Dry Ice Shipper Training

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Environmental Health and Safety
Service Building 1st Floor
2220 Circle Drive
Cleveland OH, 44106-7227
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Environmental Health and Safety

I. Introduction

Dry Ice (Carbon dioxide, solid) is considered a Class 9 miscellaneous hazardous material when transported by air according to the Department of Transportation (DOT) and the International Air Transport Association (IATA). In order to comply with regulations shippers must receive training prior to introducing a package for transport that contains dry ice.

Shipping material improperly or without the required training may result in fines and/or criminal prosecution from regulatory agencies.

This training is for Case Western Reserve University faculty, staff, and students only, and **only applies to the shipping dry ice**. The material stored on dry ice must be considered *non-hazardous according to DOT and IATA regulations* and therefore unregulated. This training does not provide sufficient information to ship hazardous materials, as defined by USDOT, such as chemicals (acetone, fuel, corrosives, etc), pathogens/infectious material (*E. coli,* bacteria cultures, human tissue), or any material regulated by the DOT or IATA, other than dry ice. If you have questions regarding the material that you are placing on dry ice, contact the EHS office (368-2907).

II. Training Requirements

The DOT and IATA require that persons shipping dry ice receive training. Training is required for persons who prepare packages for shipment, label and mark packages, and complete shipping documentation, such as airway bills, for packages containing dry ice.

All persons wishing to ship dry ice must have, prior to reading this document, attended Case Western Reserve Laboratory Standard and Regulated Chemical training or Case Western Reserve Hazard Communications training. If you have not attended either of these trainings or your training has expired, please contact EHS at 368-2907 to schedule trainings.

The training for dry ice shippers includes four steps;

1) Reading this document and understanding the concepts discussed within;
2) Completing the test located in **Appendix A** of this document;
3) Submitting the completed test to the EHS office; and
4) Receiving written approval in the form of a training completion certificate from a EHS Safety Specialist.

Regulations for shipping hazardous material are constantly changing or being updated. It is important that you **retrain every two years** to be sure that the appropriate precautions are being taken and most current regulations are being followed.

III. FedEx Online Requirement

All hazardous materials shippers, including personnel shipping materials on dry ice, are required to use Case's online shipping with FedEx. This system will allow users to process of shipments online, complete customs documents, and download shipment reports. Please email your request for the **FedEx Ship Manager Request Form** to the Mail Center at: Mailroom@case.edu, or call Judy Ritchie at 216-368-2565

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Once your registration is completed, notify Mary Ellen Scott (368-6077, maryellen.scott@case.edu) so that your certification to ship hazardous material can be finalized. If you **do not provide notification** to Mary Ellen Scott within **two weeks** of completing this course, you will **not be registered** and you will **need to complete the training again**.

IV. Hazard Communication

Packages containing dry ice present a number of hazards to the shipper as well as to the general public. These hazards include;

Explosion hazards: As dry ice sublimates, changing from solid directly to gas, it creates carbon dioxide gas. It is vital that packages containing dry ice are not air tight to prevent a pressure build-up and possible explosion. Packages containing dry ice must be properly packaged to allow carbon dioxide gas to escape.

Asphyxiation hazard: Carbon dioxide released in a confined space may produce an oxygen-deficient environment. Airlines have placed limitations of the amount of dry ice which may be loaded on to an airplane, to prevent accidental suffocation of passengers and crew. It is important that packages containing dry ice be properly labeled and marked so that they can be easily identified.

Contact Hazard: Dry ice has a surface temperature of -78.5 °C (-109.3°F) and may cause tissue damage upon direct contact with skin. It is important that proper protective gloves be worn when handling dry ice.

V. Packaging Requirements

1) **Venting—**Dry ice must *never* be packaged in an airtight container. This will lead to a build-up of pressure inside the container that may cause an explosion. Packages containing dry ice must allow for proper venting of carbon dioxide gas.

2) **Compatibility—**Due to the low temperature of dry ice many materials, such as plastics, may be rendered brittle and permeable to the contents. For examples of proper packaging or to purchase dry ice shippers refer to Appendix C. for a list of manufactures.

