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C7-1117
PDR 7/13/79

607 257-1957

24 May 1979

117 TEXAS LANE

Dr. Dade W. Moeller
Environmental Health Science Department
School of Public Health
Harvard University
665 Huntington Avenue
Boston, Mass 02215

RECEIVED
ADVISORY COMMITTEE ON
REACTOR SAFEGUARDS U.S. N.R.C

MAY 29 1979

AM
7,8,9,10,11,12,1,2,3,4,5,6 PM

Dear Dade:

As you requested, I attended and took part on 23 May in the NRC/DOE Meeting on Radioactive Waste Repositories: Environmental Surveys at the Wilstie Building, Silver Springs, MD.

Enclosed are:

1. Environmental Survey Programs by DOE, National Waste Terminal Storage Program -- a collection of papers stapled together
2. Site Identification Study -- Environmental Screening Guide Lines by Dale St.Laurent, of the Basalt Waste Isolation Program, Hanford, Wash.

In summation. DOE showed intelligent progress in moving from regional studies to area studies stopping just short of the overlaying of maps of various environmental parameters, factors and conditions which, if done, would have reduced the choices, in number, to specific locations. I believe this was deliberate and wise because:

1. Premature disclosure of location was avoided prior detailed review and checking, and
2. Not all parameters, factors and conditions had been quantified or degrees of acceptability been determined.

Considerable talk about geohydrologic suitable "systems" which seemed to mean "looking at all angles". Some comments suggesting regional repositories subject to State Planning Council might be the most desirable. I am deeply concerned about the subject discussed in the following paragraphs and so are a lot of my geological colleagues all over the country.

NRC had one geologist present during meeting which was filled with geology. Apparently he is the only geologist in the NRC staff involved in the work and he has been in this work only 3 weeks although on the Staff on plant site work for years.

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7 908170 29.8

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In October when NRC presented to ACRS the research on waste management proposed for FY 1980 (Current year) the only engineer trained in subsurface work assigned to waste management had been on duty in that field for only one month. I objected to this lack of trained personnel then.

This is absolutely ridiculous. NRC should have competent, experienced, engineering geologists assigned to and on top of the waste management studies. As it is now, I know of only one (noted above) geologist who can talk to DOE geologists and DOE contractors on subsurface and geologic studies in their own language. This is no way to run this very important business.

There seems to be no contact with the Corps of Engineers, Bureau of Mines, Reclamation Service or TVA which contain the largest and most experienced groups of engineering geologists in Government. And the great quantities of data, both field and laboratory, developed by these agencies during periods ranging from 75 to 40 years are not being used in reaching critical decisions nor does there seem to be any attempt to take advantage of these magnificent sources. It would seem as if NRC and maybe DOE were trying to reinvent the wheel, a point which I made at the meeting.

To indicate one example of what this lack of subsurface expertise means. When I seriously questioned the need for an exploratory shaft 3000 feet deep at Hanford, requiring at least a year to excavate, for the purpose of in situ testing of basalt at the repository depth and site, ONWI at Columbus greeted this with wonderment and then interest. Questions which followed were brief and sound. I don't know why this exploratory shaft is needed as such. If the decision is go to basalt, that decision can be made soundly on the basis of drill hole data and laboratory studies. Then the final design dimensions can be established when the access shaft is completed under a properly drawn construction contract allowing such to be accomplished equitably.

There seems to be a void in NRC's capability to provide critical input into the subsurface side of the waste management process which needs to be filled wisely and well and without delay. To this end, I provided to the NRC the names of two competent, individual engineering geologic consultants but the need for staff capability in this area would still remain for day to day activities.

Sincerely yours,

Shailer S. Philbrick
- Shailer S. Philbrick
Consultant

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ENVIRONMENTAL SURVEY PROGRAMS

PRESENTATION TO
U.S. NUCLEAR REGULATORY COMMISSION
MAY 23, 1979

U.S. DEPARTMENT OF ENERGY
NATIONAL WASTE TERMINAL STORAGE PROGRAM

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AGENDA

ENVIRONMENTAL SURVEY

NWTS OVERVIEW

W. HEWITT (*Bill*)

ENVIRONMENTAL SURVEY OVERVIEW

D. WAITE (*Dave*)

GIR-PARADOX SUMMARY

M. GLORA *Mike*

SALINA-PERMIAN SUMMARY

D. WAITE

NON-SALT

D. WAITE (MCINTOSH)

NATIONAL SCREENING

D. WAITE (NEWCOMB)

BWIP

G. HUNT (*Gale*) by *Dale St. Laurent*

WIPP

M. MERRITT (*Mike*)

DISCUSSION

W. HEWITT

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WMH:5/23/79



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ENVIRONMENTAL SURVEY PROGRAM

OBJECTIVE
TO ASSURE CONSIDERATION OF ENVIRONMENTAL CONCERNS IN REPOSITORY SITING
LEADING TO ENVIRONMENTAL ACCEPTABILITY AND COMPLIANCE WITH NEPA AT SITE
SELECTION STAGE.

NWTS/WIPP OVERVIEW

- WIPP** SITE SPECIFIC DEIS PREPARED AND PUBLISHED
- BWIP** LOW LEVEL OF EFFORT-PRESENT EMPHASIS ON HYDROGEOLOGIC SYSTEMS WILL
INCREASE AS GEOLOGIC WINNOWING PROGRESSES
- NTS** PRESENT EMPHASIS ON HYDROGEOLOGIC SYSTEMS
- ONWI** ENVIRONMENTAL AND HYDROGEOLOGIC EXPLORATION PROCEEDING IN PARALLEL

NWTS: 5/15/79

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THE TERM "ENVIRONMENTAL" IS USED LOOSELY AND INCLUDES
THE FOLLOWING FACTORS:

- LAND USAGE
- DEMOGRAPHY
- SOCIOECONOMIC
- NATURAL RESOURCES (INCLUDING WATER)
- TERRESTRIAL ECOLOGY
- AQUATIC ECOLOGY
- TRANSPORTATION

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THE INFORMATION/DATA DEVELOPED IN THE ENVIRONMENTAL SURVEY PROGRAM WILL BE UTILIZED AS FOLLOWS:

- ENVIRONMENTAL CHARACTERIZATION REPORTS - WINNOWING
 - REGIONAL
 - AREAS
 - LOCATIONS
- SITE QUALIFICATION REPORTS - ACCEPTABILITY
 - SHOULD MEET PARAGRAPH 60.11
- ENVIRONMENTAL IMPACT STATEMENTS - SELECTION
- ENVIRONMENTAL REPORTS - LICENSING

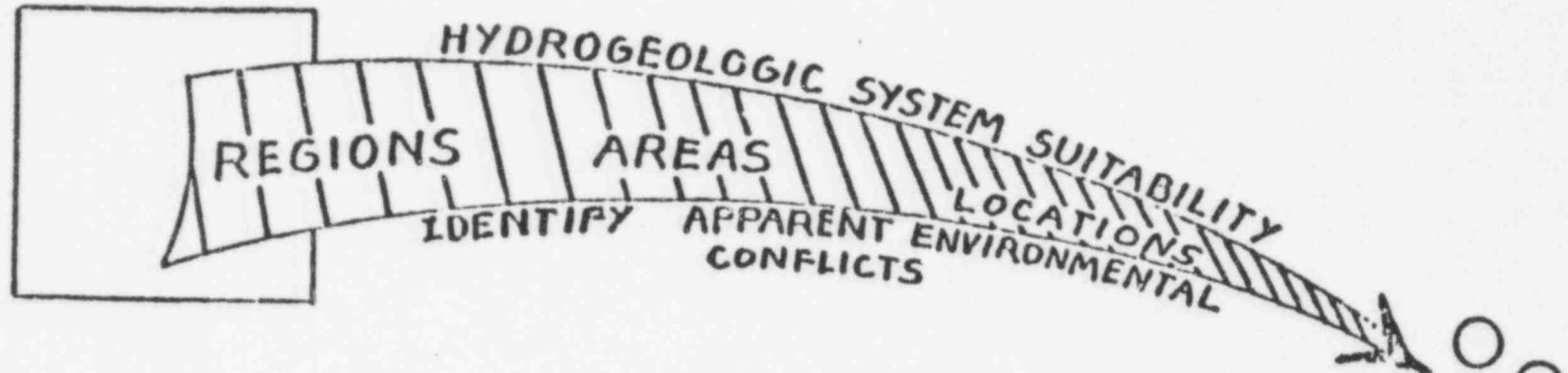
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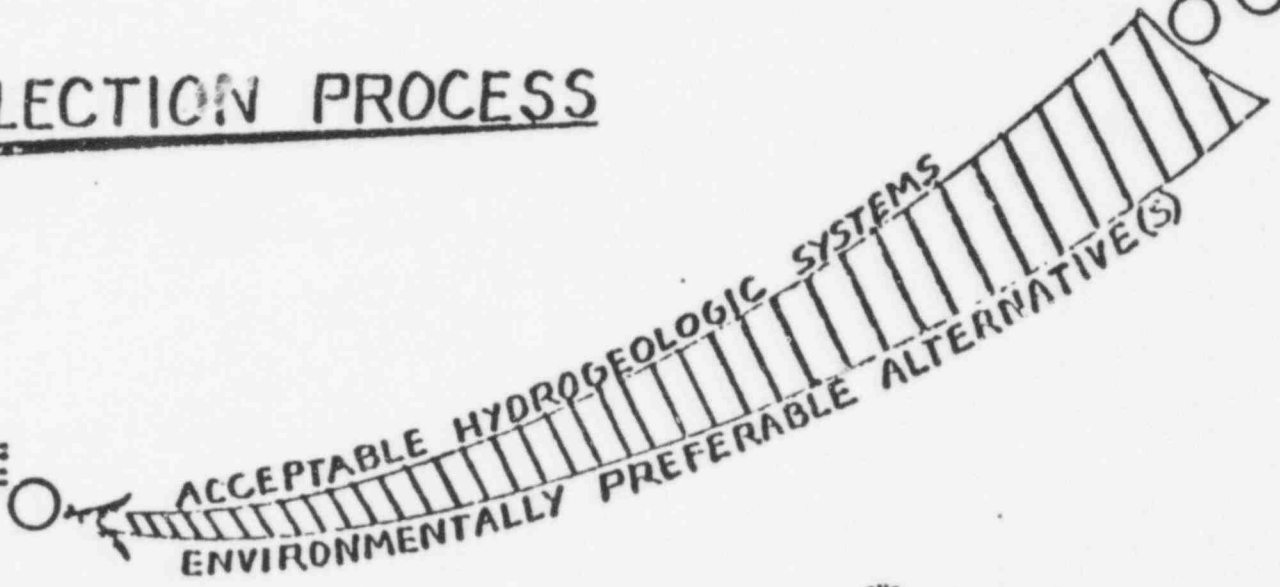
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SITE SELECTION PROCESS

RECOMMENDED SITE



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ENVIRONMENTAL SURVEY

OVERVIEW

D. A. WAITE

ONWI

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THE INFORMATION/DATA DEVELOPED IN THE ENVIRONMENTAL SURVEY PROGRAM WILL BE UTILIZED AS FOLLOWS:

- ENVIRONMENTAL SURVEY PLANS - PLANNING
- ENVIRONMENTAL CHARACTERIZATION REPORTS - MINNOWING
 - REGIONAL
 - AREAS
 - LOCATIONS
- SITE QUALIFICATION REPORTS - ACCEPTABILITY
 - SHOULD MEET PARAGRAPH 60.11
- ENVIRONMENTAL IMPACT STATEMENTS - SELECTION
- ENVIRONMENTAL REPORTS - LICENSING

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SURVEY PLAN CONTENTS

VOLUME I

- 1.0 INTRODUCTION
- 2.0 REGIONAL ENVIRONMENT
- 3.0 STUDY AREA ENVIRONMENT
- 4.0 REGULATORY REQUIREMENTS AND COMPLIANCE

VOLUME II

- 5.0 LOCAL ENVIRONMENT

VOLUME III

- COMMENTS ON VOLUME I

VOLUME IV

- COMMENTS ON VOLUME II

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2.1 ENVIRONMENTAL MEDIA SYSTEMS

2.1.1 GEOSPHERE

- 2.1.1.1 PHYSIOGRAPHY AND TOPOGRAPHY
- 2.1.1.2 STRUCTURAL GEOLOGY
- 2.1.1.3 STRATIGRAPHY
- 2.1.1.4 TECTONIC HISTORY
- 2.1.1.5 SEISMOLOGY
- 2.1.1.6 ENERGY AND MINERAL RESOURCES

2.1.2 HYDROSPHERE

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- 2.1.2.2 GROUNDWATER

2.1.3 ATMOSPHERE

- 2.1.3.1 CLIMATE
- 2.1.3.2 PALEOCLIMATOLOGY
- 2.1.3.3 SEVERE WEATHER
- 2.1.3.4 RESTRICTIVE DISPERSION
CONDITIONS
- 2.1.3.5 TOPOGRAPHY
- 2.1.3.6 DISPERSION CONDITIONS
- 2.1.3.7 AIR QUALITY

REFERENCES

- 2.1.4 BACKGROUND RADIATION

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2.2 DEMOGRAPHIC, SOCIOECONOMIC, AND LAND-USE SYSTEMS

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2.2.3.2 INDIAN RESERVATIONS

2.2.3.3 RECREATIONAL AND NATURAL AREAS

2.2.3.4 POTENTIALLY INTERACTIVE USES

2.2.3.5 TRANSPORTATION SYSTEMS

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2.3 ECOSYSTEMS

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2.3.1.2 AGRICULTURAL SYSTEMS

2.3.2 AQUATIC

2.3.2.1 IMPORTANT SPECIES AND
HABITATS

2.3.2.2 ENDANGERED AND THREATENED
SPECIES AND HABITATS

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- DATA PRESENTATION

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PLAN FOR THE PREPARATION OF
ENVIRONMENTAL REPORTS

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- 1.0 PURPOSE OF THE PROPOSED FACILITY
- 2.0 THE SITE AND TRANSPORT ROUTES
- 3.0 THE PROPOSED FACILITY
- 4.0 SHORT-TERM ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES
- 5.0 LONG-TERM ENVIRONMENTAL IMPACTS AND MITIGATING MEASURES
- 6.0 ENVIRONMENTAL MEASUREMENTS AND MONITORING
- 7.0 ALTERNATIVES
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- 9.0 ENVIRONMENTAL APPROVALS AND CONSULTATION
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- 1.0 PURPOSE OF THE PROPOSED FACILITY
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 - 1.2 NUCLEAR POWER AND THE FUEL CYCLE IN THE UNITED STATES
 - 1.3 INTERNATIONAL NUCLEAR WASTES
 - 1.4 TECHNOLOGY OF NUCLEAR WASTE STORAGE IN GEOLOGIC MEDIA
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 - 2.1 LOCATION
 - 2.2 GEOSPHERE
 - 2.3 HYDROSPHERE
 - 2.4 ATMOSPHERE
 - 2.5 HUMAN ENVIRONMENT
 - 2.6 ECOLOGICAL ENVIRONMENT
 - 2.7 BACKGROUND RADIATION
 - 2.8 NOISE
- 3.0 THE PROPOSED FACILITY
 - 3.1 ON-SITE FACILITY SYSTEMS AND THEIR OPERATION
 - 3.2 TRANSPORTATION AND WASTE ROCK STORAGE AND DISPOSAL FACILITIES
 - 3.3 CONSTRUCTION
 - 3.4 DECOMMISSIONING AND SURVEILLANCE
 - 3.5 SCHEDULE AND COSTS

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(Continued)

4.0 SHORT-TERM ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

- 4.1 FACILITY CONSTRUCTION**
- 4.2 FACILITY OPERATION**
- 4.3 DECOMMISSIONING**
- 4.4 TRANSPORTATION**
- 4.5 ABNORMAL EVENTS**

5.0 LONG-TERM ENVIRONMENTAL IMPACTS AND MITIGATING MEASURES

- 5.1 THE HUNDRED TO THOUSAND YEAR PERIOD**
- 5.2 THE VERY LONG TIME PERIOD**

6.0 ENVIRONMENTAL MEASUREMENTS AND MONITORING

- 6.1 GEOLOGICAL MONITORING**
- 6.2 HYDROLOGICAL MONITORING**
- 6.3 METEOROLOGICAL MONITORING**
- 6.4 AIR QUALITY MONITORING**
- 6.5 RADIOLOGICAL MONITORING**
- 6.6 NOISE MONITORING**
- 6.7 SOCIOECONOMIC MONITORING**
- 6.8 ECOLOGICAL MONITORING**

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**CONTENTS OF ER
(Continued)**

- 7.0 ALTERNATIVES**
 - 7.1 NO-ACTION ALTERNATIVES**
 - 7.2 OTHER TECHNOLOGY ALTERNATIVES**
 - 7.3 OTHER DESIGN ALTERNATIVES**
 - 7.4 OTHER SITE ALTERNATIVES**
 - 7.5 DELAY IN SCHEDULE**

- 8.0 SUMMARY COST/BENEFIT ANALYSIS**
 - 8.1 UNAVOIDABLE ADVERSE AFFECTS**
 - 8.2 COMMITMENT OF RESOURCES**
 - 8.3 SHORT-TERM USES AND LONG-TERM PRODUCTIVITY**
 - 8.4 ENVIRONMENTAL TRADE-OFF ANALYSIS**

- 9.0 ENVIRONMENTAL APPROVALS AND CONSULTATION**

- 10.0 REFERENCES**

- 11.0 GLOSSARY, ABBREVIATIONS, AND ACRONYMS**

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2.1.2 TRANSPORT ROUTES

The location of roads and railways, proposed to be built as part of this facility should be shown on the layout maps described under Section 2.1.1 along with the location of existing systems in the same area. Also major highways and railroads which will serve the repository should be presented on appropriate maps and described.

