AD-A147 375 CHARACTERISTICS OF DEEPWATER SEAPORTS WITHIN THE CONTINENTAL UNITED STATES(U) DAVID W TAYLOR NAVAL SHIP RESEARCH AND DEVELOPMENT CENTER BETHESDA MD C ASH 1/1

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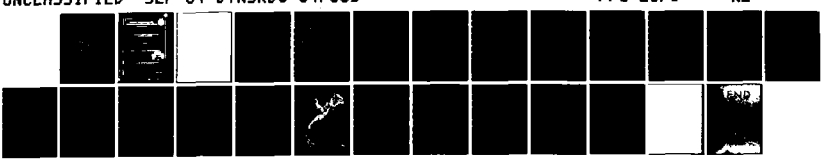

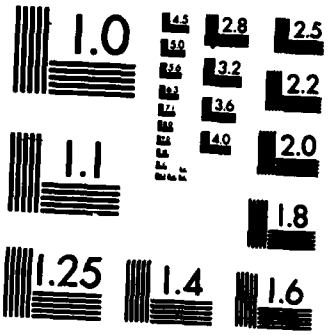
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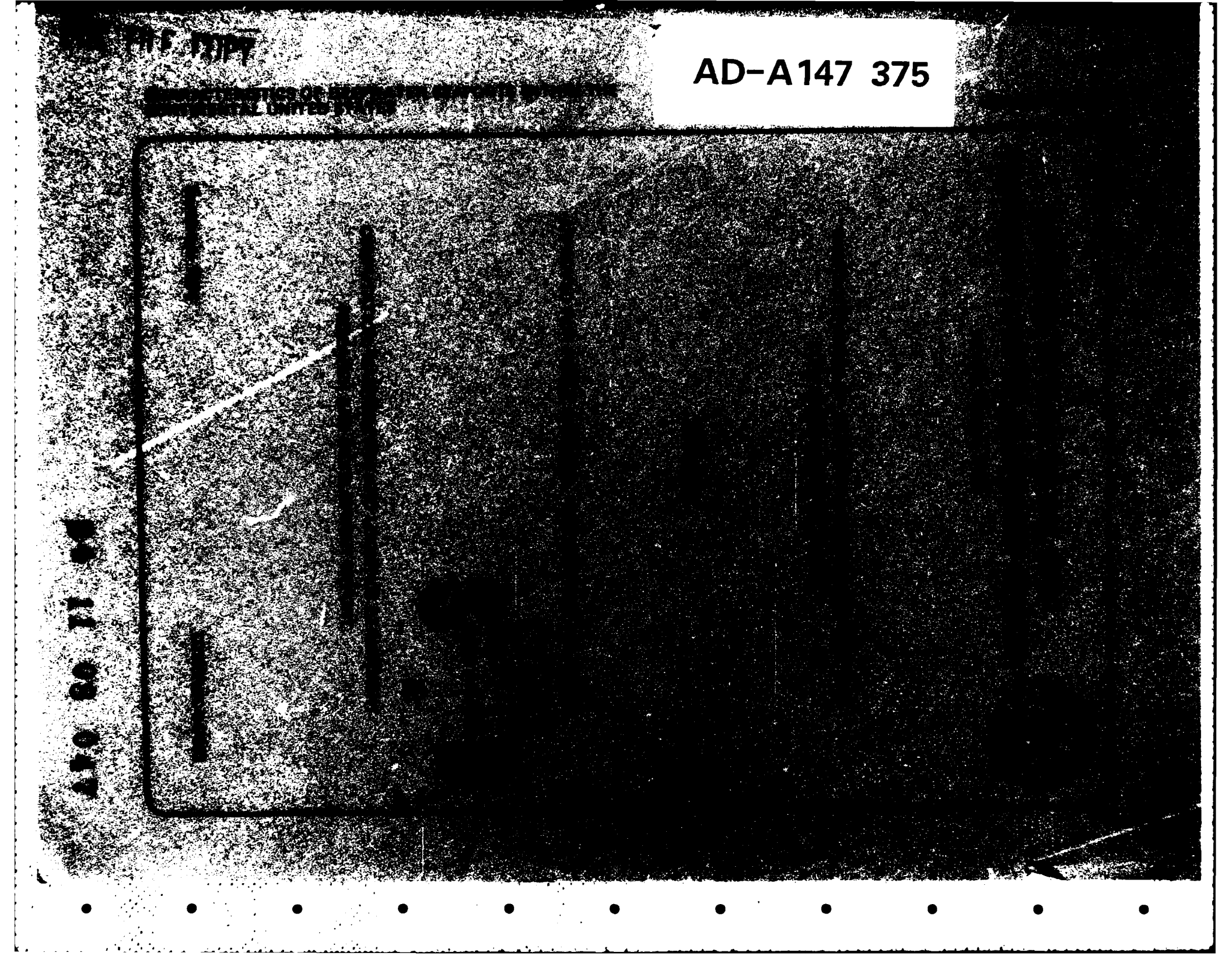
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REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER DTNSRDC-84/053	2. GOVT ACCESSION NO. AD-A147375	3. RECIPIENT'S CATALOG NUMBER
4. TITLE *(and Subtitle)* CHARACTERISTICS OF DEEPWATER SEAPORTS WITHIN THE CONTINENTAL UNITED STATES		5. TYPE OF REPORT & PERIOD COVERED Final 6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Curtis Ash		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS David W. Taylor Naval Ship Research and Development Center Bethesda, Maryland 20084		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS Task Area Program Element OMN Work Unit 1871-045
11. CONTROLLING OFFICE NAME AND ADDRESS Deputy Chief of Naval Operations (Logistics) Code 40 Washington, D.C.		12. REPORT DATE September 1984 13. NUMBER OF PAGES 21
14. MONITORING AGENCY NAME & ADDRESS*(if different from Controlling Office)*		15. SECURITY CLASS. *(of this report)* UNCLASSIFIED 15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT *(of this Report)*

