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SOLAR RADIATION OBSERVATION STATIONS

WITH

COMPLETE LISTING OF DATA ARCHIVED BY THE NATIONAL CLIMATIC CENTER, ASHEVILLE, NORTH CAROLINA

AND

INITIAL LISTING OF DATA NOT CURRENTLY ARCHIVED

Center for Environmental and Energy Studies

The University Of Alabama In Huntsville

November 1976

SOLAR RADIATION OBSERVATION STATIONS

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COMPLETE LISTING OF DATA ARCHIVED BY THE NATIONAL

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by

E. A. Carter
R. E. Wells
B. B. Williams

CENTER FOR ENVIRONMENTAL
AND ENERGY STUDIES
The University of Alabama in Huntsville
P. O. Box 1247
Huntsville, Alabama
35807

November 1976

prepared for:

THE UNITED STATES ENERGY RESEARCH
AND DEVELOPMENT ADMINISTRATION
DIVISION OF SOLAR ENERGY
UNDER CONTRACT NAS8-31293

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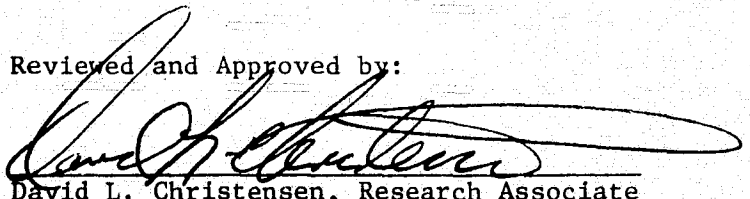
Reviewed and Approved by:



David L. Christensen, Research Associate
Principal Investigator, NASA Contract NAS8-31293
The University of Alabama in Huntsville
Huntsville, Alabama

FOREWORD

This document presents the results of work performed by the Center for Environmental and Energy Studies, The University of Alabama in Huntsville, under Contract NAS8-31293. Mr. E. A. Carter is the UAH Task Team Leader and and Mr. O. L. Smith is the NASA Task Coordinator. Mr. David L. Christensen is the Principal Investigator of the contract. Mr. Fred Koomanoff is the ERDA Technical Coordinator.

ACKNOWLEDGEMENT

The authors acknowledge the help and cooperation from many organizations listed herein and appreciate the willing support of individuals who provided information for this report. Particular thanks are expressed to Mr. Fred Koomanoff and Mr. Michael Riches of the ERDA Division of Solar Energy; Mr. Edwin Flowers of the NOAA, Boulder, Colorado; and Mr. Frank Quinlan of the National Climatic Center, Asheville, North Carolina, for their direct support and participation.

ABSTRACT

The National Climatic Center (NCC) is re-evaluating the solar radiation data of the National Weather Service (NWS) which has been collected over the past 25 years and stored at the NCC, Asheville, North Carolina. Appendix A is a listing of these data from 150 solar radiation stations.

Hourly data from twenty-six stations in the contiguous United States are being rehabilitated and a standard year will be established for these stations. This work should be completed in December 1976. Daily solar radiation data for an additional twenty-nine stations will be rehabilitated. The twenty-six stations plus the additional twenty-nine stations will then have a standard year established using daily solar radiation data.

The Energy Research and Development Administration (ERDA) is examining solar radiation data from areas of the U. S. not covered by the observations archived at the NCC. These data which can be rehabilitated will supplement the NCC data and augment the historical solar radiation data of the U. S.

The NWS is initiating a program to collect solar radiation data with better controls on maintenance of equipment and recording procedures. A new NWS solar radiation station network with thirty-four stations in the contiguous U. S. and one in Alaska will be in operation in the near future.

Various state government organizations, utilities, universities, and private companies are also measuring solar radiation, as well as the Energy Research and Development Administration (ERDA), the Environmental Protection Agency (EPA), and other Federal government organizations. This report lists these organizations, the 166 stations where solar radiation observations were taken, the type of equipment used, the form of the recorded data, and the period of operation of each station. With this broader knowledge of solar radiation data sources, an expanded data base can be established which should benefit all who are interested in solar energy.

This document was prepared with the support and cooperation of the Energy Research and Development Administration, the National Aeronautics and Space Administration, the National Oceanic and Atmospheric Administration, and many other organizations. A source list of all organizations which participated in this survey is included herein.

Much of the solar radiation data listed in this report was recorded for specific requirements and may not be applicable to solar energy projects. Careful consideration should be exercised during the process of selecting data which may be applicable. Also, this report does not include evaluations of the radiation observational data nor was actual data collected as part of this research effort.

Many changes should occur over the next few years in station locations, observational equipment, and recording techniques for solar radiation measurements. The assistance of the reader is respectfully requested in reporting these changes and in identifying any sources of solar radiation data not included in this report.

TABLE OF CONTENTS

I. INTRODUCTION

With the recent increased interest in uses of solar energy, there is a corresponding need for solar radiation data. While there have been programs for many years to collect such data, interest and support of the programs have been varied and generally short-lived. Until recently, the solar radiation data collection program maintained by the National Weather Service received only modest support because there was no urgent demand for the data, and organizations with local needs could establish their own programs. Some solar radiation data reached the National Weather Service (NWS) archives at the National Climatic Center (NCC) in Asheville, North Carolina, through the NWS Cooperative Program. However, if the solar radiation data was not recorded at or near a National Weather Service Station, it was not included in the standard NCC solar radiation card decks used for automated data processing.

The present urgent need for solar radiation data justified a project to locate as many additional solar radiation data sources as possible. This report is the documented results of the UAH efforts to locate such data and to record such potentially useful information. To make the report as complete as possible, locations where National Weather Service data have been recorded, stations which will have their data rehabilitated and a standard year established, areas under consideration by the Energy Research and Development Administration from which solar radiation data could be obtained to augment the historical data at NCC, and a map of the new National Weather Service solar radiation network are also included.

To keep this recorded information up to date and as useful as possible, it is hoped that those interested will provide any needed changes or comments and additional data for future publications. As a result of this project, the technical community may learn of the efforts and existence of solar radiation observations and possibly avoid expensive and time consuming duplication of such research activities.