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2.3.1.3 Water Quality

This section should describe the temporal and spatial variation of surface water quality in the vicinity of the repository. It should include:

- Monthly mean and extreme value of the physical, chemical, biological, and radiological characteristics of streams, lakes, and impoundments.
- Location of point and nonpoint sources of surface water pollutants; monthly variations in the quantity and characteristics of pollutants.
- Local, state, and Federal laws, regulations, and standards.

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GULF INTERIOR REGION

AND

PARADOX SUMMARY

M. A. GLORA

ONWI

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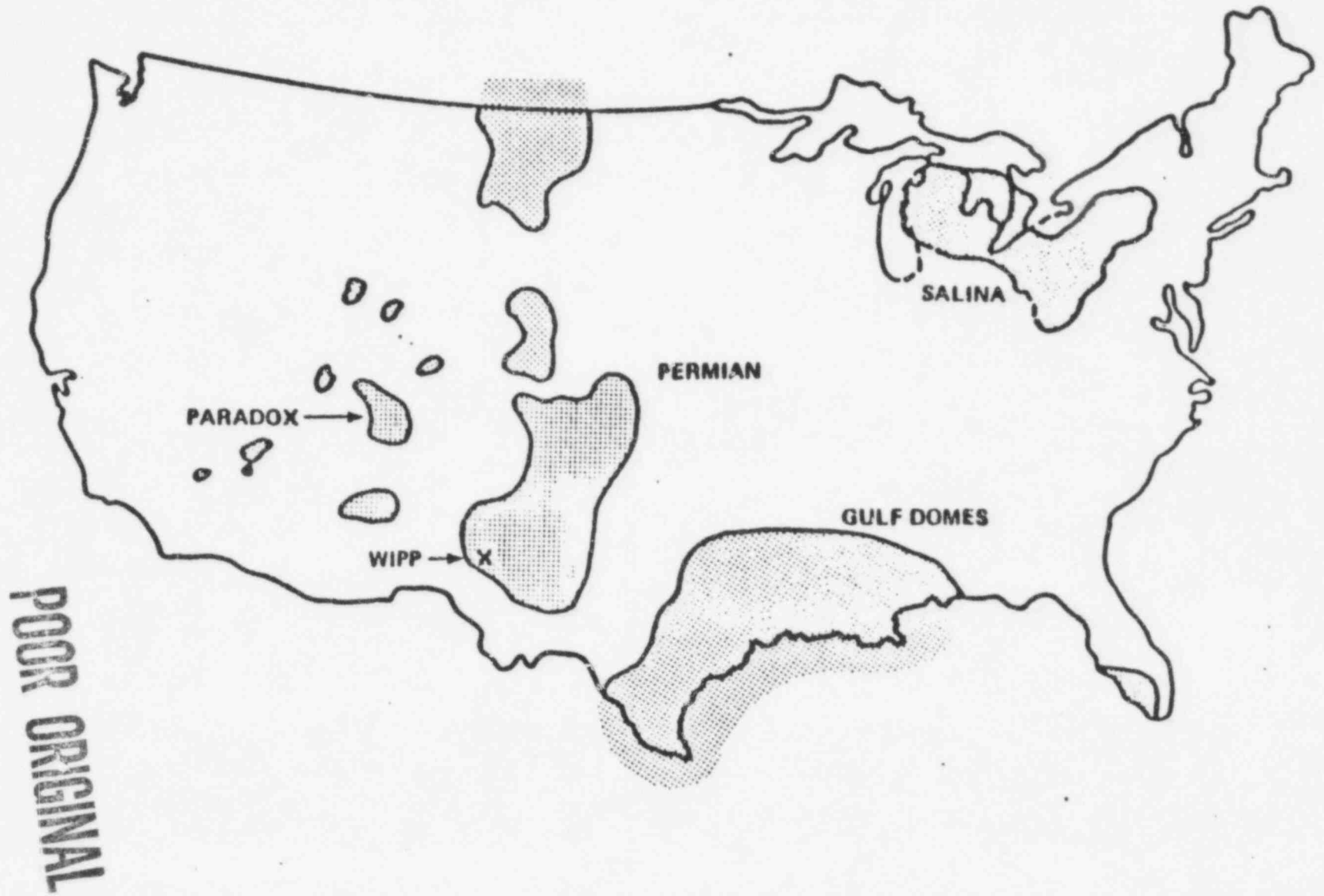


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SALT FORMATIONS OF THE UNITED STATES



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GULF INTERIOR REGION
ENVIRONMENTAL CHARACTERIZATION

- ~ 263 ON-SHORE DOMES
- ~ 125 INTERIOR DOMES
- ALTITUDE: AVERAGES SEVERAL
HUNDRED FEET ABOVE SEA LEVEL
- CLIMATE: HUMID/TEMPERATE
- DEMOGRAPHY - GIR BY STATE
 - LOUISIANA - GIR
 - 29 PARISHES AND POPULATION OF 1,062,000
(1970)
 - CITIES OF SHREVEPORT, MONROE, ALEXANDRIA
 - MISSISSIPPI - GIR
 - 35 COUNTIES AND POPULATION OF 1,064,000
(1975 ESTIMATE)
 - CITIES OF JACKSON, MERIDIAN, HATTIESBURG,
VICKSBURG
 - TEXAS - GIR
 - 32 COUNTIES AND POPULATION OF 766,154 (1970)

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GULF INTERIOR REGION
ENVIRONMENTAL CHARACTERIZATION

- SOCIOECONOMIC

● LOUISIANA

- FARMING, GRAZING
- NATURAL GAS/PETROLEUM
- LUMBER/WOOD PRODUCTS, TEXTILES,
CHEMICALS

● MISSISSIPPI

- MANUFACTURING
- NATURAL GAS/PETROLEUM
- AGRICULTURE

● TEXAS

- LOW POPULATION DENSITY (~0.02 PEOPLE/ACRE)
- WOODLANDS AND AGRICULTURE
- EXTENSIVE RECREATIONAL AREAS
- EXTENSIVE TRANSPORTATION SERVICES

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GULF INTERIOR REGION
ENVIRONMENTAL CHARACTERIZATION

- ECOSYSTEMS

● LOUISIANA

- PRAIRIE
- THREE MIXED HARDWOOD/SOFTWOOD FOREST TYPES
- DIVERSE WILDLIFE HABITATS
- CONTAINS NATIONAL FOREST, NATURAL AREA,
STATE/NATIONAL AND PRIVATE WILDLIFE AREAS

● MISSISSIPPI

- FIVE VEGETATION TYPES (HARDWOOD/SOFTWOOD)
- SIX NATURAL AREAS, FIVE NATIONAL FORESTS
- DIVERSE HABITATS

● TEXAS

- NINE VEGETATION TYPES (SAVANNA → HARDWOOD/
SOFTWOOD FOREST)
- FOUR NATIONAL FORESTS
- LOCALLY ADMINISTERED NATURAL AREAS

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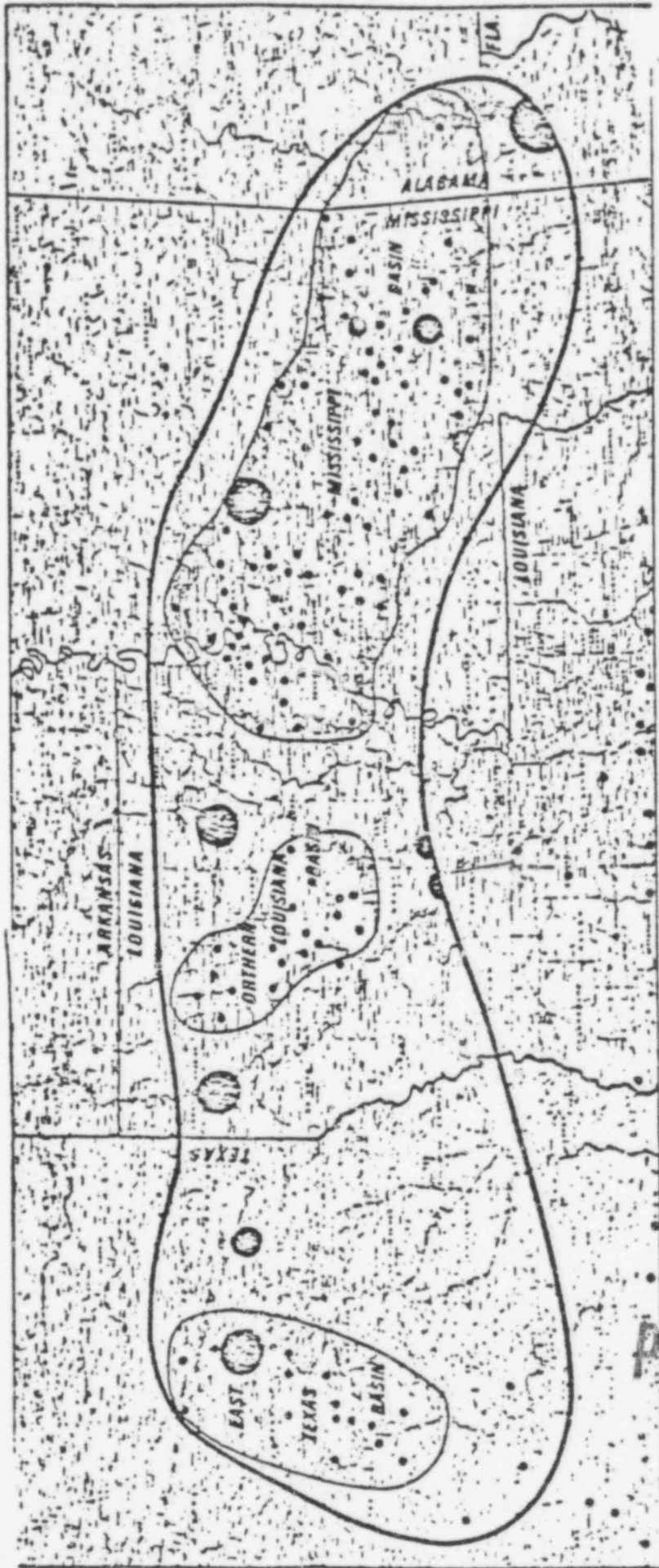


