

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

INFORMATION REPORT

October 2, 1980

SECY-80-245C

For: The Commissioners

From: John G. Davis, Director
Office of Nuclear Material Safety
and Safeguards *W. Davis*

Thru: William J. Dircks, Executive Director for Operations

Subject: RELEASE OF PRE-PUBLICATION COPIES OF DRAFT NUREG-0725
ON NRC APPROVED ROUTES FOR SPENT FUEL SHIPMENTS

Purpose: To inform the Commission of the staff actions being taken to
make information on NRC-approved spent fuel shipment routes
publicly available.

Category: Information

Discussion: The staff, in response to the Secretary's memorandum of July 3,
1980, stated in SECY 80-245B that an action was then underway
to prepare the first of a series of NUREG reports containing
maps of the United States showing approved spent fuel shipment
routes, the quantities of shipments made over these routes, and
an introductory statement to distinguish between the safety and
safeguards aspects of these shipments. Enclosure "A" is a
draft copy of the proposed document, NUREG-0725, "Public
Information Circular for Shipments of Irradiated Reactor Fuel."
This document also describes NRC requirements for reporting
safeguards incidents. Although no safeguards incidents have
been reported to date, future updates of NUREG-0725 will
describe any such incidents which may occur.

The draft NUREG document will be sent to State governors under
a cover letter from the Chairman (see Enclosure "B"). Following
receipt by the State governors, additional copies will be made
available to the public through the Public Document Room, the
news media, and selected distribution to individuals and
organizations who have previously requested such information.
Copies will also be sent to the appropriate Congressional
Committees. A public announcement to this effect has been
prepared by the Office of Public Affairs (see Enclosure "C").

Contact:
Tom R. Allen, SGRI
42-74181

8010200365

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POOR QUALITY PAGES

PDR

Discussion:
(Continued):

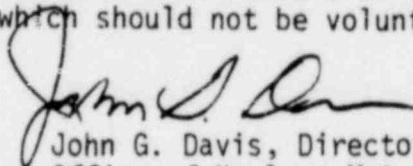
Publication as a finished NUREG document cannot be accomplished for several weeks. Therefore, pre-publication copies of the draft NUREG-0725 will also be used on an interim basis to respond to FOIA requests for this type of information. It is expected that most of the outstanding FOIA requests for spent fuel shipment routing information will be satisfied by the distribution of the draft or published versions of the NUREG document. However, it may be necessary, in some cases, to supply additional information.

The draft NUREG document includes approved routes as of September 10, 1980. In order to respond to FOIA requests for routes approved subsequent to publication of the initial NUREG-0725 and between publications of successive semi-annual updates, the staff intends to supplement published route information with draft material as necessary on a case by case basis.

As indicated in SECY 80-245B, development of proposed regulations to notify State governors prior to spent fuel shipments through their respective States is being undertaken in a separate action.

Coordination:

The Office of the Executive Legal Director has no legal objection to the intended course of action. The Offices of State Programs, Standards Development, and Inspection and Enforcement concur in this paper, but IE feels that Table 2 of Enclosure A provides a level of detail which should not be voluntarily published by the Commission.



John G. Davis, Director
Office of Nuclear Material Safety
and Safeguards

Enclosures:

- "A" - Draft NUREG-0725
- "B" - Draft Letter to Governors
- "C" - Draft Public Announcement

DISTRIBUTION

Commissioners
Commission Staff Offices
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ACRS
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ENCLOSURE A

PUBLIC INFORMATION CIRCULAR FOR
SHIPMENTS OF IRRADIATED REACTOR FUEL

U.S. NUCLEAR REGULATORY COMMISSION

September 1980

REF ID: A66666

This circular has been prepared in response to numerous requests for information regarding routes for the shipment of irradiated reactor (spent) fuel. Such routes are required by the Nuclear Regulatory Commission (NRC) to be approved by the NRC staff prior to their first use, in accordance with the regulatory provisions of 10 CFR Part 73.37. These regulations were promulgated in May, 1979 in response to Commission concerns about the possible threat of terrorist activity that could lead to radiological sabotage of spent fuel shipments. At the time these safeguards regulations were promulgated the Commission judged the then existing regulations to be completely adequate in assuring the safety of spent fuel shipments from accidental dispersal of radioactive material. Thus the additional safeguards regulations contained in 10 CFR Part 73.37 were aimed exclusively at protection against radioactive dispersal caused by malevolent acts by persons.

The information included herein reflects NRC staff knowledge as of September 10, 1980. Spent fuel shipment routes, primarily for road transportation, but also including one rail route, are indicated on reproductions of commercially available road maps. Also included are the amounts of material shipped during the approximate one year period that safeguards regulations have been effective, and information regarding NRC requirements for reporting safeguards incidents which could occur during a spent fuel shipment (of which none have been reported to date).

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1.1 About This Publication

This publication is the first in a proposed series of semiannual publications issued by the Nuclear Regulatory Commission in response to public information requests regarding the Commission's regulation of shipments of irradiated reactor fuel. Subsequent issues in this series will update the information contained herein.

This publication contains basically three kinds of information.

- (1) Routes approved by the Commission for the shipment of irradiated reactor fuel,
- (2) Information regarding any safeguards-significant incidents which have been reported to occur during shipments along such routes, and
- (3) Cumulative amounts of material shipped.

1.2 NRC Regulatory Objectives

The Nuclear Regulatory Commission is authorized under the Atomic Energy Act of 1954, as amended, to regulate the private nuclear industry for purposes of protecting the public health and safety and the common defense and security of the United States. The Commission is concerned with the transportation of all nuclear materials in the nuclear fuel cycle, which includes the transportation of irradiated reactor fuel (spent fuel).

Protection of the public, insofar as the transportation of spent fuel is concerned, depends on maintaining the integrity of the massive casks in which

the spent fuel is transported. As long as the radioactive material is kept within the casks, significant radiation doses to the public will not occur. The design of the cask is intended to provide reasonable assurance that accidents do not cause severe leakage. The NRC believes that the package design provides adequate protection so that it is safe to transport appropriately packaged spent fuel over existing rail systems and over any highway system that is designed to bear the weight, without specific NRC approval of the route.

Although the design of the massive cask makes difficult the release of a significant amount of radioactive material as a result of sabotage, the NRC believes that until the possible consequences of sabotage can be evaluated more fully, protective measures in addition to reliance upon cask design are prudent. Hence, exercising prudence, the Commission approved in May 1979, for issuance in effective form, new interim regulations for strengthening the protection of shipments of spent fuel against sabotage. In May 1980, these regulations were revised in response to public comments and were issued in effective form as an interim final rule. These regulations are expected to remain in effect until the completion of an ongoing research program concerning the response of spent fuel to certain forms of sabotage, at which time the regulations may be rescinded, modified or made permanent, as appropriate. In particular, these regulations require NRC approval of routes for the transportation of spent fuel. This requirement for advance route approval is not based on accident prevention, but as a matter of prudence, is intended to provide additional protection against actual or attempted acts of sabotage. Further discussion of the safety of spent fuel shipments is provided below.

1.3 Safety of Spent Fuel Shipments

The NRC distinguishes between safety regulation of shipments and safeguards regulation of shipments. Safety deals with protection against adverse consequences from accidents or natural causes, while safeguards deals with the protection of shipments against deliberate, malevolent acts by persons.

The NRC ensures the safety of spent fuel shipments mainly through stringent packaging requirements. Spent fuel is shipped only in massive, durable casks designed to withstand severe accidents without release of the radioactive contents.

Of the thousands of shipments that have been made during the past thirty years, none has resulted in an identifiable injury to the public through release of radioactive material.

General standards and requirements for spent fuel casks are set forth in NRC regulations. A cask must be designed to withstand a series of specified impact, puncture, and fire environments, thereby providing reasonable assurance that the package will withstand serious transportation accidents. The cask design is initially reviewed by the NRC staff to verify its resistance to accidents. A certificate must be issued by the NRC before a cask fabricated from that design can be used to transport spent fuel.

The standards that have been established in the regulations provide that a cask shall prevent the loss or dispersion of the radioactive contents, provide adequate shielding and heat dissipation, and prevent nuclear criticality under both normal and accident conditions of transportation. The normal conditions of transportation which must be considered are specified in the regulations in terms of hot and cold environments, pressure differential, vibration, water

spray, impact, puncture, and compression tests. Accident conditions which must be considered are specified in terms of impact, puncture, and fire conditions.

Thus far, success of the packaging strategy has been demonstrated despite an occasional violent traffic accident. For example, one such accident occurred on December 8, 1970, on a major highway near Oak Ridge, Tennessee. In this accident, the driver of a vehicle carrying a spent fuel cask swerved to avoid colliding with an oncoming vehicle, lost control, and overturned off the roadway. The cask assembly was thrown into a ditch, traveling more than one hundred feet before coming to rest. No release of contents or release of radiation occurred. The outer surface of the cask suffered minor damage. The cask was recovered and subsequently returned to service after repairs.

The durability of casks has also been demonstrated in controlled tests. In one test, a truck bearing a cask was deliberately placed in the path of and struck by a 120-ton locomotive traveling about 80 miles per hour. In another test, a cask aboard a truck moving at about 80 miles per hour was deliberately crashed into an immovable concrete structure. Subsequent examination confirmed in both of these tests that no radioactive material would have been released from these casks had they been loaded with spent fuel. Thus, both field experience and controlled tests have substantiated the NRC strategy of depending upon packaging design for safety in transit.

2. SAFEGUARDS FOR SPENT FUEL SHIPMENTS

2.1 Safeguards Incident Reporting Requirements

Safeguards incidents for spent fuel shipments are those which involve attempts at sabotage of spent fuel, or purposeful acts which threaten or result in

significant degradation of the safeguards system used to protect the shipment.

Licensees are currently required to record such events in a written log which is available to NRC personnel. In addition, licensees may soon be required under proposed amendments to the regulations (10 CFR Part 73) to promptly report safeguards incidents to the NRC by telephone, followed by a written report. Licensees are also required under existing regulations to immediately notify local law enforcement authorities upon the occurrence or discovery of a safeguards incident for the purpose of initiating an appropriate response.

2.2 Safeguards Incidents Reported

To date, no safeguards incidents have been reported to have occurred during a spent fuel shipment under NRC license. Although there have been several minor incidents (flat tire, radiator hose repair, brake drum replacement) none of these have caused or been accompanied by a significant degradation in the effectiveness of the safeguards systems employed in accordance with NRC requirements. Any future safeguards incidents reported under the regulations referred to above will be included in subsequent issues in this series of publications.

3. APPROVED ROUTES FOR SPENT FUEL SHIPMENTS

3.1 Routes Described

NRC licensees planning to ship spent fuel are required to submit proposed routes for such shipments to the NRC staff for approval prior to the first use of a given route. Once approved, the same route may be utilized for additional shipments in a proposed series of shipments without further approval of the route, providing that the NRC is notified in advance of each shipment. From time to time, the NRC may authorize alternate routes or detours as

circumstances dictate at the time of shipment. Also, minor detours may be taken without prior approval in response to unforeseen circumstances which arise during a shipment. Criteria for determining when and how such detours may be taken are provided in published regulatory guidance (NUREG-0561/Rev. 1).

The spent fuel shipment routes shown in Appendix A in this document are those which were approved as of September 10, 1980. Some of these routes have been used for series of shipments which have already been completed, others for series of shipments which have yet to be completed, while some have been approved but have yet to be utilized. Also, some routes were changed from the originally approved route after one or more shipments in a series were completed. The routes shown do not include previous routes which are no longer approved or those contemplated for future shipments but which are not yet approved.

3.2 Route Display Format

The routes are shown in the form of maps adapted from a commercially available road atlas. Each state containing one or more approved spent fuel shipment routes is represented. In some cases, to achieve the best clarity, only the portions of the state including the routes are shown. The routes are indicated by widened shaded lines drawn along the routes and should be obvious to the reader. The route numbers have been left unshaded to assure maximum clarity.

3.3 States Containing Approved Routes

The states containing portions of approved spent fuel shipment routes are listed in Table 1. In total, there are thirty-three states containing portions of such routes.

The amounts of spent fuel shipped from one facility to another are presented in Table 2. Each entry describes the number of shipments completed between July 16, 1979 and September 10, 1980, and the total number of kilograms of spent fuel included in such shipments (exclusive of structural and packaging material). Since some nuclear facilities both send and receive spent fuel shipments, shipments may proceed in either direction along a given route. Accordingly, each location listed in Table 2 is considered to be alternately a point of origin or destination.

1. ARIZONA
2. CALIFORNIA
3. COLORADO
4. CONNECTICUT
5. IDAHO
6. ILLINOIS
7. INDIANA
8. IOWA
9. KANSAS
10. KENTUCKY
11. MARYLAND
12. MICHIGAN
13. MINNESOTA
14. MISSOURI
15. NEBRASKA
16. NEVADA

17. NEW JERSEY
18. NEW MEXICO
19. NEW YORK
20. NORTH CAROLINA
21. OHIO
22. OKLAHOMA
23. OREGON
24. PENNSYLVANIA
25. SOUTH CAROLINA
26. TENNESSEE
27. TEXAS
28. UTAH
29. VIRGINIA
30. WASHINGTON
31. WISCONSIN
32. WEST VIRGINIA
33. WYOMING