This report does not attempt to evaluate solar radiation data nor confirm validity of any of the information provided by the various sources. Solar radiation observations generally have been taken to meet special local requirements and may or may not be appropriate for a new requirement. The National Climatic Center is currently re-evaluating solar radiation data and their advice should be sought for the use of the data. Comments on the quality of the National Weather Service pyranometer network data are included in Reference 1. The quality of any recorded solar radiation data should be carefully reviewed in order to use it properly.

Reports of summarized solar radiation data encountered during the preparation of this document are listed in the references. This listing is not intended to be comprehensive and the references are included for the reader's convenience.

The list of National Weather Service solar radiation stations with data archived at the National Climatic Center is organized by states in Appendix A and the locations of data stations in the contiguous U. S. are shown in Figure 1. The stations with data not archived at the National Climatic Center are listed in Appendix B, with sub-groupings to identify the sources. The locations of these stations are shown in Figure 2. ERDA will collect some of these data and evaluate the observations. If the solar radiation measurements can be rehabilitated, ERDA will add these data to the historical data at NCC. The stations under consideration are shown in Figure 4.

An addendum has been added to list those stations from which information was received after Appendix B was printed.

The information on most of the radiation observational stations listed in Appendix B was obtained by contacting the organization and requesting that a questionnaire be completed. A copy of the questionnaire form which was used is included as Appendix D. Announcements of the project with a request for pertinent information were published in the Bulletin of the American Meteorological Society and The Solar Engineering Magazine.

Some of the information in Appendix B was obtained from various publications and in the section, "List of Sources of Information on Solar Radiation Stations", the publication or office from which the information was obtained is indicated. Reference 15 is a comprehensive listing of solar radiation measuring equipment which may be helpful in determining the types and quality of equipment used at the various locations. This effort was also a related research activity performed by The University of Alabama in Huntsville, Center for Environmental and Energy Studies.

II. SOURCES OF DATA

National Weather Service

The National Weather Service data from both prime and cooperative stations provide the greatest assortment and geographical distribution of any solar radiation data available in this country (Figure 1 and Appendix A). Most of the data is stored on magentic tape and is available for purchase from the National Climatic Center. Further details are included in References 1 and 2. The national solar radiation archives are being re-evaluated and considerable progress on improving quality is expected.

The data from twenty-six stations in the contiguous U.S. have been selected for rehabilitation and a standard year for hourly data and daily data will be established by December 1976. The stations are indicated in Figure 5. Daily solar radiation data for an additional twenty-nine stations will be rehabilitated. This will provide fifty-five stations which will have standard years established for daily solar radiation. The twenty-nine stations have not been determined at present.

Energy Research and Development Administration (ERDA)

ERDA and the National Oceanic and Atmospheric Administration (NOAA) are cooperating in the upgrading of solar radiation measurements. ERDA and the National Climatic Center of NOAA are coordinating the rehabilitation of solar radiation data and expansion of the data base. Locations with solar radiation stations have been selected to supplement the NWS stations which have data archived at NCC (Figure 4).

The rationale used in the selection of these locations was: (1) basic network of NWS did not have a solar radiation station in the area; (2) climatic and solar radiation maps indicated the weather regime of the area was different from weather in surrounding areas where solar radiation stations were located; (3) a study by The University of Alabama in Huntsville had determined that a solar radiation station existed at the location with data which could possibly be rehabilitated using the same basics as used by NCC to rehabilitate NWS data. Appendix C gives more detail on methodology used to screen possible additional archival sites. These data will supplement and expand the data base and augment the historical solar radiation data of the United States.

State Organizations

Various state departments have recorded and/or compiled solar radiation measurements. Some state organizations have published summaries of their state's climatic conditions and solar radiation measurements. References 3, 4 and 5 are examples.

The Department of Water Resources, Division of Resources Development for the State of California, has compiled an extensive collection of solar radiation observations which were taken in and near California (Reference 6).

The Atmospheric Science Research Center, State University of New York at Albany, has published a report of solar radiation measurements with summaries of radiation conditions for New York State (Reference 7).

Agriculture experiment stations have been recording solar radiation data for many years. Because these data were being used in conjunction with crop experiments and monitored closely, they probably represent the most reliable long-term records available. Many of the agricultural experiment stations have been part of the National Weather Service Cooperative Network with most of them operated in conjunction with state agricultural colleges and universities. Colleges and universities have frequently published solar radiation summaries. References 8 and 9 are examples.

Environmental Protection Agency

In recent years, the National Environmental Protection Agency (EPA) and some state and local environmental protection agencies have been measuring solar radiation because of its role in the formation of photochemical smog. Some of these data measurements recorded only ultraviolet radiation, with wavelengths of approximately 0.295 - 0.385 Microns. The most comprehensive data recorded by EPA has been in the St. Louis, Missouri, area, but EPA radiation studies include the administration of an atmospheric turbidity network of 80 stations (50 in the U.S. and 30 in other countries) to provide information on the earth's optical quality as it may relate to the distribution of the aerosol and gaseous pollution of the atmosphere (Reference 10).

Power Companies and Tennessee Valley Authority (TVA)

Most power companies that record solar radiation data have started to do so only in the past few years. The initial purpose was for determining solar radiation effects on emissions and atmospheric thermal effects. TVA has a network of ten solar radiation and meteorological measuring stations, and several stations have been in operation for about ten years.

Universities

Solar radiation measurements at universities have been recorded for a variety of uses, from instruction to serious research. The records, therefore, vary widely in quality. Those supporting agricultural experiment stations are the most consistent, although their equipment was not intended for high resolution.

Other Organizations

The following organizations have been identified as having recorded some solar radiation data, but the observations have been generally sporadic, covering short periods for specific test purposes.