3) **Package Quality—**Shippers are responsible for choosing a package which will withstand normal transport activity intact. Packages must be able to withstand multiple loadings and unloading, vibrations associated with ground and air travel, possible temperature changes, humidity and pressure changes, and manual/mechanical handling. Outer and inner packages must be constructed and closed in a manner to prevent the loss of contents.

4) **Combination Packaging—**Transportation companies have specific rules regarding what type of packages will be accepted, such as dry ice stored in Styrofoam only. It is strongly recommended that all packages containing dry ice have both a Styrofoam inner package and fiberboard outer package.

5) **Labeling** - Proper labeling of packages containing dry ice includes;

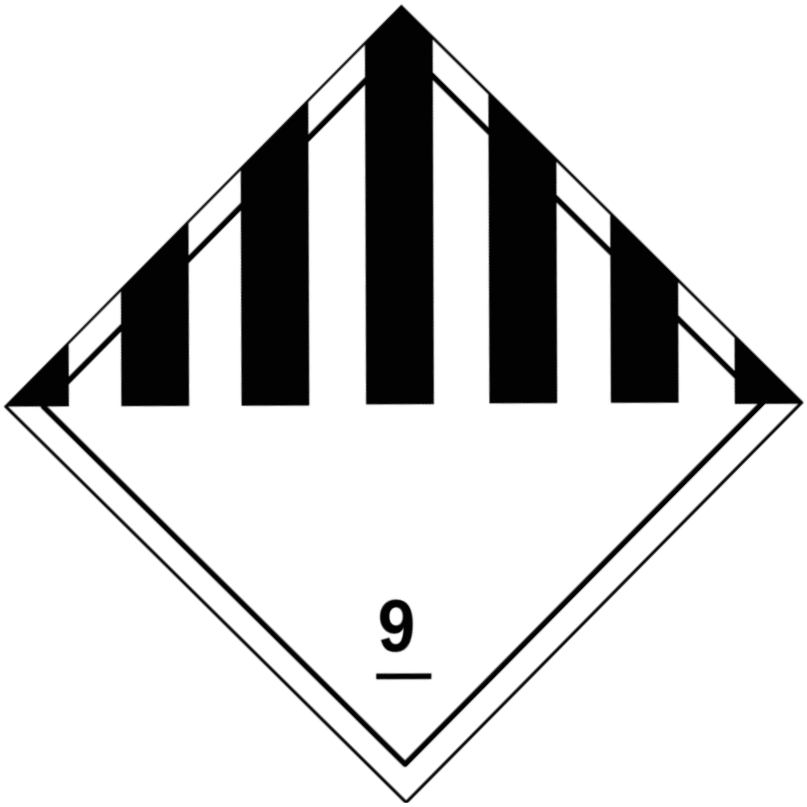
   a. Proper shipping name: **Dry Ice** *or* **Carbon dioxide (solid)**

   b. UN Identification Number for dry ice: **UN 1845**

   c. Net weight of dry ice

   d. Hazard class 9 (miscellaneous) Label

   e. Names and addresses of shipper and consignee



Labels are available from the EHS office upon request.

Finally, labels must be placed on a vertical side of the package (i.e. not on the top or bottom of the container). An example of the proper labeling of a package can be found in **Appendix C.**

6) **<u>Material description</u>**- If an accident were to occur with your package it is important that the material inside can be easily identified, **even if it is non-hazardous**. A description of the contents should be included with the package with the following information;

   a. Shippers name and contact information

   b. Basic description of the material being shipped on dry ice. This description should be placed between the fiberboard box and the Styrofoam container.

VI. Airway Bill

An airway bill, or airbill, must accompany packages containing dry ice. The airway bill must include the following;

Dry Ice, 9, UN 1845 number of packages x net weight of dry ice in kilograms

It is the shipper's responsibility to complete the airway bill in its entirety. An example of a domestic airway bill is shown in Appendix B.