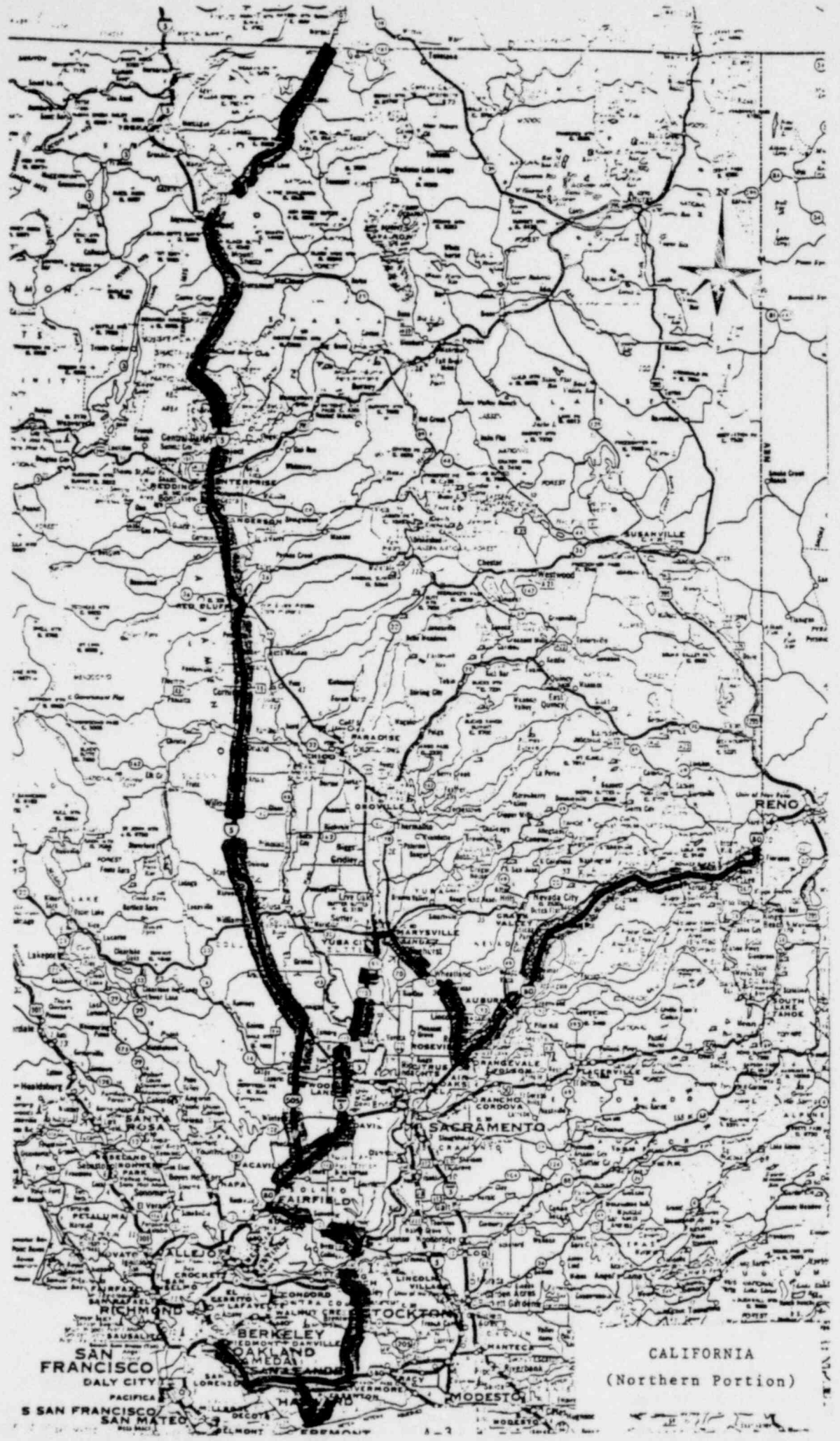
APPENDIX A

SPENT FUEL SHIPMENT ROUTES BY STATE

TABLE 2

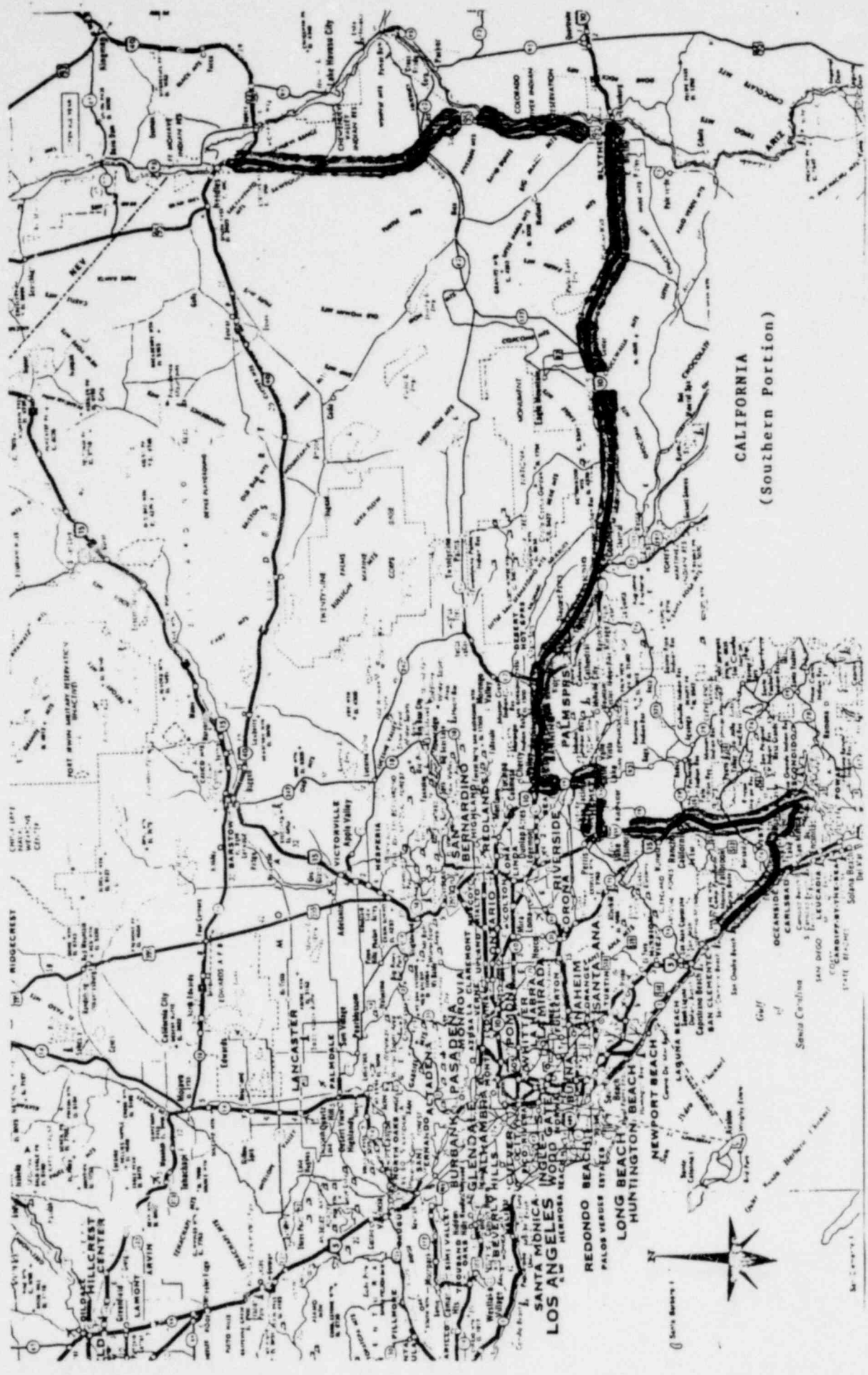
NUMBER/QUANTITY OF SHIPMENTS (number/kgs)

ORIGIN/DESTINATION	A. Aiken, SC	B. Cornelius, NC	C. Lynchburg, VA	D. Morris, IL	E. Oakland, CA	F. Pleasanton, CA	G. Richland, WA	H. Scottie, ID	I. Seneca, SC	J. Southport, NC	K. West Jefferson, OH
1. Ann Arbor, MI	3/6.1										1/24.3
2. Calvert Cliffs, MD											
3. Columbia, MO	2/50.4										
4. Forked River, NJ											
5. Fort St. Vrain, CO							24/1828.8				
6. Genoa, WI											3/1500
7. Haddam Neck, CT										10/35,000	
8. Hartsville, SC											
9. Lynchburg, VA											1/500
10. Monticello, MN											
11. Oakland, CA											
12. Ogdensburg, NY	14/72.1										
13. Pleasanton, CA											
14. Portsmouth, VA	31/183.4										
15. San Onofre, CA											
16. Seneca, SC											
17. Southport, NC											
18. Tuxedo, NY											
19. Waterford, CT											

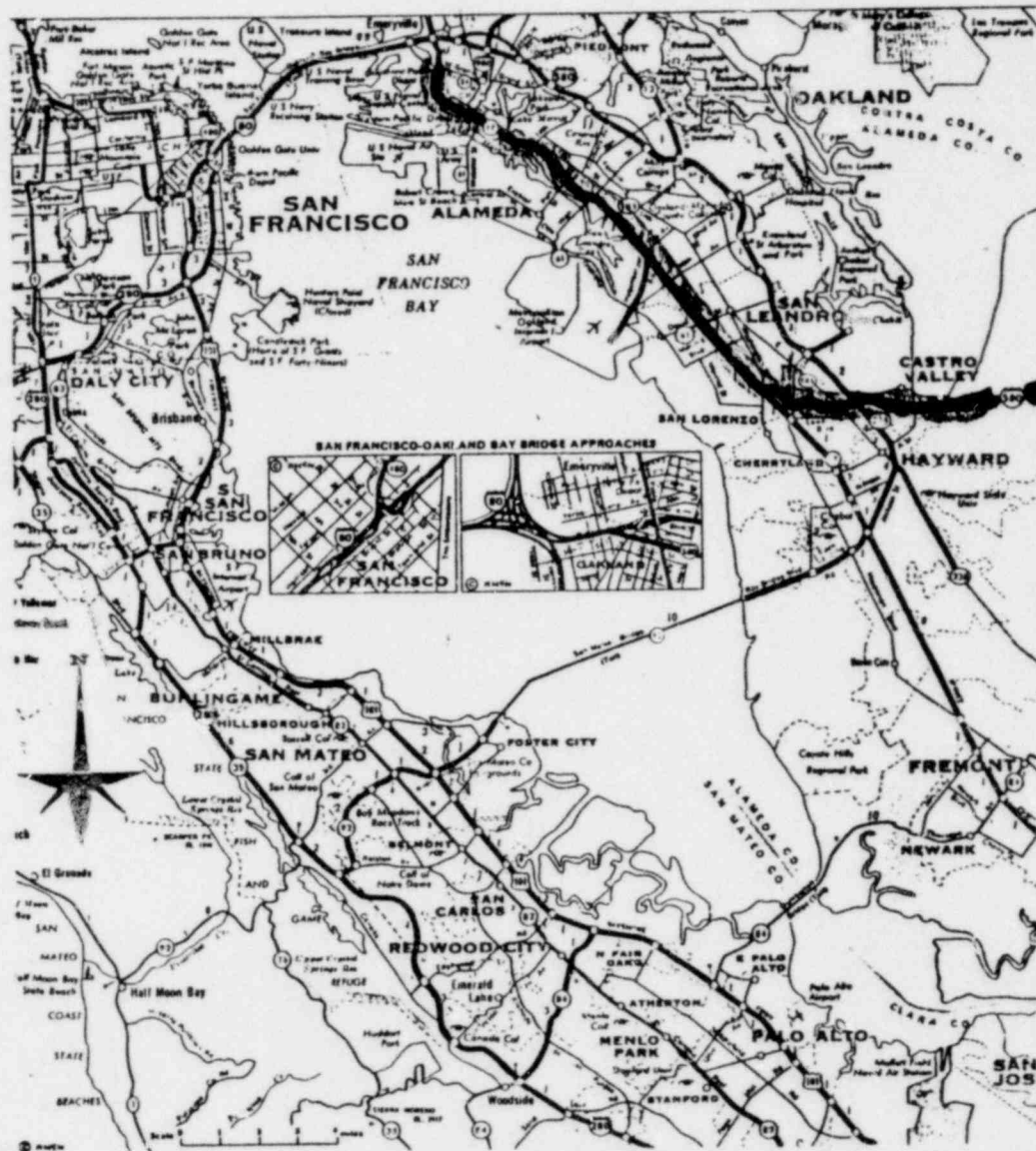


CALIFORNIA
(Northern Portion)

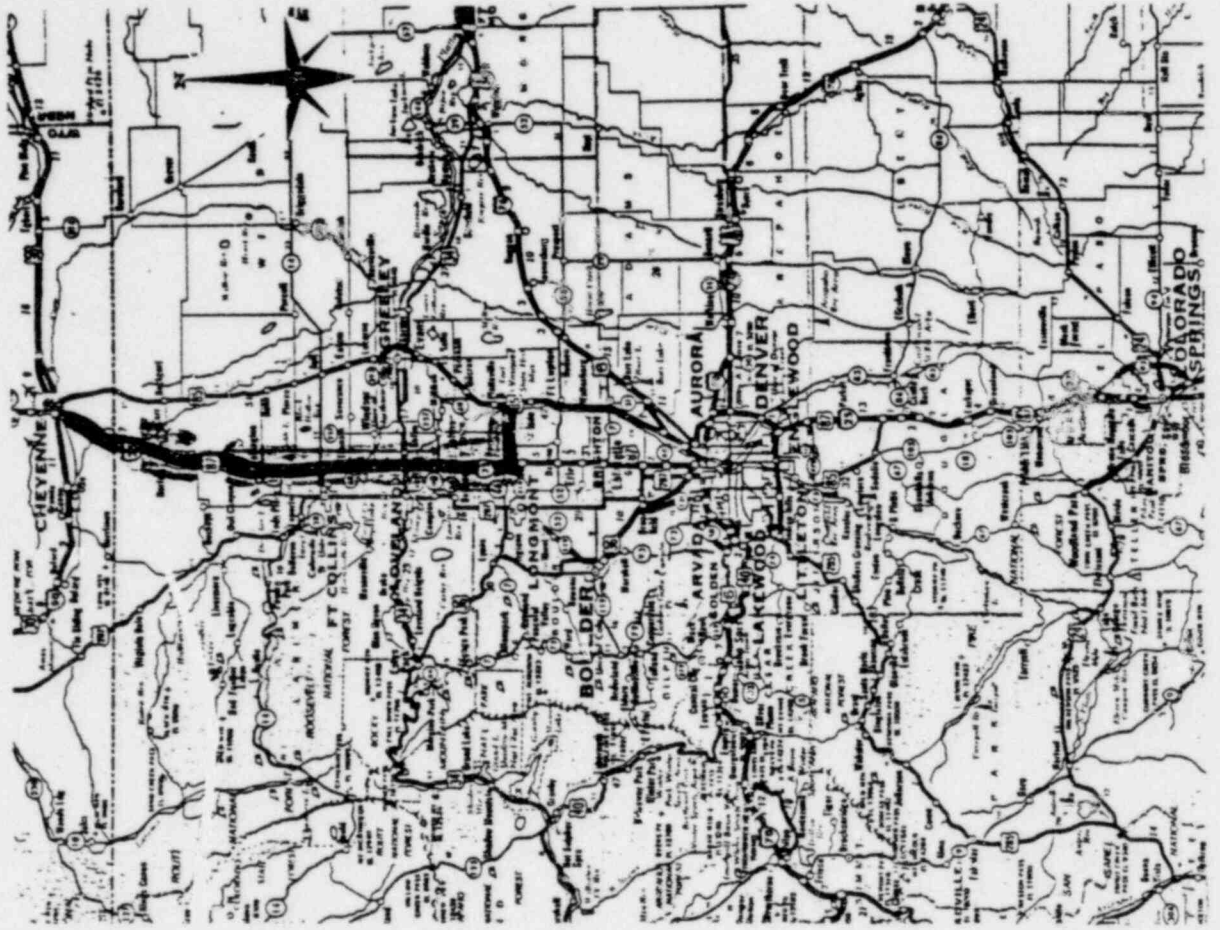
SAN FRANCISCO
DALY CITY
SAN FRANCISCO
SAN MATEO
RICHMOND
BERKELEY
OAKLAND
STOCKTON
SACRAMENTO
FAIRFIELD
SANTA ROSA
YUBA CITY
RENO
SUSANVILLE