1. National Aeronautics and Space Administration
   a. Marshall Space Flight Center
   b. Jet Propulsion Laboratory
   c. Flight Research Center
   d. White Sands Test Facility

2. Department of Defense
   a. U. S. Army
   b. U. S. Navy

3. U. S. Geological Survey

4. U. S. Forest Service

5. U. S. Bureau of Reclamation

Private companies and organizations, some of which have provided data to the National Climatic Center for inclusion in the National Weather Service data tape, include:

Smithsonian Institution
Eppley Laboratories
Desert Sunshine Exposure Tests, Inc.
Scripps Institute of Oceanography

Special Data Collections

Some organizations are compiling electronic tapes with weather and solar radiation data for special uses such as input for computer simulations. Examples include the following:

1. Sandia Laboratories is collecting previously recorded solar radiation data into three samples. Copies of these will be available through the Argonne Data Center, Argonne National Laboratories, Lemont, Illinois.

   a. The first sample consists of readings of direct-normal intensity and global intensity recorded at ten-minute intervals for the year 1962 for Albuquerque, New Mexico.

   b. The second solar data sample consists of four weeks of data from each of three locations in the country. These four weeks of data samples are representative of the four seasons at each of the locations. The locations are: Omaha, Nebraska; Blue Hill, Massachusetts; and Albuquerque, New Mexico. Each data sample consists of readings of direct-normal intensity and global intensity at ten-minute intervals.

   c. The third solar data sample consists of hourly readings of global radiation at eight locations spread throughout the U. S. for the years 1962 and 1963. This data sample also contains estimates of hourly readings of direct-normal intensity for these same locations and years. The relevant surface weather observations are included on the same computer tape.

2. The Solar Energy Laboratory, University of Wisconsin, Madison, Wisconsin, has compiled a data tape with eight years of Madison, Wisconsin, solar radiation data and relevant surface weather data. Also, one year of "representative data" is included for Albuquerque, New Mexico; Miami, Florida; Boulder, Colorado; Charleston, South Carolina; and Blue Hill, Massachusetts.

3. The Aerospace Corporation has compiled data tapes for 32 locations in the contiguous United States using the 1962 and 1963 hourly National Climatic Center data. Where observational data were inadequate, statistical procedures were used to estimate the hourly direct and global insolation. The Blue Hill, Massachusetts, and Albuquerque, New Mexico, data were used to obtain substantially independent measurements of direct and global solar radiation.

III. CONCLUSIONS AND RECOMMENDATIONS

The recent increase in the interest of solar energy to aid the nation's energy demands has produced a corresponding interest in the measurement of solar radiation. Many changes are occurring in locations of solar radiation stations, the type of equipment used, and methods of recording and evaluating the data.

Appendix A includes 150 solar radiation measuring stations and Appendix B and the Addendum includes 166 for a total of 316 stations. This is not a complete listing of past and present solar radiation stations. Some stations with a short period of operation or with data of limited use are not included in the listing, and there are some which were not directly contacted.

By collecting, evaluating, and rehabilitating the data from selected stations, the NCC and ERDA will expand and strengthen the historical data base of the United States. Then, by storing these data in a retrievable form, a valuable source of historical information will be provided.

The National Weather Service is establishing a new network of 35 solar radiation stations (Figure 3). To expand our knowledge of this basic energy resource, solar radiation observations from locations other than these 35 stations need to be taken. By upgrading the equipment and developing more strict standards for obtaining and evaluating solar radiation observations, many non-NWS solar radiation stations could have their data processed and added to the national data base.

Considering the climatology of the states, the data from at least 35 additional solar radiation stations could be added to the basic NWS network for solar radiation coverage. This is assuming that areas with similar weather patterns will have similar solar radiation patterns. Of course, there will be variations in detail, and some requirements will demand a micro network.

This report attempts to inform those in the research and engineering fields, who are interested in solar energy, of the past historical records which are available, the locations of the present and future solar radiation stations, and to understand the observational and evaluative procedures of solar radiation measurements. By making the past records and present activity in solar radiation measurements available to the community active in solar energy, the duplication of efforts should be prevented, thereby saving money, manpower, and materials.