Shipper's Declaration

A Shipper's Declaration is needed for air transport when shipping dangerous goods (hazardous materials). Dry ice, itself, does not need a shipper's declaration. However, if dry ice is packaged with a hazardous material, as defined by USDOT, or dangerous good, as defined by IATA, the dry ice information must be included on the Dangerous Goods Declaration form. For instance, dry ice can be used to ship with exempt human specimens and some other biologicals without the need for a Shipper's Declaration. However, If dry Ice is used to ship S. aureus or any other pathogen, a Shipper's Declaration must be used and include both the pathogen and dry ice information. This type of training must be conducted in person, with a Safety Specialist at the EHS office. If you are going to ship any regulated dangerous goods, PLEASE contact the EHS office at 368-2907.

VII. Proper Steps

1) Reuse dry ice shippers. Many fiberboard dry ice shipping containers arrive on campus each day and whenever possible should be reused. Before reusing a container, please take the following precautions;

    a. Ensure that package was not used for the transport of infectious material. If you are unsure, find another box.

    b. The box must be in good condition. Remember that a package should be able to withstand normal wear and tear associated with transport. If the box is torn or damaged or the insulation material inside is damaged, a different box must be used.

    c. Use a black permanent marker to deface all labels on the box. This includes company names, barcodes, product names, addresses, hazard labels, et.

2) Dry ice sublimates at a rate of 5 – 10 lbs every 24 hours. There are a number of steps that can be taken to ensure that the material packaged on dry ice arrives intact. These include;

    a. Use enough dry ice to ensure that the material arrives safely to its location. If the material is being sent overseas use more dry ice to account for possible delays in customs.

    b. If you do not fill the Styrofoam container completely with dry ice, the dry ice will sublimate more rapidly. Fill empty spaces with packing peanuts, packing paper, etc to reduce the exposed surface area.

c. Communicate with the consignee (receiver) when the package will be shipped and when they should expect arrival.

d. Send packages containing dry ice early in business week. Packages sent later in the week have a greater likelihood of being delayed because most businesses are closed on Saturday and Sunday.

3) Do not write “specimen”, “diagnostic specimen”, “research specimen” or any other words, other than what is required as outlined in this document, on the outermost container. Specimens fall under specific regulatory guidelines and requirements. Confusion regarding the contents of your package may lead to delivery delay and more importantly, fines from regulatory organizations.

VIII. Security Awareness

1.2 million shipments of hazardous material are made each day in the United States alone. It is thought that between $15 billion and $30 billion in cargo are stolen annually in the United States. To enhance security of hazardous materials shipments, the DOT has required all organizations that ship hazardous materials develop a security plan. As hazardous material employees, people who directly affect the package transportation security, shippers are required to receive security awareness training.

- Case faculty, staff, and students can take a number of steps to ensure that all people and property are protected.

- Ensure that doors are closed and locked when leaving laboratories and offices unattended.

- Never lend Case ID cards or keys to other people, even people you know.

- If a person is not familiar to you, do not allow them entrance into any building with card key access. If they say they misplaced their ID, send them to the nearest security office.

- Do not discuss internal operating procedures or security matters openly or with persons you do not know.

- Report any familiar persons or persons exhibiting strange behavior to security at 368-3333.

    - This is especially important in open laboratory situations where expensive equipment and computers are generally not secured.

      Hazardous materials shippers have a responsibility to ensure the security of a package.

While shippers cannot transport the package personally, shippers can take steps to ensure that the material is secure prior to pick-up. These include:

- Using commercial shippers that are well known and have a good reputation.
    - Fed Ex, DHL, UPS, etc.

- Only release packages containing hazardous material to commercial shipping employees who are dressed in a proper uniform and who display a picture ID from their company.

- Never leave a package containing hazardous material unattended.

- Pack shipments personally or review the contents prior closing to be sure you know what is in the container.

Again, if you notice a person behaving strangely, unfamiliar person asking questions, or wandering around an area where they do not belong call Case Security immediately at 368-3333.

PLEASE PRINT OUT AND TAKE TEST, BELOW.

Appendix A. Dry Ice Shipping Test

This test must be completed in full and returned to the EHS office. via fax (368-2236) or handed in personally. You must wait for written approval from an EHS Safety Specialist before shipping any material on dry ice. Retraining must occur every 2 years.