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AIRPORTS AND URBAN AREAS

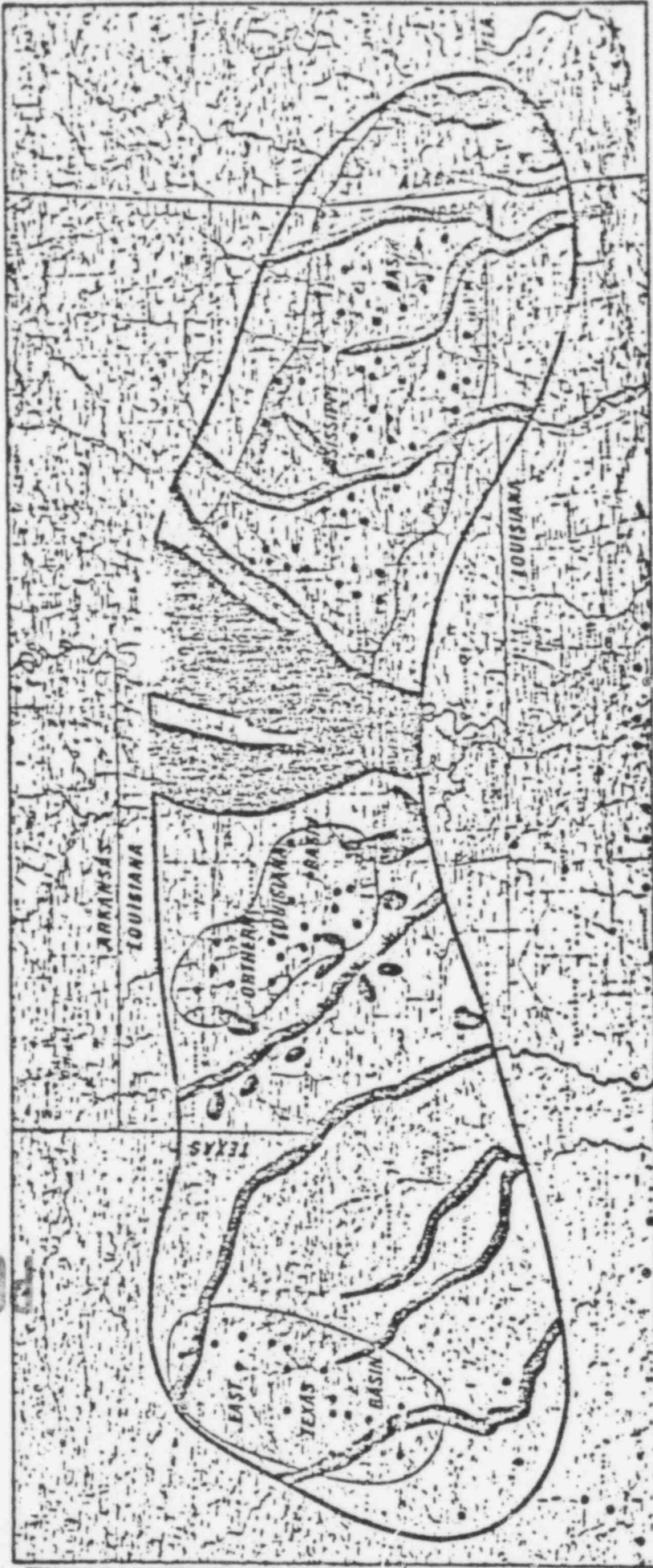


GULF INTERIOR REGION

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MAJOR RIVERS, LAKES AND AREAS SUBJECT TO FLOODING

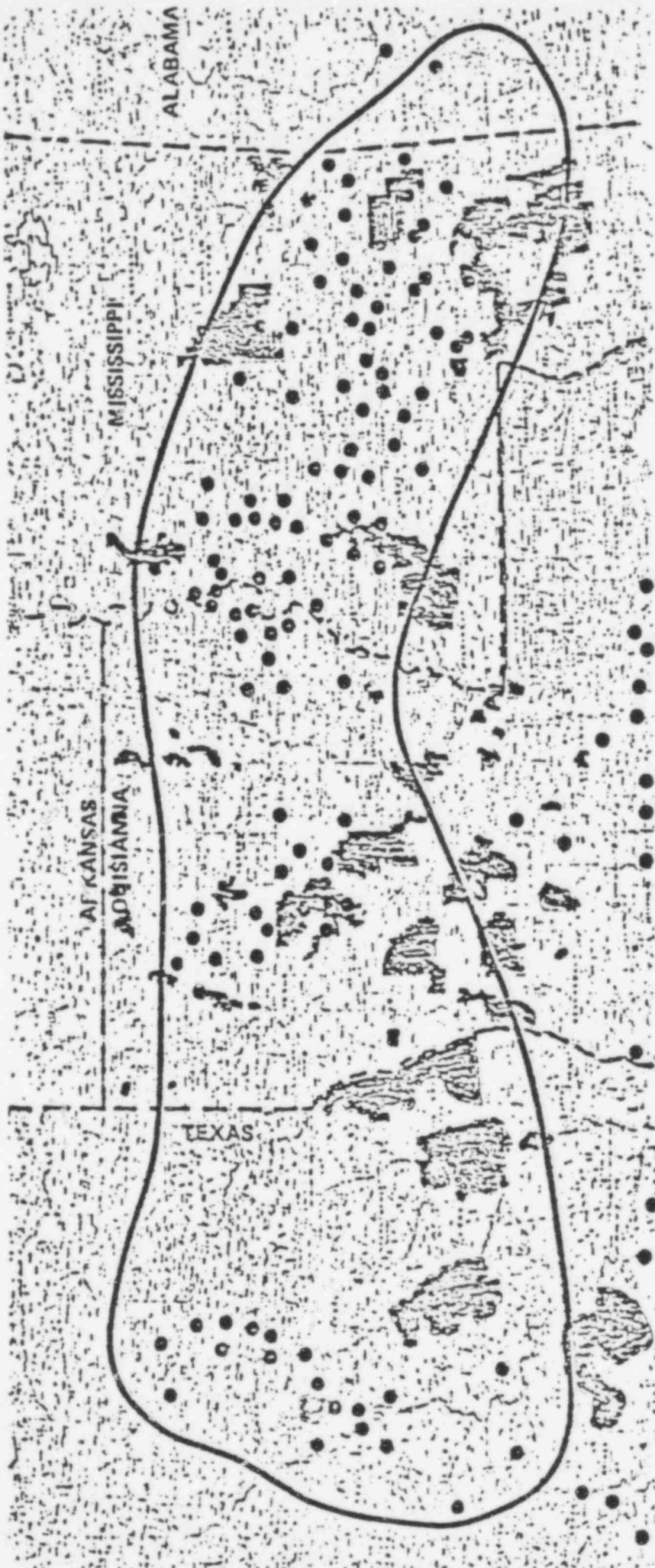


GULF INTERIOR REGION

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LEGALLY DEDICATED LANDS OF THE GULF INTERIOR REGION



• SALT DOME



LEGALLY DEDICATED LANDS


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PARADOX REGION
ENVIRONMENTAL CHARACTERIZATION

- AREA 12,000 SQUARE MILES
- IN COLORADO PLATEAU PHYSIOGRAPHIC PROVINCE
- ALTITUDE: 5,000 FEET
- BEDDED/ANTICLINAL SALT
- COOL-SEMIARID STEPPE WITH ISOLATED DESERT AND HUMID CONTINENTAL REGIMES
- DEMOGRAPHY
 - TOTAL POPULATION 240,000 (1970)
 - NUMEROUS SMALL TOWNS
 - NO LARGE CITIES
 - NEAREST ADJACENT FARMINGTON, N.M.;
 - GRAND JUNCTION, CO.

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PARADOX REGION
ENVIRONMENTAL CHARACTERIZATION

- ECOSYSTEMS
 - LARGE, RELATIVELY UNDISTURBED AREAS
 - PINE/FIR FOREST
 - SCRUBLANDS
 - STEPPES
 - BARRENLANDS

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PARADOX REGION
ENVIRONMENTAL CHARACTERIZATION

- SOCIOECONOMIC

- EXTRACTIVE INDUSTRY (PETROLEUM, COAL, POTASH, URANIUM)
- AGRICULTURE (HAY, GRAIN, LIVESTOCK)

- LAND USE

- 29% FEDERAL AND STATE RECREATION AND NATURAL AREAS
- BULK OF REMAINDER - OPEN LAND

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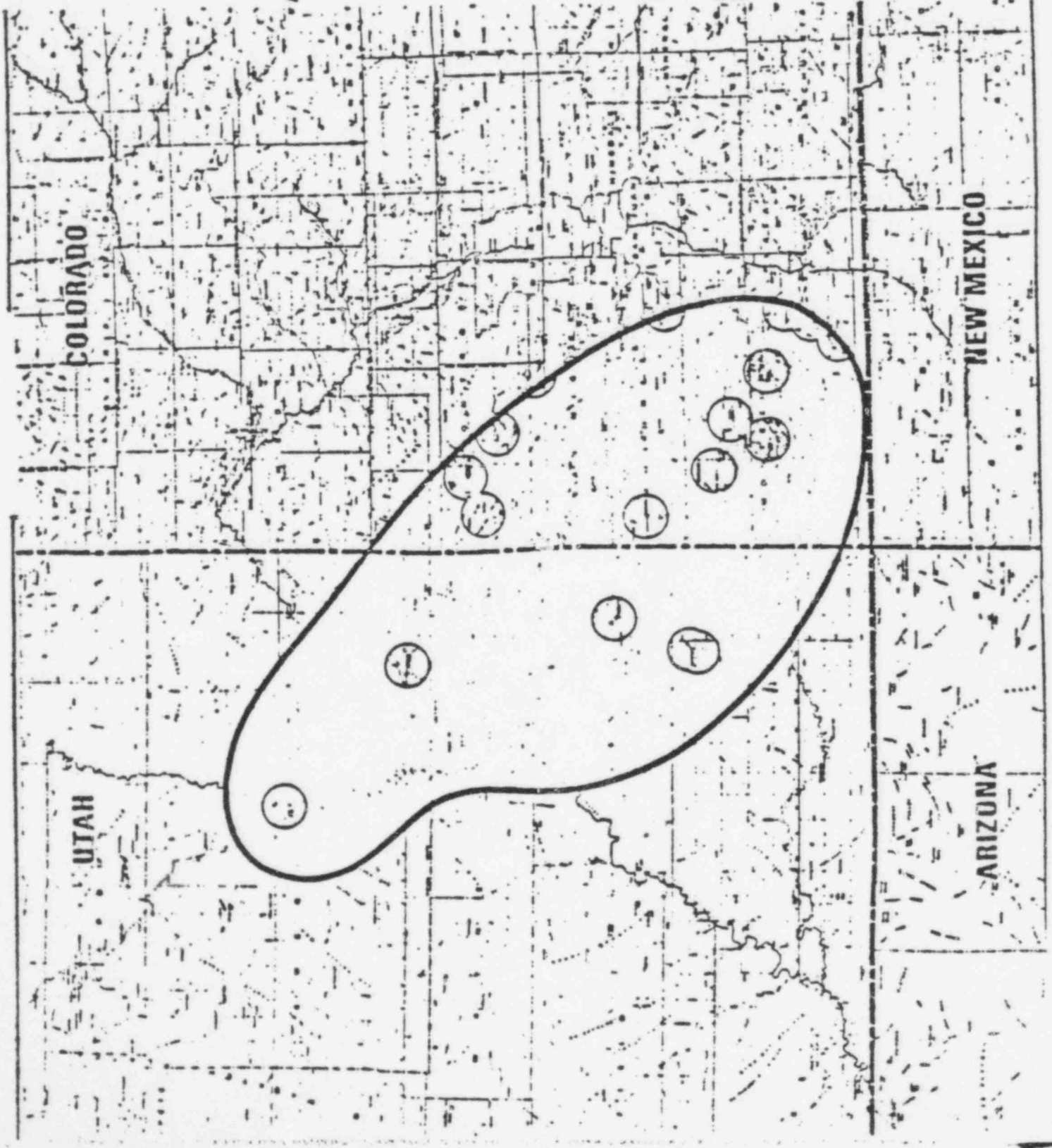
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PARADOX
REGION

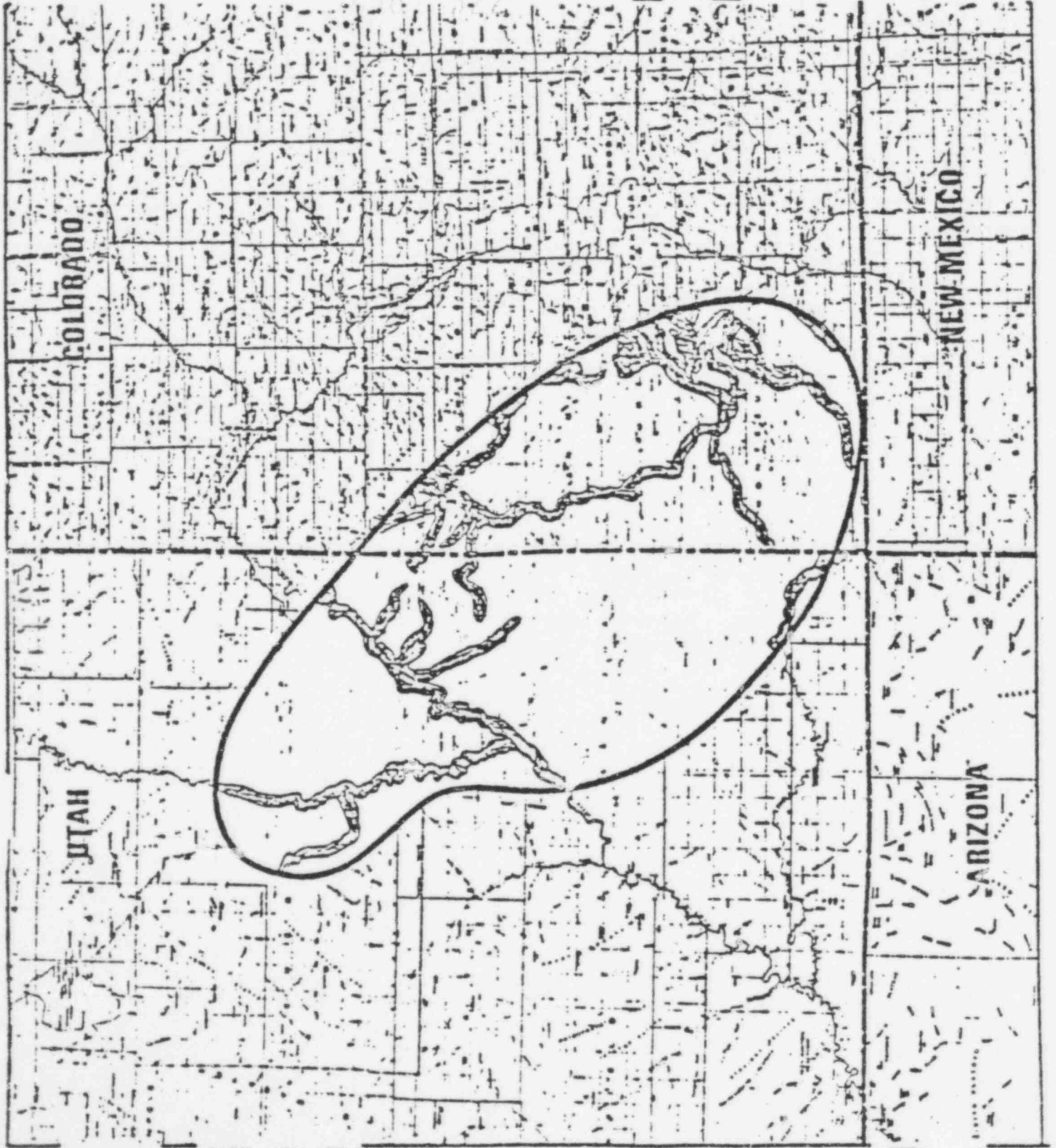
AIRPORTS & URBAN AREAS



RIVERS & RESERVOIRS

PARADOX

REGION DOOR ORIGINAL

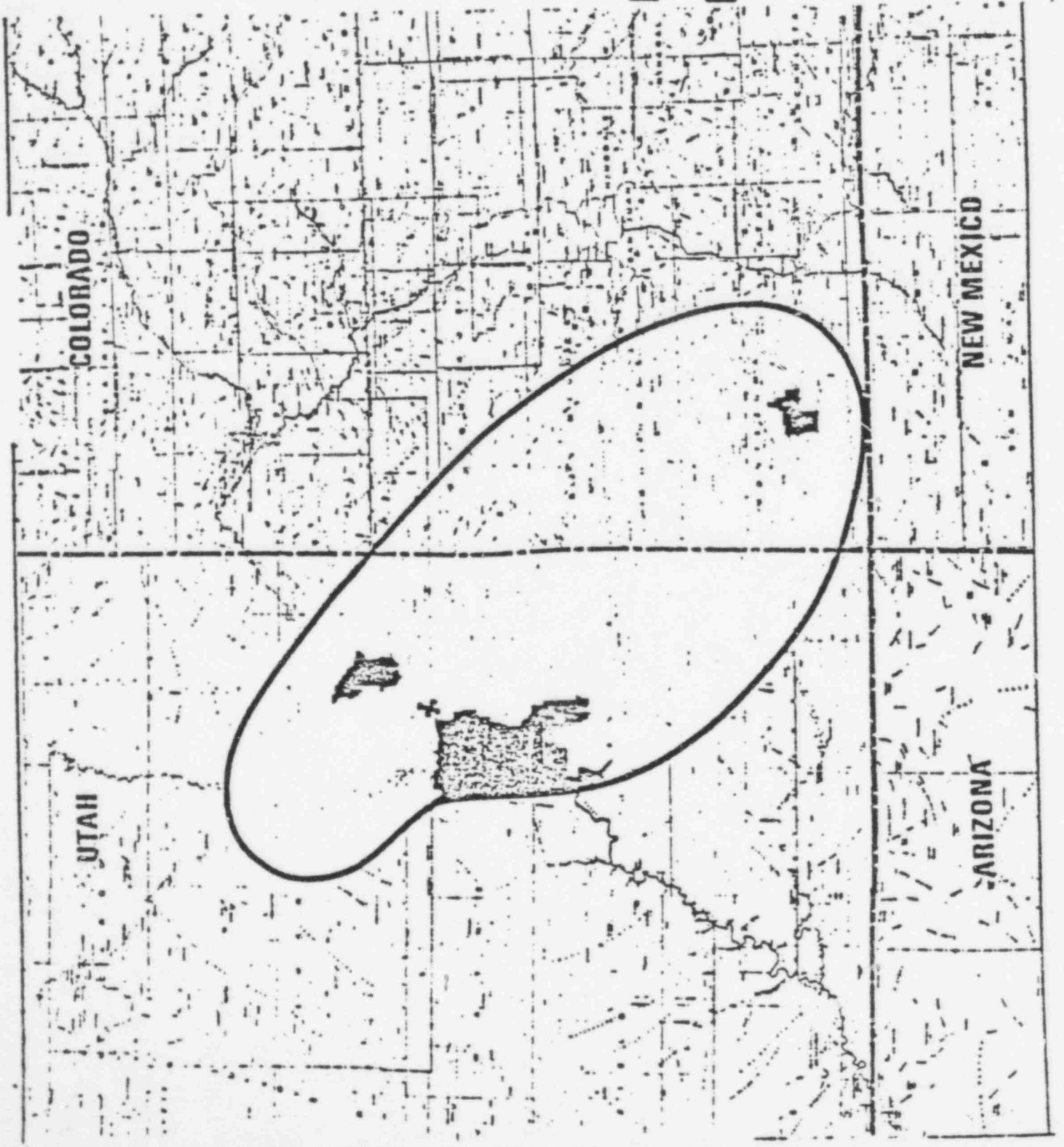


NATIONAL PARKS
WILDERNESS AREAS
STATE PARK

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PARADOX
REGION

POOR ORIGINAL



POOR ORIGINAL

PARADOX
REGION

756 524

SLOPE > 500'/MI



COLORADO

UTAH

NEW MEXICO

ARIZONA

ENVIRONMENTAL DOCUMENTATION STATUS

- PARADOX

REGIONAL CHARACTERIZATION REPORT FOR THE PARADOX
BEDDED SALT REGION AND SURROUNDING TERRITORY
(Y/OWI/SUB-78/42507/1)

- PUBLIC COMMENT COMPLETED 4/1/79
- FINAL REPORT IN PREPARATION

- GULF INTERIOR REGION

REGIONAL ENVIRONMENTAL CHARACTERIZATION REPORT FOR
THE GULF INTERIOR REGION AND SURROUNDING TERRITORY
(ONWI/SUB/78/512-01600-1)