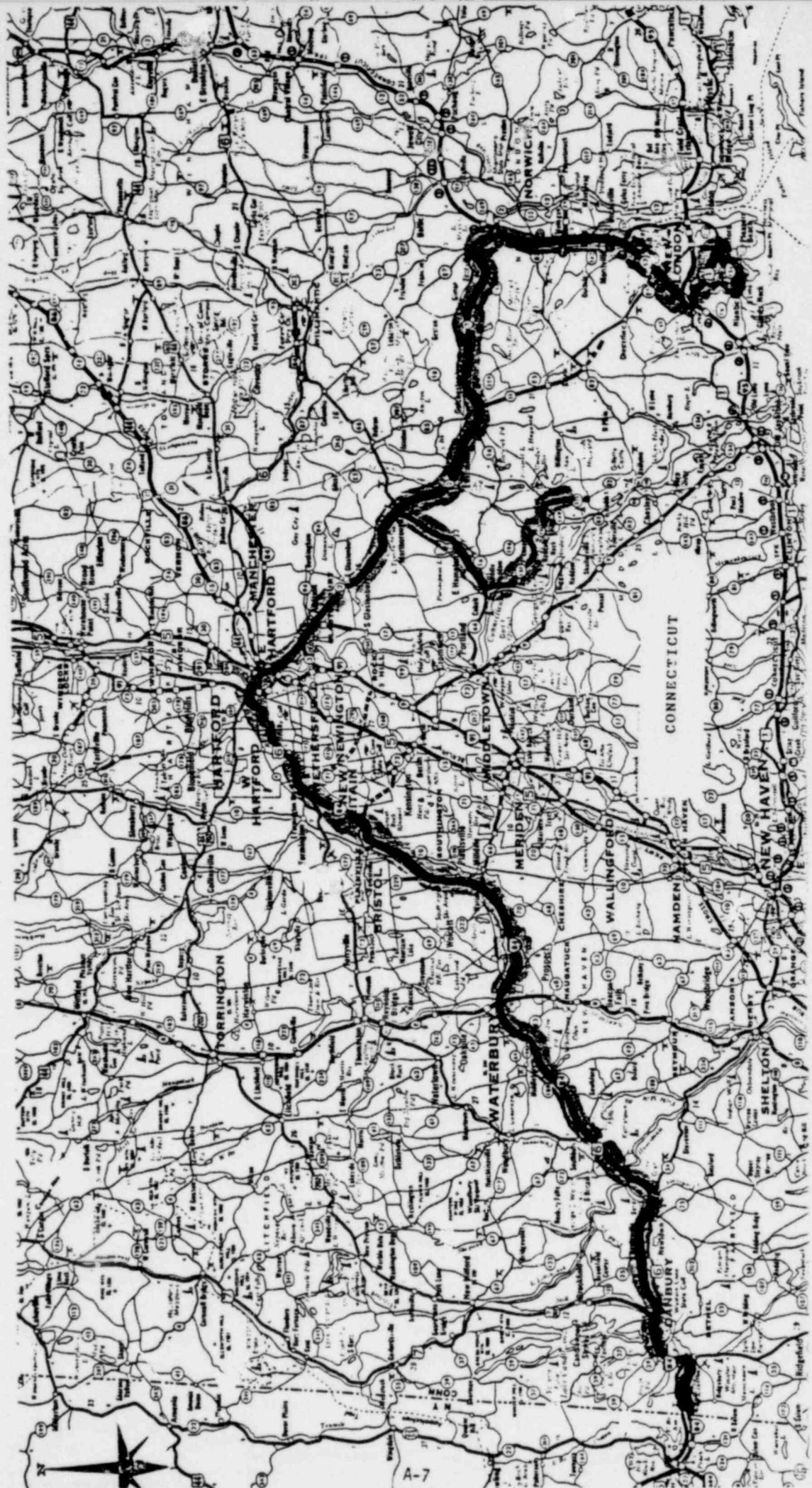


CALIFORNIA
(Southern Portion)

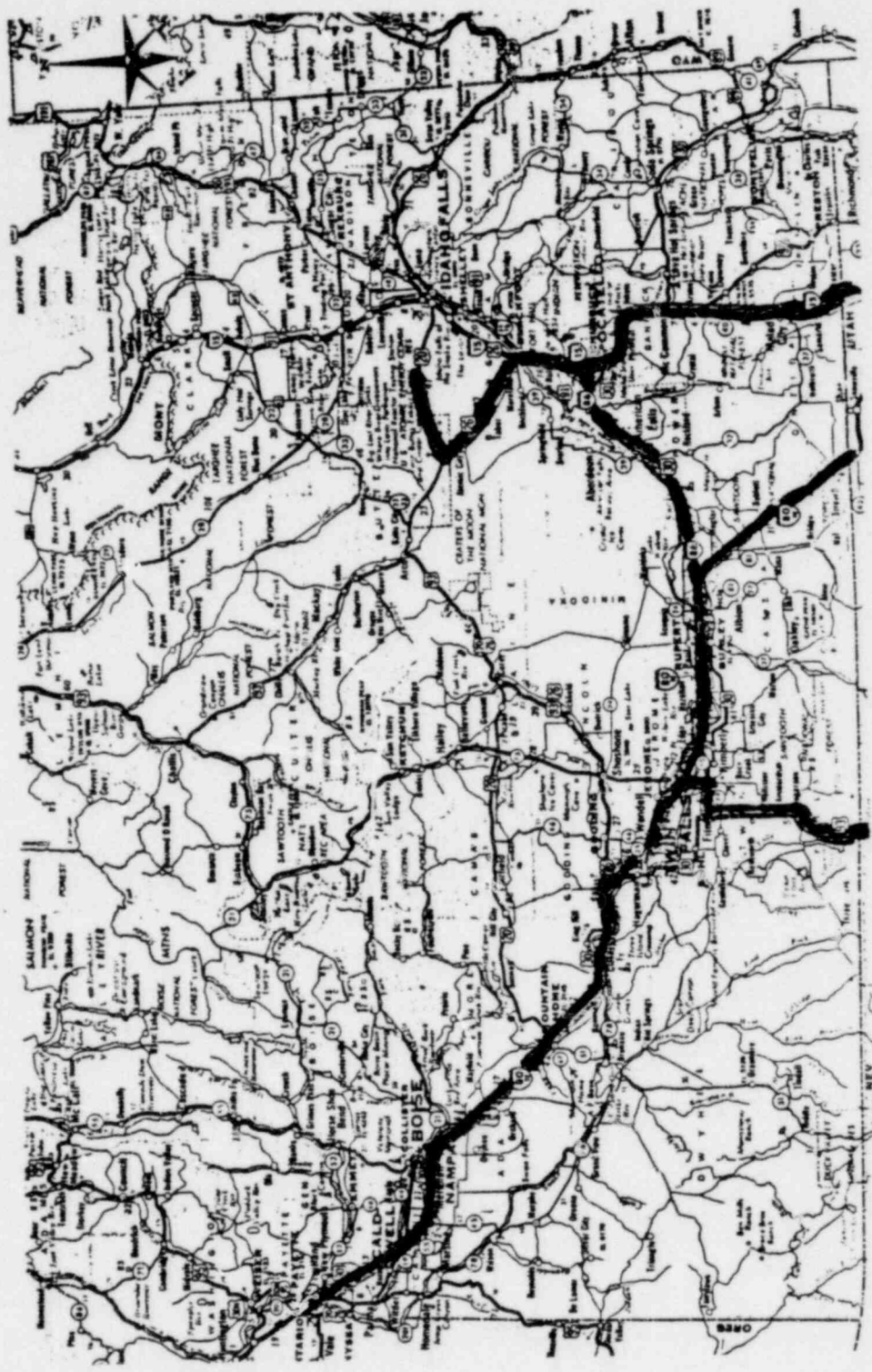


CALIFORNIA
(San Francisco -
Oakland Area Detail)