APPROVED FOR PUBLIC RELEASE: DISTRIBUTION UNLIMITED

17. DISTRIBUTION STATEMENT *(of the abstract entered in Block 20, if different from Report)*

18. SUPPLEMENTARY NOTES

19. KEY WORDS *(Continue on reverse side if necessary and identify by block number)*

Seaports
Seaport Characteristics
CONUS Seaports

20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*

The objective of this study is to design and implement a data base of deepwater seaport characteristics within the Continental United States. Both military and civilian ports are considered. The study includes only general, container, roll-on/roll-off cargo; and petroleum and petroleum products. Data sources include verifiable and referenced documents. The

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The Data Management System used to implement the data base is Joint Reporting Structure--Two (JRS2) which provides for data base query and for continuous update.

ADMINISTRATIVE INFORMATION

The seaport characteristics data base was designed primarily to aid naval planning groups who have the responsibility of planning operations. The study was initiated in FY 83 by the Logistics Division (Code 187) of the Computation, Mathematics and Logistics Department. The study was funded by the Logistics Plans Division (Code 40) of the Deputy Chief of Naval Operations (Logistics). The Logistics Division (Code 187) of the Computation, Mathematics and Logistics Department was the performing organization.

INTRODUCTION

BACKGROUND

Naval planning groups who have the responsibility of planning naval operations require seaport information pertinent to port and harbor description, harbor berth, storage capacity, and material handling equipment for deepwater ports within the Continental United States (CONUS). Included in these planning groups are Chief of Naval Operations (Code 40), Commander in Chief, U.S. Atlantic Fleet, and Commander in Chief, U.S. Pacific Fleet. Because information on these characteristics is dispersed, sparse, and difficult to obtain, this study was undertaken for selected CONUS seaports. The ports were selected on the basis of their previous use in maritime operations and on their significance for various scenarios associated with naval operations.

OBJECTIVE

The objective of this study is to design, develop, and implement a verifiable data base on characteristics of selected ports.

SCOPE

This study includes selected deepwater seaports within CONUS.

GENERAL INFORMATION

In the initial effort 57 CONUS seaports were selected. This set includes both military and civilian seaports. Updating the data base and adding new ports are considered to be continuous efforts. This study addresses those seaports which handle general, container, and roll-on/roll-off (Ro/Ro) cargo; and petroleum and petroleum products.

Ports require material handling equiment (MHE) for off-loading, loading, or processing cargo. Appendix A lists the several types of equipment considered in this study. The seaport characteristics to be addressed in this study are those, in part, from JCS Publication 6, Volume I, Appendix E.

CHARACTERISTICS

This study deals with port characteristics required by naval planning groups, some are optional.

The following are the required characteristics addressed in the study:

Geographical location (geoloc) code
Basic encyclopedia (B.E.) number (unique No. from DIA basic encyclopedia publication)
Airfield geoloc code
Airfield distance to seaport (miles)
Good holding ground (area suitable for ship anchorages)
Class S anchorage (diameter over 1250 yd, depth over 50 ft)
Class 1 anchorage (diameter over 800 yd, depth over 38 ft)
Class 2 anchorage (diameter over 500 yd, depth over 30 ft)
Class 3 anchorage (diameter over 300 yd, depth over 20 ft)
Number of harbors
Anchorage protection (the extent to which anchorage is sheltered)
Number of harbor entrances
Harbor type (see Appendix B)
Tidal rise (ft)
Swell (see Appendix C)

Ice restrictions

Other harbor restrictions

Turning basin depth (ft)

Turning basin diameter (ft)

Length largest container berth (ft)

Depth largest container berth (ft)

Length largest general cargo berth (ft)

Depth largest general cargo berth (ft)

Length largest tanker berth (ft)

Depth largest tanker berth (ft)

Length largest Ro/Ro berth (ft)

Depth largest Ro/Ro berth (ft)

LST ramps (No. of ramps for landing ship tank (LST))

LST causeways (indicate if causeways are present and recommended for loading/unloading of LSTs).

