

## **SHIPPING INFECTIOUS SUBSTANCES WITH OR WITHOUT DRY ICE**

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(For assistance, please contact EHS at (402) 472-4925, or visit our web site at <http://ehs.unl.edu/>)

This Standard Operating Procedure (SOP) describes how to prepare a shipment containing infectious substances for transport by air with a carrier that subscribes to International Air Transport Authority (IATA) standards. The information in this SOP is based on the IATA Dangerous Goods Regulations, 53<sup>rd</sup> Edition.

Only persons who have documentation of current DOT/IATA training are authorized to ship packages containing infectious substances. This SOP is a supplement to and not a substitute for the DOT/IATA training provided by EHS. Training is required before engaging in any transport-related function and at least every three (3) years thereafter.

### **SAFETY INFORMATION – INFECTIOUS SUBSTANCES**

Prior to preparing infectious substances for shipment, review the Material Safety Data Sheet or agent hazard summary or other technical literature regarding the hazards of the known or suspect organisms. Following is a broad summary of the typical hazards of small quantities of infectious substances shipped in commerce from UNL.

- These materials can cause serious or lethal disease in humans and/or animals.
- These materials are often infectious by inhalation, and may also be infectious by inoculation, ingestion, and contact with broken skin. Because they are often infectious by inhalation, it is very important to avoid aerosol-producing activities. When there is risk of inhalation, a HEPA filter respirator is necessary.
- A freshly prepared 10% solution of household bleach with a contact time of 20 minutes is generally effective in disinfecting non-porous equipment, surfaces, and spills of liquid cultures. Efficacy of disinfection is diminished in the presence of heavy organic loading (e.g., lots of dirt, grime, grease, etc.).
- Use surgical-type protective gloves, protective eyewear, and protective outer garments when handling. Unsealed containers should be handled in a biosafety cabinet or with respiratory protection if a cabinet is not available.
- Avoid contact with unprotected skin, eyes, and mucous membranes. Wash hands and skin thoroughly after handling. Flush eyes for 15 minutes after contact.
- Seek medical attention following known or suspected exposures.

Sometimes, infectious substances are shipped with dry ice. Following is a broad summary of the hazards of small quantities (e.g., 5 pounds or less) of dry ice shipped in commerce.

- Dry ice sublimates. It changes directly from a solid to a gas. Therefore, packages and over-packs must not be tightly sealed. They must allow gases to escape to prevent the build-up of pressure.
- As dry ice sublimates it creates carbon dioxide gas, which is colorless and odorless. If enough dry ice were to sublime in an unventilated space, the amount of oxygen available could be reduced to an amount that is insufficient to support life.
- Dry ice is extremely cold at -109.3°F (-78.5°C). Touching dry ice unprotected can lead to frostbite. Always handle dry ice with care and wear protective gloves and eyewear. Use mechanical device (e.g., tongs) to handle.

## DEFINITIONS

**Infectious Substance:** Infectious substances are known or reasonably expected to contain pathogens (bacteria, viruses, rickettsiae, parasites, fungi, and other agents such as prions, which can cause disease in humans or animals). Infectious substances are divided into two categories:

- **Category A:** An infectious substance transported in a form that, when exposure to it occurs, is capable of causing permanent disability, life-threatening or fatal disease in otherwise healthy humans or animals. Examples of *Infectious Substances, Category A* are provided in Appendix A of this SOP.
- **Biological Substance, Category B:** An infectious substance which does not meet the criteria for inclusion in Category A.

**Exceptions:** The following materials are not classified as infectious substances:

- Substances which do not contain infectious substances or substances which are unlikely to cause disease in humans or animals.
- Substances containing micro-organisms which are non-pathogenic to humans or animals.
- Substances in a form that any present pathogens have been neutralized or inactivated such that they no longer pose a health risk.
- Environmental samples (including food and water samples) which are not considered to pose a significant risk of infection.
- Dried blood spots, collected by applying a drop of blood onto absorbent material, or fecal occult blood screening tests and blood or blood components which have been collected for the purposes of transfusion or for the preparation of blood products to be used for transfusion or transplantation and any tissues or organs intended for use in transplantation.

