

NAVIGATION AND VESSEL INSPECTION CIRCULAR NO. 2-87

Subj: Domestic Barge Transportation of Radioactive Materials/Nuclear Waste

1. **PURPOSE.** The purpose of this circular is to call the attention of Coast Guard field units, marine surveyors, the domestic barge transportation community, and others to American National Standards Institute (ANSI) Standard N14.24-1985 HIGHWAY ROUTE CONTROLLED QUANTITIES OF RADIOACTIVE MATERIALS - DOMESTIC BARGE TRANSPORT.
2. **BACKGROUND.**
 - a. The nuclear industry, working through ANSI, develops standards for safety of radioactive materials transportation methods and equipment. Among the standards developed by the ANSI Committee on Transportation of Fissile and Radioactive Materials is ANSI Standard N14.24-1985 HIGHWAY ROUTE CONTROLLED QUANTITIES OF RADIOACTIVE MATERIALS - DOMESTIC BARGE TRANSPORT, approved by ANSI July 23, 1985. Both the Coast Guard and the Department of Energy are represented on the ANSI Committee and participated in preparing this standard.
 - b. When used to describe a shipment of radioactive materials, a "Highway Route Controlled Quantity" means a large quantity of radioactive material based not on the weight or volume of the material, but on its total level of radioactivity (see 49 CFR 173.401(1)). A shipment of radioactive material that is highway route controlled must, under the Department of Transportation's Hazardous Materials Regulations, be operated on routes that minimize radiological risk. These Regulations require highway carriers to consider the accident potential, transit time and population density of their intended routes; to operate, wherever possible on preferred routes in accordance with DOT guidelines; and to have a written route plan, which must be filed with the DOT's Office of Hazardous Materials Transportation.
 - c. A highway route controlled quantity must be shipped in a packaging that maintains its integrity and shielding under serious accident conditions, including an external pressure of 21 psi (gauge) which is equivalent to submersion in 50 feet of water. The shipping container for highway route controlled quantities of radioactive materials is called a "cask". This is typically a steel cylinder weighing anywhere from 13 to 100 or more tons. Much of this weight is from lead shielding, thermal insulation, fire shielding, and impact protection.

- d. The scope of ANSI Standard N14.24-1985 is limited to highway route controlled quantities of radioactive material because of the nature of the packaging used to transport these quantities of material. The scope is not, however, restricted only to commercial spent nuclear fuel and defense related high-level waste, since the packages for other highway route controlled quantities are generally similar in design to packages used for spent fuel and high-level waste and must meet the same test requirements. Although this standard does not cover barge -transportation of contaminated equipment and structures from decommissioned nuclear facilities, its principles and procedures may be followed for movements of that type as well.

3. **DISCUSSION.**

- a. ANSI Standard N14.24-1985 identifies the organizations, equipment, operations, and documentation involved in barge shipments of radioactive materials between U.S. ports by inland waterways and in coastwise and ocean service. The Standard includes requirements pertaining to -

- (1) Selection of the cask, barge, and towing vessel;
- (2) Certification and documentation;
- (3) Radiological and non-radiological operations;
- (4) Insurance;
- (5) Emergency planning; and
- (6) Physical protection and security of the shipment.

These requirements apply to the water mode phase of a typically multimodal operation. Every barge shipment involves an intermodal transfer - either highway to water, water to highway, or both.

- b. The ANSI Standard describes four phases in a movement of a highway route controlled quantity of radioactive material: the planning phase, the pre-operational phase, the operational phase, and the post-operational phase. The shippers have overall responsibility for ensuring that the shipment is conducted in accordance with the ANSI Standard. They must consult and coordinate with numerous organizations throughout each of the phases of the operation. The Coast Guard is just one of many regulatory, advisory, enforcement, and permit-issuing bodies involved, but it has an important part in each phase.

- c. In the Standard, there is guidance for the selection of the barge. Since Title 46 of the Code of Federal Regulations contains no specific regulations for barges transporting radioactive materials, the shipper is advised to contact Commandant (G-MTH) early in the planning process. The Standard specifies the following -

- (1) The barge must be steel, at least 125 feet long, and classed by a recognized classification society.
- (2) It must have intact stability in accordance with Subpart E of Part 172 for a Type II hull under 46 CFR Subchapter 0, Part 151.
- (3) Its damage stability must be to a one compartment standard as for a Type II hull. This does not mean that the barge must be a Subchapter 0 barge, merely that it must meet those stability requirements.
- (4) The barge must have the following ancillary equipment -
 - (a) A Class A Emergency Position Indicating Radiobeacon (EPIRB);
 - (b) A passive radar reflector;

- (c) A sonar pinger with a one-mile range, good for 30 days; and
 - (d) An emergency towing wire made up and laid out on deck with a messenger line trailing in the water.
- (5) When in coastwise or ocean service, the barge must have a current Loadline Certificate and a Certificate of Inspection for its intended route.

The Standard places a great emphasis on the design of the tiedowns for the cask. Tiedown design must be based on collision accelerations, modeled on the requirements for independent chlorine tanks in 46 CFR 151.15, and wave action accelerations in both head and beam seas.

- d. The Standard advises the shipper of a barge shipment to prepare a shipping plan in considerable detail, and to provide the carrier with handling instructions and an emergency response plan covering both radiological and non-radiological emergencies. The Standard advises the shipper developing an emergency response plan to consult the Coast Guard Captains of the Port (COTPs) having jurisdiction over the planned shipping route.
- e. The section of the Standard relating to operations contains requirements for loading and off-loading the radioactive material both as lift-on/lift-off and roll-on/roll-off cargo. The Operations section contains requirements on docking, mooring, and towing conditions, as well as physical protection of the package, security and radiological monitoring.
- f. This Standard is intended to be a voluntary industry standard. Compliance will be enforced by insurers, state and local licensing bodies, and partly by the Nuclear Regulatory Commission. As a statement of Coast Guard policy, it may also be used by COTPs when issuing permits an' controlling the movement of the barge.

4. **ACTION.**

- a. Shippers, marine surveyors, insurance underwriter., towing vessel owners and operators, industry associations, and other interested parties are encouraged to adopt and implement the ANSI Standard for Highway Route Controlled Quantities of Radioactive Materials - Domestic Barge Transport (ANSI N14.24-1985).
- b. Other parties planning or involved in a movement of a highway route controlled quantity of radioactive material by barge should purchase the Standard from:

American National Standards Institute
1430 Broadway
New York, NY 10018
ATTN: Sales Department

The cost of the Standard is \$15.00 plus \$4.00 for shipping and handling (\$19.00 total).
Delivery time is approximately two weeks after receipt of an order.



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