Y -- yes
N -- no
U -- unknown

POL storage capability (barrels)

Covered storage capability (sq ft)

Open storage capability (acres)

Refrigerated storage capability (cu ft)

Ammunition storage capability (cu ft)

Harbor entrance width (ft)

Harbor entrance depth (ft)

Harbor entrance length (ft)

Harbor entrance height limit (ft)

Other harbor entrance restrictions

Berth class (see Appendix D)

Berth type (see Appendix E)

Number of berths

Berth capacity (S/T)*

Berth capacity (M/T)**

---

* S/T - short ton

** M/T - measurement ton

Berth capacity (MBBLS)*

MHE ID

MHE Capacity

MHE Quantity

Berth MHE Restrictions

The following are the optional characteristics addressed in the study:

Port Name	Name of port
Latitude	Port latitude
Longitude	Port longitude
State Code	Numeric characters which identify the state within the U.S. in which the port is located (see Appendix F)
Section (LPR** Code)	A set of alphanumeric characters which identifies the section of the geographical area in which the port is located (see Appendix G)
Theater	Area of operation. The various areas are defined and coded (see Appendix H)
Port authority	The governing body of the port
Port controller	Specifies whether the port is under civilian or military control. 1 - civilian, 2 - military
Port container or Ro/Ro facilities	Facilities which can be used for handling container or Ro/Ro cargo, e.g., berth, crane, ground storage, rail track, platform, shed, warehouse. 0 - none, 1 - berth, 2 - crane, 3 - ground storage, 4 - rail truck, 5 - platform, 6 - shed,7 - warehouse
Ship repair facilities	Major repairs refer to those repairs which require shipyard or dry dock services. All others are considered general or minor repair (that fact is indicated). 0 - none, 1 - major, 2 - minor
Bunker service	Services which provide fuel for ship consumption. 1 - service available, 2 - service not available.
Working hours	The specific days worked including start and stop times. (24-hour clock)

* MBBLS - Thousands of barrels

** LPR - Logistic Planning Report

Traffic	The amount of in/out cargo (in short tons) processed by the port within a given year.
Towage	Tugs to aid the movement of cargo vessels. 1 - towage available, 2 - towage not available
Port clearance	Identifies the types of vessels authorized to enter port. 1 - general cargo, 2 - bulk POL, 3 - ammunition, 4 - nuclear power
Throughput rate	The amount of cargo that can be completely processed within a given time
Pier/wharf/dock	Name of terminal
Beam	Width of minimum berth at terminal
Length of shortest berth	Length of shortest berth at terminal
Terminal type*	Defined by the vessels and cargo accommodated.
Terminal capacity (av. throughput by type per day) • civilian • military - peactime - wartime	The average amount (in short tons/barrels) of cargo that can be processed in a normal working day
Controlling depth (draft)	The minimum depth (at mean low water) alongside the terminal
Vessel type served**	The type of vessel accommodated by the terminal
Cargo types***	The types of cargo processed by the terminal

DATA SOURCE

Several documents were researched for data pertinent to the required characteristics. These sources are listed in Appendix I. The most informative document was "Corps of Engineers U.S. Army Port Series."

---

*1 - All cargo
2 - Container cargo
3 - POL
4 - General cargo
5 - Ammunition
6 - Ro/Ro cargo
7 - Military
8 - Dry bulk
9 - Liquid bulk

**1 - Tanker
2 - Container
3 - General cargo
4 - OBO (Ore, Bulk, Oil)
5 - LASH or SEABEE
6 - Ro/Ro
7 - Passenger
8 - Dry bulk
9 - Liquified gas/propane
10 - Refrigerated
11 - Barges
12 - Other

***1 - General cargo
2 - Passenger
3 - POL
4 - Grain
5 - Refrigerated
6 - Natural Resources
7 - Other

DATA PROCESSING

Data were collected from the publications listed in Appendix I. To authenticate data in this report, source name and page number were recorded for each data item extracted. From these recordings, an auxiliary data base was developed which provides the reference for each data item. These data were carefully screened in accordance with the required characteristics and were formatted for computer input. Using computer programs, these data were put into a permanent file from which a data base was created.

DATA BASE

MANAGEMENT SYSTEM

A data management system, Joint Reporting Structure - Two (JRS2), was created for data base manipulation. The data management system is hierarchically structured and designed specifically for handling port data. Easy querying and updating the data base are principal attributes of the system.

QUERYING

The data base management system provides for querying for desired entities of the 24 optional characteristics. Eleven characteristics, defined as key elements, are:

- Geoloc code
- Port type code
- LPR code
- Theater code
- Container code
- Ro/Ro code
- Clearance code
- Terminal type code
- Vessel type code
- Cargo type code
- Equipment code

A user may choose to query for any single-type element or any combination of types provided at least one element is a key.