## IATA TABLE 4.2 ENTRIES - INFECTIOUS SUBSTANCES, CATEGORY A

IATA 4.2 Substances Infectious to Animals	
Proper shipping name:	Infectious substance, affecting animals
UN/ID No.:	UN 2900
Class or Division	6.2
Hazard Label	Infectious Substance
Packing Group	-

Packing Instructions	620
Maximum Quantity/Package for Limited Quantity Shipment	“E0”- Not permitted as Excepted Quantity
Passenger/Cargo Aircraft	50 g (solid), 50 ml (liquid)
Cargo Aircraft Only	4 kg (solid), 4 L (liquid)
Special Provisions	A81 – The quantity limits do not apply to body parts, organs, or whole bodies. A140 – When the infectious substances shipped are unknown but are suspected of meeting the criteria for inclusion in Category A, the word “Suspected Category A infectious substance” must appear in parenthesis following the proper shipping name in the Shipper’s Declaration for Dangerous Goods.

<b>IATA 4.2 Substances Infectious to Humans</b>	
Proper shipping name:	Infectious substance, affecting humans
UN/ID No.:	UN 2814
Class or Division	6.2
Hazard Label	Infectious Substance
Packing Group	-
Packing Instructions	620
Maximum Quantity/Package for Limited Quantity Shipment	“E0”- Not permitted as Excepted Quantity
Passenger/Cargo Aircraft	50 g (solid), 50 ml (liquid)
Cargo Aircraft Only	4 kg (solid), 4 L (liquid)
Special Provisions	A81 – The quantity limits do not apply to body parts, organs or whole bodies. A140 – When the infectious substances shipped are unknown but are suspected of meeting the criteria for inclusion in Category A, the word “Suspected Category A infectious substance” must appear in parenthesis following the proper shipping names in the shipper’s declaration for dangerous goods.

<b>IATA 4.2 Dry Ice</b>	
Proper shipping name:	“Carbon dioxide, solid” or “Dry ice”
UN/ID No.:	UN 1845
Class or Division	9
Hazard Label	Miscellaneous
Packing Group	
Packing Instructions	954
Maximum Quantity/Package for	“E0”- Not permitted as Excepted Quantity

Limited Quantity Shipment	
Passenger/Cargo Aircraft	200 kg
Cargo Aircraft Only	200 kg
Special Provisions	A48 (package test not required); A151: A805

