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U.S. Department  
of Transportation

East Building, PHH - 30  
1200 New Jersey Avenue, Southeast  
Washington, D.C. 20590

**Pipeline and Hazardous  
Materials Safety Administration**

DOT-SP 10045  
(FIFTH REVISION)

EXPIRATION DATE: October 31, 2010

(FOR RENEWAL, SEE 49 CFR § 107.109)

1. GRANTEE: FedEx Express  
Memphis, TN
2. PURPOSE AND LIMITATION:
  - a. This special permit authorizes highway transportation and temporary storage incident to the transportation of non-fissile or fissile-exempt radioactive materials packages when their combined transport indices exceed 50 or the separation distance criteria cannot be met. This special permit is subject to the implementation of a radiation protection program and other safety control measures, and may be used only from specific points of origin to specific destinations. This special permit provides no relief from the Hazardous Materials Regulations (HMR) other than as specifically stated herein.
  - b. The safety analyses performed in development of this special permit only considered the hazards and risks associated with transportation in commerce.
  - c. Party status will not be granted to this permit.
3. REGULATORY SYSTEM AFFECTED: 49 CFR Parts 106, 107 and 171-180.
4. REGULATIONS FROM WHICH EXEMPTED: 49 CFR §§ 172.203(a), 173.447(a), 177.842(a) and 177.842 (b).
5. BASIS: This special permit is based on the application of Federal Express dated April 20, 2006, submitted in accordance with § 107.109, and additional information dated September 18, 2007.

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6. HAZARDOUS MATERIALS (49 CFR § 172.101):

<b>Proper Shipping Name/ Hazardous Materials Description</b>	<b>Hazard Class/ Division</b>	<b>Identi- fication Number</b>	<b>Packing Group</b>
Radioactive Material, Type A package <i>non-special form, non fissile or fissile-excepted</i>	7	UN2915	N/A
Radioactive Material, Type A package, special form <i>non fissile or fissile-excepted</i>	7	UN3332	N/A
Radioactive Material, Type B(U) package <i>non fissile or fissile-excepted</i>	7	UN2916	N/A
Radioactive Material, Low specific activity (LSA-I) <i>non fissile or fissile-excepted</i>	7	UN2912	N/A
Radioactive Material, Low specific activity (LSA-II) <i>non fissile or fissile-excepted</i>	7	UN3321	N/A
Radioactive Material, Low specific activity (LSA-III) <i>non fissile or fissile-excepted</i>	7	UN3322	N/A

7. SAFETY CONTROL MEASURES:

Relief from Transport Index and Separation Distance Requirements - The special permit holder is exempt from the Transport Index (TI) and separation distance limitations prescribed in §§ 177.842(a) and 177.842(b) of the HMR for the transportation in motor vehicles and unit load devices (ULDs) of radioactive materials packages with proper shipping names indicated in paragraph 6. The temporary storage of the packages and of the ULDs associated with the transport by motor vehicle is permitted without regard to the limitations of § 173.447(a). To provide a level of safety at least equal to that required by regulations, the special permit holder must:

- a. Maintain a radiation protection program that will ensure compliance with the standards set forth in the regulations of the Occupational Safety and Health Administration: 29 CFR 1910.1096 (a), (b) (1), (3), (4), (c), (d), and (i) through (o), except where overridden by the other requirements of this special

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permit, for employees who are exposed to ionizing radiation from the transport of packages containing radioactive materials. Additionally, the radiation dose equivalent to an unborn child as a result of occupational exposure of a woman who has declared herself to be pregnant may not exceed 5 mSv (500 mrem).

b. Maintain radiation exposures as far below the limits set forth in 29 CFR 1910.1096(b)(1) as is reasonably achievable (ALARA program).

c. Ensure that each person performing tasks under this special permit who is occupationally exposed to radiation is monitored for radiation exposure through the use of dosimetry devices as part of the radiation protection program required by subparagraph 7.a. of this paragraph, unless the special permit holder has an evaluation of the worker activities signed by the health physicist referred to in paragraph 7.e. that demonstrates that the anticipated radiation dose to that worker is expected to be less than 1 mSv (100 mrem) per year. Radiation exposure records for each person must be maintained on file for five years after the individual's last activity under the special permit.

d. Ensure that each person performing tasks under this special permit is trained in accordance with Part 172, Subpart H. For the function specific training and safety training required by § 172.704, at a minimum, the subject matter described in Annex 1 to this special permit must be used in training the hazardous material employees who handle radioactive materials.