The hierarchically structured management system enhances the efficiency in accessing data elements. When a user designates a port's geoloc code in a query, the system automatically makes available all related elements. Querying may be limited to a particular area or unlimited to cover all possible areas. A sample output is presented in Appendix J. Minimal training is required to enable users to handle all facets of querying.

UPDATING

The data bases are never final. Continuous change in seaport communities makes updating the present data bases a necessity. The data management system provides for deleting, adding, and inserting data. Updating the data base is a programmer's function.

OUTPUT

Output may be obtained in various ways. A user can acquire output via a terminal. Those terminals with a CRT can provide a visual display. This information can also be provided on hard copy for those terminals with printers. Output may be routed from the terminal to the main frame printers. Output of the required characteristics can be provided on cards and tape. Appendix J gives various computer sample outputs.

SUMMARY

The purpose of this effort is to provide a verifiable data base of seaport characteristics for selected deepwater ports in CONUS. The study includes general, container, roll-on/roll-off cargo; and petroleum and petroleum products. Data have been obtained from verifiable and reliable documents. The source name and page number where applicable were recorded for each data item extracted.

Data for the port data base are segregated into three groups: port data, harbor data, and material handling equipment. Data grouping provides an added advantage for computer input and handling. The JRS2 data base management system was created to manage the data base. It satisfies the basic requirements and is cost-effective and convenient.

EXPLANATION OF APPENDIXES

Appendixes A through J contain amplifying information. Appendix A is a list of material handling equipment used for loading/off-loading and transferring cargo within the ports.

Appendix B contains a list of harbor types. The harbor type code and description are so stated.

Appendix C contains a list of phrases which convey the degree of harbor swell. The swell code and description are given.

Appendix D defines berth class. It contains the berth class code, dimensions, and vessel type accommodated.

Appendix E contains a list of berth types.

Appendix F contains a list of states and their assigned state codes. Each state is assigned a unique two-digit code. These codes are used in the port data base to identify the state in which the port is located.

Appendix G is a map of North America divided into geographical areas. Each division containing seaports of interest is assigned a unique code which identifies the area in which a seaport is located.

Appendix H is a list of the theater (area of operation) codes and their descriptions. The codes are the set of whole numbers, one and two. The description identifies the areas to which the number is assigned.

Appendix I contains a list of sources from which data were researched. This list contains document title and publication year.

Appendix J contains three samples of computer output. Blanks in the output mean that data for that entity were not available during the research period.

Sample one gives port name, state code, longitude, latitude, and tidal range, for ports in theater code 1 (see Appendix H). Sample two gives port name, geoloc code, and port authority for ports in LPR code 3L (see Appendix G). Sample three gives port name, covered storage, open storage, refrigerated storage, and POL storage for ports in theater code 2.

APPENDIX A

MATERIAL HANDLING EQUIPMENT CODE AND DESCRIPTION

MHE Code	MHE Description
FC	Cantilever, floating
CT	Cantilever, tower
CB	Conveyor, belt
CN	Crane, cantilever, type unknown
CC	Crane, container
CI	Crane, fixed
CL	Crane, floating
CM	Crane, mobile
CU	Crane, type unknown
FD	Derrick, floating
DS	Derrick, stiffleg
FL	Forklift
GL	Grain gallery with loading chutes
GR	Grain sucker
HH	Hammerhead
JP	Jib, portal
JS	Jib, semiportal
JT	Jib, tower
JN	Jib, tower portal
LB	Loader, bulk
LC	Loader, coal (loader/unloader)
LF	Loader, grain, floating
LM	Loader, grain, mechanical
LP	Loader, grain, pneumatic
LL	Loader, type unknown
LT	Loading tower
LR	Loading trestle
PP	Pipeline, POL
PC	Pipeline, vegetable oil
PW	Pipeline, wine

PL	Pipeline, (type unknown)
PB	Chicksan loaders
SS	Shearlegs
FS	Shearlegs, floating
TS	Telpher system
NT	Track, industrial
TB	Transporter, bridge
TT	Transporter, tower
WT	Wharf truck
MS	Miscellaneous

APPENDIX B
HARBOR TYPE

Code	Description
1	Natural coastal
2	Improved coastal
3	Estuarial
4	River
5	Open roadstead
6	Artificial
7	Other

APPENDIX C
HARBOR SWELL

Code	Description
2	No swell
3	Slight swell
4	Moderate swell
5	Rather rough swell
6	Rough swell
7	Heavy swell
8	Very heavy swell
9	Abnormal swell