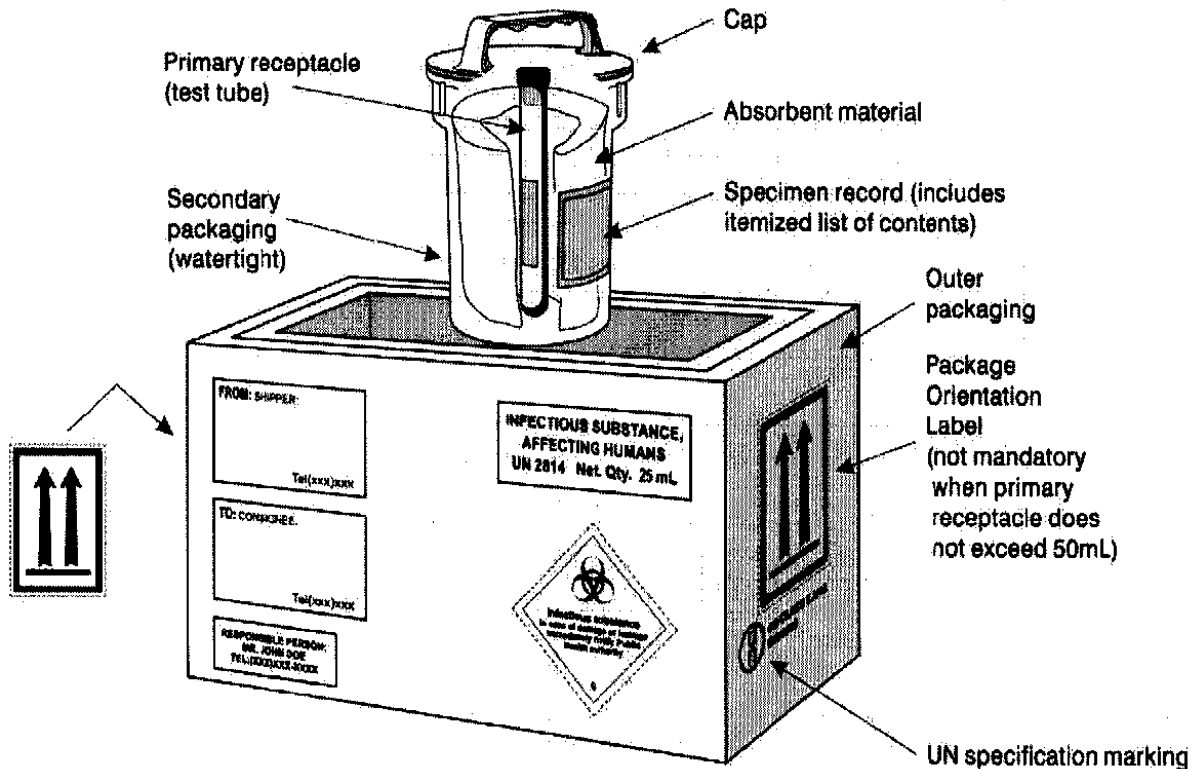
### **PACKAGING - INFECTIOUS SUBSTANCES, CATEGORY A**

Specification packaging is required (indicated by the manufacturer's specification marking). Packaging must be compatible with the contents and consist of three components:

1. Primary receptacle(s) that is/are leak- or sift-proof (liquids or solids, respectively) and have positive means of closure (e.g., tape reinforced lid closure);
2. Secondary packaging that is leak- or sift-proof (liquids or solids, respectively) and have positive means of closure (e.g., tape reinforced lid closure); and
3. Rigid outer packaging. If dry ice is included in the package, then the outer package must be designed and closed in a manner that will allow off-gassing vapors to escape.

In addition,

1. Inner packages containing liquids must have sufficient headspace to allow for expansion of the liquid due to temperature/pressure changes.
2. Inner packages must be packed, secured, or cushioned against leakage and/or breakage.
3. Packages cannot be vented except for the venting of dry ice.
4. Packages containing liquids must be orientated with the closures in an upright position, and sufficient absorbent placed between the primary and secondary containers to absorb the entire content. For multiple inner packages in a single secondary packaging, each inner package must be wrapped individually.
5. Other dangerous goods must not be packed in the same packaging with *Infectious substances, Category A* unless they are necessary for maintaining viability, stabilizing or preventing degradation, or neutralizing the hazards of potentially infectious substances; and then the quantity is limited to thirty (30) ml or less of Class 3 (flammable and combustible liquids), 8 (corrosive), or 9 (miscellaneous) per each primary receptacle.
6. An itemized list of the content must be included between the primary and secondary packaging.
7. Refrigerant, if used, must be placed outside of the secondary packaging. If dry ice is used as the refrigerant, seal the outside package in a manner that allows carbon dioxide gas that forms to be released, preventing build-up of pressure that could rupture the packaging.
8. Packages must be packed so the contents do not shift as the refrigerant changes physical state or disappears.