e. Engage the services of a health physicist to supervise the radiation protection program, and ensure that the health physicist meets the qualifications and conducts the activities specified in Annex 2 to this special permit. A record describing the activities performed by the health physicist during each calendar quarter must be available to authorized Federal and state inspectors on request.

f. Conduct radiation surveys with a calibrated survey instrument and record the maximum radiation levels of each vehicle transporting packages of radioactive materials under the TI and separation distance relief granted by this special permit after initial loading

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and prior to the departure of the vehicle. The measured radiation levels must not exceed the limits specified in § 173.441(b)(2), (3), and (4). Records of these surveys must be maintained for at least one year and must be made available to authorized Federal and state inspectors on request.

g. Conduct contamination surveys with a calibrated survey instrument and record the contamination levels of the interior of any vehicle in the following situations:

- (1) after any incident that has or may have resulted in contamination of the vehicle; and
- (2) after last use of the vehicle under this special permit prior to returning the vehicle to service for transport of cargo other than radioactive materials.

Any surface contamination on the vehicle must be removed to the lowest level that is reasonably achievable, but may not exceed the limits specified in § 173.443(a). The records of contamination surveys must be maintained for at least one year and must be made available to authorized Federal and state inspectors on request.

h. Ensure that no transportation or storage operation will cause any person, who is not covered by the radiation protection program required by paragraph 7.a., to receive a radiation dose greater than 0.02 mSv in any hour (2 mrem in any hour). Drivers must be instructed that when it is necessary to park a vehicle transporting radioactive materials in a public area, a reasonable effort must be made to minimize dose to the public; this includes parking the transport vehicle away from occupied buildings and personal or recreation vehicles. In this regard, the special permit holder must establish written procedures for performing exposure assessments to unmonitored employees or members of the public during such operations as inter-vehicular package transfers, temporary storage incident to inter-vehicular package transfers, and other similar operations. Records of the above assessments must be maintained for at least one year and must be made available to authorized Federal and state inspectors on request.

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i. As a part of the radiation protection program:

(1) Assess on at least a quarterly basis the radiation exposure received by each person who has worked full or part time under the special permit.

(2) Assess on a quarterly basis the effectiveness of the program in satisfying the requirements of paragraphs 7.a. through 7.d. and 7.h.; and

(3) Determine, if necessary, improvements to the program to minimize radiation exposure to workers and members of the public. In this regard the recommendations of the health physicist will be considered to the extent practicable.

8. SPECIAL PROVISIONS: In addition to the requirements prescribed in paragraph 7, the following requirements apply to operations conducted under this special permit:

a. Approved Transport Routes and Storage Activities

(1) Packages are loaded into ULDs at Bristol-Myers Squibb in North Billerica, MA and are transported by closed motor vehicle to the Federal Express facility or directly to aircraft at Logan International Airport (BOS), Boston, MA.

(2) Packages from CIS US, Inc., Bedford, MA or QSA Global Inc., Burlington, MA are loaded into ULDs at the FedEx Express Station, Wilmington, MA, and are transported by closed motor vehicle to the Federal Express facility or directly to aircraft at Logan International Airport, Boston, MA.

(3) Packages are loaded into closed motor vehicles or ULDs at Mallinckrodt Inc., Maryland Heights, MO and are transported to the Federal Express facility or directly to aircraft at St. Louis Lambert International Airport, St. Louis, MO.

(4) Packages are loaded into closed motor vehicles or ULDs at Mallinckrodt Inc., Maryland Heights, MO and/or at Federal Express Corporation, St. Louis, MO, and are transported from St. Louis, MO directly to the Federal Express hub at Memphis International Airport, Memphis, TN.

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(5) The temporary use of alternative routes are authorized only when acknowledgement and approved in writing by the Office of Hazardous Materials Special Permits and Approvals (OHMSPA)

b. The special permit holder must post a copy of this special permit and a copy of 29 CFR 1910.1096 in the principal work places where operations are conducted under this special permit. Personnel provided with radiation dosimetry devices must be furnished, within 120 days of their request or of termination of employment (or before such records are destroyed, if worker remains employed after leaving the radiation protection program), their cumulative radiation doses for the year-to-date and during employment with the special permit holder.

c. In addition to the documentation required by 49 CFR Part 172 Subparts C, G, and H, the special permit holder must ensure that the following documents accompany the shipping papers:

(1) A copy of this special permit;

(2) A copy of 29 CFR 1910.1096;

(3) A copy of the radiation survey record required by paragraph 7.f.;

(4) Evidence that the vehicle operator has satisfactorily completed a training course in the hazards associated with radioactive materials as required by paragraph 7.d. (e.g., a certificate of successful completion signed by the health physicist); and