APPENDIX D

CLASSIFICATION OF BERTHS

Class of Berth	Berth Dimensions Length* (ft)	Depth* (ft)	Representative Vessels Accommodated
A	565	30	Large ocean-type cargo vessel
B	460	23	Standard ocean-type cargo vessel
C	350	18	Small ocean-type cargo vessel
D	250	17	Standard coaster-type cargo vessel
E	200	13	Small coaster-type cargo vessel
F	100	7	Lighter
TA	600	34	Large ocean-type tanker
TB	525	31	Standard ocean-type tanker
TC	450	26	Small ocean-type tanker
TD	250	14	Standard coaster-type tanker
TE	175	9	Representative sound-and-river-type tank barge
TS	---	50	Super tanker berth (includes anchorages with pipeline connection)
AA	700	34	Large ocean-type cargo vessel
AB	900	36	Large ocean-type cargo vessel

* Depths and lengths are minimum figures. Depth is the controlling factor.

APPENDIX E

BERTH TYPE

Code	Description
A	Ammunition - container
B	Ammunition - breakbulk
C	Container cargo
G	General cargo/breakbulk
M	All cargo types
P	POL
R	Ro/Ro cargo

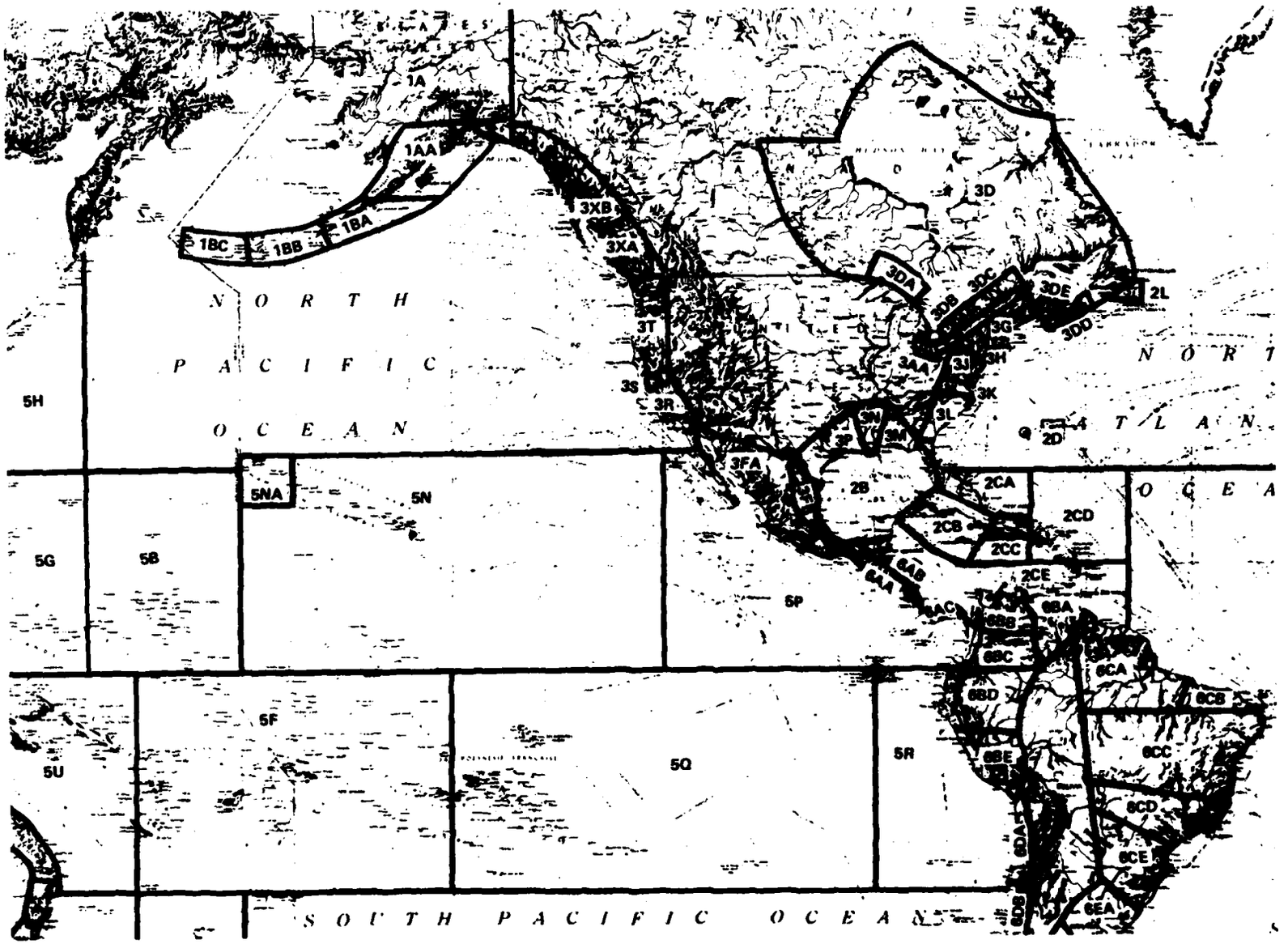
APPENDIX F

STATE CODES

Code	State	Code	State
01	Alabama	29	Missouri
02	Alaska	30	Montana
04	Arizona	31	Nebraska
05	Arkansas	32	Nevada
06	California	33	New Hampshire
08	Colorado	34	New Jersey
09	Connecticut	35	New Mexico
10	Delaware	36	New York
11	District of Columbia	37	North Carolina
12	Florida	38	North Dakota
13	Georgia	39	Ohio
15	Hawaii	40	Oklahoma
16	Idaho	41	Oregon
17	Illinois	42	Pennsylvania
18	Indiana	44	Rhode Island
19	Iowa	45	South Carolina
20	Kansas	46	South Dakota
21	Kentucky	47	Tennessee
22	Louisiana	48	Texas
23	Maine	49	Utah
24	Maryland	50	Vermont
25	Massachusetts	51	Virginia
26	Michigan	53	Washington
27	Minnesota	54	West Virginia
28	Mississippi	55	Wisconsin
		56	Wyoming

APPENDIX G

LPR CODES



APPENDIX H

THEATER CODES

No.	Description
1.	North America: East Coast, CONUS; Gulf of Mexico; Great Lakes; Saint Lawrence River; Newfoundland; Nova Scotia; Bermuda Islands
2.	North America: West Coast, CONUS; Hawaii; Midway Islands; Alaska; West Canada

APPENDIX I

DATA SOURCE

Corps of Engineers, U.S. Army Port Series, U.S. Government Printing Office, 1971-1980

Ports of the World, Benn Publications Ltd., London, England, 1979