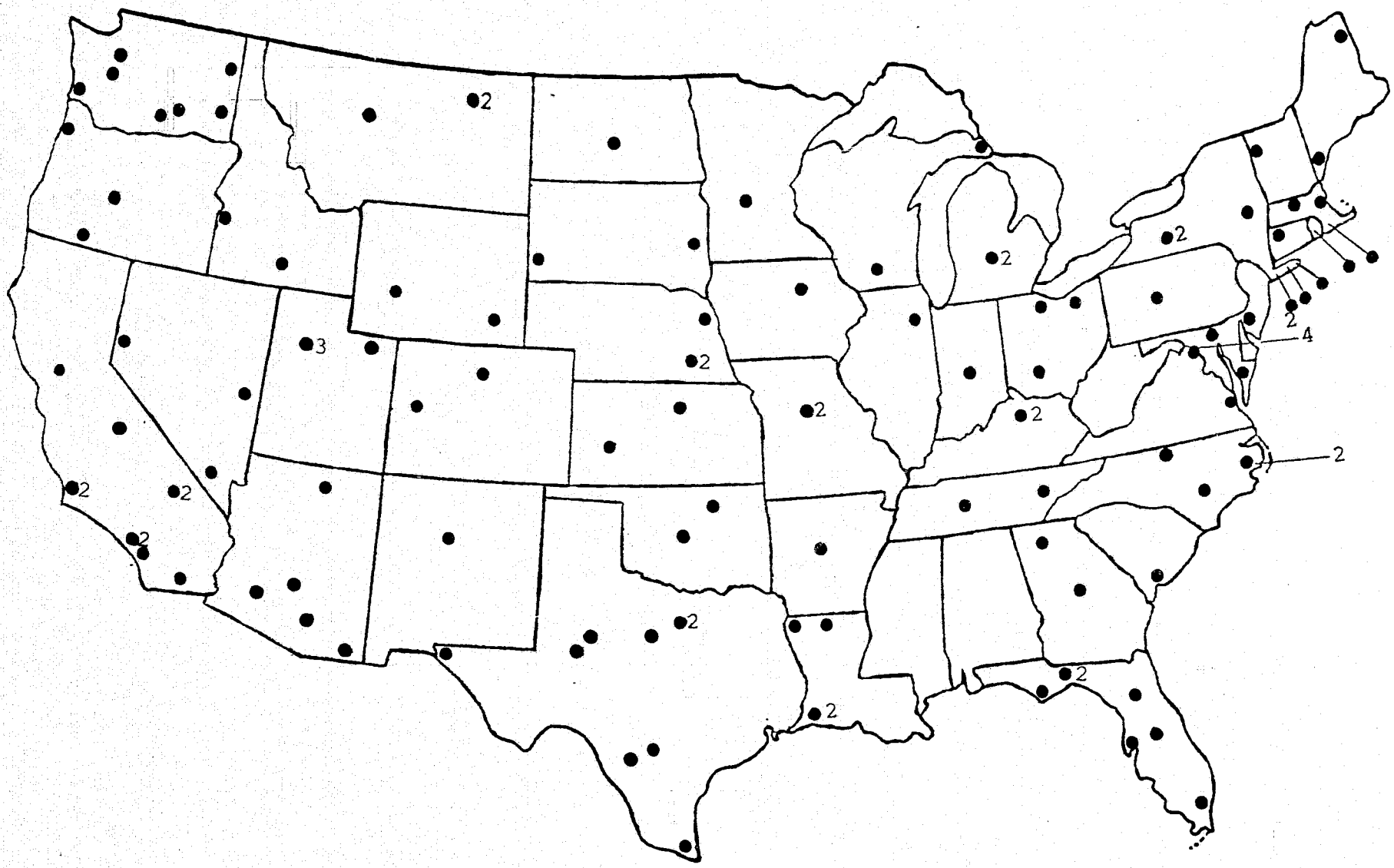


Figure 1. Location of Solar Radiation Stations with Data Archived at the National Climatic Center, Asheville, N. C. Numbers indicate more than one station in area.

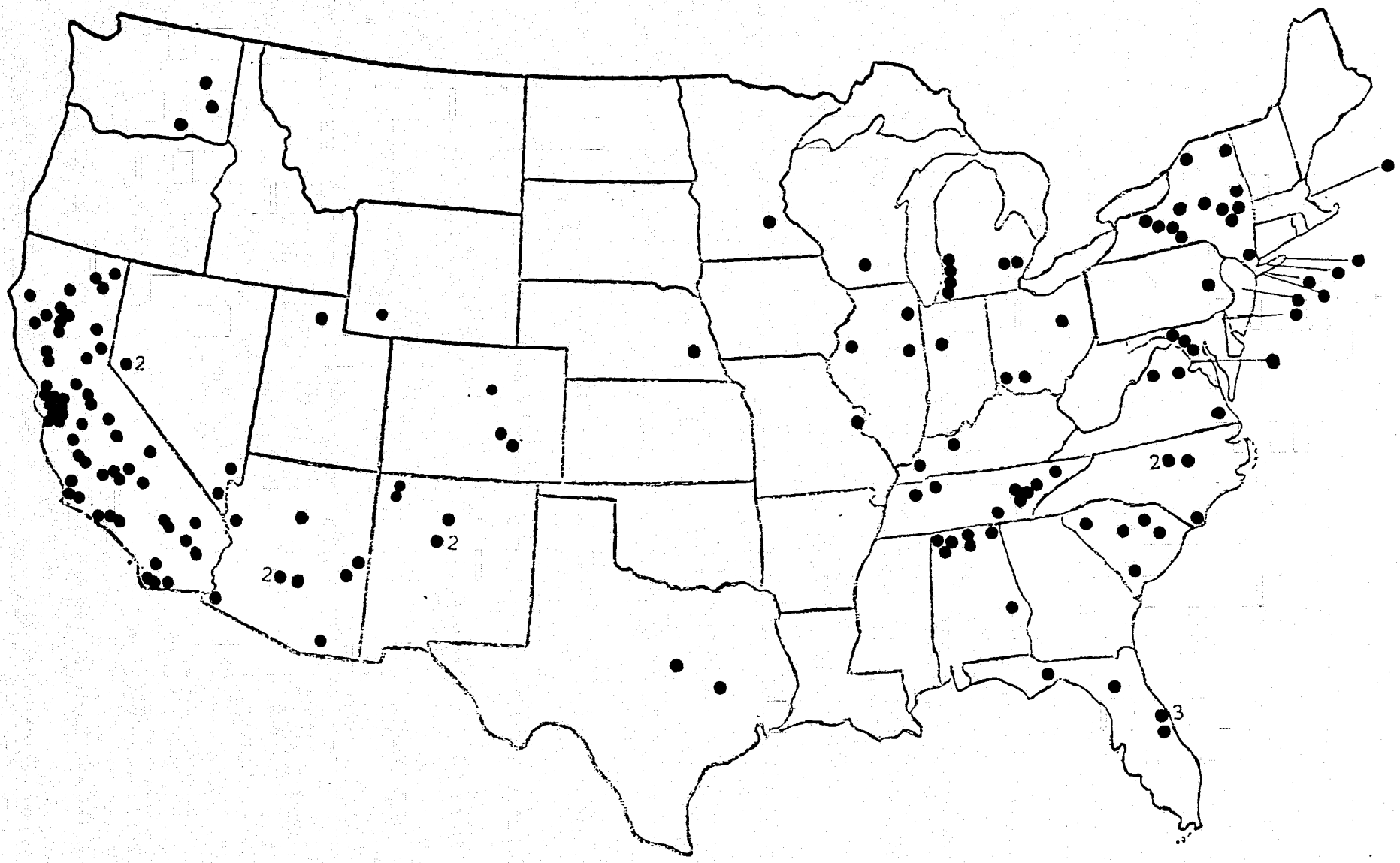


Figure 2. Location of Solar Radiation Stations with Data Not Archived at the National Climatic Center, Asheville, N. C. Numbers indicate more than one station in an area.