- PUBLIC COMMENT COMPLETE 6/15/79

MAG:5/21/79
SQ&L



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756 325

PERMIAN
AND
SALINA SUMMARY

D. A. WAITE

ONWI

DAW: 5/23/79
SQ&L



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756 326



Figure
Regional Location

POOR ORIGINAL

756 327





Source: Johnson, 1976

756-329

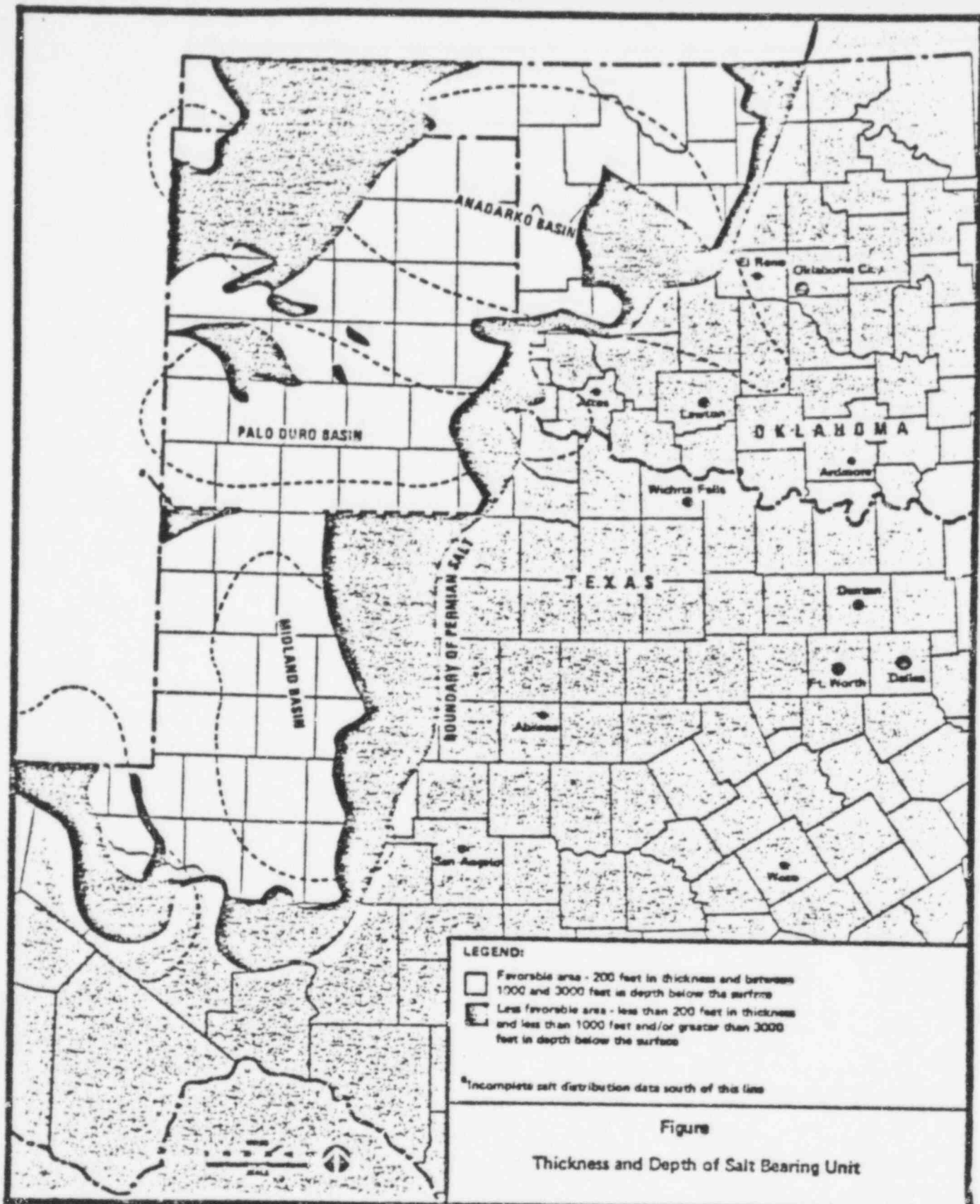
POOR ORIGINAL



Source: Modified from Johnson, 1976 and Bachman and Johnson, 1973

POOR ORIGINAL

756 330



Source: Modified from Johnson, 1976 and Bechman and Johnson, 1973

POOR ORIGINAL

756 331



Figure
Economically Exploitable Deposits -
Oil and Gas Fields

Source: Modified from Johnson, 1976 and
Texas Bureau of Economic Geology, 1978

756 332

POCC ORIGINAL

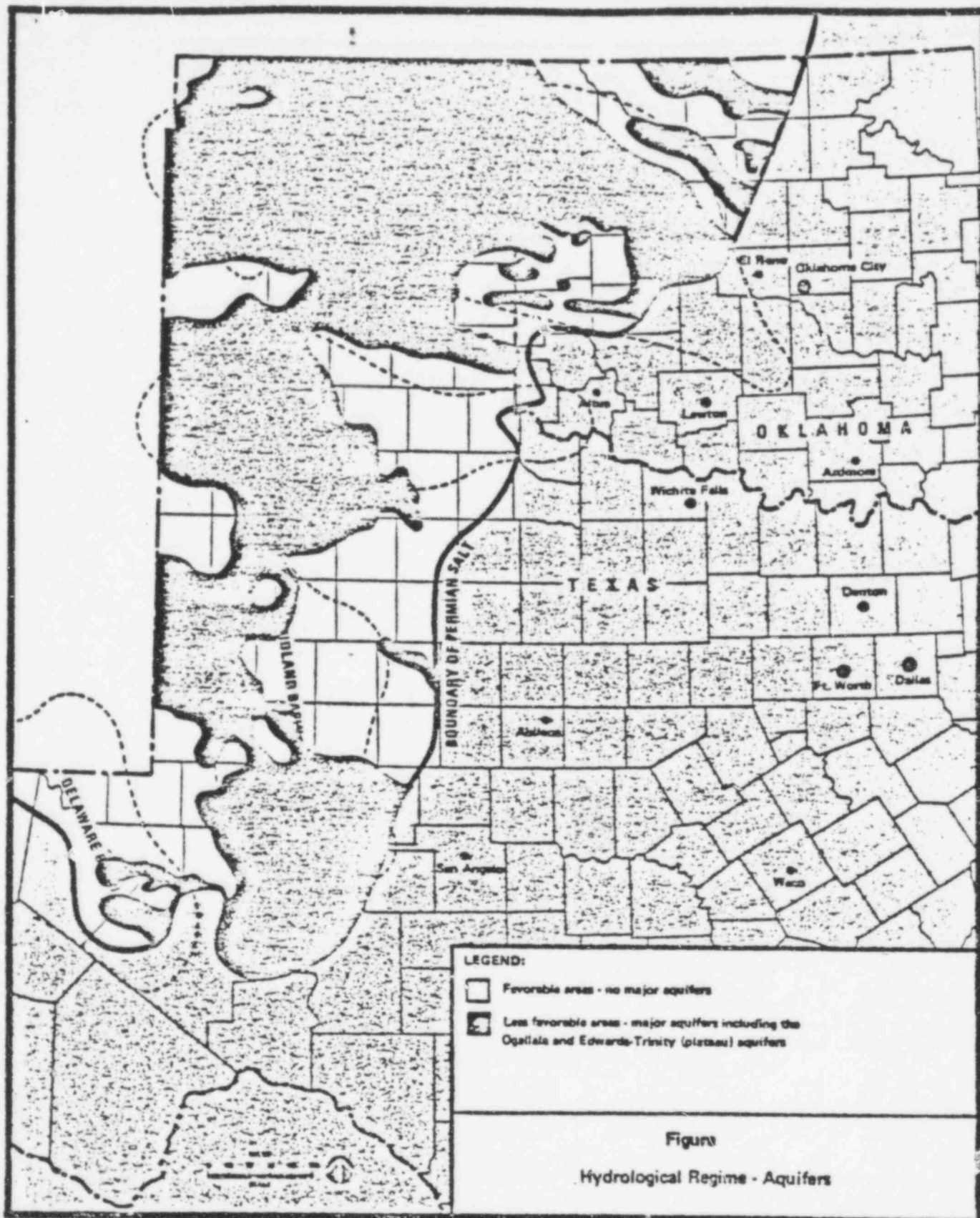


Figure
Economically Exploitable Deposits -
Potash Deposits

Source: Modified from U.S. Dept. of Interior, 1956

756 333

POOR ORIGINAL



Source: NUS, 1978

POOR ORIGINAL

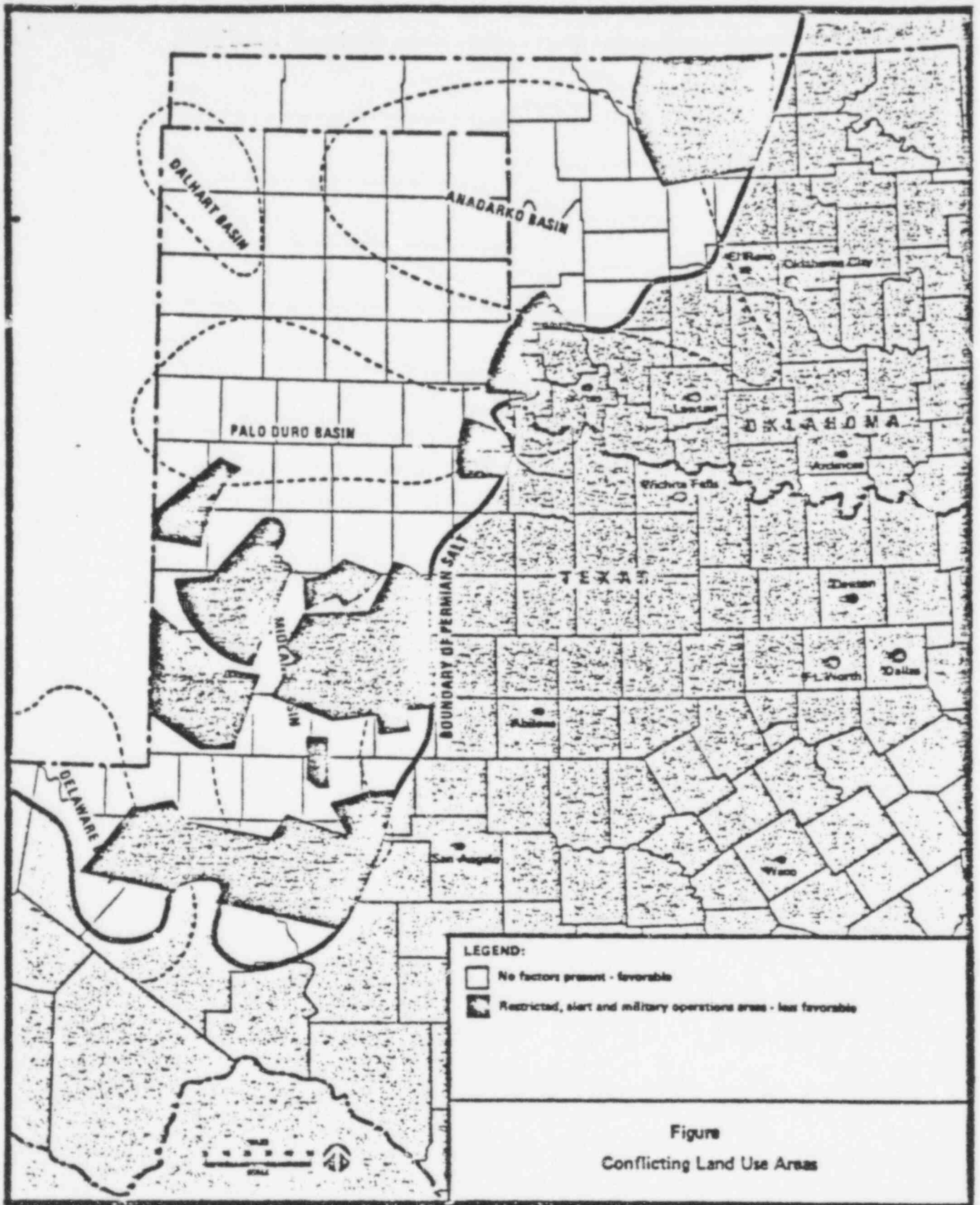


Figure
Conflicting Land Use Areas

Source: Adapted from National Oceanic and Atmospheric Administration (1977)

POOR ORIGINAL
786 335



Source: National Register of Historic Places (1979)
 Texas Dept. of Parks and Wildlife (1977)
 U.S. Fish and Wildlife Service (1977)

POOR ORIGINAL

756 336



Source: U.S. Bureau of the Census (1971)

POOR ORIGINAL

36 331



Source: U.S. Bureau of the Census, Census of Agriculture (1974)

756 338

POOR ORIGINAL



Source: Adapted from J.S. Forest Service (1976)
 U.S. Bureau of Reclamation (1976)
 Godwin and Nearing (1975)

POOR ORIGINAL
 756 339



LEGEND:

- INTERSTATE HIGHWAYS
- MAJOR U.S. HIGHWAYS (DUAL LANE, LIMITED ACCESS)
- SELECTED U.S. HIGHWAYS
- SELECTED STATE ROADS

Figure
Selected Regional Highways

Source: Adapted from Rand McNally Road Atlas (1978)

POOR ORIGINAL

756 340



LEGEND:		ATSF	ATCHESON TOPEKA & SANTA FE
—	MAJOR RAILROADS	FWD	FORT WORTH & DENVER
—	SECONDARY RAILROADS	MP	MISSOURI PACIFIC
		PV	PECOS VALLEY SOUTHERN
		RI	CHICAGO, ROCK ISLAND & PACIFIC
		SLSF	ST. LOUIS SAN FRANCISCO
		TNM	TEXAS-NEW MEXICO
		TP	TEXAS & PACIFIC
		UP	UNION PACIFIC

Figure
Regional Rail System

Source: Adapted from U.S. Geological Survey (1975)

756 341
POOR ORIGINAL

STATUS OF SALINA BASIN ENVIRONMENTAL SURVEY WORK — MAY, 1979

STATUS — MAY, 1979

- DRAFT REGIONAL ENVIRONMENTAL CHARACTERIZATION REPORT ISSUED APRIL, 1978 — OUTSIDE REVIEW AND COMMENT — DRAFT FINAL REPORT (ONWI-16) - SUBMITTED TO DOE FOR APPROVAL TO PUBLISH

- DRAFT SUPPLEMENTAL INFORMATION REPORT (ONWI-23) — CONTAINS LIMITED LAND USE AND SOCIOECONOMIC DATA NOT IN REGIONAL REPORT — ENVIRONMENTAL DATA RELATED TO STONE & WEBSTER (S&W), GEOLOGIC DATA — UNDERGOING ONWI AND DOE REVIEW

REGULATORY PROGRAM MANAGEMENT

FOR

MINED GEOLOGIC REPOSITORIES

IN

NONSALT MEDIA

MAY 23, 1979

W. H. McINTOSH

ONWI

SITE QUALIFICATION AND
LICENSING DEPARTMENT

WHM: 5/23/79

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NONSALT MEDIA—PROGRAM MANAGEMENT

PURPOSE:

IDENTIFY AND CHARACTERIZE NONSALT
GEOLOGICAL SITES FOR USE AS
REPOSITORIES FOR NUCLEAR WASTE

SCOPE:

1. MANAGE EFFORTS TO QUALIFY NONSALT SITES
TO COMPLY WITH SAFETY AND ENVIRONMENTAL
LICENSING CRITERIA (NRC, DOE)
2. PROVIDE (LICENSING) DIRECTION FOR AND
SUPPORT THE ACTIVITIES OF
 - WASTE ISOLATION SYSTEM ANALYSIS
 - TECHNOLOGY AND ENGINEERING RESEARCH
AND DEVELOPMENT
 - GEOLOGIC EXPLORATION
 - FACILITIES ENGINEERING

756 344

WHM: 5/23/79



CONTAINMENT SYSTEMS

STUDIES MAY INCLUDE, BUT NOT BE LIMITED
TO THE FOLLOWING MEDIA

- CRYSTALLINE
- ARGILLACEOUS
- CARBONATE

WHM: 5/23/79

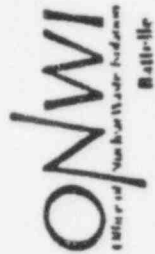
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756-345

ONWI NONSALT SCHEDULE

FY	1979	1980	1981	1982	1983	1984	1985
NATIONAL OVERVIEWS	—	—					
IDENTIFICATION OF REGION	○						
REGIONAL RECONNAISSANCE	—	—					
IDENTIFICATION OF AREA	●						
AREA STUDIES	—	—	—	—			
IDENTIFICATION OF LOCATION			○				
CONFIRMATION STUDIES							
SITE RECOMMENDATION						○	
EARLIEST PSAR SUBMITTAL							○