(5) A copy of the instructions and procedures to be followed in the event of an emergency which at a minimum must include:

(i) A general description of the radioactive materials normally carried and the potential radiological hazards that may be present during accident conditions for damaged and undamaged packages;

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(ii) The actions to be taken by the operator to control radiological exposures;

(iii) Information and suggested instructions for emergency services personnel responding to an emergency in which the vehicle operator is incapacitated; and

(iv) A listing of the names and telephone numbers of cognizant State and Federal authorities as well as responsible individuals associated with the special permit holder for the states in which the special permit operations are conducted.

d. The special permit holder must not carry packages containing undeveloped film or packages identified as being sensitive to x-rays or radiation with packages containing radioactive materials being transported under this special permit.

e. The special permit holder must not carry packages containing fissile materials, as evidenced by the word "fissile" in the proper shipping name or the presence of a "Fissile" label on the package.

f. The special permit holder must meet the requirements prescribed in Annexes 1 and 2, which are incorporated as part of this special permit.

g. Shipping papers for packages carried under this special permit are not required to satisfy the requirement in § 172.203(a) that they bear the notation "DOT-SP" followed by the special permit number.

9. MODES OF TRANSPORTATION AUTHORIZED: Closed motor vehicle.
10. MODAL REQUIREMENTS: No additional requirements other than those in the HMR.
11. COMPLIANCE: Failure by a person to comply with any of the following may result in suspension or revocation of this special permit and penalties prescribed by the Federal hazardous materials transportation law, 49 U.S.C. 5101 et seq:

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- o All terms and conditions prescribed in this special permit and the Hazardous Materials Regulations, 49 CFR Parts 171-180.
- o Persons operating under the terms of this special permit must comply with the security plan requirement in Subpart I of Part 172 of the HMR, when applicable.
- o Registration required by § 107.601 et seq., when applicable.

Each "Hazmat employee", as defined in § 171.8, who performs a function subject to this special permit must receive training on the requirements and conditions of this special permit in addition to the training required by §§ 172.700 through 172.704.

No person may use or apply this special permit, including display of its number, when this special permit has expired or is otherwise no longer in effect.

Under Title VII of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU)- 'The Hazardous Materials Safety and Security Reauthorization Act of 2005' (Pub. L. 109-59), 119 Stat. 1144 (August 10, 2005), amended the Federal hazardous materials transportation law by changing the term 'exemption' to 'special permit' and authorizes a special permit to be granted up to two years for new special permits and up to four years for renewals.

12. REPORTING REQUIREMENTS:

a. In addition to the requirements in §§ 171.15 and 171.16, in the event of any occurrence that results in a suspected release of radioactive material, a loss of the package, or a personnel radiation exposure exceeding the levels identified in paragraph 7.a., the special permit

holder must make a telephone report of the occurrence within one business day to the Associate Administrator for Hazardous Materials Safety.

b. To meet the notification and reporting requirements of 29 CFR 1910.1096(1), the special permit holder shall



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direct all required notices to the AAHMS, in lieu of the Assistant Secretary of Labor.

c. The special permit holder operating under this special permit must notify, in writing, the Associate Administrator for Hazardous Materials Safety, OHMS of any changes of key personnel responsible for the radiation protection program within 30 days of the change.

d. The special permit holder must submit to the Associate Administrator for Hazardous Materials Safety, OHMS a quarterly report including the following: (i) the results of the radiation dosimetry program required by paragraph 7.c., including a company-unique employee identifier, job category, and cumulative quarterly and annual doses of all monitored individuals, (ii) a description of the activities conducted by the health physicist during the quarter under this special permit as required by paragraph 7.e., (iii) summaries of the results of the radiation level surveys and contamination surveys required by paragraphs 7.f. and 7.g., (iv) any changes to the radiation safety program as determined by the requirements of paragraph 7.i., (v) an estimate of the total TI transported during the quarter; and (vi) the total quarterly dose in person-rem for all monitored personnel. The report is to be submitted within 90 days after the end of each calendar quarter and is required even if no operations were conducted under the special permit during the quarter.

Issued in Washington, D.C.:



for Theodore L. Willke  
Associate Administrator for Hazardous Materials Safety

Address all inquiries to: Associate Administrator for Hazardous Materials Safety, Pipeline and Hazardous Material Safety Administration, U.S. Department of Transportation, East Building PHH-30, 1200 New Jersey Avenue, Southeast, Washington, D.C. 20590.