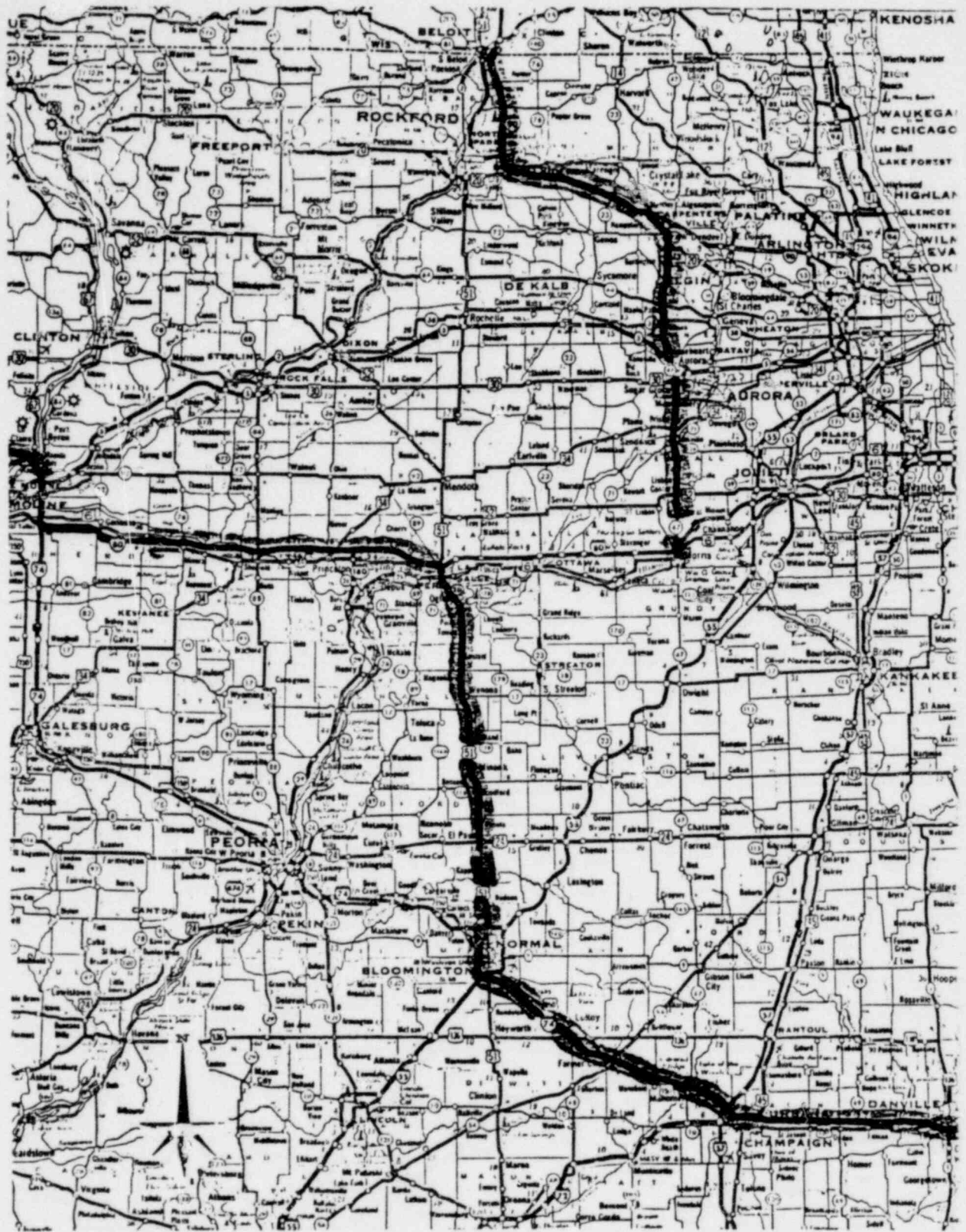




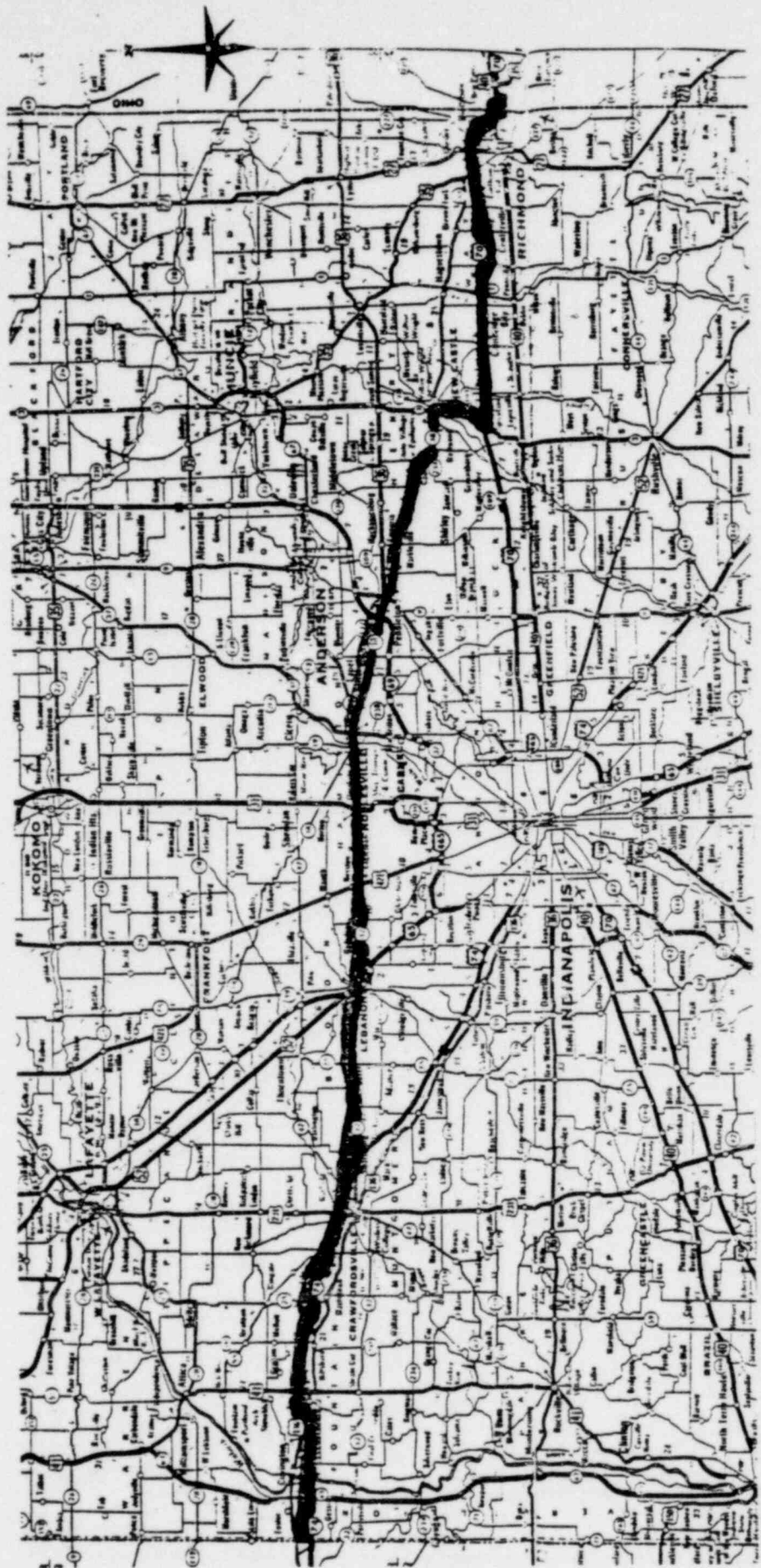
A-7



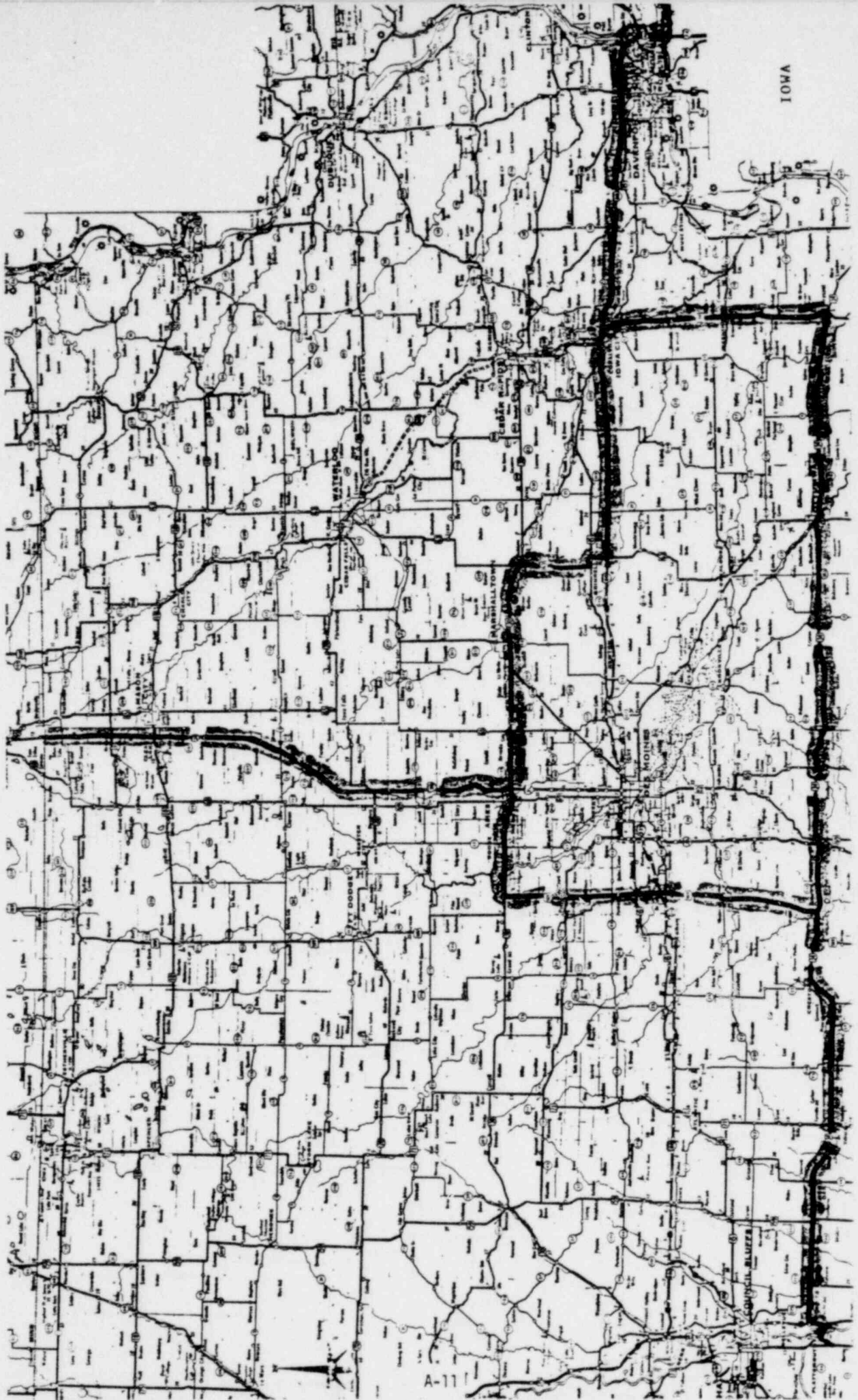
IDAHO

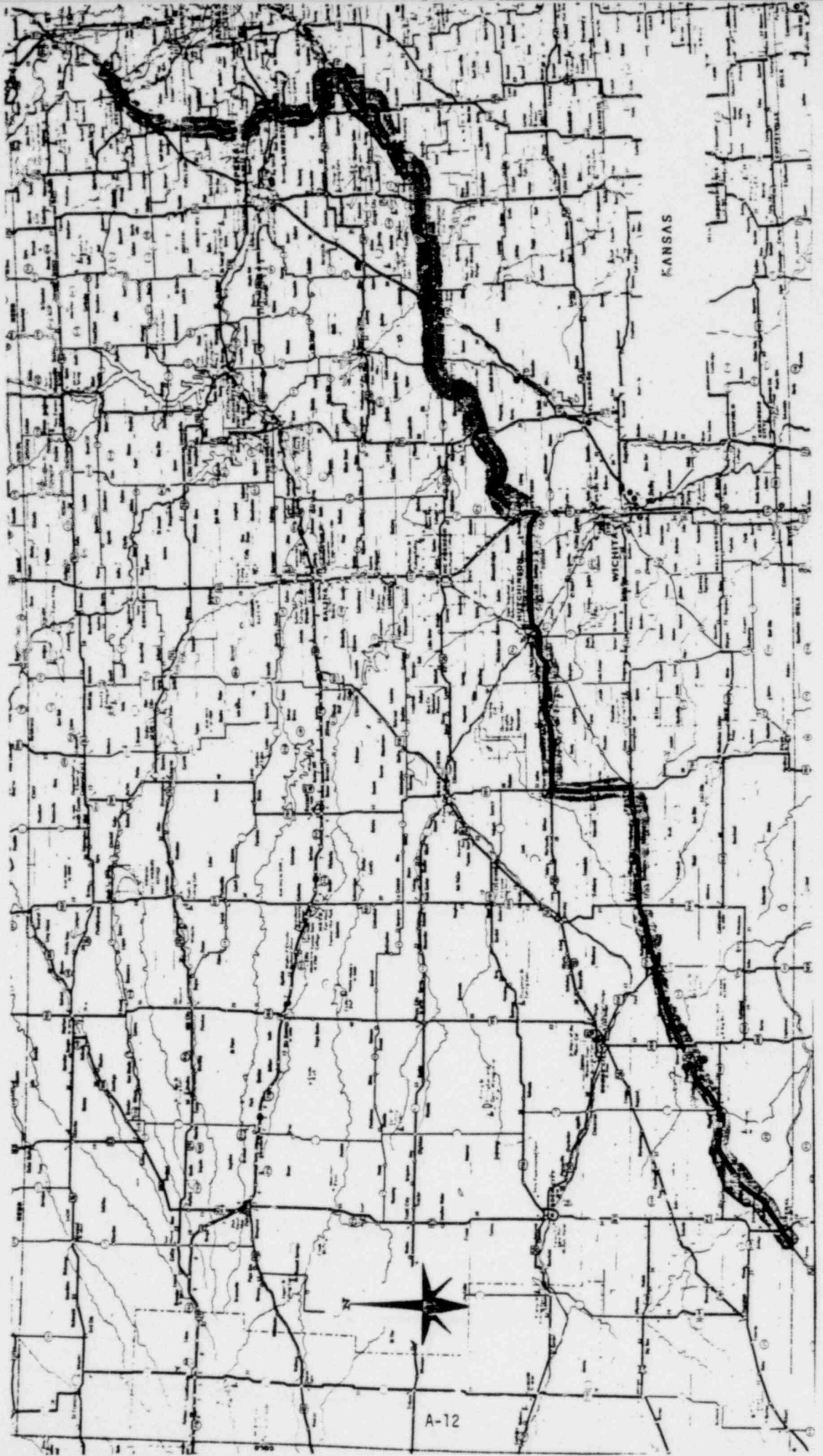


ILLINOIS



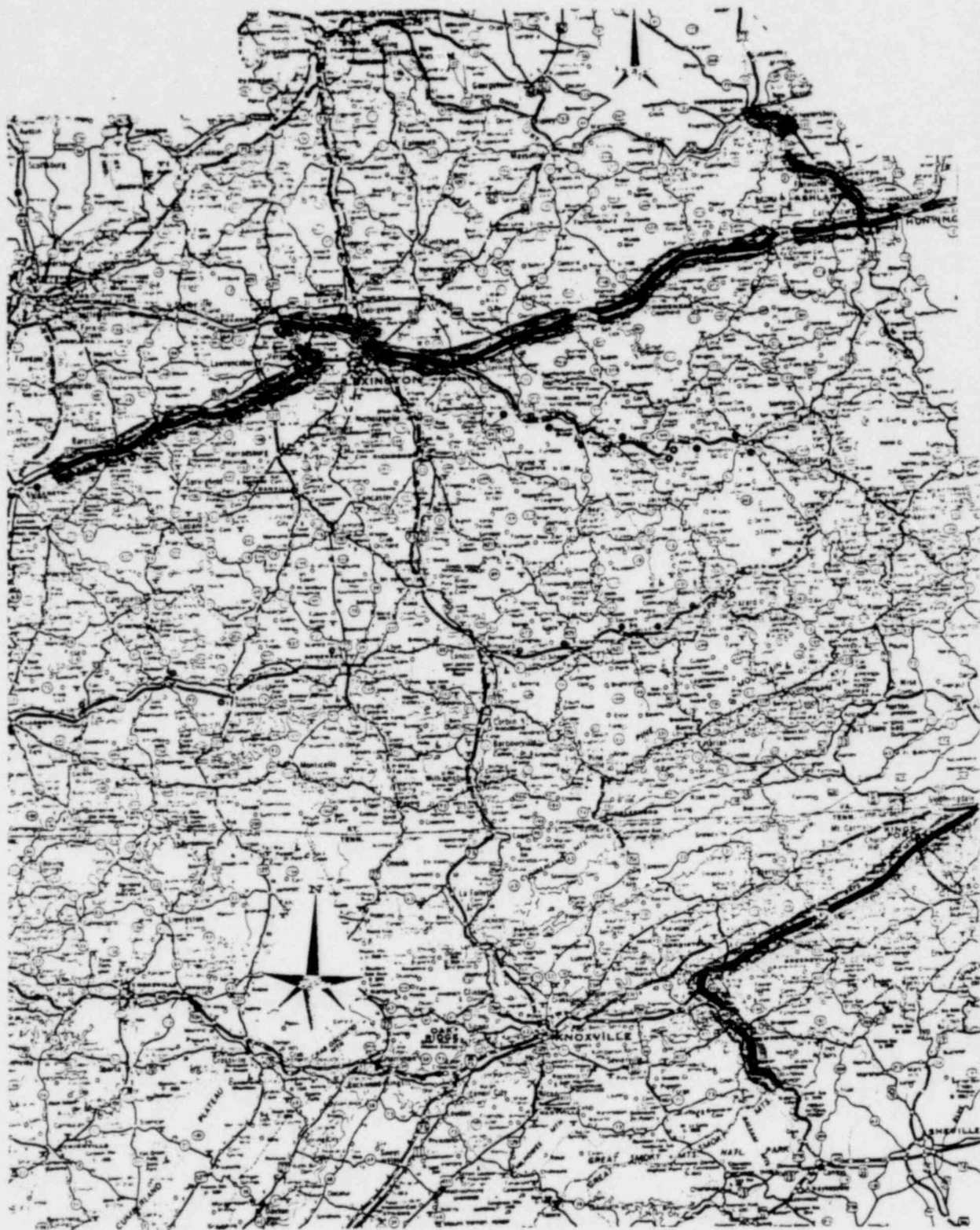
INDIANA



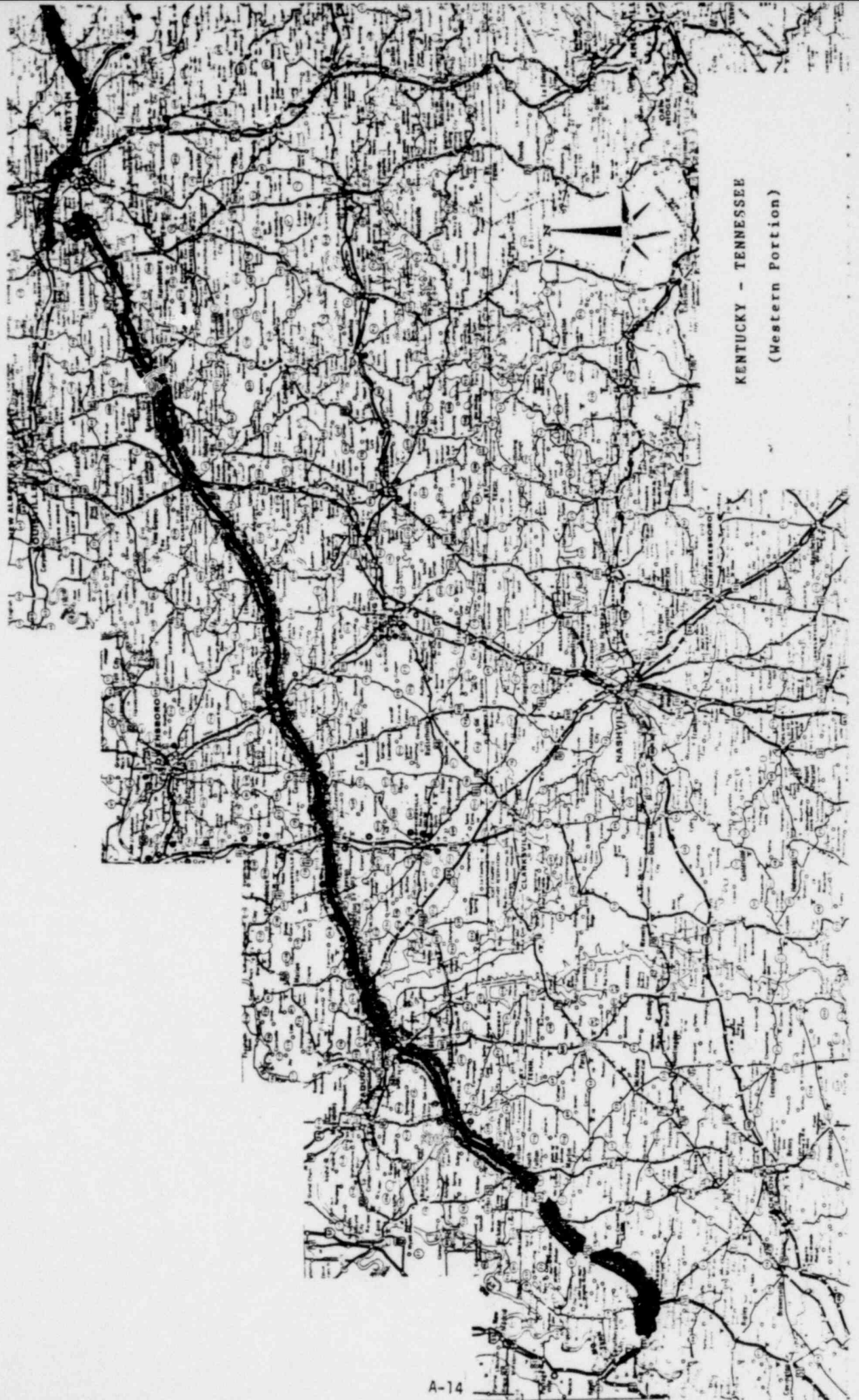


KANSAS

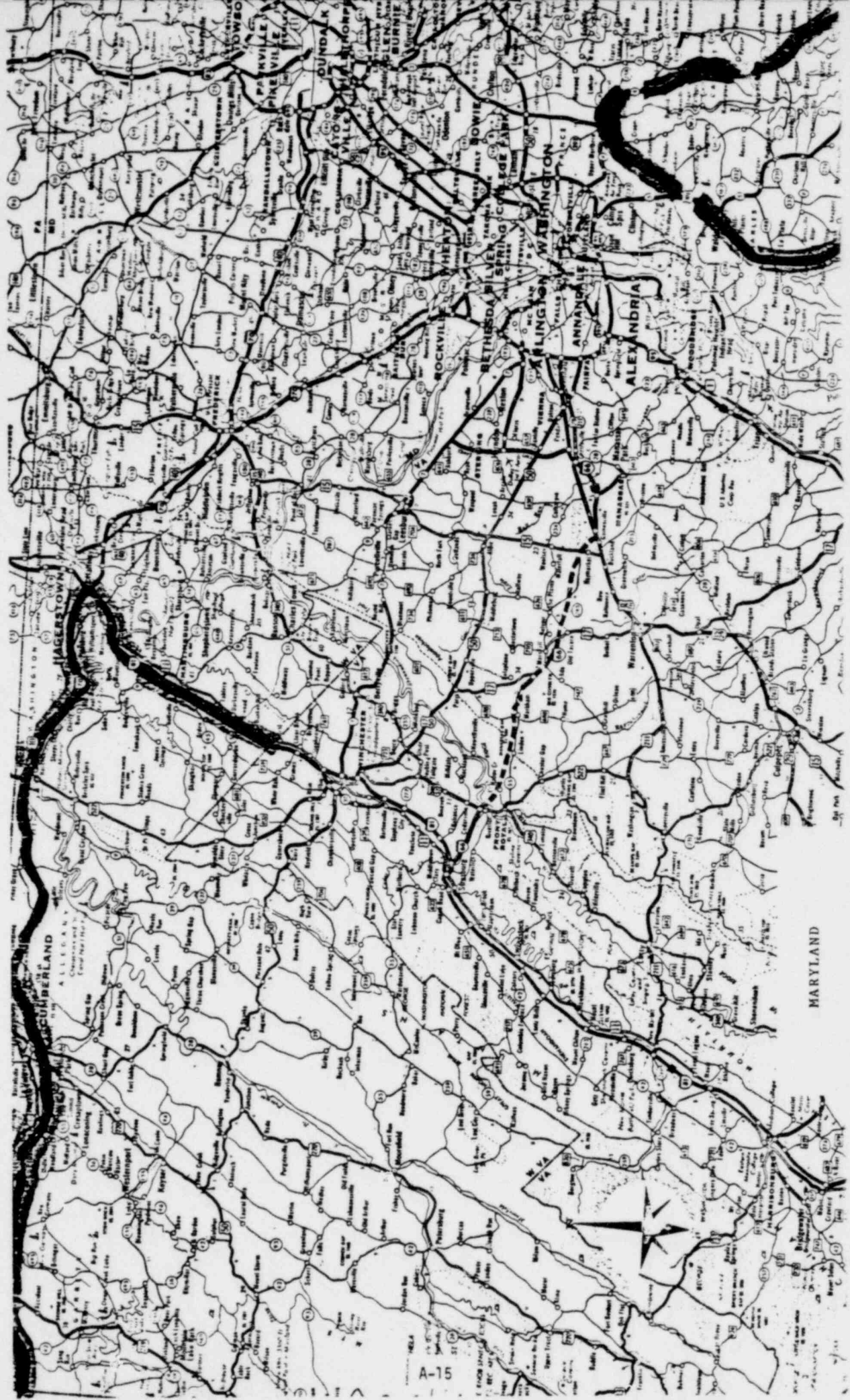




KENTUCKY - TENNESSEE
(Eastern Portion)