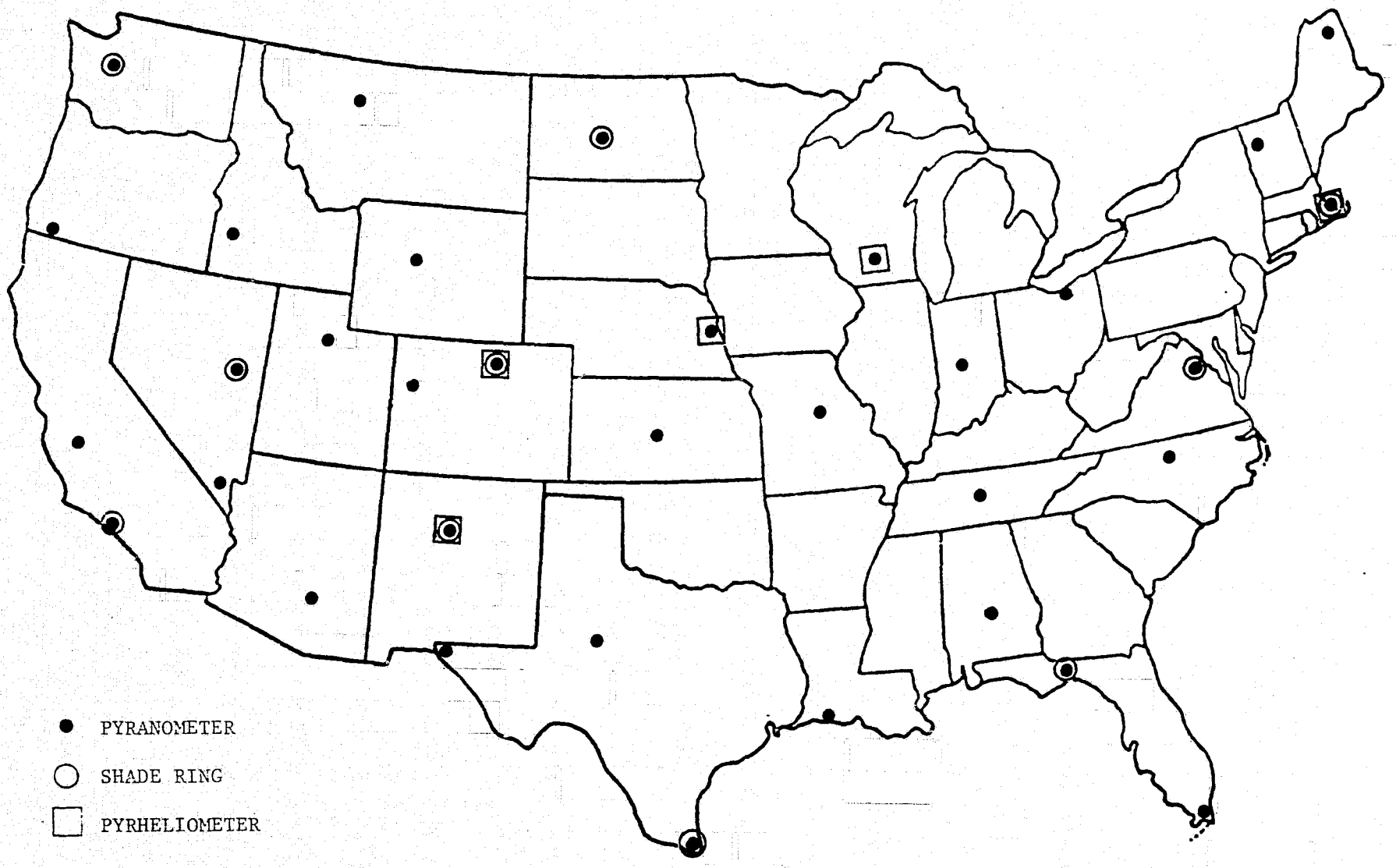


Figure 3. New National Weather Service Solar Radiation Station Network (Station at Fairbanks, Alaska, not indicated)