NATIONAL OVERVIEWS
 IDENTIFICATION OF REGION
 REGIONAL RECONNAISSANCE
 IDENTIFICATION OF AREA
 AREA STUDIES
 IDENTIFICATION OF LOCATION
 CONFIRMATION STUDIES
 SITE RECOMMENDATION
 EARLIEST PSAR SUBMITTAL



WHM: 5/23/79

NONSALT MEDIA—PROGRAM MANAGEMENT

SITE QUALIFICATION TASKS

1. SURVEY PLANS
2. ENVIRONMENTAL STUDIES
LITERATURE SEARCHES
FIELD SURVEYS
3. PREPARE OR PROVIDE INFORMATION
FOR SITE QUALIFICATION
REPORT (10 CFR 60.11)
4. PREPARE OR PROVIDE INPUT TO
LICENSING DOCUMENTS
 - SAFETY ANALYSIS REPORT
 - ENVIRONMENTAL IMPACT STATEMENT
 - ENVIRONMENTAL REPORT

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NONSALT PROGRAM IMPLEMENTATION

- **REGULATORY PROJECT MANAGERS (RPM)**
 - LICENSING TASKS
 - SAFETY ANALYSIS REPORTS

- **ENVIRONMENTAL PROJECT MANAGERS (EPM)**
 - ENVIRONMENTAL SURVEY PLANS
 - ENVIRONMENTAL REPORTS
 - ENVIRONMENTAL FIELD SURVEYS

756
348

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NONSALT ENVIRONMENTAL PROGRAM ELEMENTS TO BE CONSISTENT WITH SALT PROGRAM ELEMENTS

- 1. LICENSING PLANS**
- 2. SURVEY PLANS**
- 3. METHODOLOGY FOR COMPARATIVE
EVALUATIONS OF SITES**
- 4. NATIONAL SCREENING CRITERIA**

756 349
WHM: 5/23/79

ONWI
Office of Nonhazardous Waste
P.O. Box 111

NATIONAL SCREENING PROJECT

W. E. NEWCOMB

ONWI



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Project Management Division
Office of Nuclear Waste Isolation

756 350

PROJECT TASKS

- REVIEW LITERATURE
- ESTABLISH SCREENING CRITERIA
- COMPILE NATIONAL DATA BASE
- APPLY CRITERIA TO DATA BASE
- IDENTIFY SUITABLE AREAS BASED ON SCREENING
- REPORT RESULTS

WEN: 5/23/79



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Office of Nuclear Waste Isolation

756 351

PROJECT OBJECTIVES

- DO NATIONAL SCREENING ON BASIS OF SYSTEMS APPROACH
- INTEGRATE ALL NWTs PROGRAMS INTO NATIONWIDE SEARCH FOR SUITABLE SITES
- SUPPLEMENT INFORMATION AVAILABLE FOR ALTERNATIVE DISCUSSIONS IN NEPA DOCUMENTS

WEN: 5/23/79



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Office of Nuclear Waste Isolation

756 352

SCREENING FACTORS

GEOLOGICAL

LENGTH OF GROUND WATER FLOW PATHS

PRESENCE OF MULTIPLE MIGRATION BARRIERS

ROCKTYPE AND THICKNESS

AQUIFER DISTRIBUTION AND FLOW RATE

SEISMICITY

FAULTING

PETROLEUM AND MINERAL RESOURCES

BORE HOLES

SUBSURFACE MINING ACTIVITY

UPLIFT AND SUBSIDANCE RATES

EROSION AND DENUDATION RATES

QUATERNARY VOLCANIC AND GEOTHERMAL AREAS

SURFACE-WATER BODIES

SUBSURFACE DISSOLUTION

WEN:5/23/79



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Office of Nuclear Waste Isolation

756 353

SCREENING FACTORS

ENVIRONMENTAL

POPULATION DENSITY

DEDICATED LANDS

TRANSPORTATION ROUTES

WASTE SOURCES

WEN: 5/23/79



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Office of Nuclear Waste Isolation

756 354

PROJECT STATUS

- STATEMENT OF WORK PREPARED
- RFP BEING PREPARED
- SOURCE EVALUATION PANEL BEING ORGANIZED
- CONTRACT IN PLACE BY NOVEMBER 1, 1979

WEN:5/23/79



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Office of Nuclear Waste Isolation

156 550

WASTE ISOLATION PILOT PLANT

(WIPP)

ENVIRONMENTAL SURVEYS

5/23/79

M. L. MERRITT



Sandia Laboratories

756 356

WIPP

STATUS OF NEPA AND LICENSING DOCUMENTS

DRAFT ENVIRONMENTAL IMPACT STATEMENT

RELEASED 4/18/79
DOE/EIS-0026-D

PRELIMINARY SAFETY ANALYSIS REPORT

DRAFT BEING
REVIEWED IN-HOUSE

ENVIRONMENTAL REPORT

NOT STARTED

756 557

WIPP ENVIRONMENTAL SURVEYS

DEIS REFERENCES

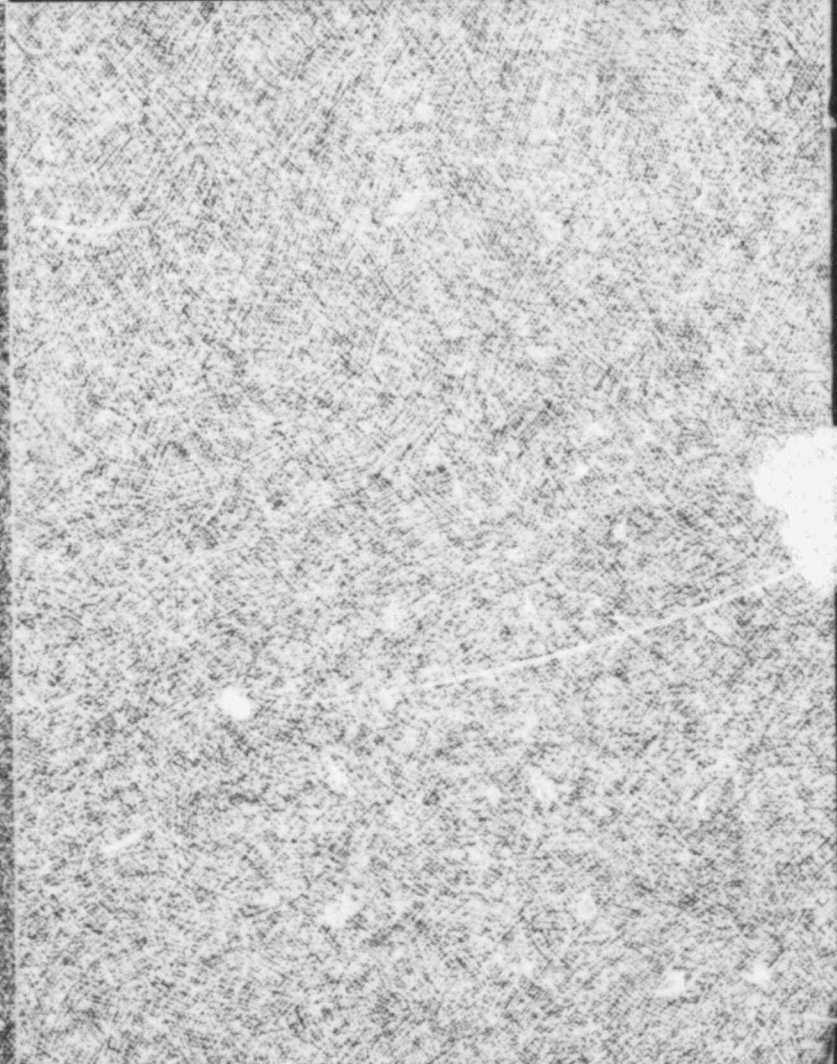
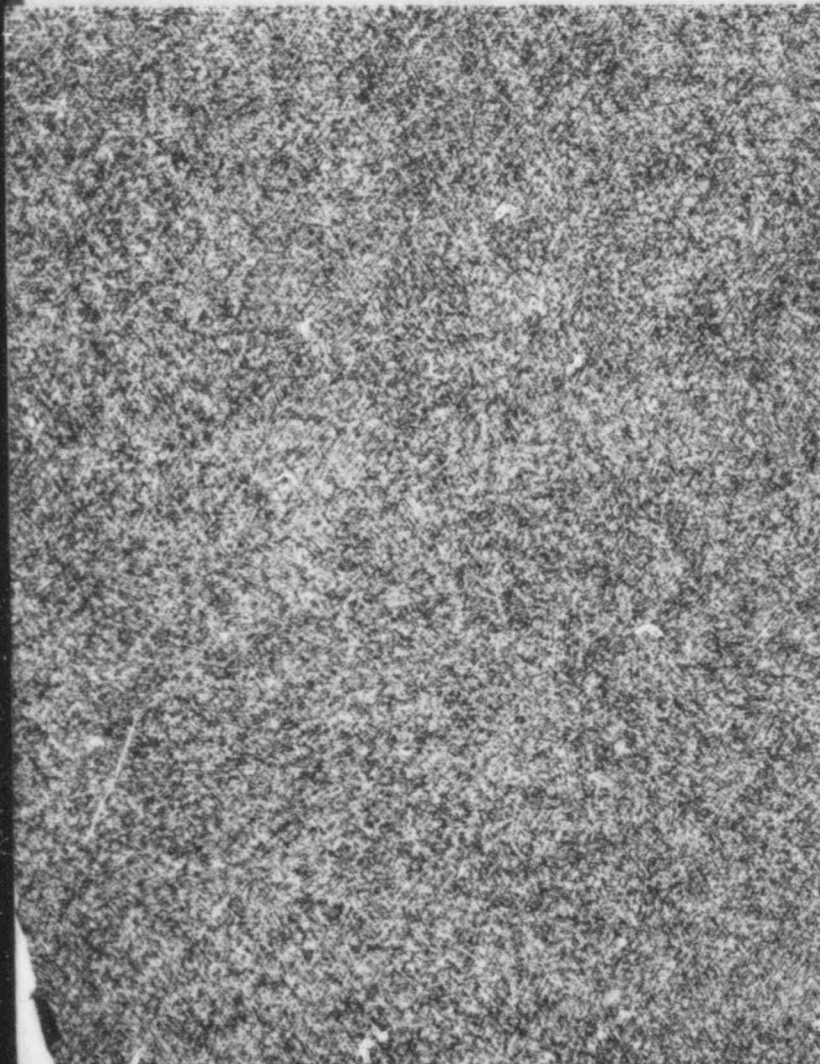
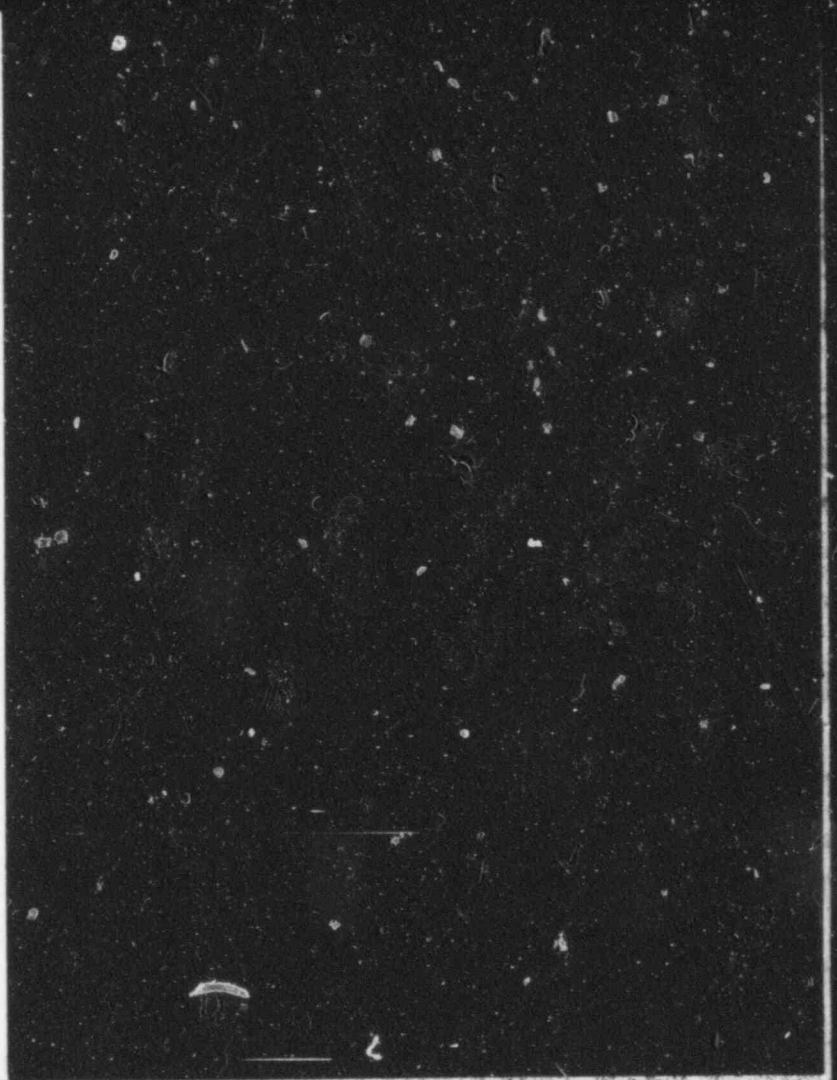
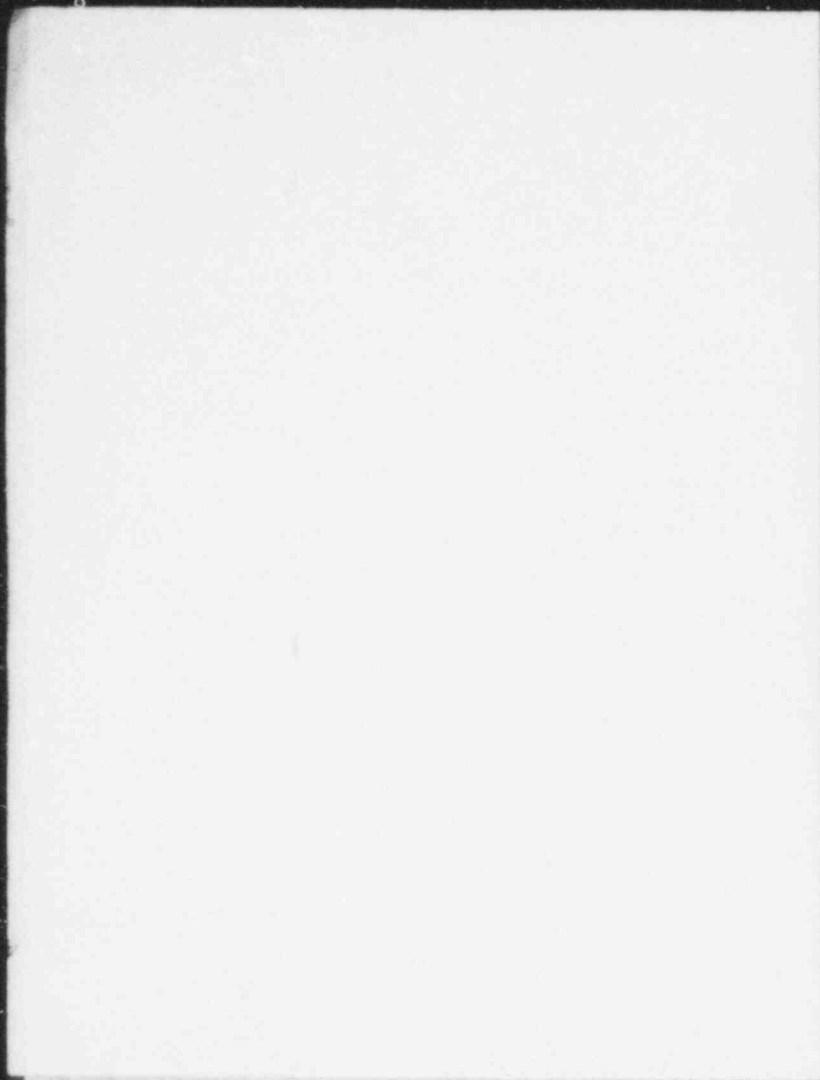
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ARCHAEOLOGY	7.4	3	Methods, results
	I	11	Correspondence
BIOLOGY	J.1.3	2	Methods
	H.5	28	Resultant description
	H, Annex 2	42	Supporting data
METEOROLOGY	J.1.5	2	Methods
	H.4	20	Resultant description
	H, Annex 1	30	Supporting data
SOCIOECONOMICS	L	63	Input-output model
	H.2	8	Population
	H.3	34	Economic setting
	M	20	Supporting data
SURFACE WATERS	7.3.1	2	Description
AIR QUALITY	J.1.4	2	Methods
	H.4.5	3	Results
RADIATION BACKGROUND	J.1.6	8	Methods
	H.6	5	Results

