Transportation of Hazardous Materials in Arizona

Executive Summary

Phase I Study

Arizona Transportation Research Center

Arizona Department of Transportation

U.S. Department of Transportation (FHWA)

TRANSPORTATION OF HAZARDOUS MATERIALS IN ARIZONA

EXECUTIVE SUMMARY

PHASE I STUDY

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The Phase I Study of Transportation of Hazardous Materials in Arizona is in draft review status. Copies can be requested from Frank McCullagh, Director, Arizona Transportation Research Center, Arizona State University, Tempe, Arizona, 85287.

EXECUTIVE SUMMARY

The State of Arizona will continue to experience growth in industrial development and population. As development continues to expand, hazardous materials (HM) will be transported in greater amounts into the State. In addition, with the advent of more stringent regulations for hazardous waste management, greater demands will be placed on transporting hazardous waste to treatment and disposal facilities. The objective of the Phase I study was to assess the magnitude of hazardous materials shipments, load characteristics in terms of chemical type, volume, and hazard class, and the flow pattern by route. The statistical analysis is considered to be a first step in understanding the nature of the hazardous material transportation situation and will serve as a basis for risk assessment and hazard management studies as well as for program development.

Surveys and Data Base Management System

Several surveys were conducted to obtain HM shipment data. These surveys included: 1) hazardous waste shipments for 1983 and 1984 compiled from manifests required by the Resource Conservation and Recovery Act; 2) two one-week surveys of HM placarded trucks at Arizona's ports of entry; 3) an intra-state survey at 9 state locations; and 4) interviews with industries distributing bulk materials of gasoline, acids and propane. The hazardous waste manifests totalled 5,000 entries and represented total shipments for 2 years. The ports of entry surveys were taken at the five major entry points into Arizona - Topock, Ehrenberg, Yuma, Sanders and San Simon, and accounted for 74 percent of total incoming commercial vehicles in 1984.

A data base management system has also been developed for use by state agencies. While the report cannot display the thousands of individual hazardous substances for which information is now available - volumes entering Arizona, number of truckloads, routes traversed, the data can be retrieved for use for program planning, conducting risk evaluations, and as a basis for safety and emergency management. Port of entry data, for example, can be retrieved by entry place, origin-destination, volume/weight of hazardous substances, chemical number and hazard class, and transportation routes.

Hazardous Materials Entering Arizona

Based on data from the five ports of entry, there are an estimated 122,314 truckloads of hazardous materials entering Arizona annually. However, this volume is underestimated because the five ports account only for 74 percent of total incoming commercial vehicles. The percentage of vehicles carrying HM entering Arizona for the five ports was estimated to be 8.1 to 8.5 percent depending on the season. Variation by port in this percentage was also observed. For example, trucks carrying HM loads accounted for 11.2 percent of all incoming trucks at Sanders and 10 percent at Ehrenberg.

Table 1 shows the total number of annual shipments and truckloads by port of entry. Shipments constitute separate hazardous materials loads within one truck. Sanders was observed to have the greatest range between number of shipments (99,580) and truckloads (47,840) and reflects a large proportion of "mixed" chemical cargoes entering Arizona at that port. Such findings suggest that the management needed to cope with the prevention and consequences of HM truck accidents around Sanders may be different than those for other ports of entry. Further-

more, Sanders and Ehrenberg have the highest number of truckloads entering the state, representing 39.9 percent and 36.2 percent, respectively.

TABLE 1
Total Number of Annual Shipments and Truckloads
by Port of Entry

Port of Entry	Shipments	Truckloads	Tons	Gallons (000)	Total Equivalent Tonnage
Ehrenberg	46,800	43,368	176,532	149,000	799,571
Sanders	99,580	47,840	239,255	117,000	730,524
Topock	6,136	5,772	40,437	17,900	115,407
Yuma	11,856	11,024	20,740	76,200	340,080
San Simon	17,368	11,856	124,225	71,800	425,148

Table 2 shows HM truckloads entering Arizona by Hazard Class. Flammables are the largest group, followed by corrosives and combustibles. The data also showed that about 44 percent of HM vehicles entering Arizona are "drive through" transport; that is, they do not unload their cargo in Arizona.