Print Name: _____ Phone: _____
Department: _____ User ID (ex. *xyz123*):_____
Supervisor: _____
A detailed description of what will be placed on dry ice: _____
_____
_____

By signing this document, I acknowledge that I have received, read, and understand the requirements outlined in this document. I acknowledge and agree that it is my responsibility to adhere to the requirements as mandated by Case Department of Environmental Health and Safety (EHS) and the United States Department of Transportation. I also understand that should I have questions regarding hazardous material shipping, I will call the EHS office at (216) 368-2907.

Signature: _____

1) What are three reasons why dry ice is considered a “hazardous material?

2) Completing this training will allow you to ship which of the following items (Circle all that apply)?
    a. UN 1987, Alcohol, n.o.s.
    b. UN 2814, Infectious substance, affecting humans on Dry Ice
    c. HIV infected mouse tissue on Dry Ice
    d. DNA from a normal mouse on Dry Ice

3) In order to protect people on passenger airplanes from suffocation/asphyxiation, dry ice must be stored inside of an airtight container to prevent the escape of carbon dioxide gas.

    □ True □ False

4) Proper dry ice labeling of outer packages includes: (Check all that apply)

□ UN Identification Number □ Frostbite Warning □ Hazard Class 9 Label
□ Net weight of dry ice □”*Research Specimen”* □ Hazard Class 6.2 label
□ Biohazard Warning □ Proper Shipping Name

5) A description of the material being shipped should be included with the package.

    □ True □ False

6) Hazard Class 9 Labels can be placed on the top or bottom of a package.

    □ True □ False

7) Dry ice shipping containers can be reused as long as: (Circle all that apply)
    a. The outermost container is in good condition.
    b. The Styrofoam container has one damaged corner
    c. Information from a previous shipment (barcodes, addresses, etc) is removed or defaced with a black marker.
    d. The package has not been used to ship infectious material for the past 6 weeks.

8) It is acceptable and suggested to write *"Research Specimen, Fragile, Rush Delivery",* on the outermost box to ensure safe and quick delivery of a package.

    □ True □ False

9) Completing this training certifies shippers to package anything on dry ice.