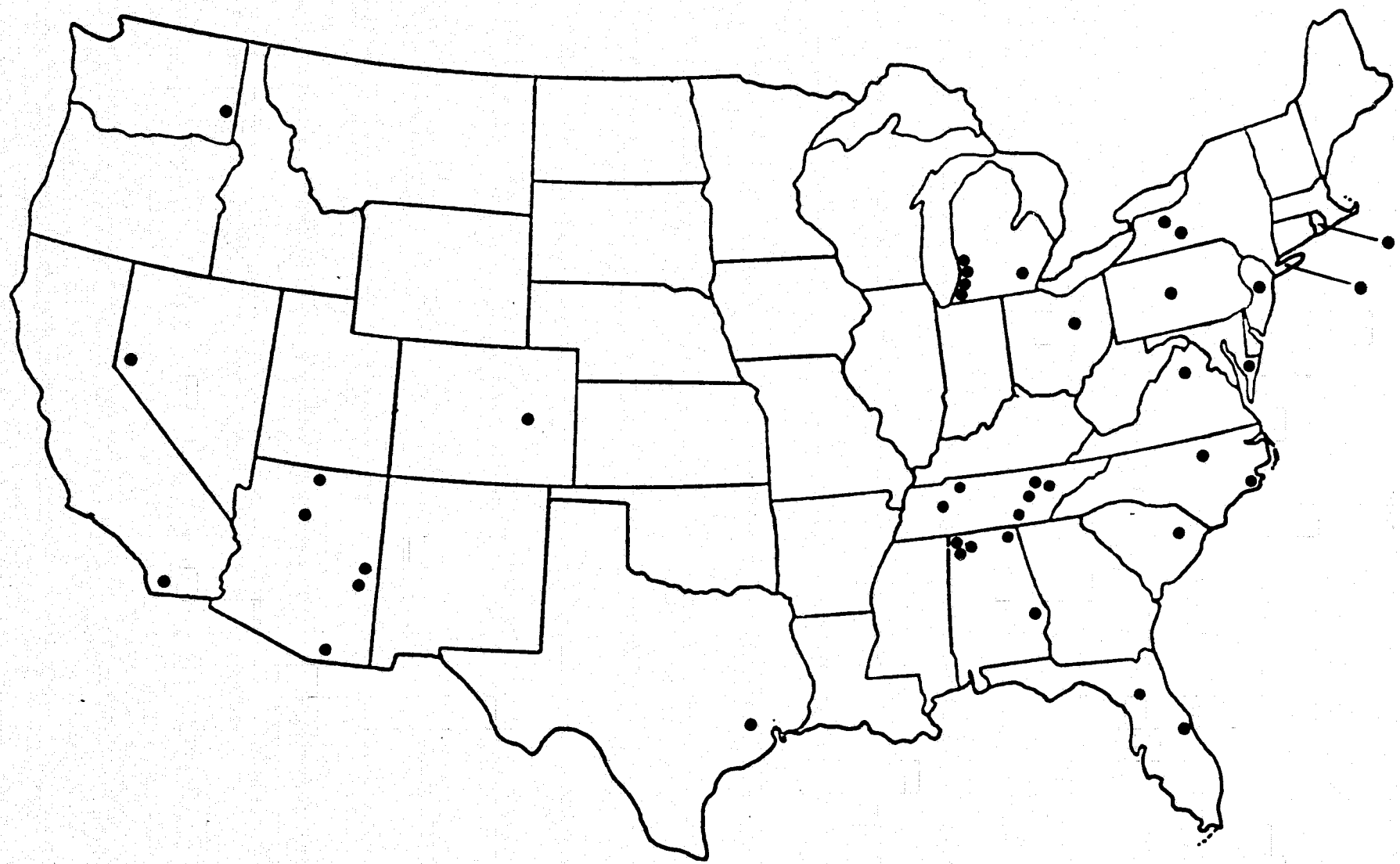


Figure 4 Stations with Solar Radiation Observations to Augment the Historical Data at NCC

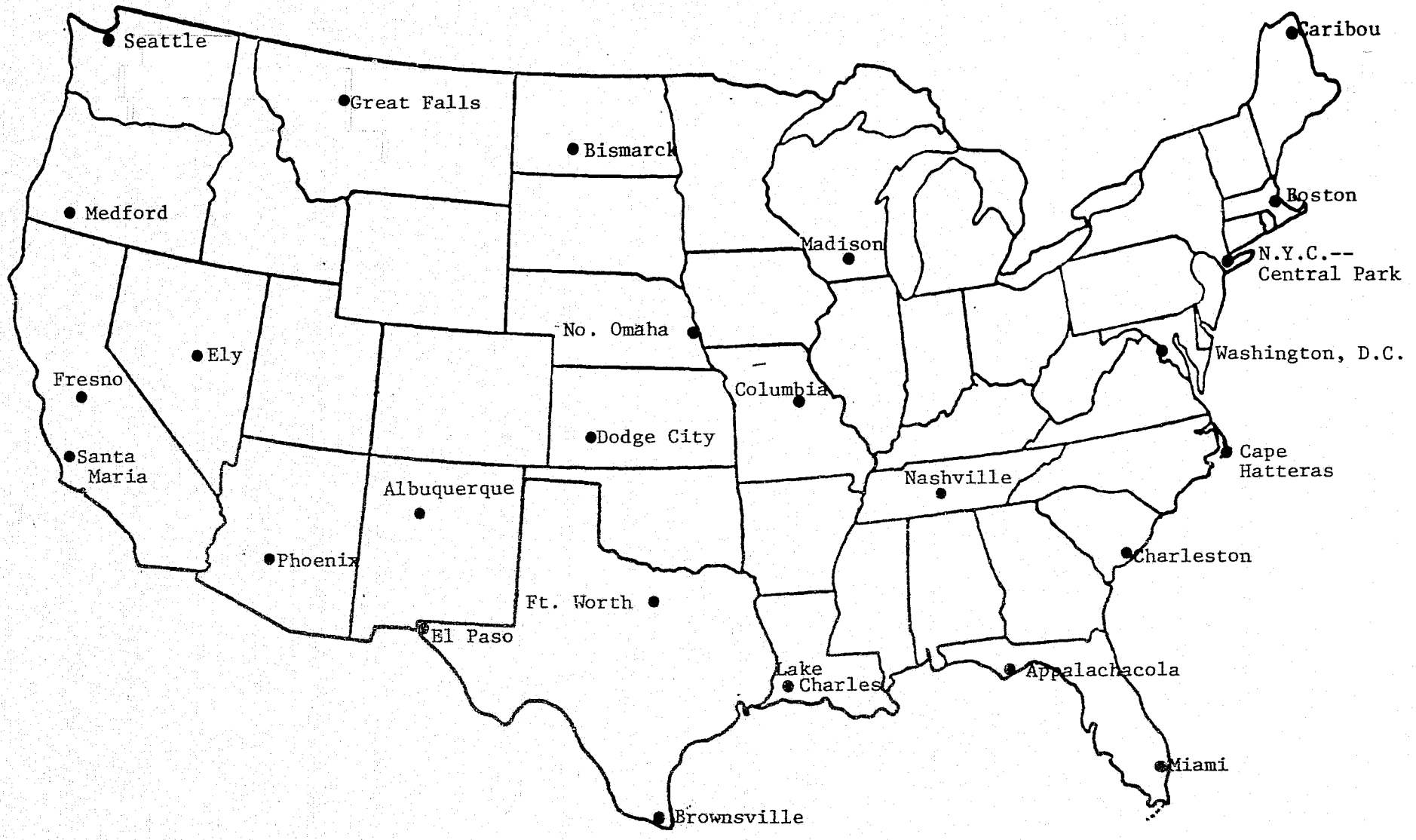


Figure 5 NWS Stations with Rehabilitated Solar Radiation Data and with an Hourly and Daily Standard Year Established

LIST OF SOURCES OF INFORMATION

ON SOLAR RADIATION STATIONS

ALABAMA

Auburn University
Agricultural Meteorological Station
Environmental Study Service Center
Auburn, AL 36830
ATTENTION: Mr. D. R. Davis, Meteorologist-in-Charge

Tennessee Valley Authority
River Oaks Building
Muscle Shoals, AL 35660
ATTENTION: Dr. T. L. Montgomery, Chief, Air Quality Branch

Commander, U.S. Army Missle Command
Redstone Arsenal, AL 35809
ATTENTION: Dr. O. M. Essenwanger, DRSMI-RRA

Lockheed-Huntsville
4800 Bradford Dr. NW
Huntsville, AL 35807
ATTENTION: Mr. P. O. McCormick

ALASKA

Smithsonian Radiation Lab - See MARYLAND

NOAA-Air Resources Lab - See COLORADO

ARIZONA

Arizona State University
The Laboratory of Climatology
Tempe, AZ 85281
ATTENTION: Robert W. Durrenberger

Motorola Corp.
4039 E. Raymond Street
Phoenix, AZ 85040
ATTENTION: Mr. William Bailey

ARIZONA cont.

