

Transporting

# Hazardous Materials

On The Ohio River



*The tug pushes heavily loaded barges away from the busy river bank, beginning its nearly 1,000 mile journey down the Ohio River. The flat, dark shapes float past industries and utilities of the Ohio River Valley, toward the rich farmlands and thriving cities. The cargo may be coal or oil, perhaps other minerals or even less familiar products: sodium hydroxide, sulfuric acid, benzene.*



The Ohio River and its major tributaries serve as primary "highways" of commerce for the industrial heartland of America. The Ohio River carries over 150 million tons of freight each year, about 60 percent of which is bituminous coal. Along with shipments of such non-toxic cargo are increasingly frequent transports of chemicals, fertilizers, and industrial products which, in sufficient concentrations, are toxic to humans and aquatic life. Shipments of known hazardous materials exceed 30 million tons each year — or an average of 80 thousand tons each day. Table 1, lists the shipments of various kinds of freight on the Ohio and provides tonnage for certain hazardous cargos.

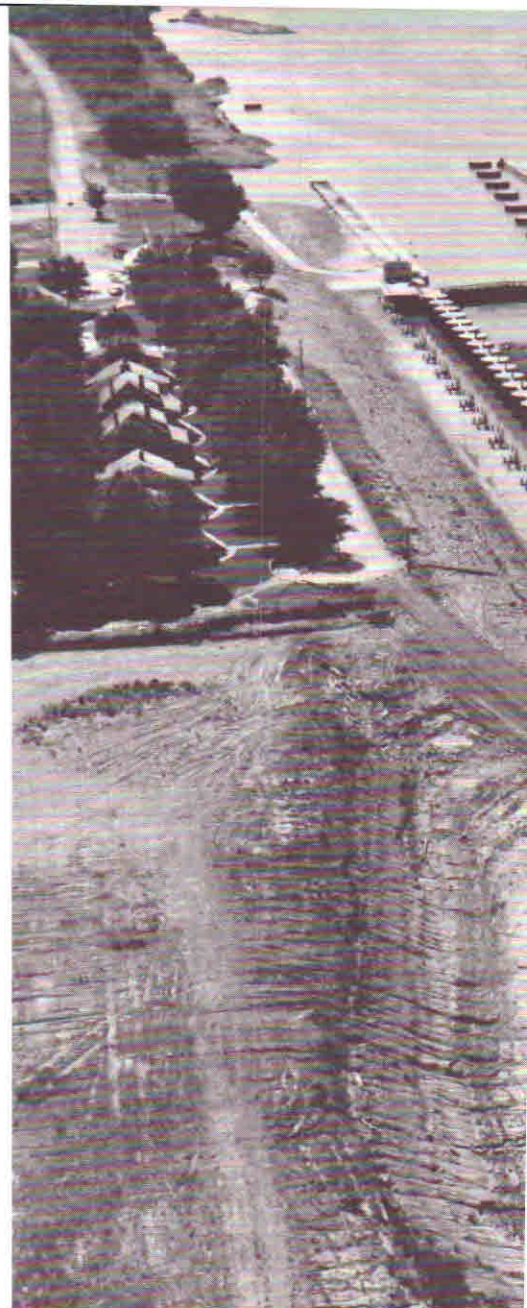
The Ohio River, which supplies drinking water to more than three million people, is a major recreational site for millions more, and is home to more than 80 species of fish.

Prevention of spills or other discharges to Ohio Valley rivers during the loading, transport and unloading of cargo is a major program of the manufacturing and river transport industries and governmental agencies concerned. Federal statutes which control the transport of hazardous and other materials are administered by the U.S. Coast Guard, the U.S. Corps of Engineers, and the U.S. Environmental Protection Agency. State environmental and natural resources agencies act individually and collectively through the Ohio-River Valley Water Sanitation Commission to regulate discharges and the quality of water in the Ohio River and its major tributaries. The Commission operates, in cooperation with public and private water users, an Organics Detection System (ODS), a network of detection and notification stations located to protect major Ohio River Valley water supplies. The Corps of Engineers and the U.S. Coast Guard have regulations covering the loading, unloading and transport of "tows" along with spill contingency plans. "Tows" is the term which describes towboats pushing barges linked together as mules and horses "towed" barges along canals in the 19th century. It is a term that has "stayed."

