as possible from permanently occupied areas. When not practicable to locate the restricted area away from permanently occupied areas, it will be necessary to conduct periodic monitorings in the adjacent occupied area. A log of radiation level readings shall be maintained with the survey conducted when the maximum number of gauges are present and the exposure maintained below the allowable 0.5 REM per year.

V. Records and Reports

Accountability Log - A permanent record shall be kept of the issue and return of all radioactive sources from the restricted area. This record shall include:

a. Model and serial number of device issued and returned.

b. Date of issuance and return.

c. Purpose of issuance.

d. Signature of person to whom source or device is issued.

e. Signature of individual certifying return.

This log shall be current and available to the Department of Nuclear Safety upon request.

Radioactive Material Inventory - A list of all sources and devices assigned to the restricted area shall be maintained (may be a part of the Accountability Log). Periodic physical inventories will be accomplished every six months and any discrepancies due to loss or theft shall be reported immediately to the Bureau of Materials and Physical Research, as well as to the Illinois Department of Nuclear Safety.

Wipe testing of all licensed material sealed sources shall also be conducted on a six-month basis and the results in microcuries of each test be recorded with date on a permanent record available for review by the Illinois Department of Nuclear Safety (see Wipe Testing).

Personnel Monitoring Records - A record shall be maintained of the annual cumulative dosage, and total cumulative dosage for each individual monitored.

Annual readings above the limits prescribed in 32 Illinois Administrative Code: Chapter II; Section 340.210 are to be reported to the Illinois Department of Nuclear Safety in accordance with 32 Illinois Administrative Code: Chapter II; Section 340.1230.

Readings of this magnitude will be the subject of an immediate investigation by the Department of Nuclear Safety. It is the Department of Transportation's responsibility to see that the proper reports are made and a permanent record is maintained in each District or Bureau (32 Illinois Administrative Code: Chapter II; Sections 340.1230 and 340.1250)

VI. Area Exposure Records

Records shall be kept of radiation levels monitored at regular periods throughout the year in unrestricted areas (defined 32 Illinois Administrative Code: Chapter II; Section 340.310) adjacent to restricted areas. It may be necessary to

estimate individual exposures if the unrestricted area is used infrequently or if the sources in the restricted area are frequently moved.

VII. Transportation

Private/State-Owned Vehicle - During transportation of radioactive sources by private/state-owned vehicle (pickup, carryall, station wagon, sedan, etc.), the radioactive source shall be located as distant as possible from the occupants to maintain personnel exposure as low as reasonably achievable. Care should be exercised to maintain the integrity of the shielding at all times. If a vehicle is left unattended, the moisture density gauge shall be locked inside, preferably in an area not visible from the outside (automobile trunk).

Common Carrier - Radioactive materials may not be transported by U.S. Mail under any conditions. However, other means of transportation are available if the applicable regulations are met.

Generally, compliance with 32 Illinois Administrative Code: Chapter II; Section 341.50 and the Code of Federal Regulations, Title 49, Transportation will assure compliance with all others.

Therefore, the following requirements suggested by the above Federal Regulation are deemed applicable to our particular situation:

a. Packing - The smallest dimension of the outside shipping container shall be no less than four inches. The transport index or maximum dose rate at a distance of three feet from any surface of the package shall not exceed ten Millirem per hour. The reading on any accessible surface of the container may not exceed 200 Millirem per hour. The outside of the container must be sealed with some device to indicate tampering. The source container must be securely packed to insure that its position relative to the outside of the packing container does not change.

b. Labeling - All surface carriers have recently adopted policies resulting in close adherence to Department of Transportation regulations on shipment of all radioactive materials. These policies and regulations make it imperative that any shipment containing radioactive material be correctly labeled and identified. This consists of attaching the appropriate Department of Transportation label (Title #49, Paragraph 172.310 to 172.442) to the portion of the container bearing the consignee's name and address. The label must be further identified as to transport index (always expressed rounded up to the next highest tenth: e.g., 1.01 becomes 1.1). These labels may be obtained from the Bureau of Materials and Physical Research.