"CONUS Ammunition Ports," MTMC* Report TE 7T-19, August 1978

"World Port Index," DMA H/T** Center, Pub. 150, 1982

"Automated Air Facilities Information File," DMAAC,*** 1983

* MTMC - Military Traffic Management Command
** DMA H/T - Defense Mapping Agency Hydrographic/Topographic
*** DMAAC - Defense Mapping Agency Aerospace Center

APPENDIX J

COMPUTER OUTPUT

SAMPLE 1

THEATR = 1

PORT NAME	CCODE NAME	LONG DEGREE	LAT DEGREE	TIDALR FEET
BALTIMORE	24	763500W	391700N	11
CHARLESTON	45	795500W	324600N	52
CORPUS CHRISTI	48	972300W	274800N	18
BAYONNE	34	740500W	404100N	46
BOSTON	25	710300W	422200N	96
HOUSTON	48	951700W	294500N	12
CHARLESTON NWS	45	800200W	325400N	68
BAYTOWN	48	950100W	294300N	
EARLE	34	743600W	400100N	
DAVISVILLE	44	792500W	363400N	45
JACKSONVILLE	12	814000W	302000N	11
GALVESTON	48	944513W	292801N	20
GULFPORT	28	890500W	302100N	17
BERMUDA ISLANDS	80	644100W	322100N	
SAVANNAH	13	810535W	320440N	74
SUNNY POINT	37	775600W	335900N	5
WILMINGTON	37	775638W	341406N	34
WILMINGTON	18	752000W	390800N	56
NEW YORK	36	735800W	404000N	47
NORFOLK,PORTSMOUTH,CHP	51	762000W	365800N	27
NEWPORT NEWS	51	762400W	370000N	27
CAMDEN	34	750000W	395700N	60
MOBILE	1	880025W	301348N	15
MOREHEAD CITY	37	764200W	344300N	25
NEW ORLEANS	22	900200W	293800N	
GLOUCESTER	34	750800W	395200N	60
PHILADELPHIA	42	751000W	395700N	60
HAMILTON	8	795100W	431400N	
MONTREAL	CA	733400W	453000N	
QUEBEC	CA	711400W	464800N	150
RIVIERE DU LOUP	CA	693400W	475000\	160
SAINT JOHN	CA	660500W	451500N	
NINOSOR	CA	830300W	421900N	
ST JOHNS	CA	524241W	473403N	46
SYDNEY	CA	601300W	460700N	50
TORONTO	CA	792300W	433800N	
HALIFAX	CA	633400W	443900N	65
PORTSMOUTH	34	704550W	430435N	
BATON ROUGE	22	910600W	302700N	2
BRUNSWICK	13	812900W	310800N	72
CHICAGO	17	873730W	415300N	
DETROIT	26	830200W	422000N	
FREEPORT	48	952000W	285600N	
GEORGETOWN	45	791700W	332100N	33
PORT ARTHUR	48	935800W	295000N	10
LAKE CHARLES	22	931500W	301300N	
MIAMI	12	801900W	254600N	20
PANAMA CITY	12	854624W	300524N	15
PASCAGOULA	28	883100W	300200N	
PENSACOLA	12	871400W	302500N	13
PORT CANAVERAL	12	803631W	282430N	
DULUTH-SUPERIOR	27	920535W	464646N	
TAMPA	12	824200W	273600N	16