756 358

OBJECTIVES

ARCHAEOLOGICAL STUDIES

- LOCATE AND DESCRIBE ARCHAEOLOGICAL SITES
- PROVIDE ARCHAEOLOGICAL CLEARANCE FOR ROADS,
DRILL PADS, AND OTHER SURFACE-DISTURBING ACTIVITIES
- RECOMMEND MITIGATING MEASURES IN CASES OF CONFLICT
BETWEEN CONSTRUCTION ACTIVITIES AND ARCHAEOLOGICAL
VALUES



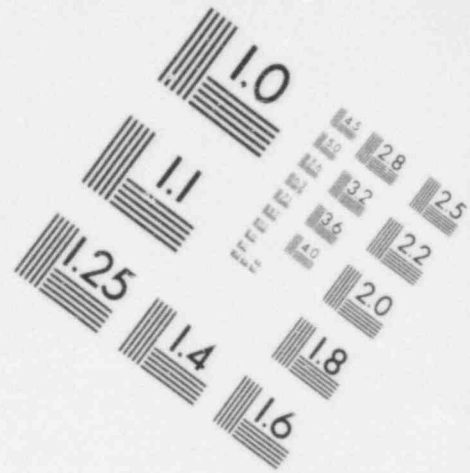
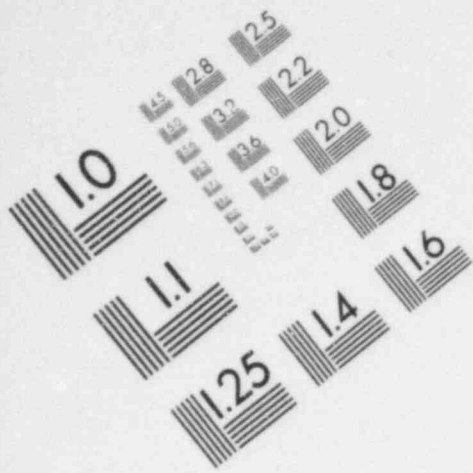
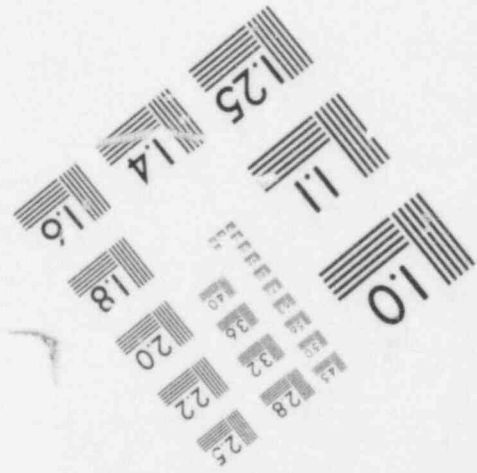
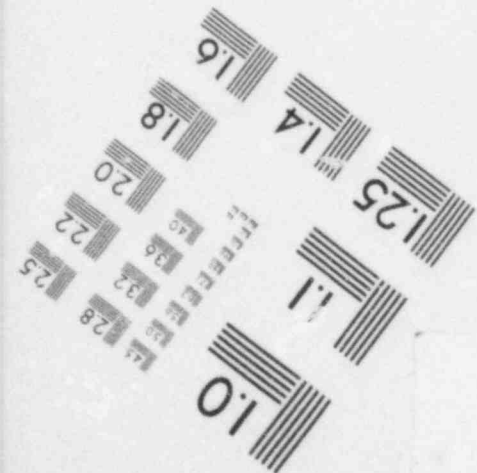
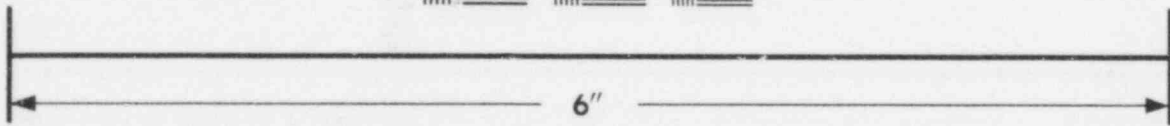
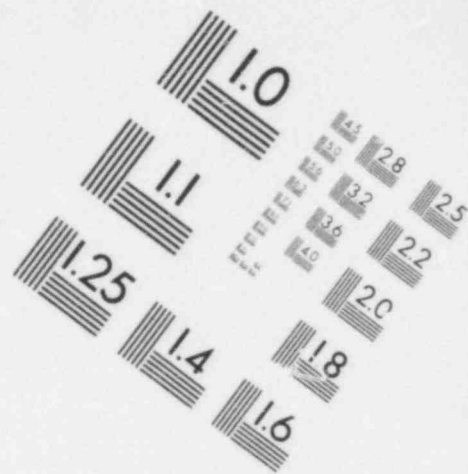
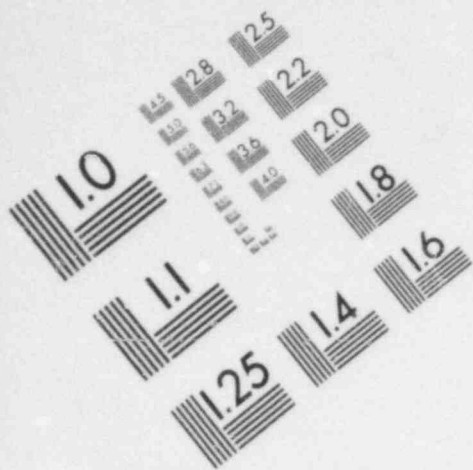
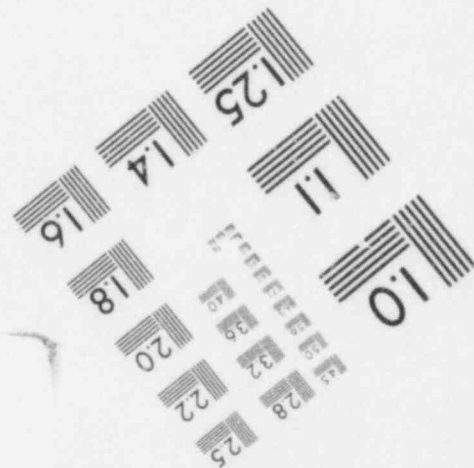
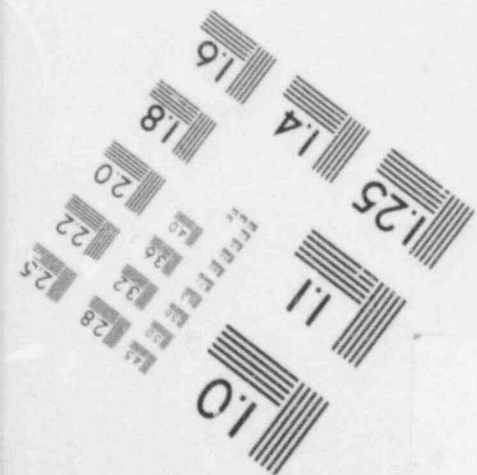
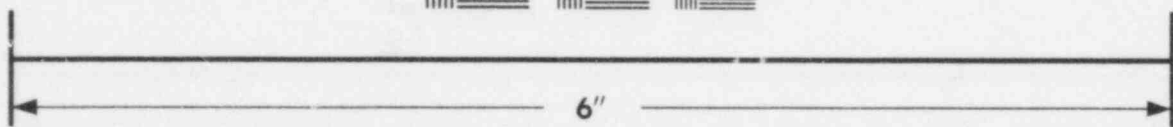


IMAGE EVALUATION
TEST TARGET (MT-3)





**IMAGE EVALUATION
TEST TARGET (MT-3)**



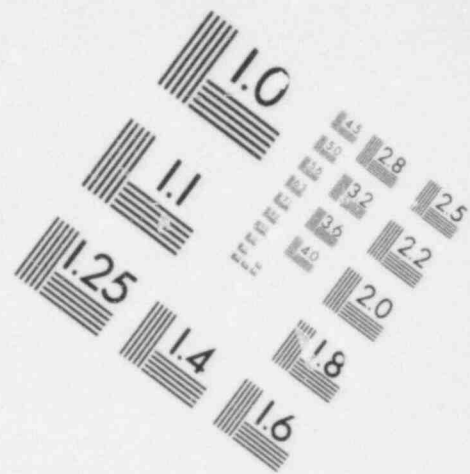
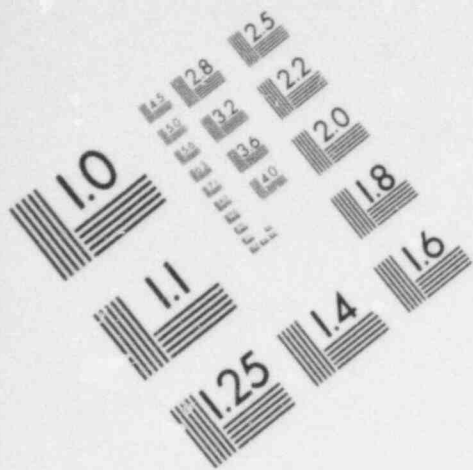
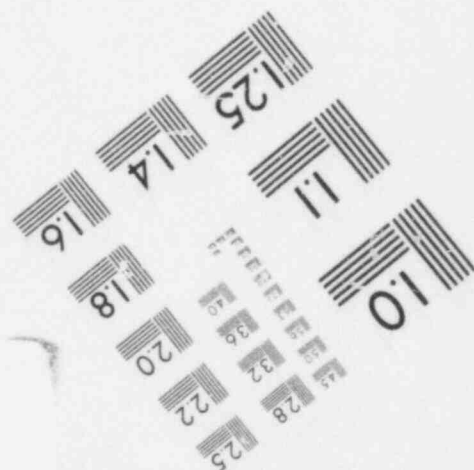
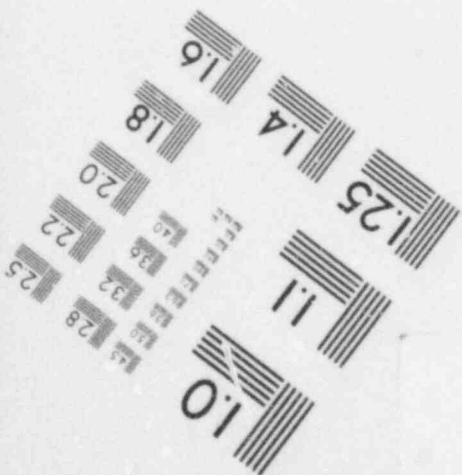
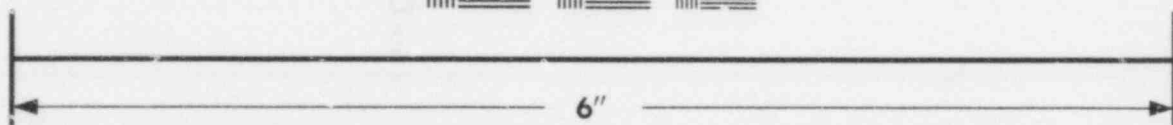


IMAGE EVALUATION
TEST TARGET (MT-3)



OBJECTIVES

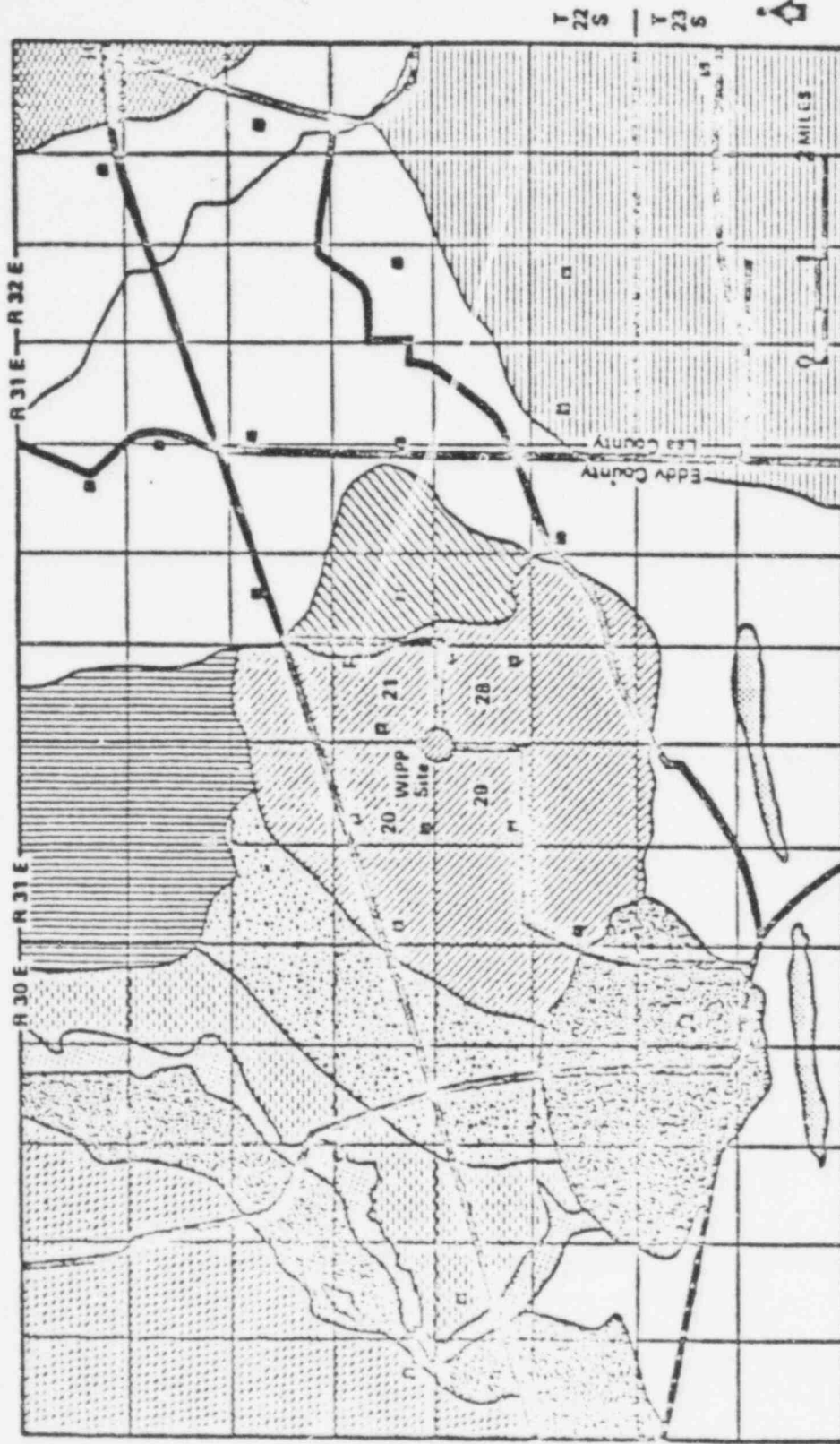
BIOLOGICAL PROGRAM

- DETERMINE BASELINE LEVELS AND TYPICAL ANNUAL VARIATIONS OF BIOMASS IN MAJOR COMPARTMENTS OF THE ECOLOGICAL SYSTEM PLANT PRODUCTIVITY IN ORDER TO
 - GUIDE OPERATIONAL MONITORING PROGRAMS
 - CREATE STANDARDS FOR EVALUATION OF OPERATIONAL IMPACTS
- DETERMINE PATTERNS OF PLANT SUCCESSION AND DO EXPERIMENTS ON THE IMPACTS OF
 - SALT PILED ON THE SURFACE
 - FENCED LAND FROM GRAZING
 - DISTURBANCE BY EARTH-MOVING MACHINERY
- ESTABLISH A BASIS FOR RADIOLOGICAL MONITORING BY
 - CREATING A SAMPLING PROTOCOL
 - NOMINATING INDICATOR ORGANISMS
- DETERMINE PRESENCE, IF ANY, OF ENDANGERED OR THREATENED ANIMALS AND PLANTS