Labeling Criteria is as follows:

Shipments

1. "Radioactive Yellow - II" label (Title 49, Part 173.392). The radiation exposure level shall be between 0.5 Millirem and 50 Millirem per hour at any point on the external surface of the package and shall not exceed 1.0 Millirem per hour at three feet from the external surface of the package.

2. "Type A - Radioactive Material" labels should be placed on two opposite sides of your packing case. Each package shall have a seal, which while intact, will be evidence that the package has not been illicitly opened.

3. Leaking Source - Do not ship any source that is know to be leaking, without notification of the consignee before shipment, as proper provision for shipment must be made.

A copy of Title 49 - Transportation, Parts 1 - 199, of the Code of Federal Regulations may be obtained from:

The Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

VIII. Wipe Testing

The wipe test shall be performed by or in the physical presence of only those individuals completing the Troxler training course or the Specific Task (S-34) training program. Each piece of equipment containing licensed material sealed sources shall be "wipe" tested for possible leaks at intervals not to exceed six months. The six-month wipe test should be completed as close to June 1 and December 1 as possible. All wipe test conducted in the field should be placed in a plastic bag and the envelope marked "Radioactive Material Leak Test", no label required, with pertinent information, placed in second envelope and forward to the Central Repair Facility for completion of the necessary paper work. All gauges at the Central Repair Facility concurrent with the semi-annual wipe test dates will be wipe tested at the facility. It is a requirement of the law that an up-to-date record be kept by the owner at all times, on file, for inspection, of all wipe test results (Radioactive Materials License).

IX. Posting of Signs and Labels

The presence of radiation must be indicated by posting conspicuous signs or labels defining the nature of the hazard, e.g., "Caution - Radioactive Material" on each container or source holder. A "Radioactive Yellow-II" label will be attached to the side of each moisture density gauge, as per U.S. Department of Transportation Regulations Title 49, Part 172.406, showing the proper Class II index symbol and sign. The appropriate symbols are defined in the U.S. Department of Transportation Title 49, CFR, Part 172.438. Vehicles used to transport Class II radioactive materials (all nuclear moisture density gauges owned by the Department of Transportation) are not required to use radioactive placards or signs on the vehicle per Department of Transportation Regulations Title 49, CFR, Part 172.504.

X. Posting of Notice to Employees

Each licensee or registrant shall conspicuously post Department of Nuclear Safety Form KLA.001.01 "Notice to Employees," in a sufficient number of places in every establishment where employees are working or frequenting any portion of a restricted area, in the presence of radiation sources (32 Illinois Administrative Code: Chapter II; Section 400.110).

Department of Nuclear Safety Form KLA.001.01 "Notice to Employees" is available from the Bureau of Materials and Physical Research's Nuclear Laboratory.

XI. Accident or Theft

Any incident of theft or damage due to collision of the source container shall be reported immediately to the Radiation Safety Officer in the District. He/she, in turn, shall notify the Bureau of Materials and Physical Research's Radiation Protection Officer, telephone (217) 782-7206 as to the nature of the incident, type, model and serial number of equipment involved, and extent of personnel injury and possible exposure. Each Radiation Safety Officer has, in his possession, an 8-step procedure to follow in case of accident or theft. All steps should be followed in the order as listed. After completion of the above steps, the area should be secured, with all equipment involved in the accident in the secured area. The safe distance in almost all cases need not be any greater than 500 feet and for nuclear equipment owned by the Department of Transportation consisting of moisture density gauges, the safe distance need be no greater than 50 feet. All personnel should be kept out of the secured area until the area is declared safe by the Radiation Safety officer or appropriate agency personnel.

Although most radioactive materials used in equipment owned by the Department are low radiation emitters, care should be taken to find out who was exposed to the radiation and the total dose. When injured or over-exposed persons are taken to the hospital, be sure to notify the medical facility of the possibility of exposure to radiation.

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