SAMPLE 2

LPRC = 3L

PORT NAME	GEOC NAME	PORTA
CHARLESTON	DKSD	SOUTH CAROLINA STATE PORT AUTHORITY
CHARLESTON NWS	DKGT	
SAVANNAH	UZXJ	SAVANNAH PORT AUTHORITY
SUNNY POINT	WNPT	MILITARY TRAFFIC MANAGEMENT COMMAND,EASTER
WILMINGTON	ZBES	NORTH COROLINA STATE PORT AUTHORITY
MOREHEAD CITY	QTUP	NORTH CAROLINA STATE PORT AUTHORITY
BRUNSWICK	CQJS	BRUNSWICH PORT AUTHORITY
GEORGETOWN	HVZT	SOUTH CAROLINA STATE PORTS AUTHORITY

SAMPLE 3

THEATR = 2

PORT NAME	COVS CU FT	OPNS ACRES	REFS CU FT	POLS BARREL
ANCHORAGE	143888	410	3000	3132188
NAVAL STATION ADAK	228888	180	29000	
CONCORD	141888	50		
HONOLULU	258888	162	2448088	3788888
TACOMA	1748858	858	2888185	186159
SAN DIEGO	645888	254	1625888	299358
SAN FRANCISCO	978388	384	4018188	118888
LONG BEACH	2456244	488		462554312
PEARL HARBOR	169888	185	2888	5888888
OAKLAND	759818	667	2199888	57458
PORTLAND	2533888	1358	6488888	7643688
PORT HUENEME	48888	488		
NEW WESTMINISTER			999346	
PRINCE RUPERT				
VANCOUVER				
VICTORIA				
SEATTLE				
LONGVIEW	924788	458		542888
REDWOOD CITY		128		357888
SACRAMENTO	75888	398	3151888	161158
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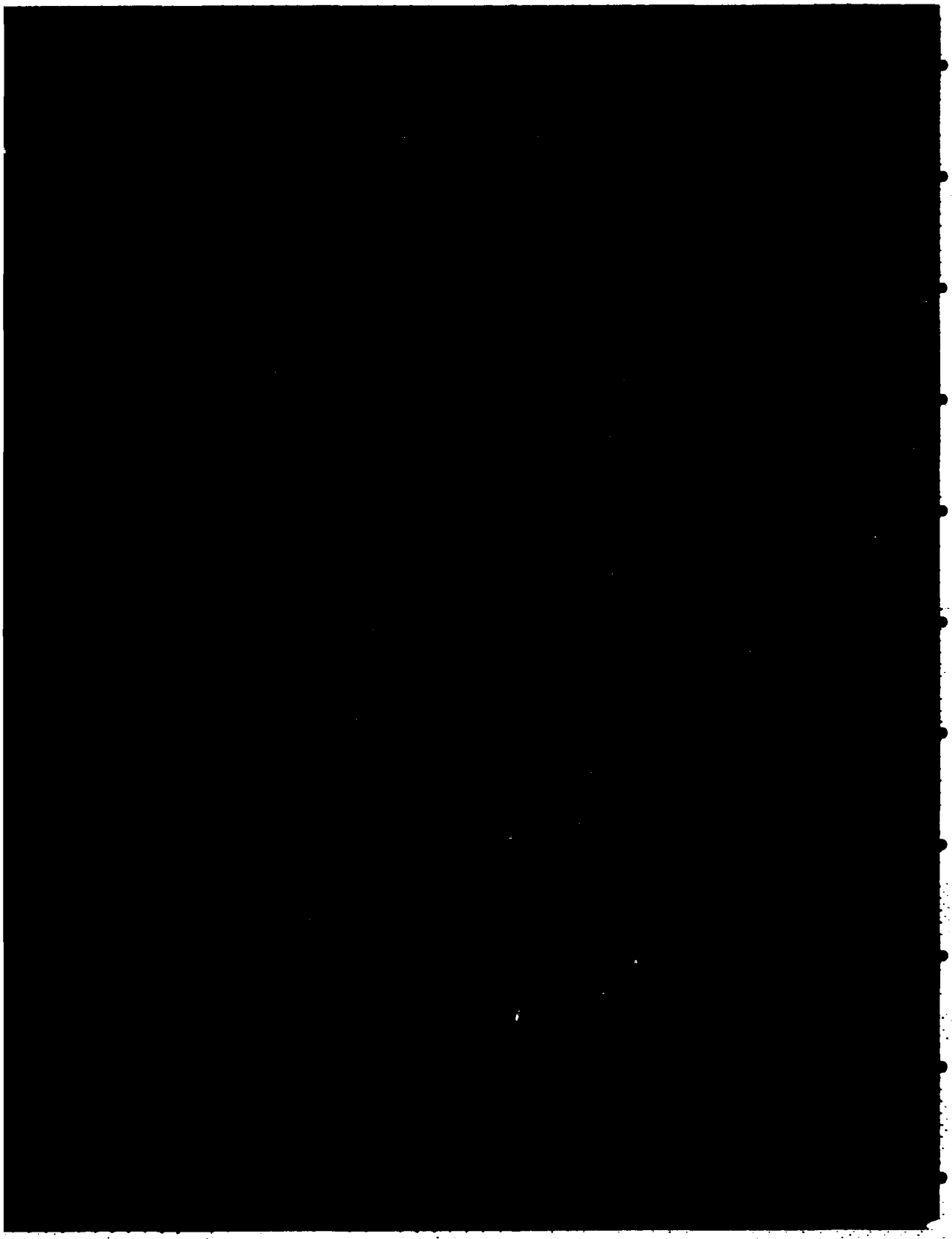