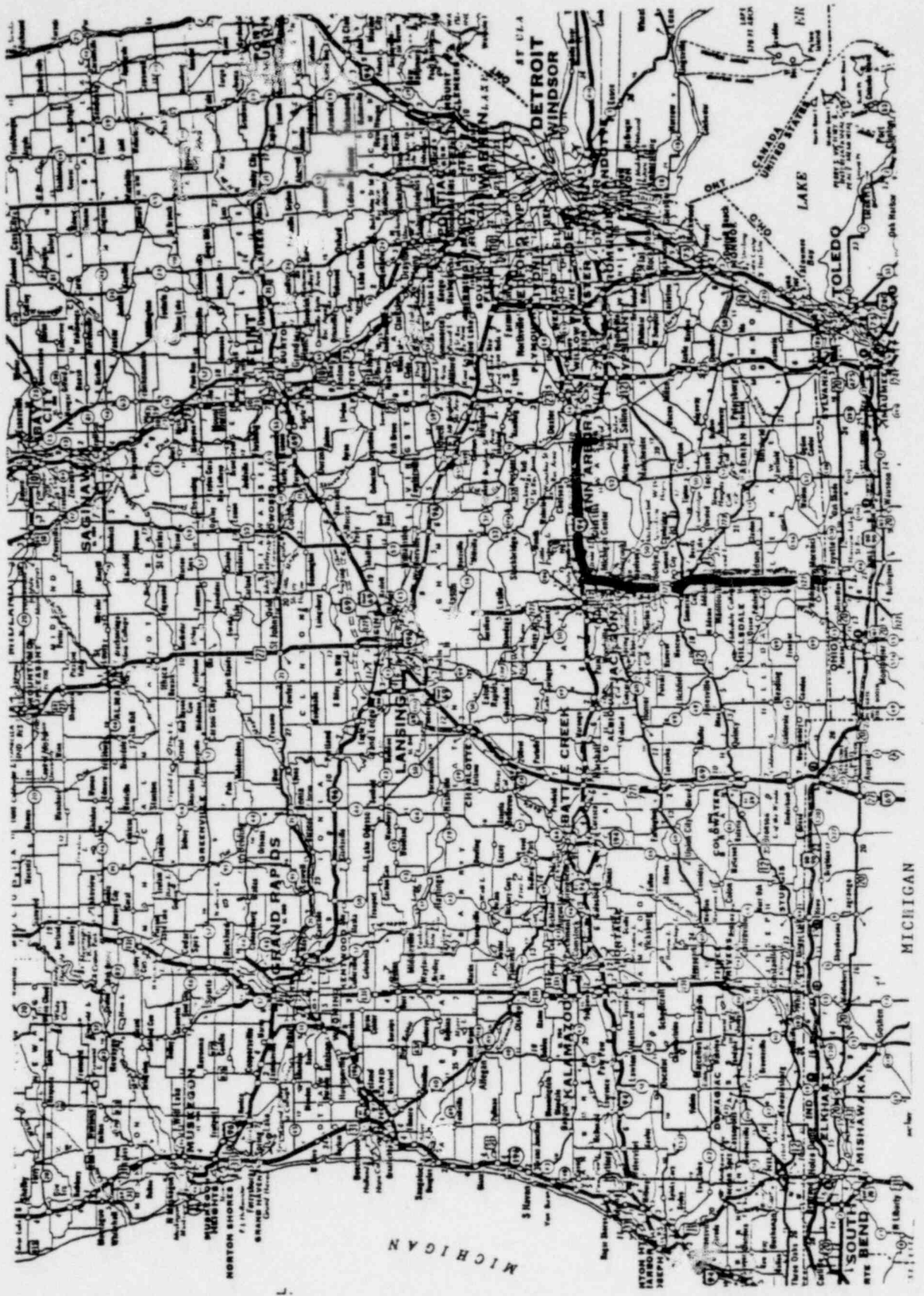


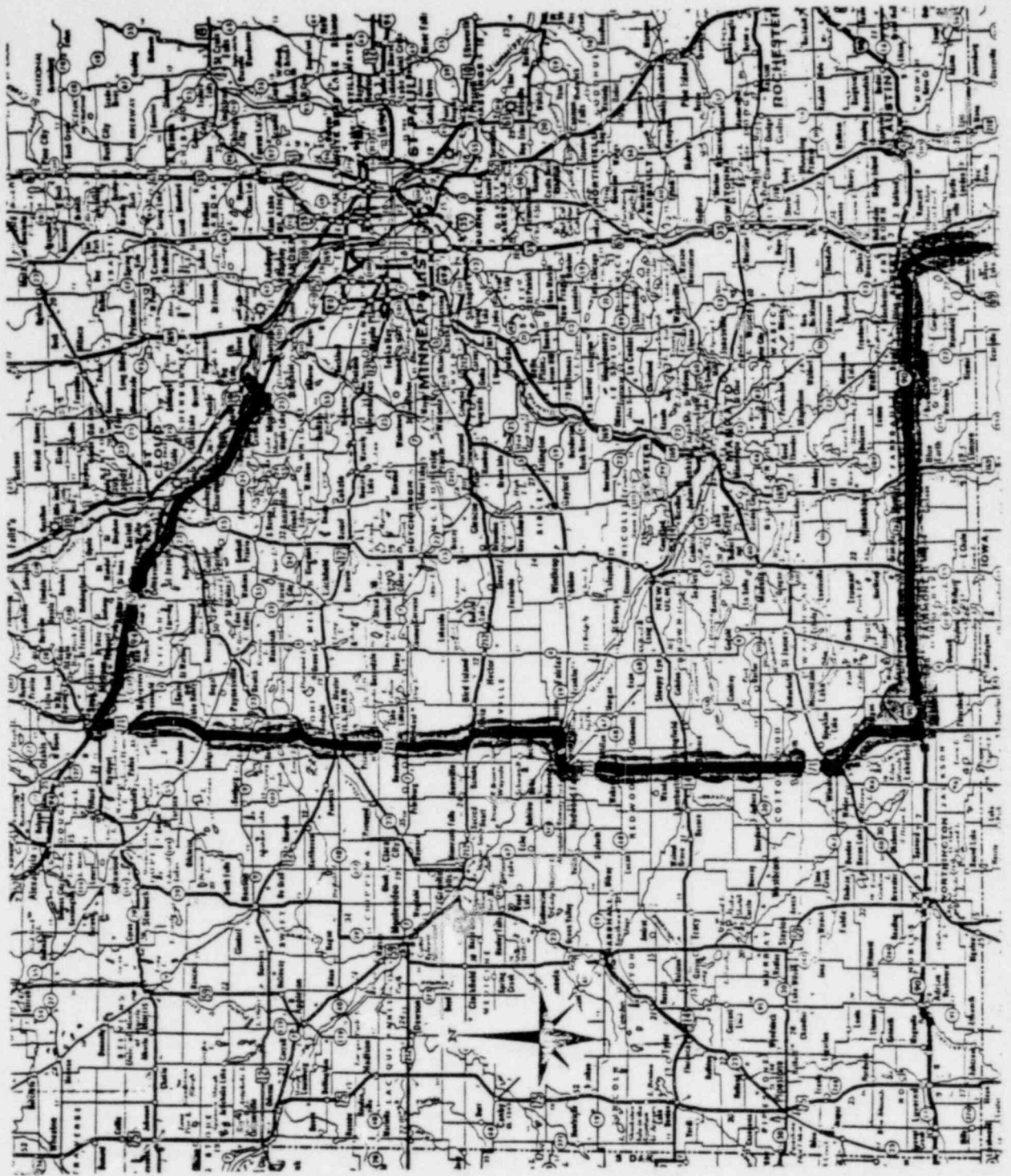
KENTUCKY - TENNESSEE
(Western Portion)