WIPP BIOLOGY PROGRAM

PROJECTS

	PRINCIPAL INVESTIGATOR	INSTITUTION
1. FLORISTICS	W. C. MARTIN	UNM
2. SOIL-PLANT RELATIONSHIPS	G. J. JOHNSON	UNM
3. PRIMARY PRODUCTION PATTERNS	J. A. LUDWIG	NMSU
4. PLANT SUCCESSION PATTERNS	R. K. PETTIT B. E. DAHL D. K. NORTHINGTON	TEXAS TECH
5. BIOGEOCHEMISTRY	D. E. CALDWELL	UNM
6. SOIL MICROBIOLOGY	K. SUBERKROPP	NMSU
7. TERRESTRIAL INVERTEBRATES	W. G. WHITFORD	NMSU
8. ENTOMOLOGY	H. BURKE J. SHAFNER	TEXAS A&M
9. TERRESTRIAL FAUNA	A. L. GENNARO	ENMU
10. AVIFAUNA AND BATS	J. D. LIGON	UNM
11. AQUATIC ECOSYSTEMS	J. E. SUBLETTE	ENMU
12. SOIL MOISTURE AND MICROMETEOROLOGY	L. FOUNTAIN	SwRI



- A** Dominant: *Prunella, Malvastrum*, and *Quercus*. High frequency of *Trichostema* and *Sida*. Occasional *Yucca*.
 - B** Dominant: *Quercus*, *Artemisia*, and *Panicum*. High frequency of *Malvastrum*, *Sida*, and *Erigeron*.
 - C** Dominant: *Quercus*, *Artemisia*, and *Astilb*. High frequency of *Yucca*, *Sporobolus*, and *Quercus*.
 - D** Dominant: *Artemisia*, *Quercus*, and *Yucca*. High frequency of *Artemisia* and *Quercus*.
 - E** Dominant: *Prunella*, *Quercus*, *Artemisia*, and *Quercus*. Occasional *Sida*.
 - F** Dominant: *Artemisia*, *Quercus*, *Prunella*, and *Yucca*. High frequency of *Yucca*, *Artemisia*, and *Prunella*.
 - G** Dominant: *Artemisia*, *Prunella*, and *Yucca*. High frequency of *Yucca*, *Artemisia*, and *Prunella*.
 - H** Dominant: *Quercus*, *Artemisia*, *Prunella*, and *Yucca*. High frequency of *Yucca*, *Artemisia*, and *Prunella*.
 - I** Dominant: *Quercus*, *Artemisia*, *Prunella*, and *Yucca*. High frequency of *Yucca*, *Artemisia*, and *Prunella*.
 - J** Dominant: *Artemisia*, *Quercus*, *Prunella*, and *Yucca*. High frequency of *Yucca*, *Artemisia*, and *Prunella*.
 - K** Dominant: *Artemisia*, *Quercus*, *Prunella*, and *Yucca*. High frequency of *Yucca*, *Artemisia*, and *Prunella*.
 - L** Dominant: *Artemisia*, *Quercus*, *Prunella*, and *Yucca*. High frequency of *Yucca*, *Artemisia*, and *Prunella*.
 - M** Dominant: *Prunella*, *Artemisia*, and *Quercus*.
- Proposed highway
 --- Imp area dirt road
 ● Completed study place

Figure H-13. Preliminary vegetation-type map of the WIPP reference site.

757 003

OBJECTIVES

METEOROLOGICAL STUDIES

- ACCUMULATE SITE-SPECIFIC METEOROLOGICAL DATA OVER A LONG TIME BASE
- ANALYZE THESE DATA FOR DIFFUSION PARAMETERS (ESP. σ/Q) NEEDED FOR NEPA AND POSSIBLE LICENSING DOCUMENTS
- DURING OPERATION, PROVIDE REAL-TIME WIND AND STABILITY DATA IN CASE OF ACCIDENTAL RELEASE OF RADIOACTIVITY

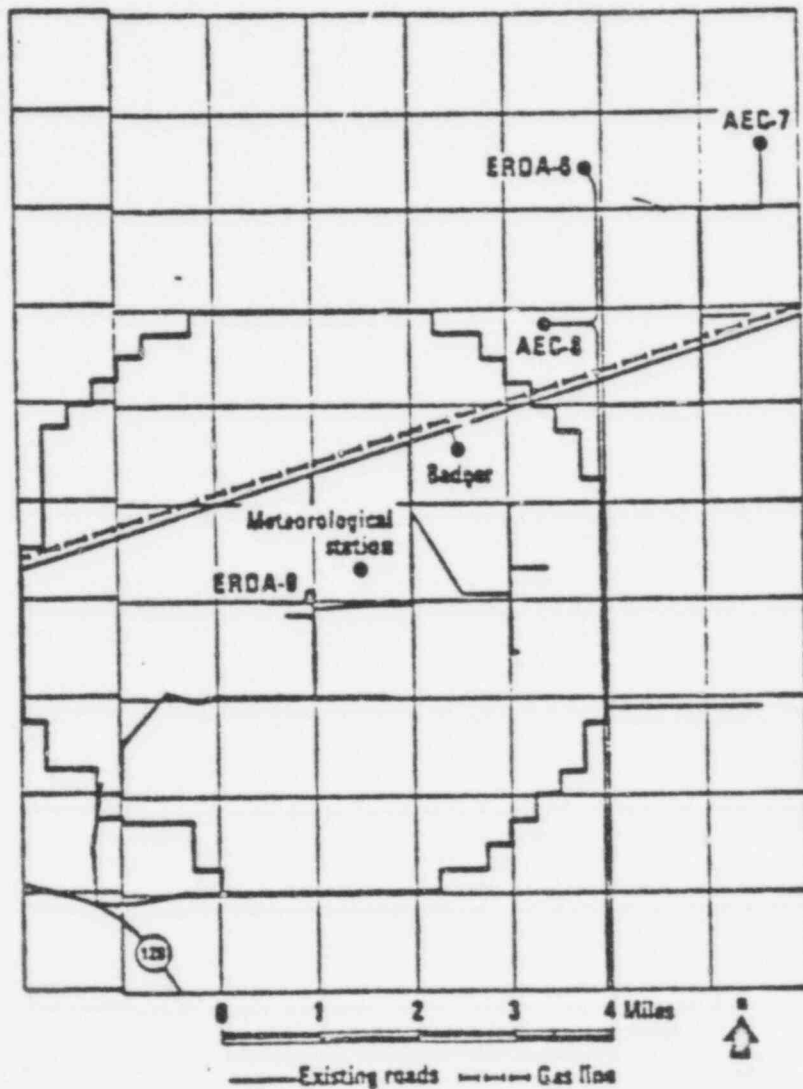


Figure H-15. Locations of thermoluminescent dosimeters in the site area. An additional thermoluminescent dosimeter will be located in Carlsbad.

757 005
POOR ORIGINAL

WIPP METEOROLOGICAL INSTRUMENTATION

	HEIGHT		RECORDING INTERVAL
	<u>1/76-5/77</u>	<u>11/77</u>	<u>11/77</u>
WIND DIRECTION	1 m	3 m	1 hour
PRECIPITATION	1 m	1 m	1 hour
HUMIDITY	10 m	---	---
DEW POINT	---	3 m	1 hour
TEMPERATURE	--	3,10,30 m	15 sec
WIND SPEED	10 m	3,10,30 m	15 sec
WIND DIRECTION	10 m	3,10,30 m	15 sec
ΔT	---	10-3 m	15 sec
ΔT	---	30-3 m	15 sec
ΔT	---	30-10 m	15 sec

757 006

OBJECTIVES

RADIOLOGICAL STUDIES

- DETERMINE BASELINE LEVELS AND NATURE OF VARIATIONS THEREFROM OF RADIOLOGICAL BACKGROUND AT THE WIPP SITE

AIR QUALITY STUDIES

- DETERMINE BASELINE LEVELS AND TYPICAL VARIATIONS THEREFROM OF AIR POLLUTANTS AT THE WIPP SITE

OBJECTIVES

SOCIOECONOMIC AND DEMOGRAPHIC STUDIES

- DETERMINE BASELINE LEVELS AND TRENDS OF:
 - POPULATION DISTRIBUTION
 - LOCAL ECONOMIC INTERRELATIONSHIPS
 - COMMUNITY SERVICES

- PREDICT FUTURE POPULATIONS AND ECONOMIC FACTORS:
 - WITHOUT THE WIPP
 - WITH THE WIPP

757 000

WIPP

SOCIOECONOMIC ANALYSIS

INPUT-OUTPUT TABLE IS A 51 X 51 MATRIX, CONSISTING OF:

- 37 PRIVATE BUSINESS SUBSECTORS
 - 6 AGRICULTURAL PRODUCTION
 - 5 MINERAL PRODUCTS
 - 4 CONSTRUCTION
 - 12 SMALL INDUSTRIES
 - 4 UTILITIES
 - 6 TRADE AND SERVICES
- 12 WIPP-RELATED SUBSECTORS
 - 4 CONSTRUCTION ABOVE-GROUND
 - 1 NON-CONSTRUCTION EMPLOYMENT
 - 4 CONSTRUCTION, BELOW-GROUND
 - 1 OPERATION ABOVE-GROUND
 - 1 OPERATION STORAGE
 - 1 OPERATION BELOW-GROUND
- 2 SUBSECTORS FOR LABOR COMPENSATION AND PERSONAL CONSUMPTION

Table L-2 (Continued)

INPUT-OUTPUT TABLES, LEA AND EDDY COUNTIES, NOVEMBER 1978
DIRECT, INDIRECT, AND COEFFICIENTS

	33	34	35	36	37	38	39	40
LIVESTOCK & LIVESTOCK PROD	1	0.00266	0.00128	0.00458	0.00207	0.00339	0.00112	0.00222
COTTON	2	0.00125	0.00170	0.00114	0.00095	0.00159	0.00108	0.00105
GRAINS AND VEGETABLES	3	0.00154	0.00243	0.00555	0.00125	0.00199	0.00116	0.00113
FRUITS AND VEGETABLES	4	0.00053	0.00055	0.00087	0.00041	0.00068	0.00046	0.00045
FORESTREPTISHERY PRODS	5	0.00059	0.00060	0.00058	0.00046	0.00078	0.00028	0.00050
AGRICULTURAL SERVICES	6	0.00085	0.00077	0.00070	0.00037	0.00059	0.00077	0.00076
MISC RET & NON-RET MER	7	0.00000	0.00001	0.00001	0.00001	0.00001	0.00000	0.00000
CRUOP PETROLEUM	8	0.01057	0.01000	0.01144	0.00863	0.01445	0.00712	0.00696
NATURAL GAS & LIQ. PET	9	0.00374	0.00348	0.00348	0.00299	0.00471	0.00220	0.00215
STONE, GRAVEL AND SAND	10	0.00071	0.00073	0.00008	0.00014	0.00034	0.00758	0.00758
POTASH MINING	11	0.00001	0.00002	0.00002	0.00002	0.00002	0.00001	0.00001
RESIDENTIAL CONST.	12	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
NONRESIDENTIAL CONSTR	13	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
ALL OTHER CONST.	14	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
CONST. MAINTENANCE	15	0.00786	0.02422	0.31248	0.00940	0.01648	0.00340	0.00331
FOOD PRODUCTS	16	0.01158	0.01140	0.00994	0.00883	0.01447	0.01000	0.00976
FABRICS AND APPAREL	17	0.00028	0.00031	0.00109	0.00018	0.00048	0.00015	0.00021
PAPER PRODUCTS	18	0.00007	0.00015	0.00022	0.00016	0.00032	0.00007	0.00007
PRINTING	19	0.00280	0.00555	0.00238	0.00238	0.00600	0.00194	0.00190
CHEMICAL PRODUCTS	20	0.00082	0.00099	0.00108	0.00161	0.00121	0.00040	0.00067
PLASTIC & PETROLEUM	21	0.02210	0.02079	0.02409	0.01005	0.03032	0.01449	0.01465
GLASS AND STONE PRODS.	22	0.00007	0.00033	0.00033	0.00000	0.00000	0.00049	0.00049
PRIMARY METAL PRODS.	23	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
FABRICATED METAL PRODS	24	0.00001	0.00002	0.00002	0.00002	0.00003	0.00337	0.00337
MACHINERY	25	0.00046	0.00085	0.00848	0.00308	0.00085	0.00070	0.00069
ELECTRICAL PRODS.	26	0.00002	0.00003	0.00012	0.00012	0.00008	0.00002	0.00002
TRANSPORT & HAULING	27	0.01697	0.01988	0.01958	0.02126	0.02194	0.01827	0.01797
COMMUNICATIONS	28	0.01659	0.02812	0.01693	0.02477	0.02764	0.01904	0.01881
ELECTRICAL UTILITY	29	0.02594	0.02594	0.02681	0.01848	0.03828	0.01354	0.01325
GAS UTILITY	30	0.01689	0.01522	0.01500	0.01338	0.02084	0.00471	0.00425
WATER AND SEWER	31	0.00552	0.00758	0.00653	0.00394	0.00776	0.00276	0.00272
WHOLESALE TRADE	32	0.03969	0.04197	0.05491	0.04323	0.06435	0.09602	0.09532
RETAIL TRADE	33	1.10809	0.31469	0.10852	0.09863	0.14907	0.08944	0.08776
F. I. & R. E.	34	0.08229	1.14177	0.08495	0.07573	0.12403	0.04792	0.04702
PERSONAL & REPAIR SER.	35	0.04767	0.04591	1.07586	0.04912	0.07151	0.01989	0.01620
BUSINESS & MISC. SERV.	36	0.02216	0.02456	0.02318	1.07035	0.04871	0.01194	0.01176
MEDICAL & NON-PROFIT	37	0.00796	0.01851	0.00829	0.00798	1.01244	0.00608	0.00594
VIPP A/G CORST 1981	38	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
VIPP A/G CORST 1982	39	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
VIPP A/G CORST 1983	40	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
VIPP A/G CORST 1984	41	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
VIPP NON-CORST EMP	42	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
VIPP B/G CORST 1981	43	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
VIPP B/G CORST 1982	44	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
VIPP B/G CORST 1983	45	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
VIPP B/G CORST 1984	46	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
VIPP OPER A/G	47	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
VIPP OPER STORAGE	48	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
VIPP OPER B/G	49	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
HOUSEHOLDS/PC WEEKLY	50	0.00000	0.00000	0.00000	0.00000	0.00000	0.02334	0.05503
HOUSEHOLDS/PC LOCAL	51	0.57555	0.56726	0.74495	0.44321	0.70987	0.23050	0.46809
*** COLUMN SUMS ***		2.03646	2.18465	2.02238	1.92543	1.39439	1.50825	1.92026

DOOR ORIGINAL

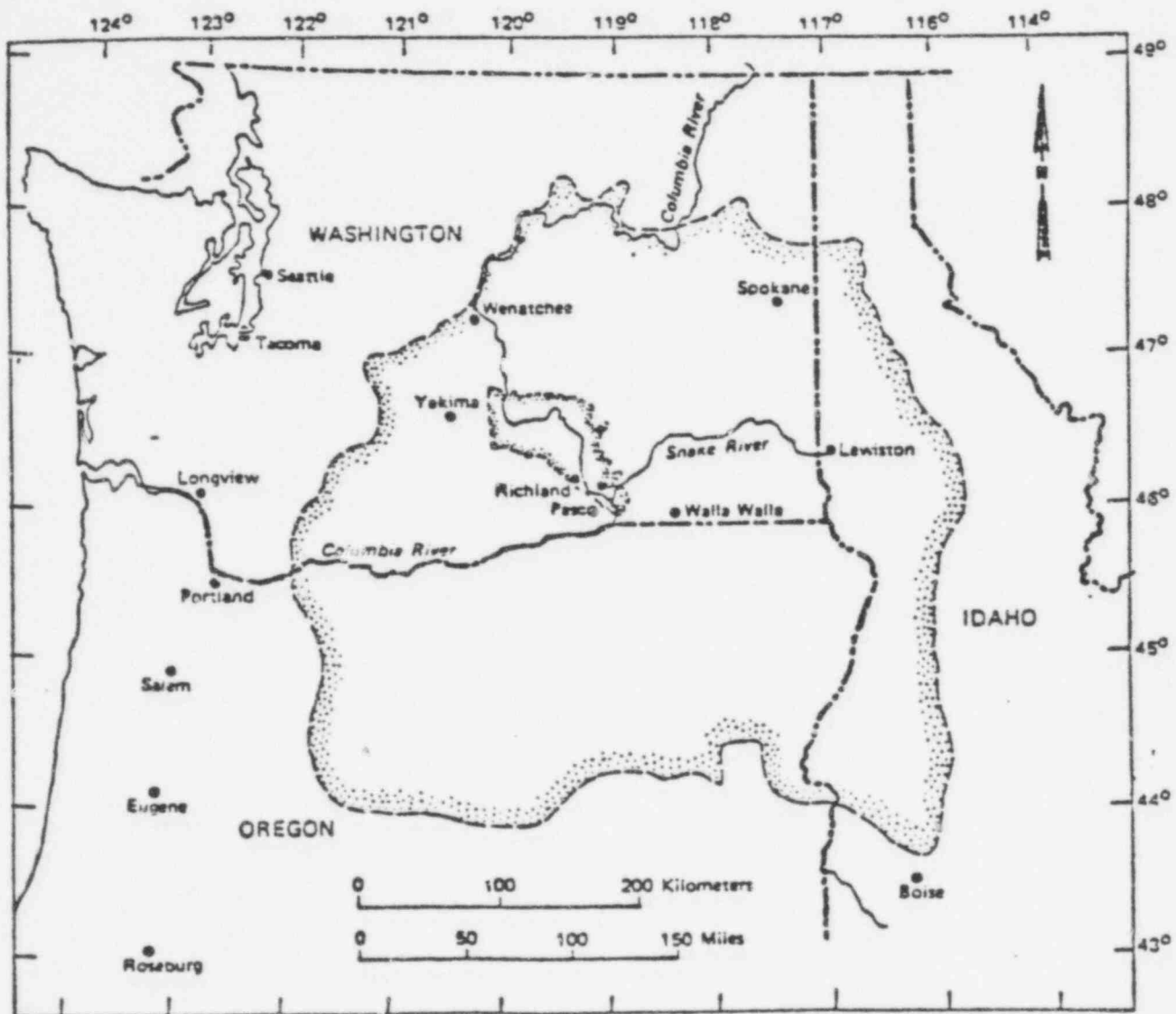
SITE IDENTIFICATION STUDY
ENVIRONMENTAL SCREENING GUIDELINES

PRESENTED BY

DALE ST. LAURENT
BASALT WASTE ISOLATION PROGRAM

MAY 23, 1979.