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Copies of this special permit may be obtained by accessing the Hazardous Materials Safety Homepage at

[http://hazmat.dot.gov/sp\\_app/special\\_permits/spec\\_perm\\_index.htm](http://hazmat.dot.gov/sp_app/special_permits/spec_perm_index.htm)

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PO: FDF/sln

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ANNEX 1

TRAINING SUBJECTS FULFILLING THE REQUIREMENTS OF  
PARAGRAPH 7.d. OF DOT SP-10045

I. Elementary radiological safety

A. Basic terms.

1. Radioactive materials (RAM)
2. Radiation
3. Radioactivity
4. Contamination

B. Radiation exposure.

1. External and internal
2. Protection factors
  - a. External - time, distance, and shielding;  
and
  - b. Internal - avoid ingestion or getting  
material into the body.

C. Dose rates and doses.

1. Relationships between dose rate and dose. (For  
example, the dose for two hours and for 15 minutes are  
twice and one fourth the per hour dose rates.)
2. Dose rate and dose examples.
  - a. Dose limit for general public or occupational  
worker not under radiation protection program (1  
mSv (100 mrem) per year).
  - b. Dose limit for occupational workers under  
radiation protection program (12.5 mSv (1250 mrem)  
per quarter).
  - c. Dose for medical procedures.
  - d. Life endangering dose range.

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e. Background levels and their influential factors.

D. Radiation risks and minimization of exposures.

1. Any increases of exposures increase risks for cancer or genetic damage.

2. All occupational radiation exposures should be kept as low as reasonably achievable (ALARA).

## II. Transportation of Radioactive Materials

A. Packages

1. Description of packages normally handled under special permit:

a. How are they constructed?

b. Why are some light and some heavy?

c. Why do some have dry ice inside?

2. Other common radioactive material packages.

3. Differences between Limited Quantity, Type A and Type B (Quantity and Packages).

4. Difference between "normal form" and "special form" radioactive materials in a package.

B. Labels, radiation levels and placards.

1. Radiation levels generally increase from White I, to Yellow II, to Yellow III labels.

2. Label type on RAM packages depends on radiation level at package surface and at 1 meter.

3. Transport Index (TI) is equal to maximum radiation level in millirem per hour at 1 meter from the package.

4. A highway vehicle with any Yellow III labeled packages must be placarded on all four sides.

C. Shipping paper required information, and its purposes.

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D. Controlling radiation exposure.

1. Normal regulatory requirements (without special permit).
  - a. Limitations on the surface dose rates and TI of packages.
  - b. A limit on the total Transport Index of all packages, e.g., 50 TI for highway vehicles.
  - c. Separation distances from nearest RAM packages to occupied spaces.

E. Good practices in handling RAM packages.

1. Avoid unnecessary time near RAM packages.
2. Stow packages to minimize handling and exposure.
3. Use mechanical means to provide separation distance when moving package, when available and practical (i.e., handcarts and dollies).
4. Stow packages away from occupied spaces if possible.
5. If possible stow White I and Yellow II (low TI ) packages between Yellow III packages and occupied spaces.

III. Special permit 10045 Specific Subjects

A. Radiation protection program requires:

1. Use of radiation dosimetry devices.
2. Compliance of program with OSHA standard (29 CFR 1910.1096).
3. Radiation exposures that are as low as reasonably achievable.
4. Training (special permit, 49 CFR and 29 CFR).
5. Dose to be limited to 12.50 milliSieverts (1250 millirems) per quarter.

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6. Notification of personnel of current and cumulative radiation exposure, on request.

B. After loading and before departure vehicle radiation levels must be monitored and recorded. All persons responsible for monitoring radiation levels must be trained in the use of survey meters.

1. Highway vehicle radiation levels must not exceed the limits of § 173.441(b) (2), (3), and (4).

a. 2 mSv/hour (200 mrem/hour) at surface of vehicle.

b. 0.1 mSv/hour (10 mrem/hour) at 2 meters (6 feet) from vehicle.

c. 0.02 mSv/hour (2 mrem/hour) in occupied space, unless the person is wearing a radiation dosimeter as a part of the radiation protection program required by this special permit.

C. Vehicle must be monitored for contamination after any incident resulting in contamination or possible contamination, and before being used for transport of cargo other than RAM. Any contamination found must be removed to the lowest level achievable, and any residual contamination may not exceed regulatory limits.

D. Special papers are required to be in the vehicle with other shipping documents required by regulation.

1. Copy of the special permit (DOT-SP 10045).

2. Copy of 29 CFR 1910.1096.

3. Vehicle radiation survey record.

4. Emergency procedures for incidents involving RAM packages.

a. Instructions for vehicle operators.