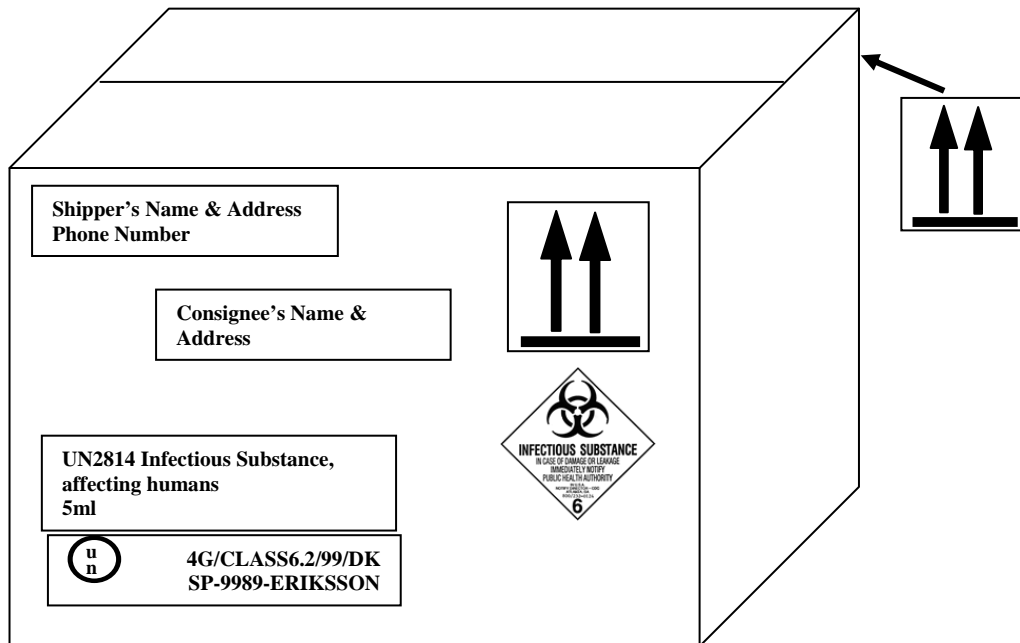
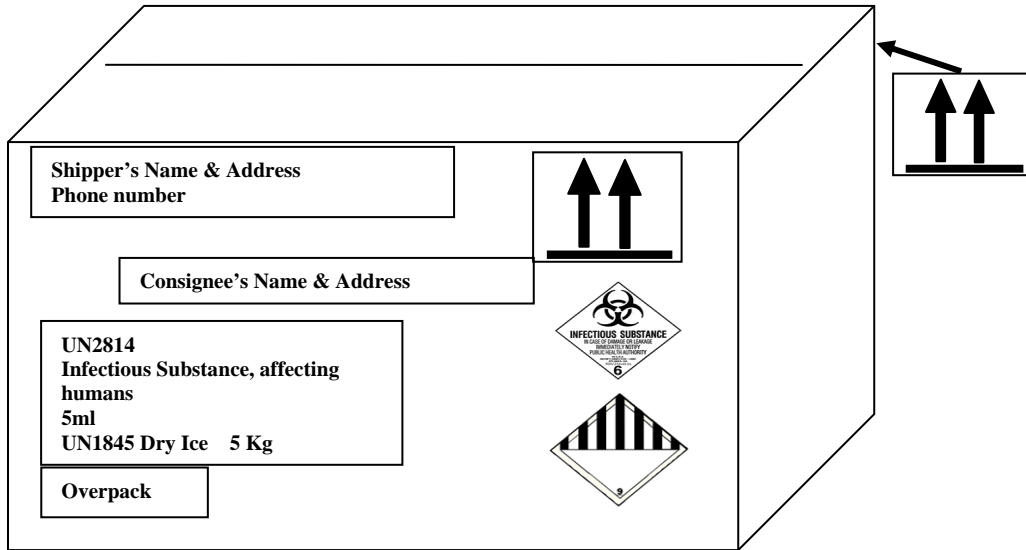


## MARKING & LABELING- INFECTIOUS SUBSTANCES, CATEGORY A

General marking and labeling requirements must be observed, such as: all markings must be in English; all markings and labels must be durable and in the correct location, and; only relevant markings and label are allowed. The following marking and labeling is required on the outer package:

1. Complete name and address of the shipper. The shipper's telephone number must also be recorded on the outer container. This does not need to be a 24-hour emergency response number, but it should be for someone that is knowledgeable of the hazards of the shipment.
2. Complete name and address of the consignee.
3. The proper shipping name, UN number, and net quantity of infectious substance in the package in letters at least 6 mm (about ¼ inch) high. If the substance is infectious to both humans and animals, use the proper shipping name of *Infectious substance, affecting humans*. If dry ice is included, the package must also contain the additional proper shipping name, UN number, and net amount of dry ice in the package (in Kilograms).
4. An Infectious Substance Hazard Class label; and a Miscellaneous Hazard Class label if the package also contains dry ice.
5. "Orientation" arrows if the package contains liquids.
6. "Overpack" if applicable.

## EXAMPLES OF PACKAGE MARKINGS & LABELS



## DOCUMENTATION – INFECTIOUS SUBSTANCE, CATEGORY A

Two shipping documents are required- 1) an Airway bill, and; 2) a Shipper's Declaration for Dangerous Goods. Copies of the shipping documents must be retained for a minimum of two years. Most of the information regarding the hazardous nature of the shipment will be contained on the Declaration form. By way of the appropriate checkbox, the airway bill will indicate that the shipment contains a dangerous good and that a Declaration form is attached.