TABLE 2
HM Truckloads Entering Arizona
via Five Ports of Entry by Hazard Class

Hazard Class	Percent	Rank
Oxidizer	3.2	6
Corrosive	18.5	2
Poison	3.3	5
Radioactive	.5	7
Explosive	4.9	4
Combustible	10.0	3
Flammable	59.6	1

Figures A and B are the estimated total annual truckloads of hazardous wastes and materials. The figures are based on the incoming traffic at the five major points of entry, and the intra-state shipments of large tank trucks of gasoline, propane and acids. The estimates do not include intra-urban HM shipments or the smaller HM intra-state loads such as the 2,000 gallon propane delivery trucks. The figures provide may underestimate total state shipments by 30 percent. Routes I-10, I-40, and I-17 represent the routes with the largest annual volumes of HM traffic.

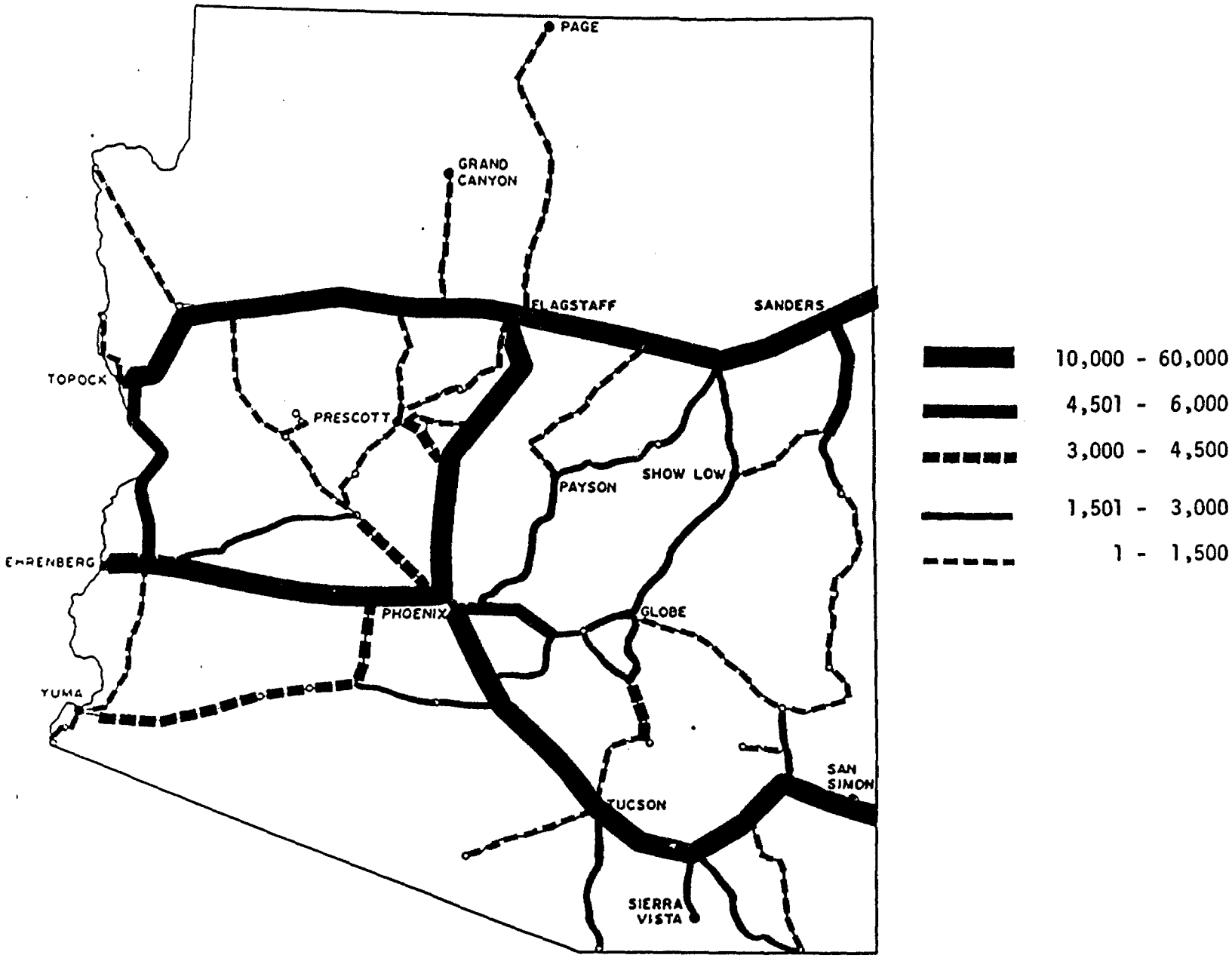

FIGURE 1 Estimated Cumulative Annual Truckloads of Hazardous Materials and Hazardous Wastes.