(1) Actions to be taken to isolate materials and keep people away.

(2) Life-saving actions.

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- (3) Nonradiological factors.
- (4) Notification of corporate officials.
- (5) Notification and cooperation with local, state, and federal authorities.

b. Additional information and suggested instructions for emergency services personnel to follow if operator is incapacitated.

- (1) General description of type of RAM carried under special permit.
- (2) Who in the company (or company emergency response representative) to contact for further information about RAM in shipment.
- (3) General guidance for coping with emergencies such as damaged packages, fire, and injured operator.

c. Contacting instructions and listing of names and phone numbers (regular hours and off-duty hours) of State and Federal authorities to be contacted in every State of operations under the special permit. (This list should be prepared and annually confirmed and updated by corporate personnel or the health physicist.)

E. Quarterly reports to DOT.

1. Radiation exposure reports.
2. Summary of vehicle radiation surveys.
3. Descriptions and assessment of efforts to keep exposures as low as reasonably achievable.
4. Description of the health physicist activities (e.g., where, when, who and what).

F. Incidents resulting in a suspected release of radioactive material, in the loss of a package, or in a radiation exposure above stated limits must be reported by telephone within 1 business day.

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G. Packages containing fissile radioactive materials (i.e., if the word "fissile" appears in the proper shipping name) may NOT be transported under this special permit.

H. Packages of undeveloped film or other radiation sensitive materials are not to be carried when using the special permit.

I. Operating procedures must be established to assure there is no unnecessary radiation exposure to personnel not handling the packages but who may be near the packages or vehicle.

J. A copy of DOT-SP 10045 and 29 CFR 1910.1096 must be posted in the carrier's point of origin work place for reading by workers (29 CFR 1910.1096(i)(3)).



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ANNEX 2

QUALIFICATIONS AND FUNCTIONS OF THE HEALTH PHYSICIST

I. Basic Qualifications

A. A health physicist performing activities under DOT-SP 10045 must meet the following requirements:

1. Possess a Bachelor's degree in a science or engineering subject; or
2. Demonstrate education and experience equivalent to a Bachelor's degree in a science or engineering subjects; and
3. Demonstrate a minimum of 3 years of responsible experience in health physics. At least 2 years of this experience must include the kinds of radiation protection problems associated with the operations of the special permit holder.

II. Functions

A. The health physicist must -

1. Provide the technical guidance and supervision for the radiation protection program required by paragraph 7.a.
2. Conduct or arrange for and maintain records of the training required by paragraph 7.d.
3. At least semi-annually personally observe and evaluate each type of operation conducted under the special permit.
4. At least semi-annually the health physicist or his designee must observe and assess the actions of each person working under the special permit who is covered by the radiation protection program. The person performing the observation must discuss with the person being observed the results of any assessment performed pursuant to this item, and appropriate work practices

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to maintain that person's dose ALARA. In cases where a worker's quarterly exposure is in excess of 75% of the quarterly limit, the observations, assessment, and discussion with the employee must be performed personally by the Health Physicist.

5. Review radiation and contamination survey records that are prepared in compliance with paragraphs 7.f. and 7.g. Records of these surveys must include the date and location of the survey, the survey method, date of calibration of the survey instrument used, and the contamination levels measured.

6. Develop procedures for ensuring that radiation levels for persons not included in the radiation protection program meet the requirements of paragraph 7.h. These procedures should be as location-specific as possible.

7. On at least a quarterly basis provide each person who handles packages or operates any vehicle containing radioactive materials under this special permit with a personnel monitoring device (dosimeter) that measures the amount of radiation exposure. Such workers need not be issued a dosimeter if the health physicist has submitted to the special permit holder or maintains in his files a written evaluation, signed by him, of worker activities in which he demonstrates that the anticipated annual dose to that worker is expected to be less than 1 mSv (100 mrem) per year. Radiation exposure records for each person, including that person's company-unique employee identifier described in paragraph II.A.8, must be maintained on file for five years after the individual's last activity under the special permit.

8. Assess the radiation exposure for each individual covered by the radiation protection program. The assessment must include a review of personnel monitoring reports with respect to quarterly, year-to-date exposure limits and lifetime radiation dose accumulation. A report detailing a company-unique employee identifier, occupation, monthly, quarterly and year-to-date exposure of monitored individuals, the total exposure of all monitored persons in person-rem, and a statistical distribution of the exposures will be prepared for inclusion in the quarterly report required in 12.d of the special permit.

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9. Conduct or arrange for annual calibration of radiation survey equipment used by special permit holder staff and record the type and date of calibration of the survey instruments.