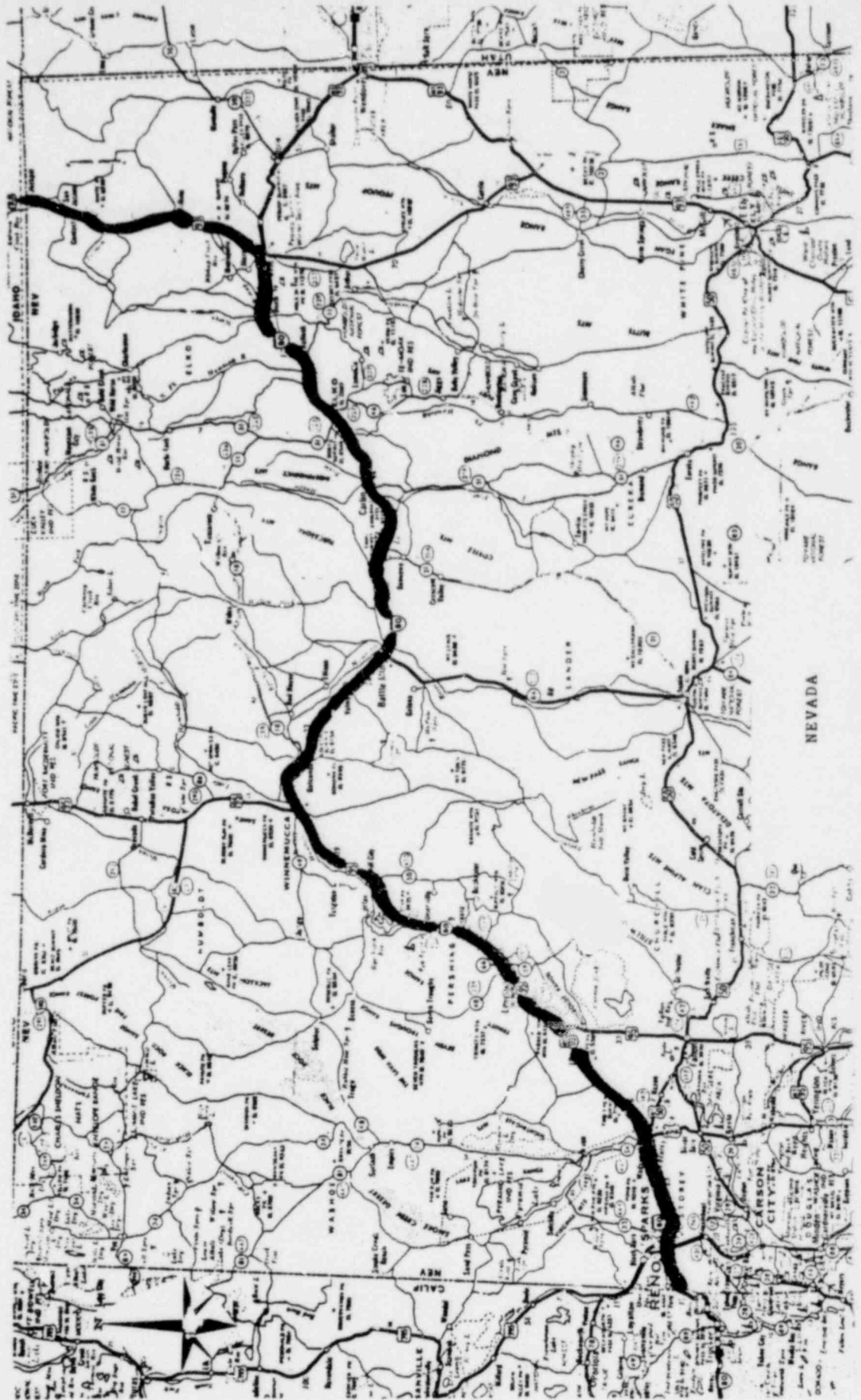
MARYLAND

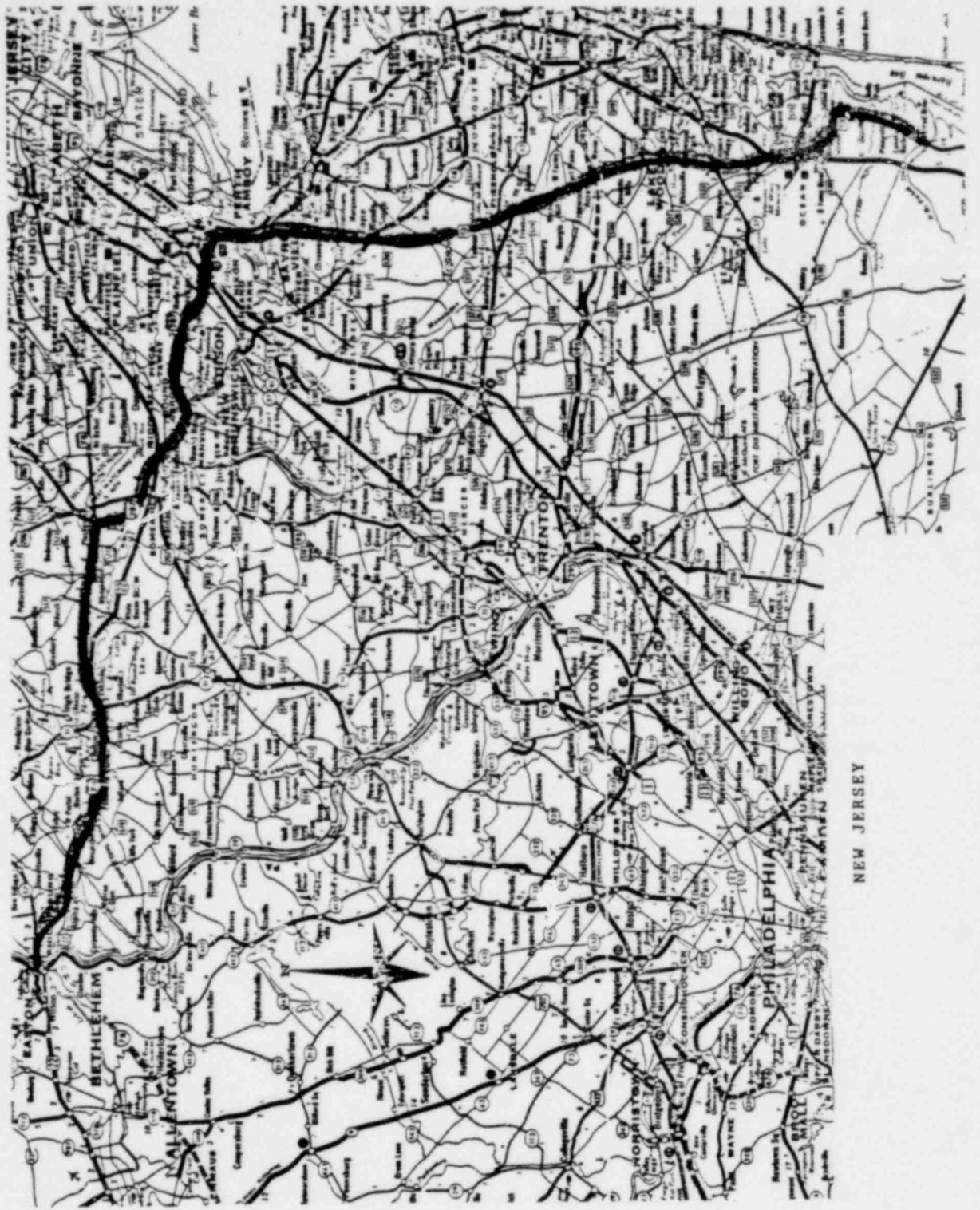
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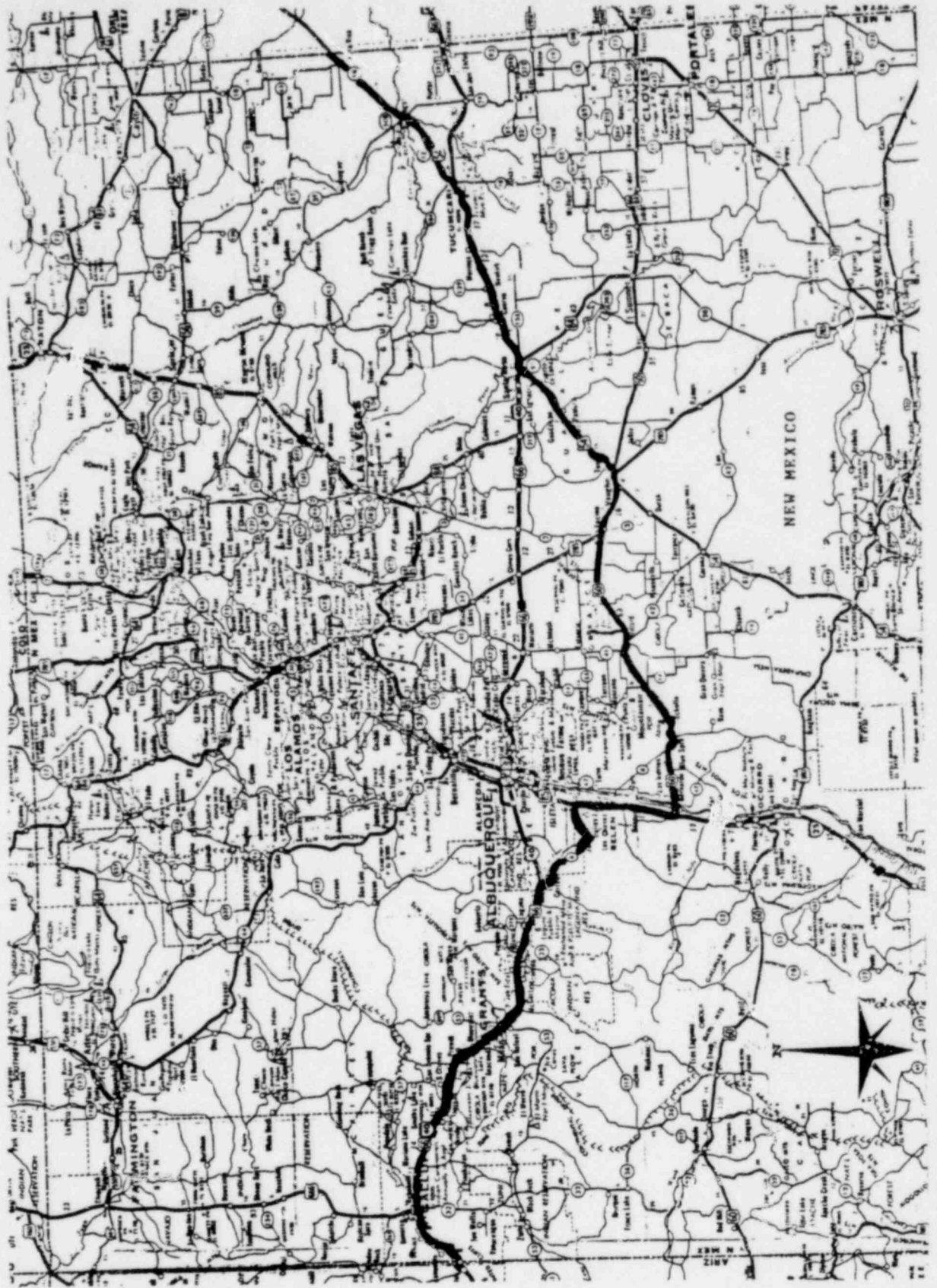


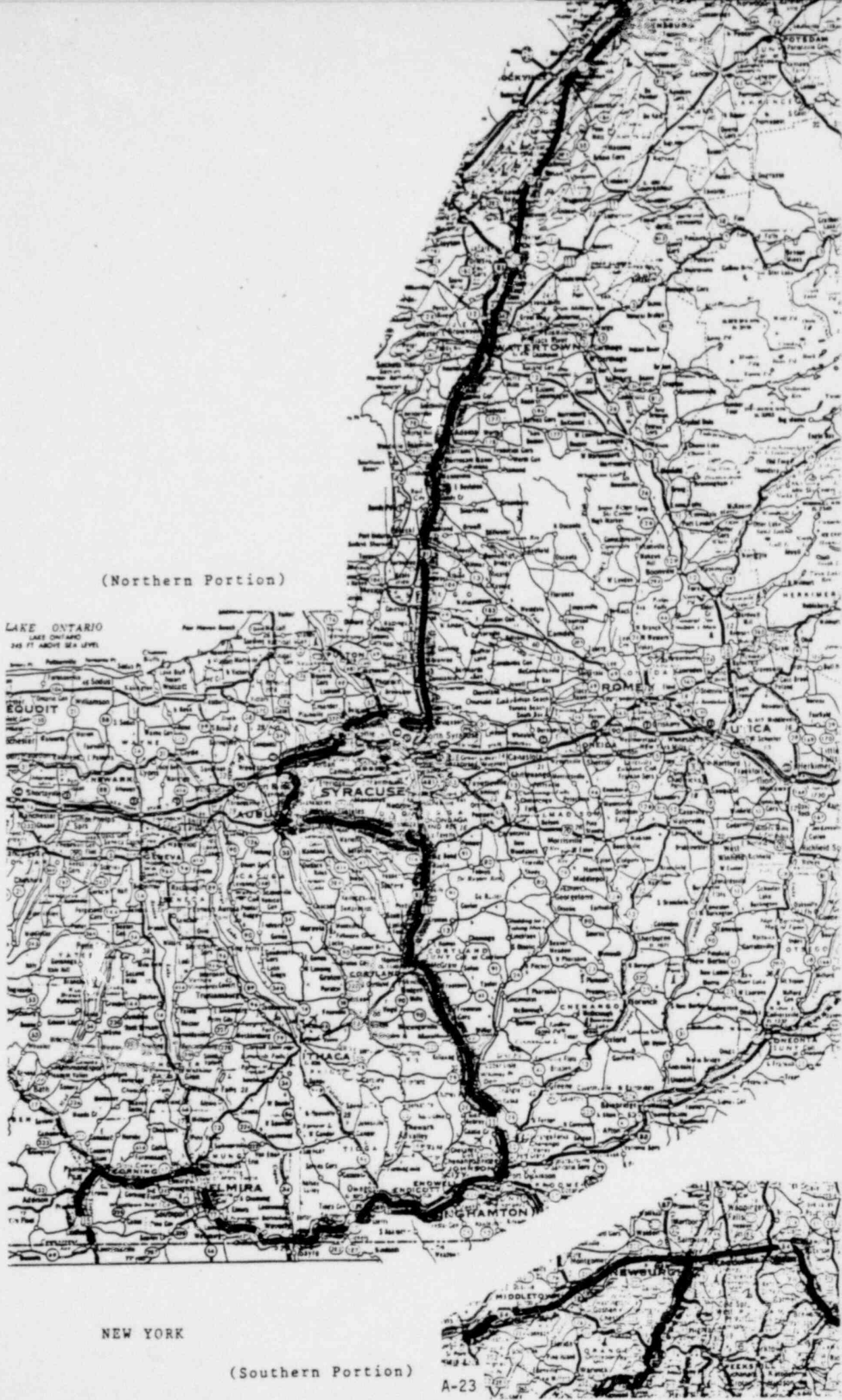
MINNESOTA





NEW JERSEY



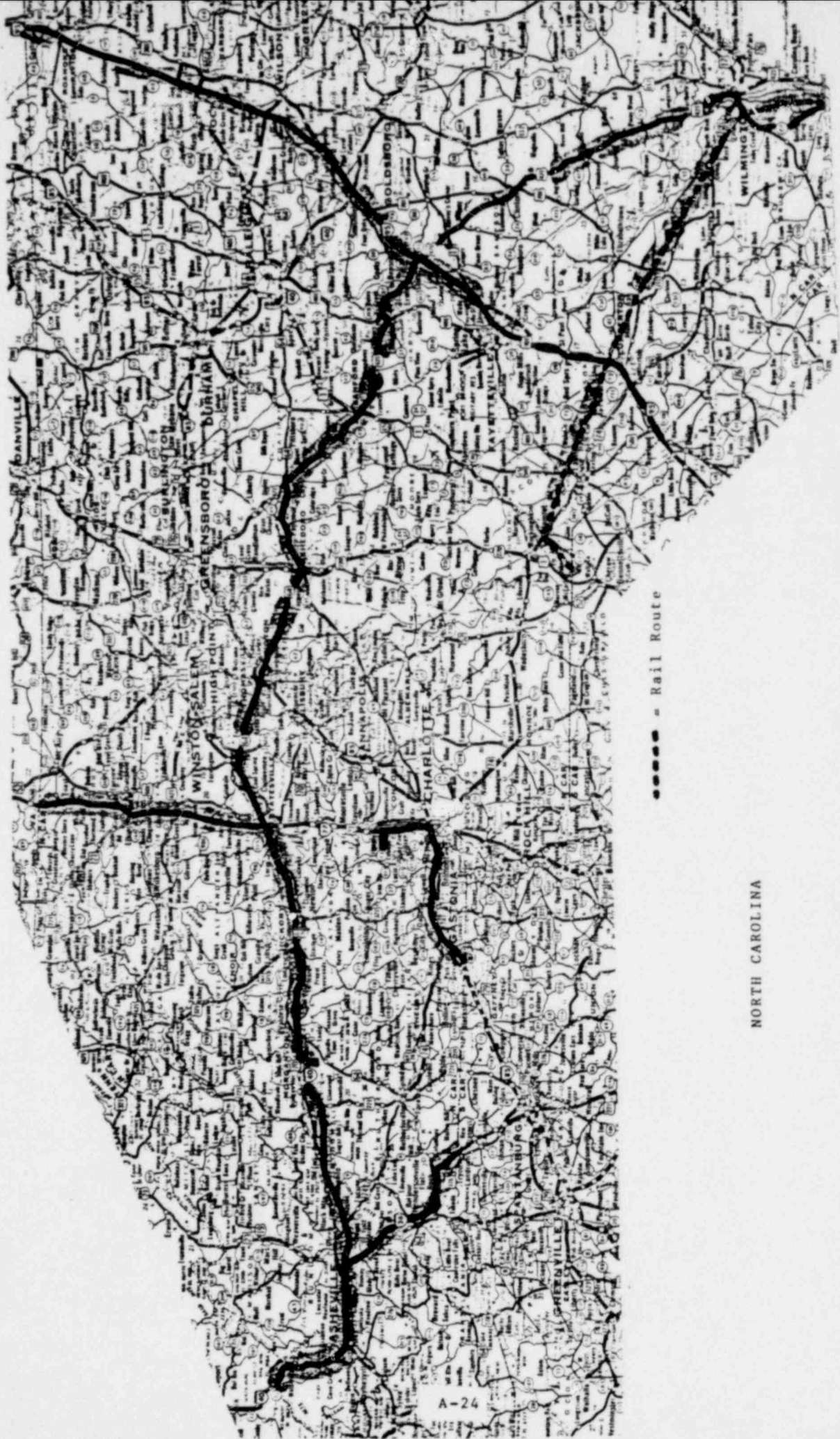


(Northern Portion)

LAKE ONTARIO
LAKE ONTARIO
243 FT ABOVE SEA LEVEL

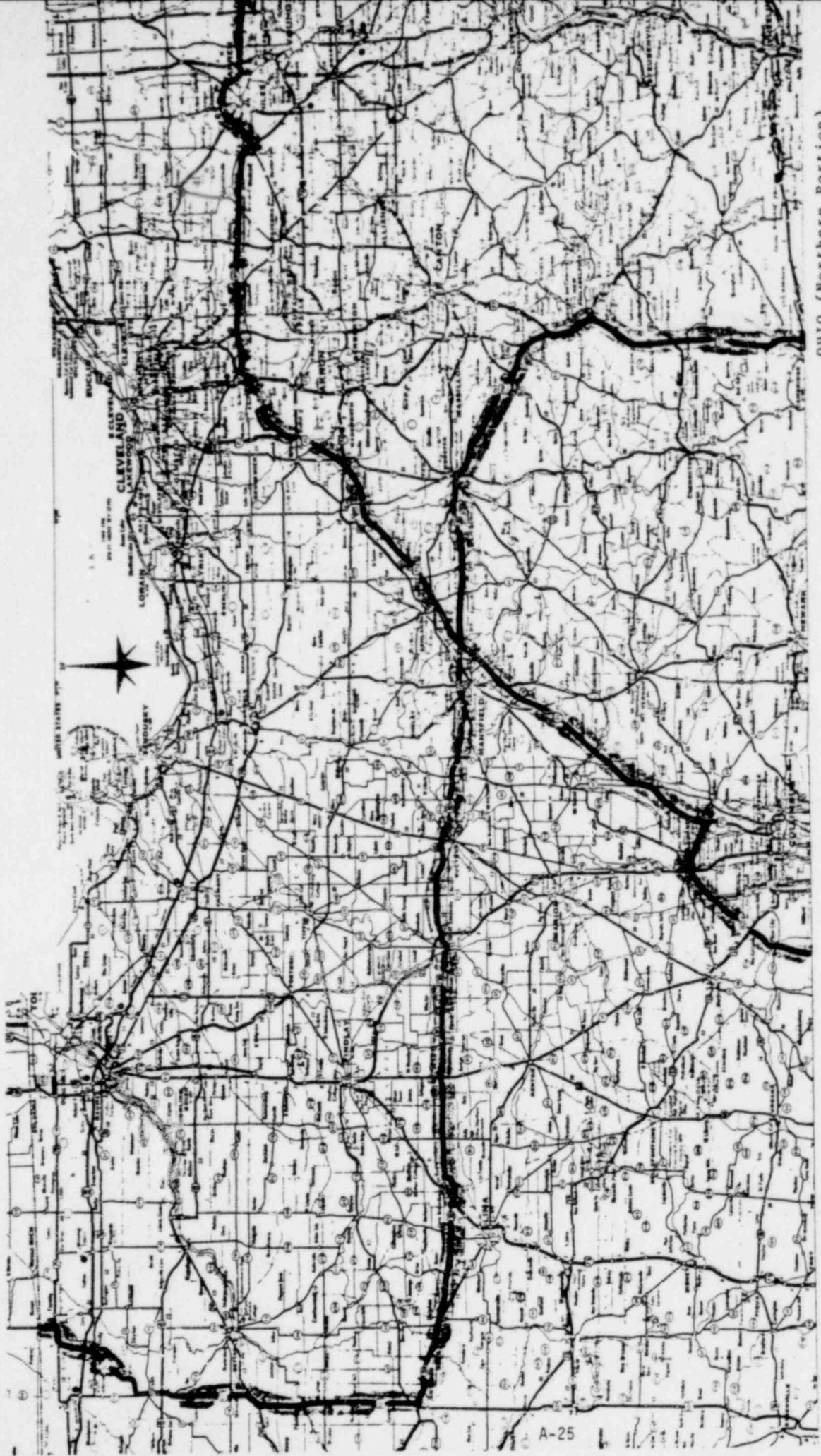
NEW YORK

(Southern Portion)