This effort at preventing major spills has four main components:

- **BARGE CONSTRUCTION SPECIFICATIONS**
- **PUMP SAFETY DEVICES**
- **LICENSING**
- **INSPECTION**

Today, the fact that there are so few accidental discharges and spills is a tribute to the success of these efforts.



*Above, Tow and barges pass through locks on the Ohio River  
Army Corps of Engineers Photo*

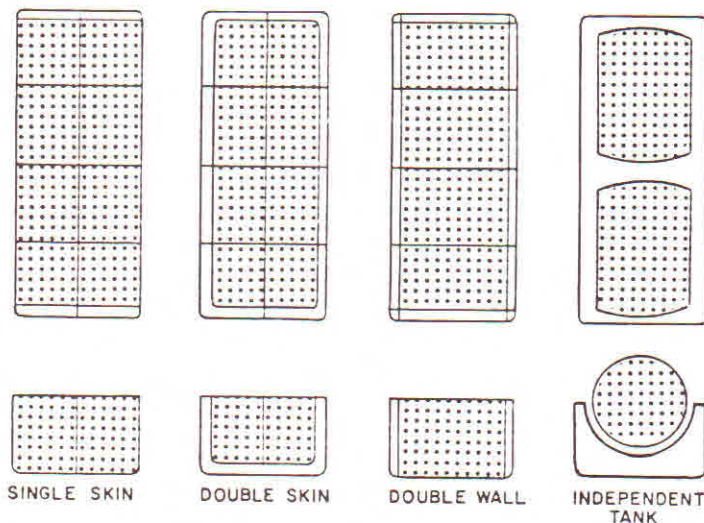




## BARGE CONSTRUCTION

Figure 1 illustrates several types of barges which are available for the transport of liquids. A *single skin barge* is a barge having one layer of steel or other material between the liquid being transported and the river water. *Double skin barges* provide annular space between two layers of steel. One layer contains the fluid being transported while the other layer is in contact with the river water. The hollow space between the layers may be monitored to check for leaks. The double skin barge extends this protection to the vessel's underside. A third type has a completely independent tank containing the fluid being transported resting upon the barge, which may have different configurations. Barges are also compartmentalized such that if one compartment is broken open, the material from other compartments will still be secure. Each successive type offers a greater degree of protection against the possibility of spilling the liquid in the event of an accident. The greater the protection provided to the transported material, the more expensive the barge and, hence, the more expensive the transportation.

Figure 1



Variations of Tank Barge Arrangements



BULK RATE  
U. S. POSTAGE  
PAID  
Cincinnati, Ohio  
Permit No 7812

Ohio River Valley Water  
Sanitation Commission  
49 E. Fourth St., Suite 815  
Cincinnati, Ohio 45202

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As of 8/85

## LICENSING

To assure that barges are handled in a safe manner and assure that the public, tow crews and their cargos are protected, tow captains and pilots are licensed by the U.S. Coast Guard. In addition, the Coast Guard issues Merchant Mariner's Documents to tankermen. Tankermen are the individuals who transfer cargoes to and from tankbarges. Both licenses and documents are based upon the individual's knowledge and experience.

A towboat captain has typically worked his way up from deckhand to tankerman to pilot operator, and is finally promoted to captain of a towboat based on his experience and qualifications as an operator of towing vessels.

## INSPECTION

The U.S. Coast Guard enforces federal laws and regulations which are designed to protect U.S. citizens, their private property, and the marine environment from the consequences of incidents involving materially unsafe vessels. Inspections of tankbarges carrying hazardous materials consists of determining the vessel's compliance with published safety standards over the course of a projected period of time. After a satisfactory inspection, a Certificate of Inspection (COI) is issued. This COI contains information on the owner, operator, vessel description, required safety equipment, manning requirements, where the barge can operate, and what hazardous materials can be carried and under what circumstances. The COI also lists cargo hazard classifications which are used in determining which chemicals can or cannot be stored in adjacent tanks.

## PUMP SAFETY

One of the more frequent causes of accidental spills is the loading and unloading of barges. At this land/water interface, special controls must be installed to ensure that in the event of an accident the material being loaded or unloaded will not enter the river. Liquid transfers are particularly vulnerable to accidental spills. In the event of a break in the transfer hose or pipe, pumps are designed to cease operating to prevent the liquid from being discharged into the river.