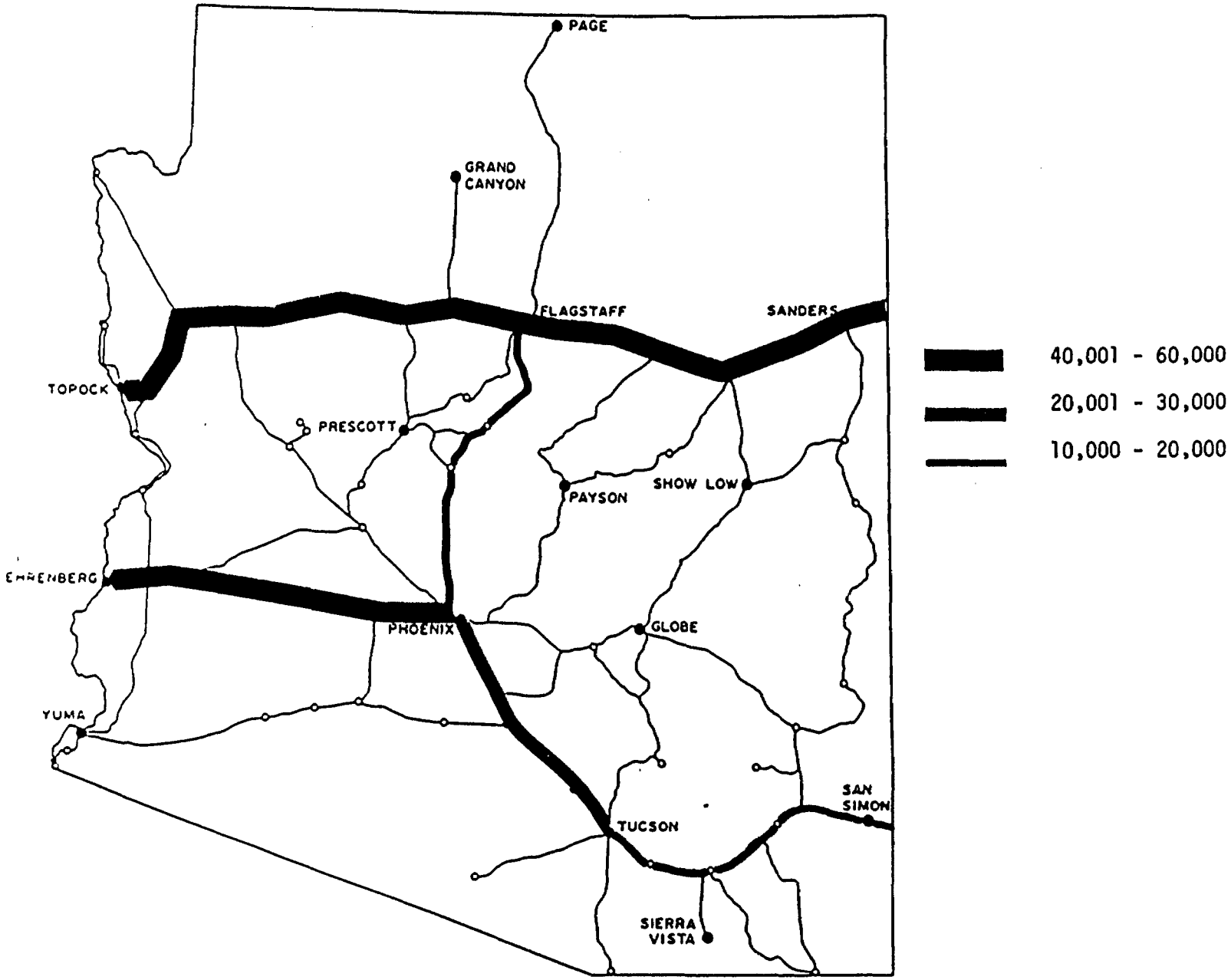

FIGURE 2 Estimated Cumulative Annual Truckloads of Hazardous Materials and Hazardous Wastes for Selected Major Routes.