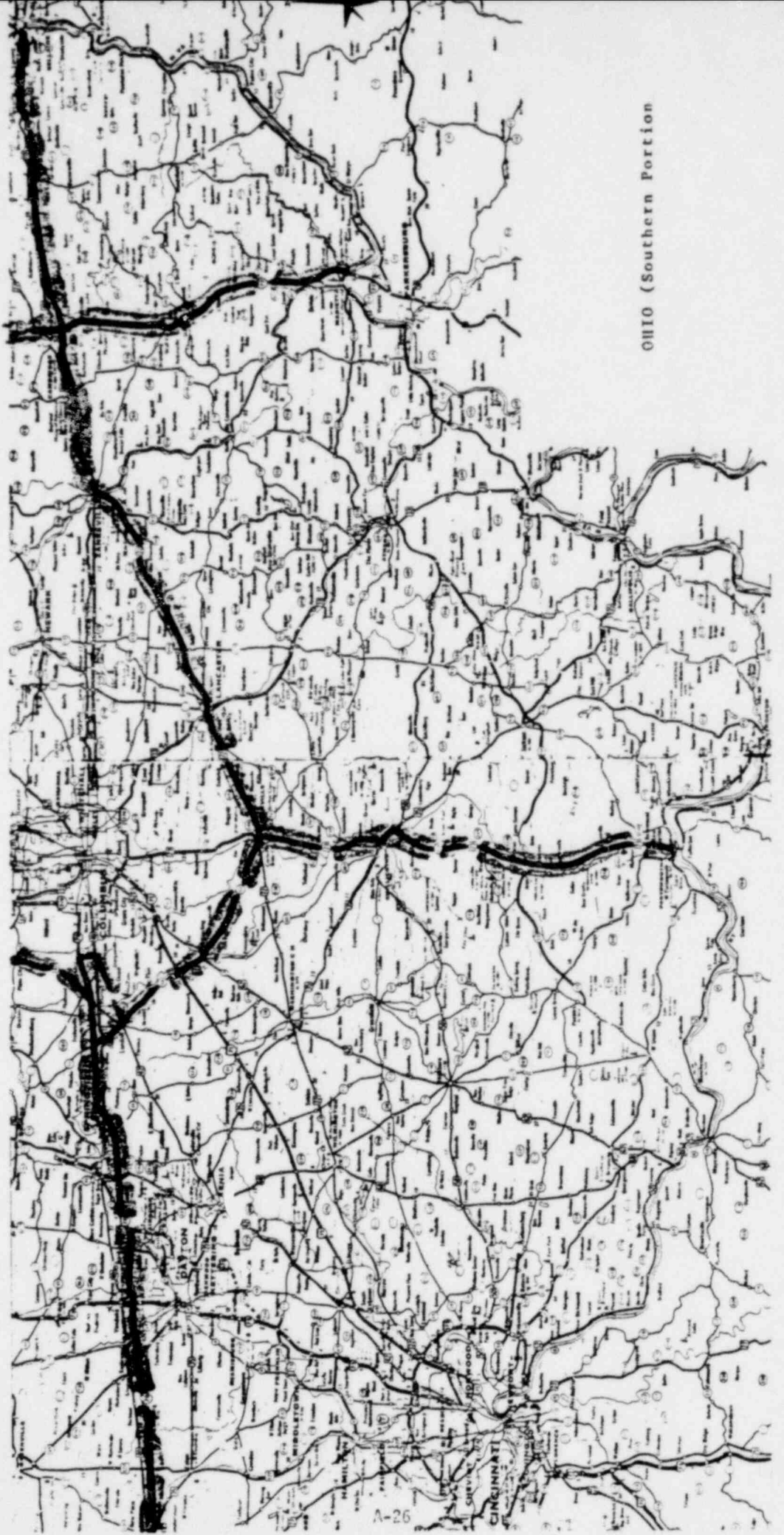


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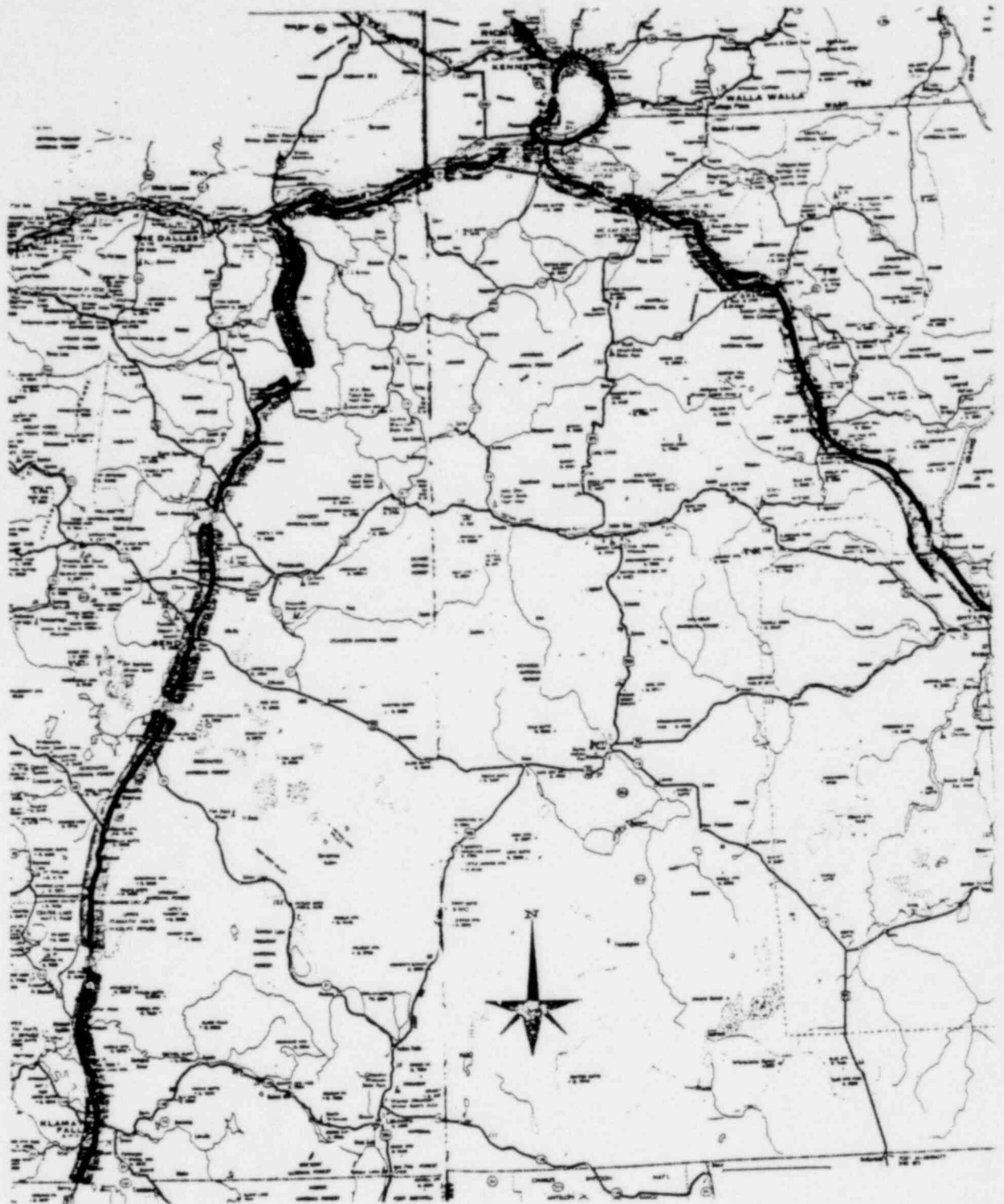
NORTH CAROLINA



OHIO (Northern Portion)

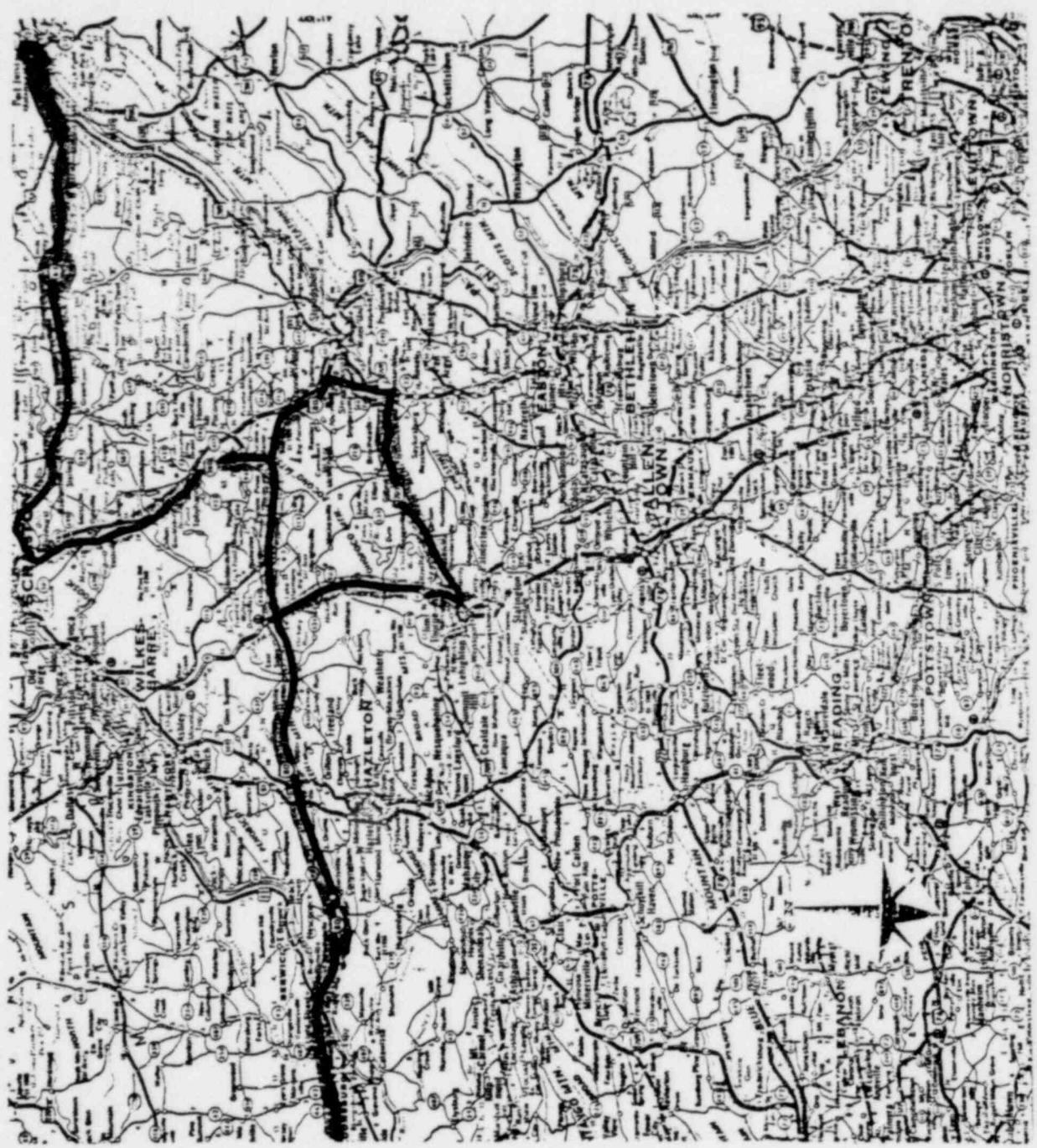


OHIO (Southern Portion)



OREGON - WASHINGTON

PENNSYLVANIA
(Eastern Portion)



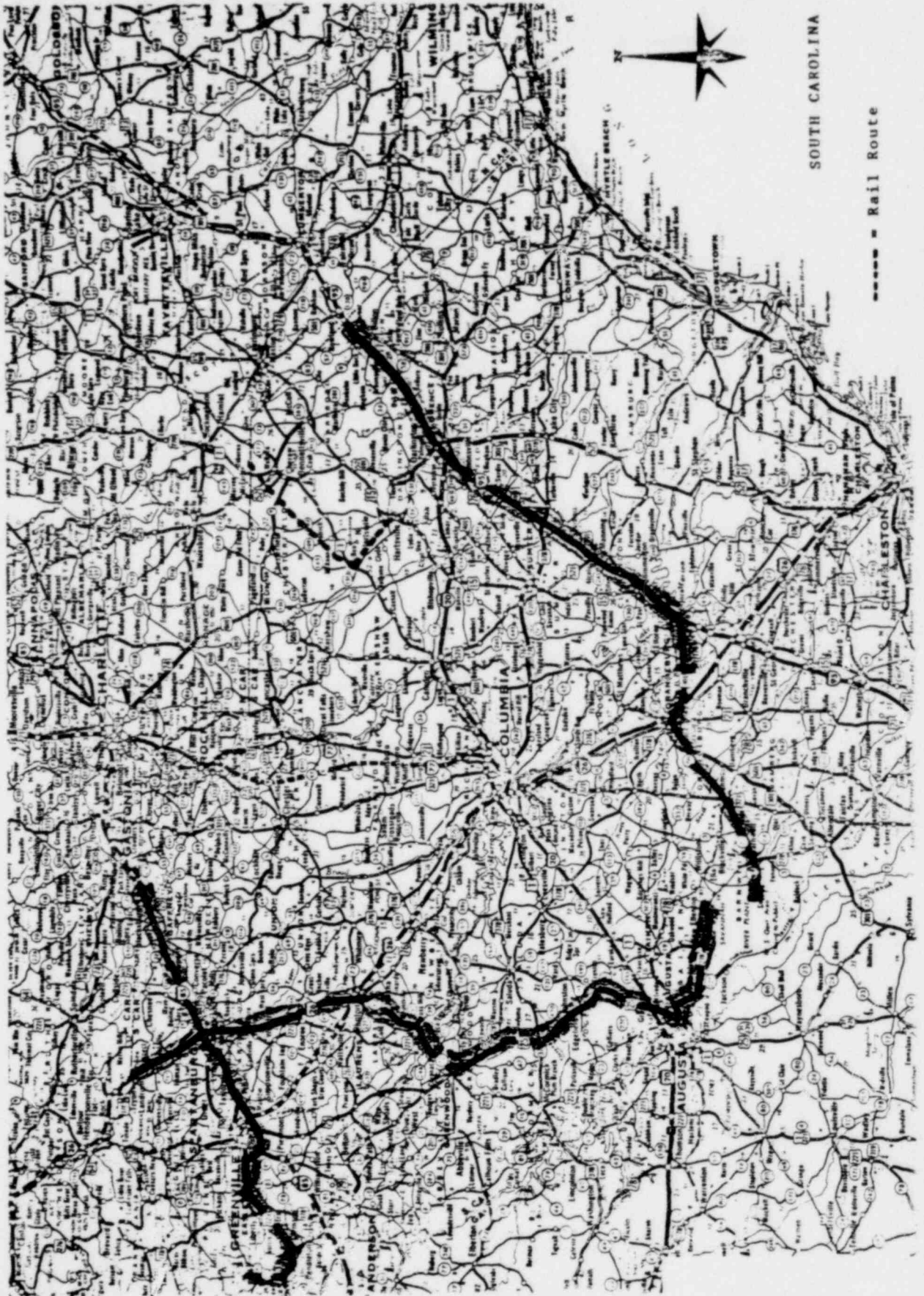


PENNSYLVANIA

(Central Portion)