## SPILLS

No effort of prevention can be perfect. Spills and accidental discharges may still occur, and occasionally these may involve hazardous materials.

Should a spill or accidental discharge occur, it must be reported to the National Response Center (800/424-8802). Additionally, the state in which the spill occurred must be notified. (A listing of spill notification agencies is shown in Table 2.) Failure to report a spill or accidental discharge could cause the discharger to be subject to fines and criminal charges. The discharger is liable for the cost of cleanup.

Table 1  
Freight Traffic on the Ohio  
1983  
(Tons)

Commodity	Traffic
Barley and Rye	1,470
Corn	4,721,768
Oats	33,167
Sorghum Grains	213,349
Marine Shells, Unmanufactured	7,180
Iron Ore and Concentrates	441,515
Coal and Lignite	84,440,752
Crude Petroleum	855,571
Alcohols	696,964
Fertilizer and Materials	833,348
Phosphatic Chemical Fertilizers	68,695
Sulfuric Acid	102,784
Benzene and Toluene	450,719
Grain Mill Products	1,176,717
Animal Feeds	1,125,285
Sand, Gravel, Crushed Rock	12,660,401
Basic Chemicals and Products	5,595,599
Gasoline	6,453,820
Jet Fuel	768,779
Kerosene	229,851
Distillate Fuel Oil	2,899,431
Residual Fuel Oil	1,482,487
Liquified Gases	18,061
Sodium Hydroxide	532,153
Nitrogenous Chemical Fertilizers	1,121,961
Crude Tar, Oil, Gas Products	354,904
Potassium Chemical Fertilizers	753,794
Slag	306,990
<u>All Other</u>	<u>22,043,151</u>
Total	150,390,666

*Below, tow pilot guides tow down river  
Jeanne Jahngen Ison Photo*





## RESPONSE TEAMS

The states, the U.S. Coast Guard, and the U.S. Environmental Protection Agency have response teams on 24-hour call which may be dispatched immediately to the scene. These teams activate contingency plans to deal with the discharge. In one instance an oil spill occurred because of a collision with an oil barge. The damage to the barge was temporarily repaired, booms were set up to confine the spill for cleanup, and the barge was being pumped out within 2-½ hours. The Commission was notified of the incident and downstream water users, in turn were notified in that period.

The extent of the resources brought to bear on a spill can be considerable. The contingency plans spell out the procedures and designate the individuals assigned to the cleanup operations. These range from evacuation plans to contaminant depending upon the nature of the spill. While most spills involve the release of only small quantities of oil or chemicals which dissipate or evaporate rapidly, the need for continued vigilance to prevent serious incidents from occurring is recognized.

*Paramount in all measures to control spills and accidental discharges is prevention.*

## SUMMARY

While the Ohio River carries a very large quantity of hazardous materials each year, the frequency of reported accidents or spills is small and declining. Effective plans have been made to ensure that in the event of an accident, there is little or no adverse effect on the human population or the aquatic environment. In the event that a serious incident does occur, response teams have been established and contingency plans prepared. Thus, the river continues to serve its many functions of water supply, transportation route, recreational site, and natural habitat, with its users and inhabitants protected.

Table 2

### Spill Notification Agencies for the Ohio River Main Stem

State	State Agencies	Location
Illinois	State Emergency Disaster Agency	Springfield
Indiana	Indiana Stream Pollution Control Board	Indianapolis
Kentucky	Environmental Response Center	Frankfort
Ohio	Environmental Protection Agency	Columbus
Pennsylvania	Department of Environmental Resources	Harrisburg
West Virginia	Department of Natural Resources	Charleston

State	Federal Agencies	Location
All	National Response Center	Washington, DC
PA, WV, VA	US EPA, Region III	Philadelphia, PA
KY	US EPA, Region IV	Atlanta, GA
OH, IN, IL	US EPA, Region V	Chicago, IL
All	US Coast Guard	St. Louis, MO
All	US Army Corps of Engineers	Cincinnati, OH

State	Interstate Agency	Location
All	Ohio River Valley Water Sanitation Commission	Cincinnati, OH

*Below, tank barge awaits its journey up river  
Army Corps of Engineers Photo*