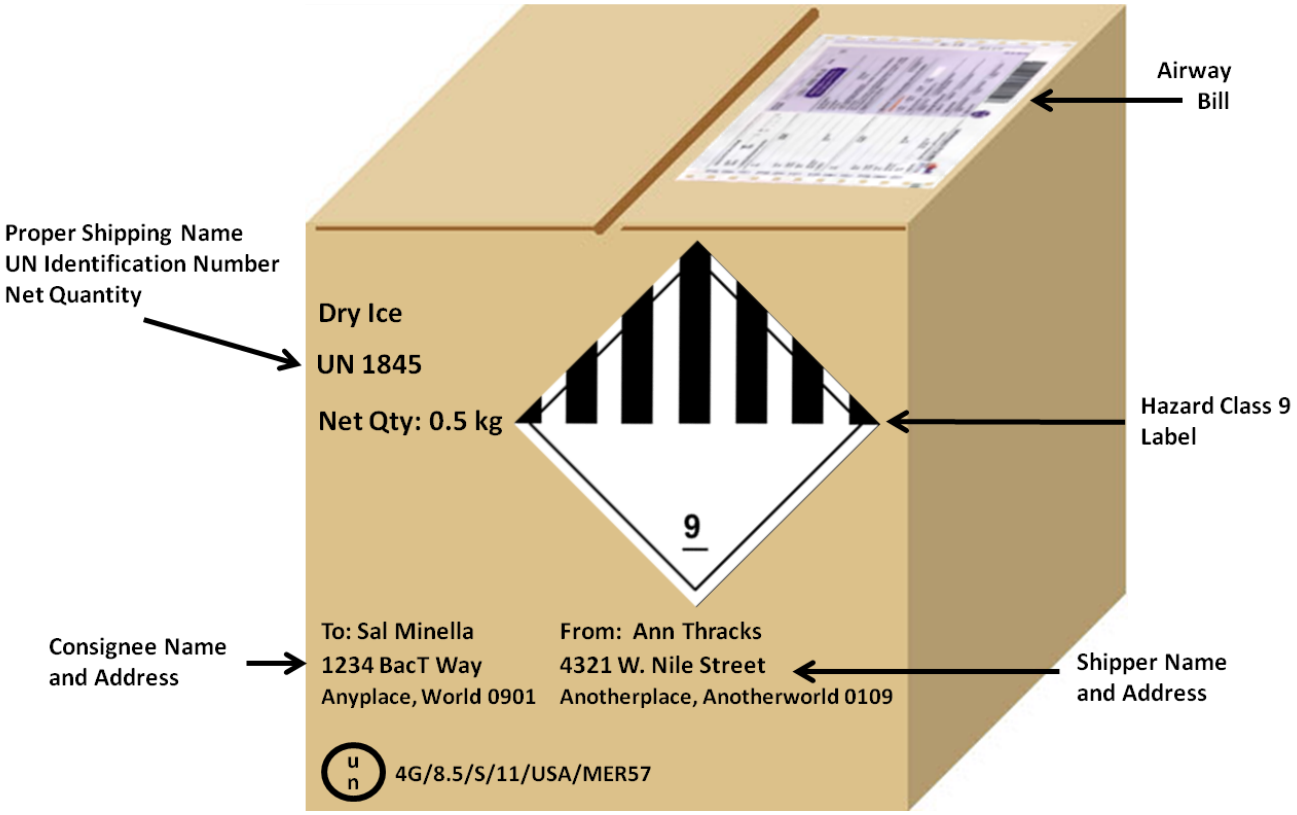
    □ True □ False

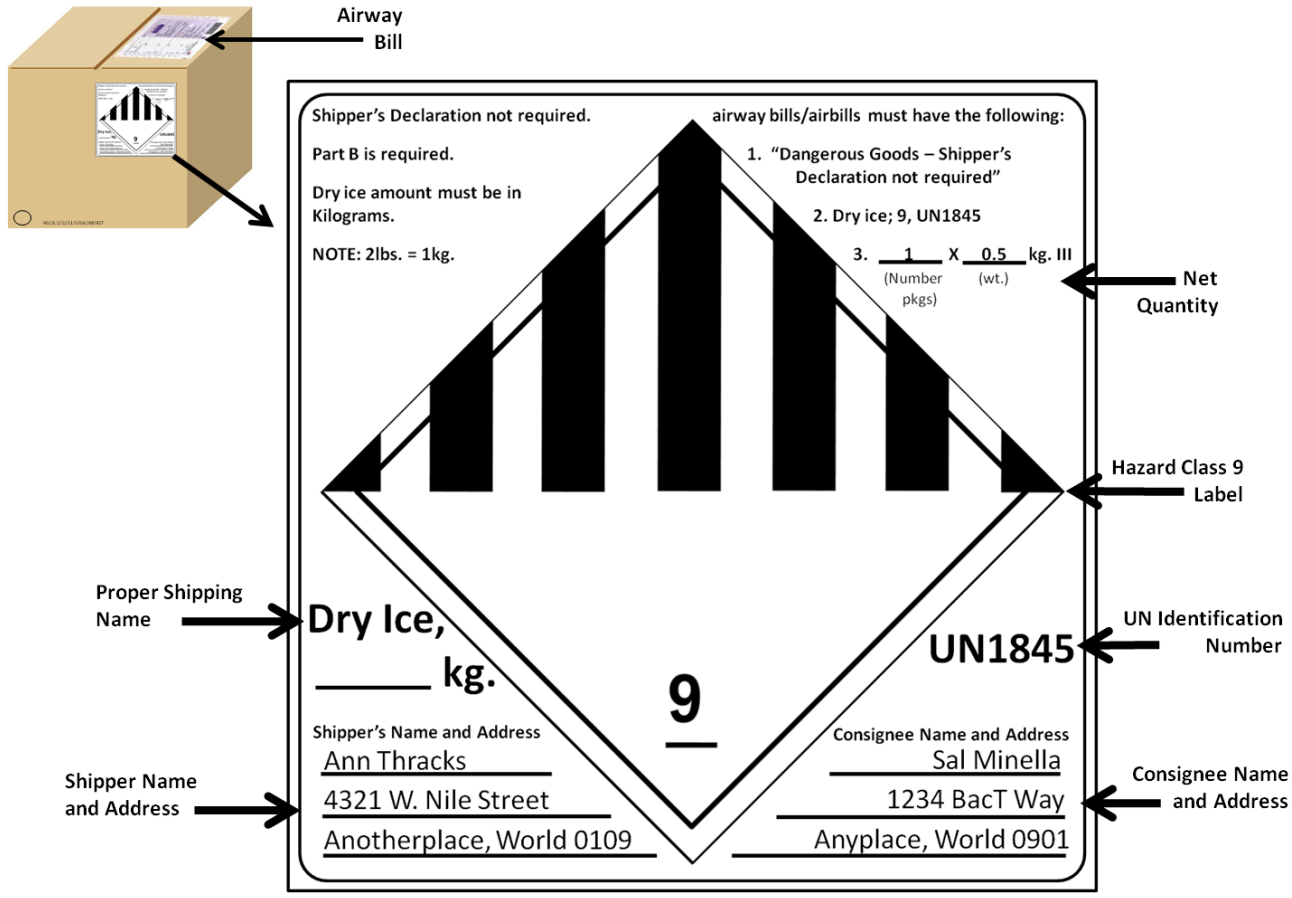
10) What can steps can be taken to ensure the safety and security of Case personnel, students and property (Circle all the apply)
    a. Close and lock your doors when leaving your office
    b. Being polite by holding a key card access door open for a unfamiliar person
    c. Reporting strange behavior of co-workers or a strange person asking questions to security.
    d. Leaving packages containing hazardous material outside of laboratory for pick-up without anyone being present.