PENNSYLVANIA (Western Portions)

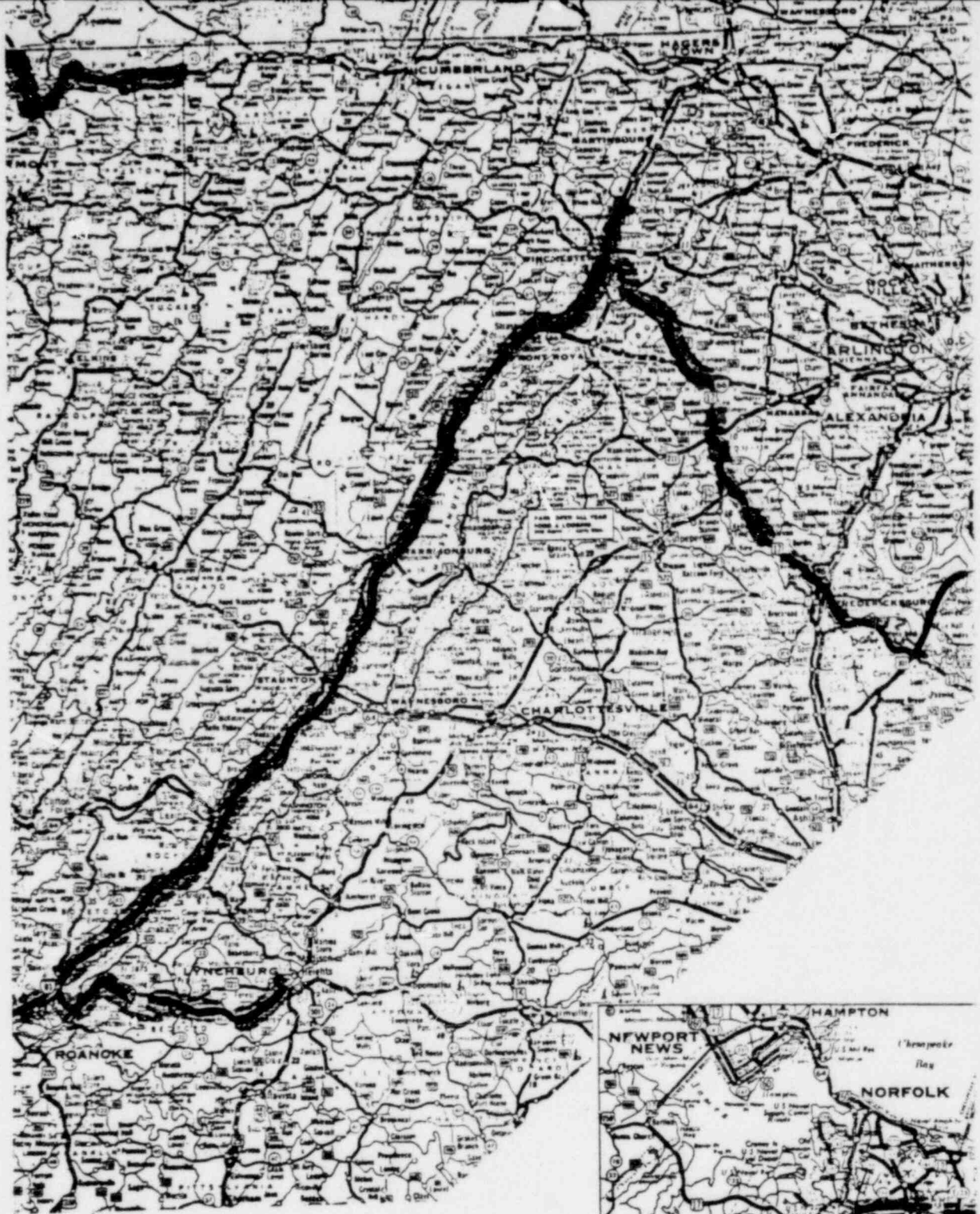


SOUTH CAROLINA

----- = Rail Route



UTAH

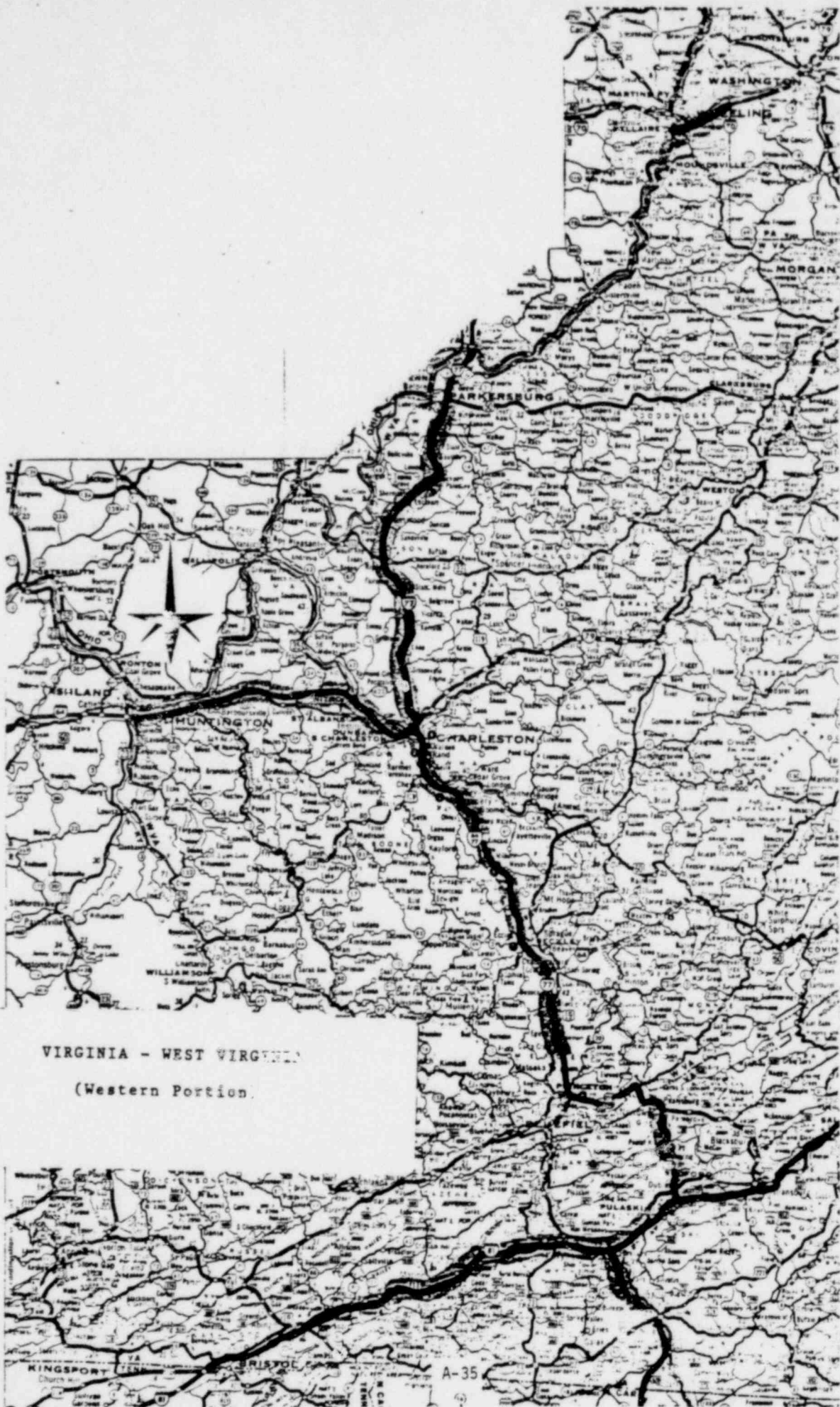


VIRGINIA - WEST VIRGINIA
(Eastern Portion)



Portsmouth Area Detail



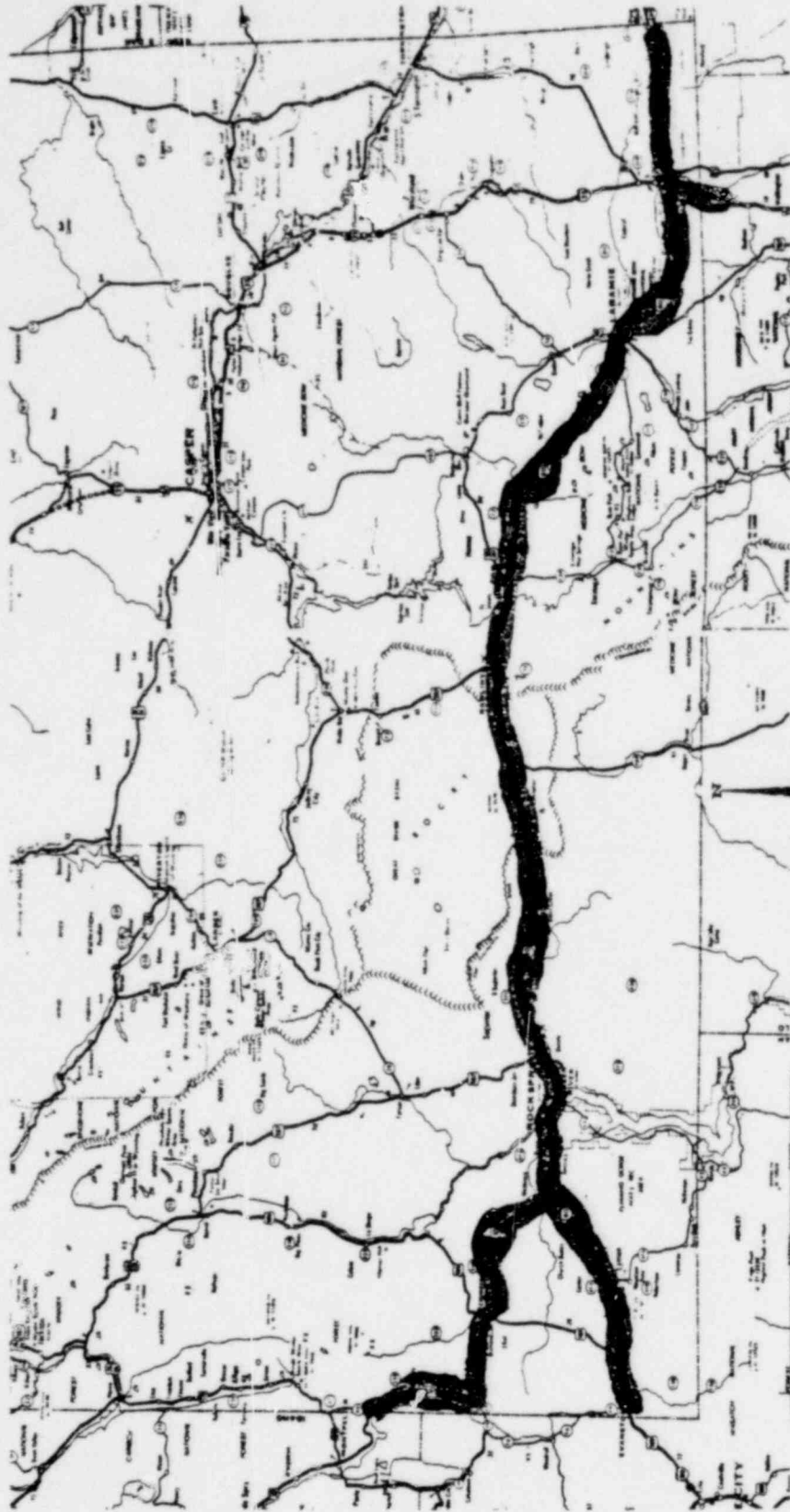


VIRGINIA - WEST VIRGINIA

(Western Portion)



WISCONSIN



WYOMING

ENCLOSURE B

Dear Governor _____:

Enclosed is a pre-release copy of a draft NUREG document providing information on spent fuel shipment routes approved by the Nuclear Regulatory Commission as of September 10, 1980. This document is in response to numerous requests for such information received by the Commission since new safeguards regulations became effective for spent fuel shipment routes in July, 1979. We intend to release this document in draft form on September , 1980 due to high interest in these approved routes.

This document was developed in conjunction with other efforts now being undertaken by the NRC to ensure that state governors are aware of shipments of radioactive wastes by NRC licensees through their states. In response to the recently signed Public Law 96-295, we are developing regulations which will result in notification to the states of shipment times and routes prior to each such shipment by an NRC licensee. We intend to request your comments prior to making these regulations effective.

Sincerely,

John F. Ahearne
Chairman

Enclosure:
Draft NUREG-0725

Enclosure "B"

ENCLOSURE C

NRC PUBLISHES ROUTES FOR SPENT FUEL SHIPMENTS

The Nuclear Regulatory Commission has made available to the state governors a report showing NRC-approved routes for the shipment of spent nuclear reactor fuel.

The report, which reflects data for the period from July 16, 1979, to September 10, 1980, contains maps detailing the approved routes in each of the 33 states through which spent fuel shipments may pass. It also gives the total number of shipments made and the total amount of spent fuel shipped between various nuclear facilities.

NRC regulations require that the routes for spent fuel shipments be approved by the NRC before their first use by an NRC licensee. Once approved, the same route may be used for additional shipments in a proposed series of shipments without further approval of the route, provided the NRC is notified in advance of each shipment.

A copy of the report, which was issued to the governors in draft form, is available for public inspection at the NRC Public Document Room, 1717 H Street, N.W., Washington, D.C. The published version, entitled "Public Information Circular for Shipments of Irradiated Reactor Fuel" (NUREG-0725), will be available for purchase in a few weeks from the GPO Sales Program, Division of Technical Information and Document Control, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, and from the National Technical Information Service, Springfield, Virginia 22161. Future issuances of the report will be on a semiannual basis.