Desert Sunshine Exposure Tests, Inc.
P. O. Box 185
Black Canyon Stage
Phoenix, AZ 85020

Northern Arizona University, Physics Dept.
P. O. Box 6010
Flagstaff, AZ 86001
ATTENTION: Mr. William G. Delinger

Lake Mojave
Yuma
(Data from California Department of Water Resources, reference 6)

Castle Creek
Seven Springs
Fort Huachucha
G. M. Proving Grounds
(Data from Solar Energy Commission of Arizona, reference 12)

Solar Energy Commission
State Capitol
Phoenix, AZ 85007
ATTENTION: Mr. Robert M. Handy

CALIFORNIA

University of California
Davis, Station at Coon Creek (reference 6)

University of California
Extension Service
Blythe (reference 6)

Scripps Institute of Oceanography
La Jolla (reference 6)

Metropolitan Water District of Southern California
Los Angeles (reference 6)

CALIFORNIA cont.

California Department of Water Resources

- Alturas
- Arvin Frick
- Bakersfield
- Berenda
- Buttonwillow
- Covelo
- Cummings Valley
- Finley
- Gerber
- Glenburn
- Guadalupe
- Kerman
- Los Banos Equip. Yard
- Maze Bridge
- McArthur
- Newville
- Old River
- Red Bluff
- Redding
- Ruth Res
- San Luis Obispo
- Soledad
- Stockton
- Thornton
- Upper Lake
- Willows

(Data from California Department of Water Resources, reference 6)

Bay Area Pollution District

- Fremont
- Oakland
- Pittsburg
- Redwood City
- Richmond
- San Jose

(Data from California Department of Water Resources, reference 6)

Department of Agriculture

- Brawley
- Lompoc

(Data from California Department of Water Resources, reference 6)

U.S. Department of Reclamation

- Coachella (reference 6)

Department of Interior

- Barrett Reservation
- Salton Sea
- Sandy Beach
- San Vicente
- Challenge

(Data from California Department of Water Resources, reference 6)

U.S. Army

- High Point
- Jolon
- Soda Springs Sno Lab

(Data from California Department of Water Resources, reference 6)

U.S. Navy

- Point Mugu (reference 6)

CALIFORNIA cont.

California State Resources
Department of Water Resources
Division of Resource Development
State Capitol
Sacramento, CA 95814
ATTENTION: Mr. James Goodrich

Hopkins Marine Station
Pacific Grove, CA 93950
ATTENTION: Mr. Delane Munson

San Diego State University
School of Engineering
San Diego, CA 92182
ATTENTION: Mr. Charles Morgan

Lawrence Berkeley Laboratory
University of California
Energy and Environment Division
Berkeley, CA 94702
ATTENTION: Mr. Arlon J. Hunt

Lawrence Livermore Laboratory
University of California
Box 808 L-40
Livermore, CA 94550
ATTENTION: Mr. Richard Neifert

Jet Propulsion Laboratory
California Institute of Technology
4800 Oak Grove Drive
Pasadena, CA 91130
ATTENTION: Mr. M. S. Reid (mail code 238-737)

COLORADO

United States Air Force Academy
Department of Civil Engineers
United States Air Force Academy, CO 80840
ATTENTION: Col. Wallace E. Fluhr

National Radiation Laboratory/ERL-NOAA
Boulder, CO 80302
ATTENTION: Mr. Edwin C. Flowers

COLORADO cont.

Kaman Sciences Corp.
P. O. Box 7463
Colorado Springs, CO 80433
ATTENTION: Mr. Doug U. Jardine, Phoenix Project

National Oceanic and Atmospheric Administration (NOAA)
Air Resources Lab RF 329
Boulder, CO 80302
ATTENTION: Mr. Bernard G. Mendonca

DELAWARE

University of Delaware
Institute of Energy Conversion
Newark, DE 19711
ATTENTION: Dr. Fredrick A. Costello, Mechanical Engineering Department

FLORIDA

IN-OMO-2
NASA-KSC, Data Branch
J. F. Kennedy Space Center, FL 32899
ATTENTION: Mr. W. G. Jelen

University of Florida Experiment Station
Quincy, FL

University of Florida
Mechanical Engineering Building
Room 325
Gainesville, FL 32611
ATTENTION: Dr. Erick A. Farber

Florida Solar Energy Center
300 S. R. 401
Cape Canaveral, FL 32920
ATTENTION: Mr. James D. Roland

ILLINOIS

Illinois State Water Survey
P. O. Box 232
Urbana, IL 61801

Western Illinois University
Department of Geography
Mocomb, IL 61455
ATTENTION: Dr. Thomas Van Heuklon

Argonne National Laboratories
Radiological and Environmental Research Div.
Atmospheric Physis Section
Building 181
Argonne, IL 60439
ATTENTION: Mr. Marvin L. Wesely

INDIANA

Purdue University
NWS Office for Agriculture
Agronomy Department
West Lafayette, IN 47904
ATTENTION: Mr. W. L. Stirm

KENTUCKY

TVA - See ALABAMA

MARYLAND

Goddard Space Flight Center
Greenbelt, MD 20771
ATTENTION: Dr. M. P. Thekaekara (mail code 219)
Mr. William Bandeen

University of Maryland
College Park, MD 20742
ATTENTION: Dr. H. E. Landsburg

Smithsonian Radiation Biology Laboratory
12441 Parklawn Drive
Rockville, MD 20852 (reference 11)

MASSACHUSETTS

Grover Cleveland School - See PENNSYLVANIA
(General Electric)

MICHIGAN

The University of Michigan
College of Engineering
Department of Atmosphere and Ocean Science
2455 Haywood
Ann Arbor, MI 48105
ATTENTION: Dr. Dennis G. Baker

Smith, Hinchman & Grylls Associates, Inc.
455 W. Fort Street
Detroit, MI 48226
ATTENTION: Mr. David C. Miller