RETURN THE COMPLETED TEST TO THE EHS OFFICE PERSONALLY OR VIA FAX (216-368-2236).

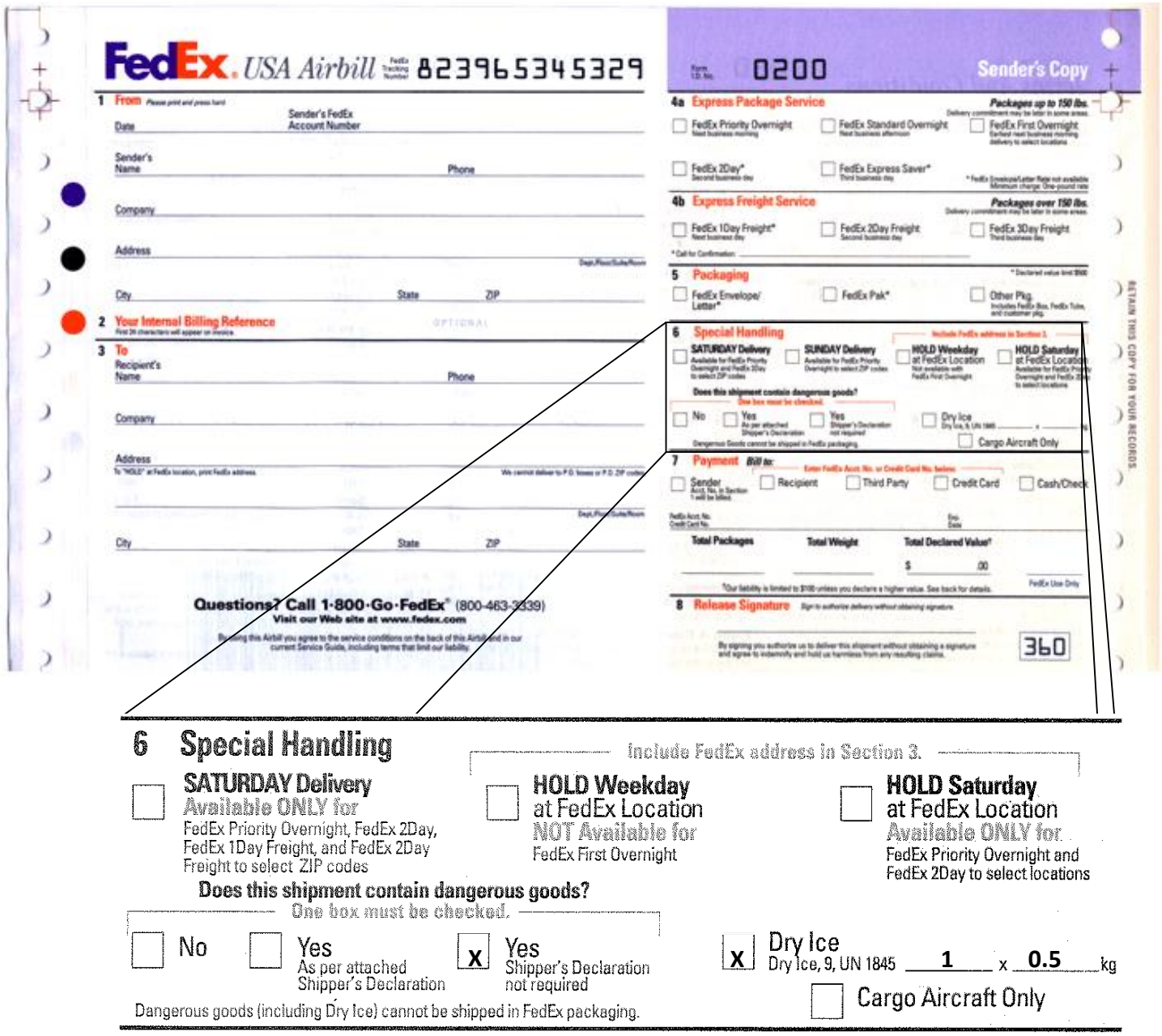
SUBMITTING THIS DOCUMENT DOES NOT CONSTITUTE AN APPROVAL TO SHIP DRY ICE OR ANY OTHER HAZARDOUS MATERIAL. POTENTIAL SHIPPERS OF MUST RECIEVE WRITTEN APPROVAL FROM A EHS SAFETY SPECIALIST BEFORE SHIPPING ANY HAZARDOUS MATERIAL

Appendix B. Examples of Properly Labeled Dry Ice Packages





Appendix C. Example of a FedEx Airway Bill



Above is an example of a Fed Ex Airway bill. The shipper is responsible for completing all necessary information on this form. Please note the expanded section 6 “Special Handling”. A package containing dry ice must have this section completed to be compliant with federal regulations as well as Fed Ex shipping requirements. This example shows how one would complete the document when shipping 1(one) box containing 0.5 kilograms of dry ice.

Appendix D. Manufacturers of Dry Ice Shipping Containers

Air Sea Atlanta
1234 Logan Circle
Atlanta, GA 30318
(880) 351-8600
http://www.airseaatlanta.com

All-Pak, Inc.
Corporate One West
1195 Washington Pike
Bridgeville, PA 15017
(800) 245-2283
http://www.all-pak.com

CARGOpak Corporation
3215-A Wellington Court
Raleigh, NC 27615
(800) 266-0652
http://www.cargopak.com

DG Supplies, Inc.
5 Boxal Drive
Cranbury, NJ 08512 405
(800) 347-7879
http://www.dgsupplies.com

HAZMATPAC, Inc.
5301 Polk St., Bldg. 18
Houston, TX 77023
(800) 923-9123
http://www.hazmatpac.com

Inmark, Inc.
220 Fisk Drive S.W.
Atlanta, GA 30336-0309
(800) 646-6275
http://www.inmarkinc.com

Polyfoam Packers Corporation
2320 S. Foster Avenue
Wheeling, IL 60090
(888) 765-9362
http://www.polyfoam.com

SAF-T-PAK, Inc.
10807-182 Street, Edmonton
Alberta, Canada, T5S 1J5
(800) 814-7484
http://www.saftpak.com

Source Packaging of New England, Inc.
Kilvert Street
Warwick, RI 02886
(800) 200-0366
http://www.sourcepak.com