1. The Declaration must be prepared using FedEx approved vendor software, preapproved shipper proprietary software, or FedEx Express Automated Shipping Solutions that have dangerous goods error checks. The declaration must be a specific format and color. The airway bill can be hand printed rather than typed.
2. The airway bill number must be recorded on the Declaration to retain the proper reference between the two documents. The name of the person preparing the shipment (if different from the person indicated as the "shipper") should be printed in Section 2 of the airway bill.
3. In the "Transport Details" section of the Declaration, complete the full name of airport of departure and airport of destination (or leave blank). In addition, the non-applicable category for the following must be deleted:
  - a. Passenger or Cargo/ Cargo only
  - b. Radioactive/ non-radioactive
4. In the "Nature and Quantity of Dangerous Goods" section of the form, record the information below in the appropriate columns. Note that a separate line entry will be required if dry ice is included in the shipment.
  - a. UN 2900 or UN2814, as appropriate.
  - b. Proper shipping name: Infectious substance, affecting animals (or humans, as applicable). This proper shipping name must be supplemented with the name of the infectious substance in parentheses; or "Suspected Category A Infectious Substance" if unknown.
  - c. Division: 6.2
  - d. Packing group: leave blank.
  - e. Quantity and type of packaging: list the number of packages, the type of packaging, and the net quantity of infectious material (i.e., 1 fiberboard box x 5 ml).
  - f. Packing instructions: 620.
  - g. Authorization: If shipping body parts, organs or whole bodies record "A81" in this column. Otherwise leave blank.
  - h. Complete the following lines: name, title, and signature of the signatory. This person must have current training credentials.
  - i. In the section titled "Additional Handling Information," Type the following:
    - *"For Chemical Emergency, Spill, Leak, Fire, Exposure or Accident, Call CHEMTREC Day or Night. Domestic North America 1-800-424-9300. International, Call 1-703-527-3887. (Collect calls accepted)."*

- In the space indicated, type the appropriate 24-hour emergency telephone number
  - 1-800-424-9300 for domestic North America shipment.
  - 1-703-527-3887 for international shipment.
- 5. If the shipment contains dry ice, indicate such on the airway bill in the appropriate section. Also record a second line of information on the Declaration form that is indicative of dry ice.
  - a. UN1845.
  - b. Proper shipping name: "Carbon dioxide, solid" or "Dry ice."
  - c. Hazard class: 9.
  - d. Packing group: III.
  - e. Since more than one type of dangerous goods are packed in a single outer container, indicate "All packed in one [container type; e.g., fiberboard box]."
  - f. When an overpack is used, the wording "Overpack Used" must be inserted on the declaration immediately following all the relevant entries relating to the packages within each overpack.
  - g. Packing instructions: 954.

**EXAMPLES OF COMPLETED SHIPPING DOCUMENTATION**

**FedEx Express US Airbill**      FedEx Tracking Number: 8531 5774 6855

**1 From** Please print and press hard  
 Date: 7-13-2008      Sender's FedEx Account Number: 0685-0276-4

Sender's Name: Ann Smith      Phone: (402) 472-9970

Company: University of Nebraska - Lincoln Postal SVC

Address: 1100 N 17th St

City: Lincoln      State: NE      ZIP: 68588

**2 Your Internal Billing Reference** 0824      OPTIONAL

**3 To**  
 Recipient's Name: John Klein      Phone: (888) 000-1111

Company:

Recipient's Address: 1600 Pennsylvania Av.

Address: Washington, D.C.      State:      ZIP: 20500

*Ann Smith*

**Try online shipping at fedex.com**

By using this Airbill you agree to the service conditions on the back of this Airbill and in our current Service Guide, including terms that limit our liability.  
**Questions? Visit our Web site at fedex.com**  
 or call 1.800.GoFedEx 1.800.463.3339.

**Sender's Copy**      Form ID No.: 0200

**4a Express Package Service**      Packages up to 150 lbs. To most locations

FedEx Priority Overnight Next business morning\*       FedEx Standard Overnight Next business afternoon\*       FedEx First Overnight Earliest next business morning delivery to select locations\*

**FedEx 2Day** Second business day\*       FedEx Express Saver Third business day\*  
 FedEx Envelope rate not available. Minimum charge: One-pound rate

**4b Express Freight Service**      Packages over 150 lbs. To most locations

FedEx 1Day Freight\* Next business day\*\*       FedEx 2Day Freight Second business day\*\*       FedEx 3Day Freight Third business day\*\*

\* Call for Confirmation: \_\_\_\_\_

**5 Packaging**      \*Declared value limit \$500

FedEx Envelope\*       FedEx Pak\* Includes FedEx Small Pak, FedEx Large Pak, and FedEx Sturdy Pak       FedEx Box       FedEx Tube       Other