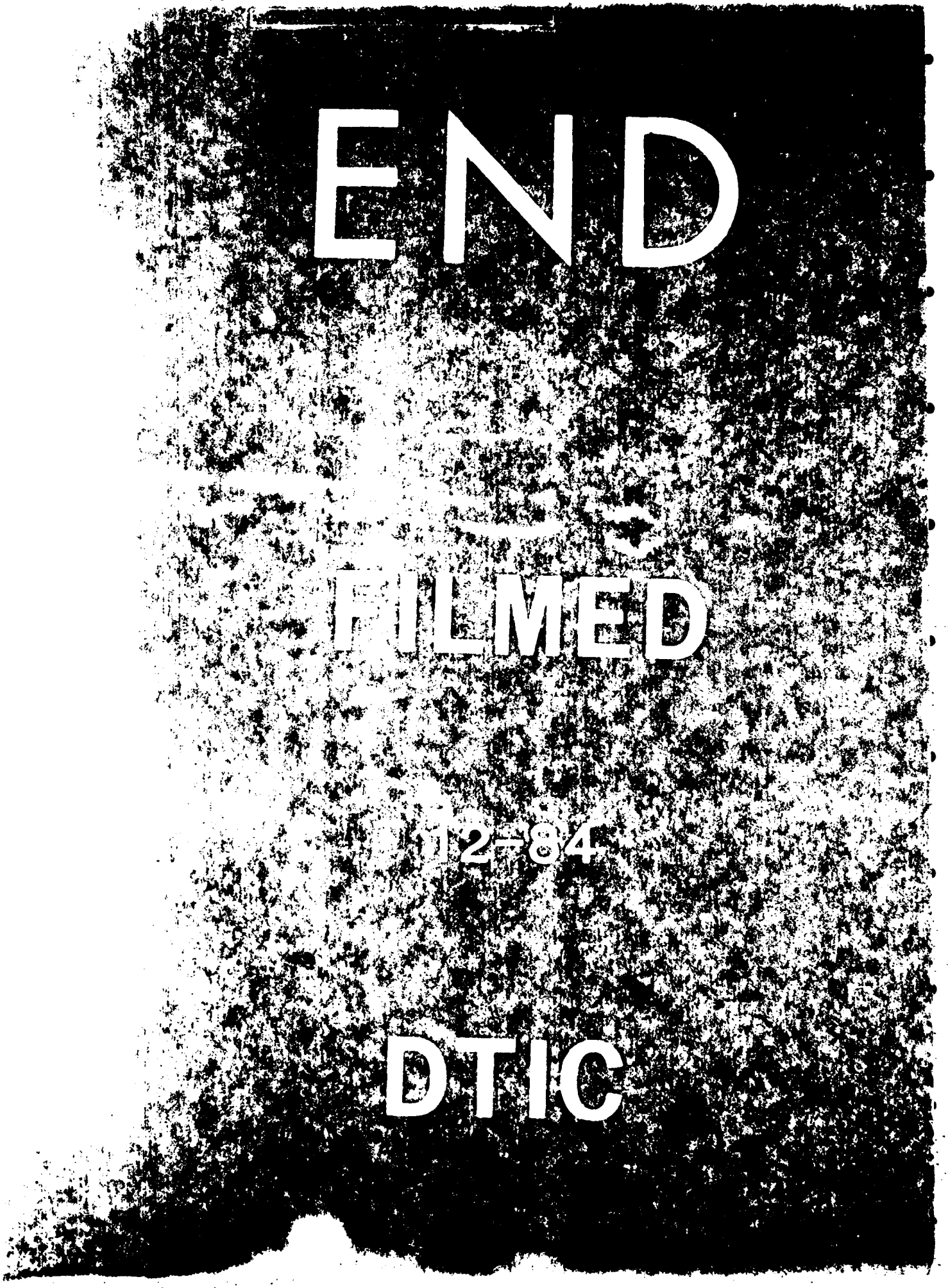
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