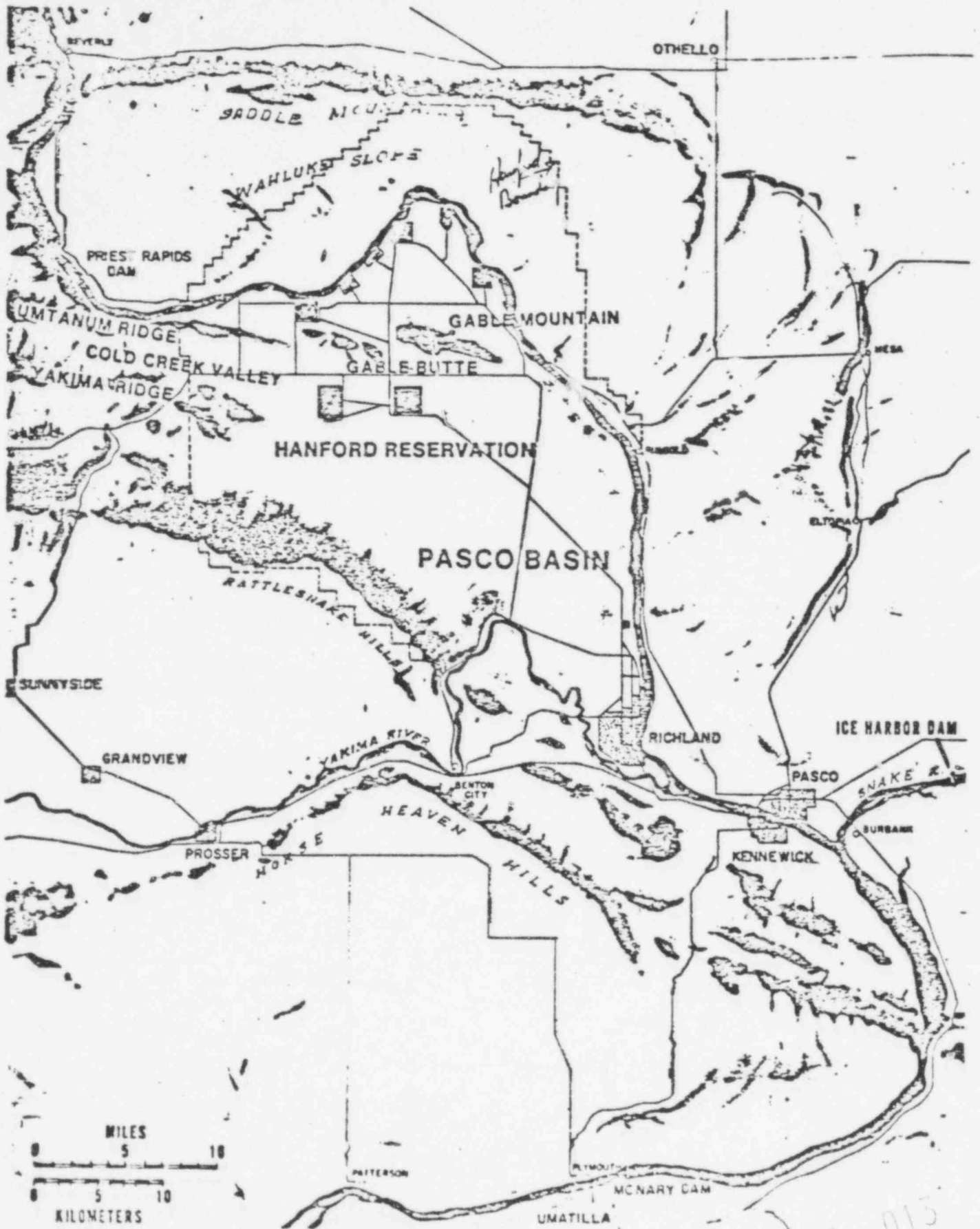
757 011



COLUMBIA PLATEAU

POOR ORIGINAL

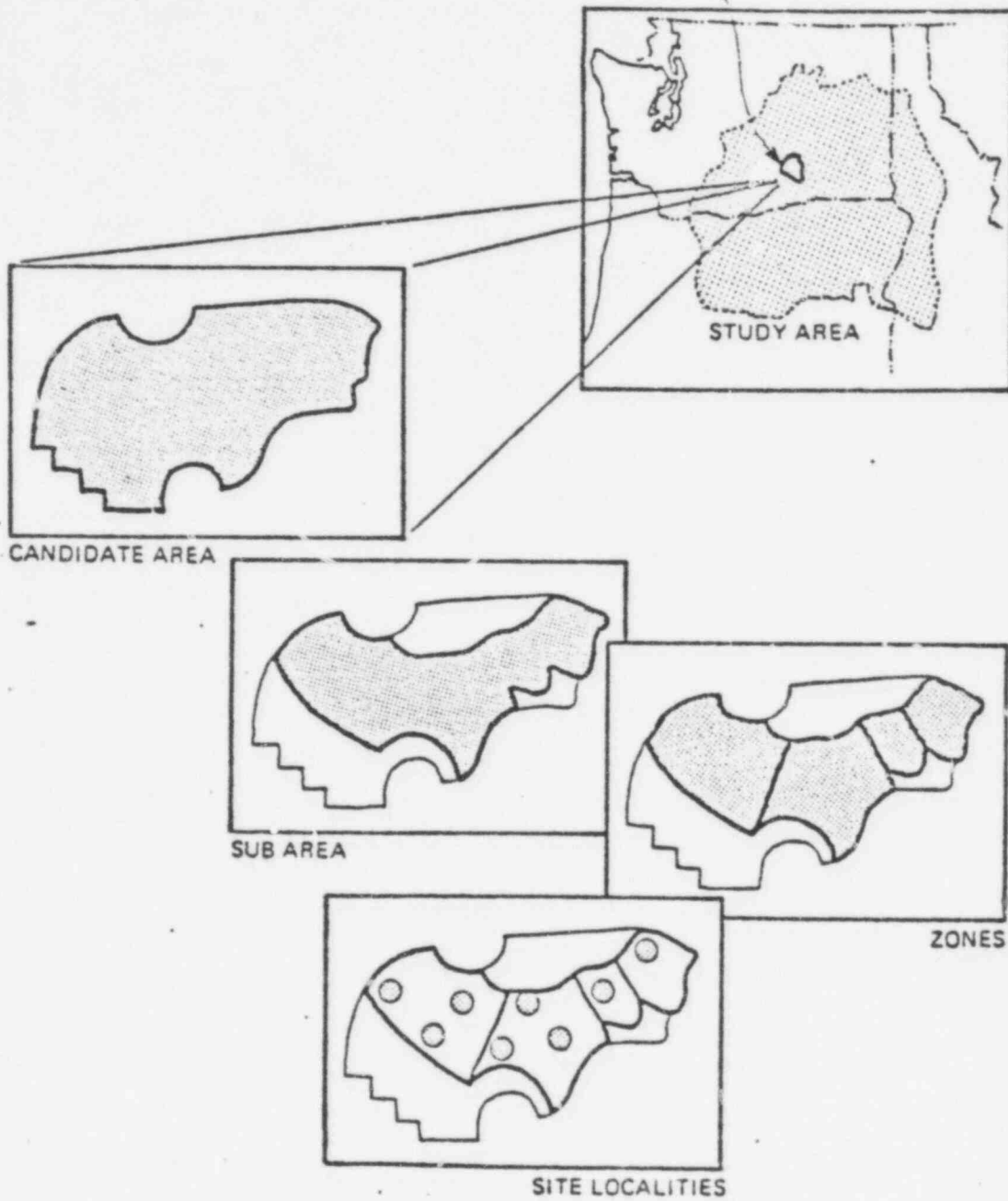
757 012



Hanford 600 miles² dedicated to Nuclear Cliffs
 Basalt thickest at Hanford - dense, like permeability

757-015
DOOR ORIGINAL

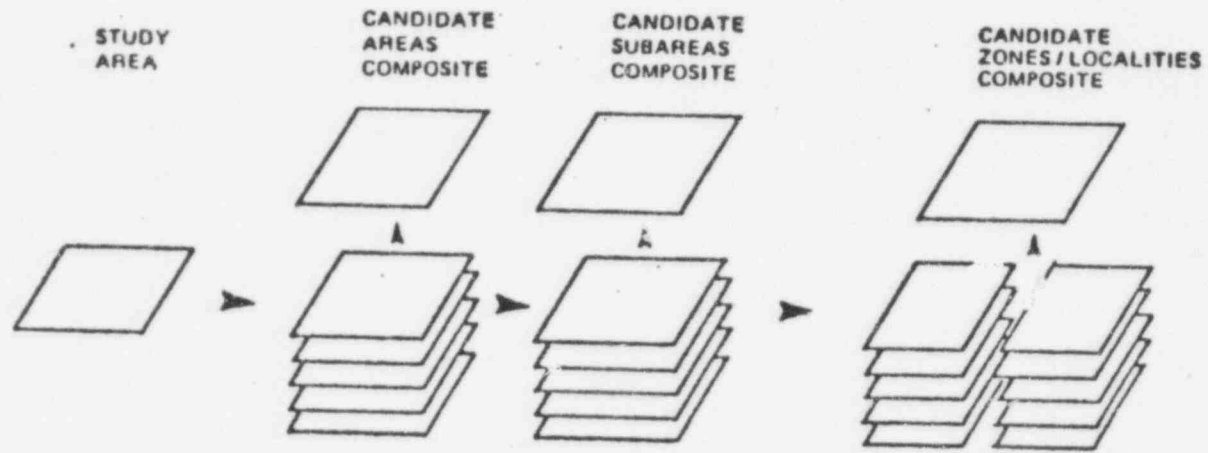
HANFORD RESERVATION



POOR ORIGINAL

RELATIONSHIP OF CANDIDATE DESIGNATIONS

757 014



STUDY AREA

SELECTION OF
CANDIDATE
AREAS

Example Guideline

- Rock Properties

SELECTION OF
CANDIDATE
SUBAREAS

Example Guideline

- Rock Dip
- Ground Water Characteristics

SELECTION OF
CANDIDATE
ZONES / LOCALITIES

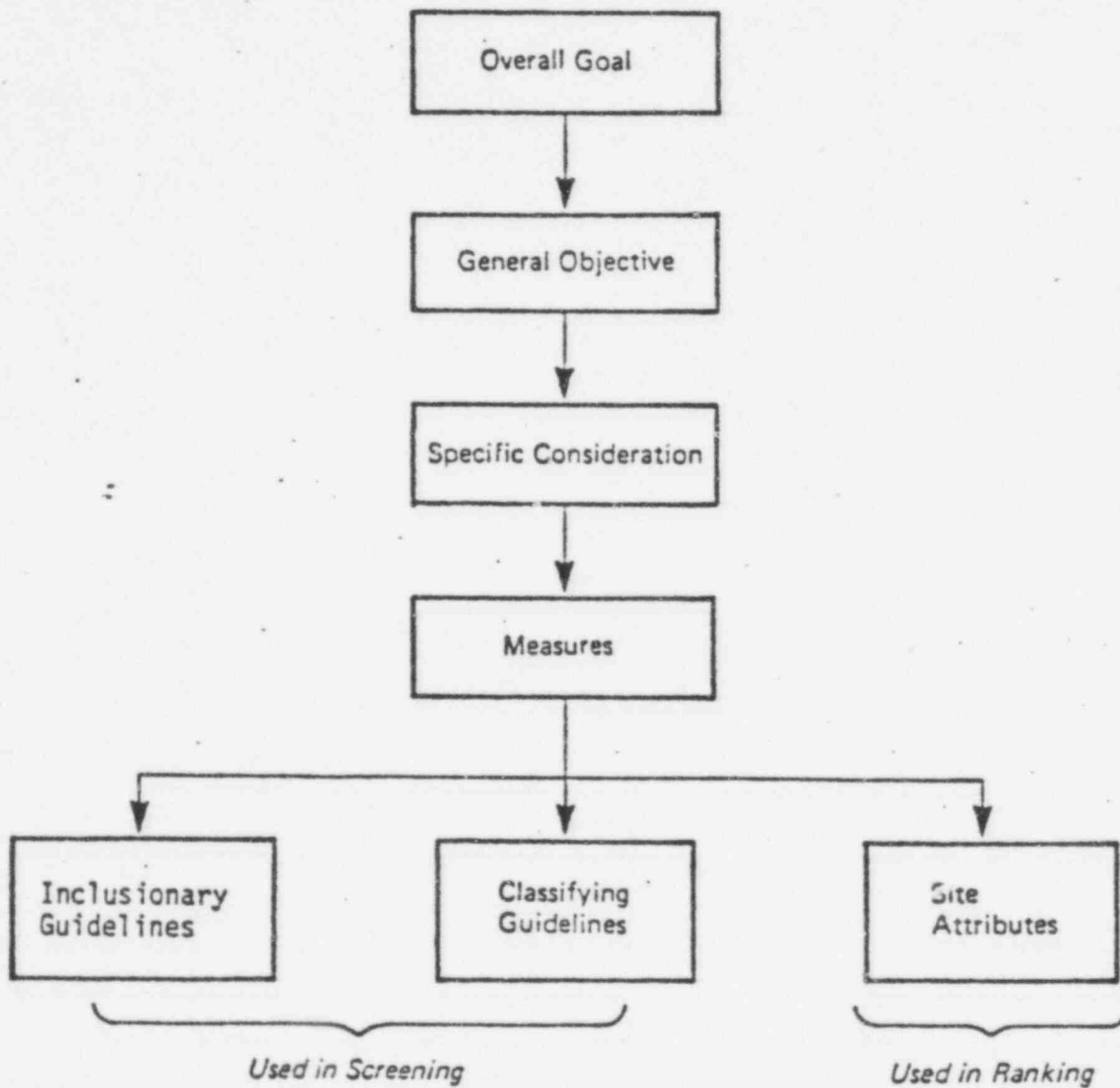
Example Guideline

- Subdivision by Natural and Man-made Features
- Ground Water Characteristics
- Seismicity

By Sept 1979
Revised to 226 March 1981

POOR ORIGINAL

757 015



RELATIONSHIPS OF TERMS USED
IN SCREENING AND RANKING

157 016

SITE IDENTIFICATION APPROACH

757 017