**6 Special Handling**      Include FedEx address in Section 3.

**SATURDAY Delivery** Available ONLY for FedEx Priority Overnight, FedEx 2Day, FedEx 1Day Freight, and FedEx 2Day Freight to select ZIP codes       **HOLD Weekday at FedEx Location** NOT Available for FedEx First Overnight       **HOLD Saturday at FedEx Location** Available ONLY for FedEx Priority Overnight and FedEx 2Day to select locations

Does this shipment contain dangerous goods?  
 One box must be checked.  
 No       Yes As per attached Shipper's Declaration       Yes Shipper's Declaration not required       Dry Ice Dry Ice, UN 1845 1 2 kg  
 Dangerous goods (including Dry Ice) cannot be shipped in FedEx packaging.       Cargo Aircraft Only

**7 Payment Bill to:** Enter FedEx Acct. No. or Credit Card No. below.

Sender Acct No. in Section 1 will be billed.       Recipient       Third Party       Credit Card       Cash/Check

FedEx Acct. No.      Exp. Date

Total Packages	Total Weight	Total Declared Value†
1	10 pounds	10.00 .00

†Our liability is limited to \$100 unless you declare a higher value. See back for details.      FedEx Use Only

**8 Sign to Authorize Delivery Without a Signature**

By signing you authorize us to deliver this shipment without obtaining a signature and agree to indemnify and hold us harmless from any resulting claims.      **467**

Rev. Date 11/03\*Part #158281 • ©1994-2003 FedEx • PRINTED IN U.S.A. SRY 03/05

**SHIPPER'S DECLARATION FOR DANGEROUS GOODS**

(Provide at least three copies to the airline.)

Shipper Ann Smith University of Nebraska - Lincoln 1100 N. 17th Street Lincoln, NE 68588	Air Waybill No. <b>853157746855</b>  Page <b>1</b> of <b>1</b> Pages Shipper's Reference Number
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Consignee John Klein 1600 Pennsylvania Ave. Washington D.C. 20500
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Two completed and signed copies of this Declaration must be handed to the operator

**WARNING**  
  
 Failure to comply in all respects with the applicable Dangerous Goods Regulations may be in breach of the applicable law, subject to legal penalties.

<b>TRANSPORT DETAILS</b>	
This shipment is within the limitations prescribed for: (delete non applicable)	Airport of Departure
PASSENGER AND CARGO AIRCRAFT <input type="checkbox"/> HAZARDOUS MATERIAL ONLY <input checked="" type="checkbox"/>	Airport of Destination:

Shipment type: (delete non-applicable)  
 NON-RADIOACTIVE  ~~HAZARDOUS~~

**NATURE AND QUANTITY OF DANGEROUS GOODS**

Dangerous Goods Identification						
UN or ID No.	Proper Shipping Name	Class or Division (Subsidiary Risk)	Packing Group	Quantity and type of packaging	Packing Inst.	Authorization
UN 2814	Infectious Substance Affecting Humans	6.2		5 ml	620	
UN 1845	Dry Ice	9		2 Kg	954	
				All packed in one fiberboard box. Overpack used. Total weight 5 Kg.		

**Additional Handling Information**  
 For Chemical Emergency, Spill, Leak, Fire, Exposure or Accident, Call CHEMTREC Day or Night.  
 Domestic North America 1-800-424-9300, International, Call 1-703-527-3887 (collect calls accepted).  
 Emergency Telephone Number 1-800-424-9300

I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labelled/placarded, and are in all respects in proper condition for transport according to applicable International and National Governmental Regulations. I declare that all of the applicable air transport requirements have been met.	Name/Title of Signatory Ann Smith, Director Place and Date Lincoln, NE 1-1-2011 Signature (see warning above) <i>Ann Smith</i>
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FOR RADIOACTIVE MATERIAL SHIPMENT ACCEPTABLE FOR PASSENGER AIRCRAFT, THE SHIPMENT CONTAINS RADIOACTIVE MATERIAL INTENDED FOR USE IN OR INCIDENT TO RESEARCH, MEDICAL DIAGNOSIS, OR TREATMENT.

**NOTIFICATION TO CHEMTREC**

Prior to shipment, a Material Safety Data Sheet or agent hazard summary must be submitted to CHEMTREC to facilitate response in the event of an emergency. Fax the following information to CHEMTREC at 1-703-741-6090:

- The organization name: "University of Nebraska – Lincoln"
- UNL's CHEMTREC customer number: 227166
- A copy of the Material Safety Data Sheet for the dangerous goods being shipped

## **SECURITY AWARENESS TRAINING REMINDER**

Hazmat employees must receive training relative to security. Following is a summary of the security awareness information included in the EHS IATA training program. Reduce the possibility of unauthorized access, possession, and use of hazardous materials by securing all hazardous materials, including dangerous goods. The following general guidelines represent minimum requirements:

- Packages containing dangerous goods must be kept in a secured area, or under the supervision of a designated shipper, or other authorized employee(s) until picked up by the carrier. Limit access to areas where dangerous goods packages or other hazardous materials are prepared for shipment, received, stored, unpacked or used to authorized employees only. Report latches and locks on doors or other security devices that are damaged, sticky, or have been tampered to your supervisor and the Building Maintenance Reporter.
- Make sure the carrier picking up dangerous goods shipments has identification (e.g., company ID, uses a clearly identified company vehicle, or wears a company uniform).
- Report suspicious individuals, behavior, stolen or missing hazardous materials and hazardous materials packages, and known or suspected unauthorized entry into secured areas to your supervisor and to the UNL Police Department 402-472-2222. Be aware of your surroundings; look for out-of-place vehicles and abandoned or out-of-place backpacks, bags, or other containers.
- Limit information concerning hazardous materials shipments to individuals who need to know, such as other authorized employees, carrier personnel, and supervisors. Do not share information on dangerous goods shipments with casual acquaintances or strangers.
- Be familiar with emergency procedures in place at UNL and know what to do if a package is leaking or damaged.

**APPENDIX A**  
**EXAMPLES - INFECTIOUS SUBSTANCES, CATEGORY A**

UN Number and Proper Shipping Name	Micro-organism
UN2814 Infectious substance affecting humans	Bacillus anthracis (cultures only) Brucella abortus (cultures only) Brucella melitensis (cultures only) Brucella suis (cultures only) Burkholderia mallei – Pseudomonas mallei – Gianders (cultures only) Burkholderia Pseudomallei – Pseudomonas pseudomallei (culture only) Chlamydia psittaci – avian strains (cultures only) Clostridium botulinum (cultures only) Coccidioides immitis (cultures only) Coxiella burnetii (cultures only) Congo-Crimean hemorrhagic fever virus Dengue virus (cultures only) Eastern equine encephalitis virus (culture only) Escherichia coli, verotoxigenic (cultures only) Ebola virus Flexal virus Francisella tularensis (cultures only) Guaranito virus Hantaan virus Hantavirus causing hemorrhagic fever with renal syndrome Hendra Virus Hepatitis B virus (cultures only) Herpes B virus (cultures only) Human immunodeficiency virus (cultures only) Highly pathogenic avian influenza virus (cultures only) Japanese encephalitis virus (cultures only) Junin virus Kyasanur Forest disease virus Lassa virus Machupo virus Marburg virus Monkeypox virus Mycobacterium tuberculosis (cultures only) Nipah virus Omsk hemorrhagic fever virus Poliovirus (cultures only) Rabies virus (cultures only) Rickettsia prowazekii (cultures only)

	<p>Rickettsia rickettsii (cultures only)  Rift Valley fever virus (cultures only)  Russian spring-summer encephalitis virus (cultures only)  Sabia virus  Shigella dysenteriae type 1 (culture only)  Tick-borne encephalitis (cultures only)  Variola virus  Venezuelan equine encephalitis virus (cultures only)  West Nile virus (cultures only)  Yellow fever virus (cultures only)  Yersinia pestis (cultures only)</p>
<p>UN2900  Infectious substances affecting animals</p> <p>All listed infectious substances affecting animals are considered Category A when transported in cultures.</p>	<p>African swine fever virus  Avian paramyxovirus Type 1 – Velogenic Newcastle disease virus  Classical swine fever virus  Foot and mouth disease virus  Lumpy skin disease virus  Mycoplasma mycoides – Contagious bovine pleuropneumonia  Peste des petits ruminants virus  Rinderpest virus  Sheep-pox virus  Goatpox virus  Swine vesicular disease virus  Vesicular stomatitis virus</p>