MINNESOTA

University of Minnesota
Agriculture Experiment Station
Soil Science Department
St. Paul, MN 55108
ATTENTION: Mr. Don G. Baker

MISSOURI

Environmental Protection Agency (reference 10)

NEBRASKA

Lambda Instruments Corporation
4421 Superior Street
P. O. Box 4425
Lincoln, NE 68504

NEVADA

University of Nevada
Sead Campus
Desert Research Institute
Reno, NV 89507
ATTENTION: Dr. V. Smiley

University of Nevada
Department of Geography
Reno, NV 89507
ATTENTION: Dr. John Haughton

Lake Mead (reference 6)

NEW JERSEY

Department of Meteorology & Physical Oceanography
Cook College, Box 231
Rutgers University
New Brunswick, NJ 08903
ATTENTION: Dr. Nathan M. Reiss

NEW MEXICO

Sandia Laboratories
Albuquerque, NM 87115
ATTENTION: Mr. Eldon C. Boes, Energy Program Development Division 5711

Solar Energy Group, LASL
P. O. Box 1663
Group Q-24
Los Alamos, NM 87545
ATTENTION: Mr. S. W. Moore

Lawrence Berkeley Laboratory - See CALIFORNIA

NEW YORK

Cornell University
Aurora (reference 7)

Cornell University
Canton (reference 7)

State University of New York at Albany
Lake George (reference 7)

NEW YORK cont.

State University of New York at Albany
Whiteface Mountain (reference 7)

Department of Environmental Conservation
Eisenhower Park
Fonda
Mamaroneck
Schenectady
Welfare Island
(Data from Solar Energy Atlas for New York State, reference 7)

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Meteorology Group, Division of Atmospheric Sciences
Upton, NY 11973
ATTENTION: Dr. Constance Nagle

State University of New York at Albany
Atmospheric Sciences Research Center
1400 Washington Avenue
Albany, NY

Cornell University
Department of Agronomy
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Grumman Aerospace Coporation
Energy Programs, Plant 25
Bethpage, NY 11714
ATTENTION: Mr. K. Speiser

E. S. Department
SUC Brockport
Brockport, NY (reference 7)

Department of Veg. Crops
Geneva Research Farm
Geneva, NY (reference 7)

New York Ocean Science Laboratory
Drawer EE
Montauk, NY 11954
ATTENTION: Dr. Rudolph Hollman

SUNY College of Environmental Science and Forestry
Department of Silviculture
Syracuse, NY 13210
ATTENTION: Mr. Richard A. Schwab

NORTH CAROLINA

National Climatic Center
Asheville, NC 28801
ATTENTION: Dr. Nathan Gutman

Carolina Power & Light Company
P. O. Box 1551
Raleigh, NC 27602
ATTENTION: Mr. D. G. Wilder

Environmental Sciences Research Laboratory, EPA
Research Triangle Park, NC 27711
ATTENTION: Mr. Charles R. Hosler

NC/STRC
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Research Triangle Park, NC 27709
ATTENTION: Mr. Leon Neal

OHIO

NOAA - See COLORADO

USDA-ARS-NCR
P. O. Box 478
Coshocton, OH 43812
ATTENTION: Mr. J. L. McGuinness

PENNSYLVANIA

General Electric Company
P. O. Box 8661
Philadelphia, PA 19101
ATTENTION: Mr. John E. Notestein

Lehigh University
Department of Mechanical Engineering & Mechanics
Bethlehem, PA 18015
ATTENTION: Mr. R. Sarubbi
Mr. D. Leenov

SOUTH CAROLINA

Clemson University
South Carolina Agricultural Experiment Station
Clemson, SC 29631

SOUTH CAROLINA cont.

Carolina Power & Light Company - See NORTH CAROLINA

ERDA
Savannah River Operation Office
Environmental Activities Branch
P. O. Box A
Aiken, SC 29801
ATTENTION: Mr. S. R. Wright
Dr. Jerry Nelsen

TENNESSEE

ASG Industries, Inc.
P. O. Box 929
Kingsport, TN 37662
ATTENTION: Mr. George H. Gose

NOAA
Atmospheric Turbulence & Diffusion Laboratory
P. O. Box E
Oak Ridge, TN 37830
ATTENTION: Mr. Detlef R. Matt

TVA - See ALABAMA

TEXAS

Environmental Studies Service Center
Room 161, Bizzel Hall, TAMU
College Station, TX 77843
ATTENTION: Mr. Ray L. Jensen or Professor John Griffiths

Lawrence Berkeley Laboratory - See CALIFORNIA

UTAH

Utah State University
Logan, UT 84322
ATTENTION: Mr. Inge Dirmhirn

VIRGINIA

NASA/Langley Research Center
Mail Stop 261
Hampton, VA 23665
ATTENTION: Mr. I. L. Hamlet

VIRGINIA cont.

Wallops Flight Center
Wallops Island, VA 23337
ATTENTION: Mr. J. Holland Scott or Robert L. Krieger

Intertechnology Corporation
100 Main Street
Warrenton, VA 22186

WASHINGTON

Washington State University
Department of Agronomy
Pullman, WA 99163
ATTENTION: Professor Gaylon S. Campbell

Battelle
Pacific Northwest Laboratories
P. O. Box 999
Richland, WA 99352
ATTENTION: Mr. W. A. Stone

WISCONSIN

University of Wisconsin
Solar Energy Laboratory
Engineering Research Building
1500 Johnson Drive
Madison, WI
ATTENTION: Dr. Jack Duffy

WASHINGTON, D. C.

Smithsonian Radiation Laboratory (reference 11)
See MARYLAND

ANTARTICA HAWAII SAMOA

NOAA - Air Resources Lab - See COLORADO

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15. Carter, E. A., S. A. Greenbaum, A. M. Patel, "Listing of Solar Radiation Measuring Equipment and Glossary". ERDA/NASA/31293/76/3. Prepared by the University of Alabama in Huntsville for ERDA, July, 1976.

APPENDIX A
SOLAR RADIATION OBSERVING STATIONS WITH DATA ARCHIVED AT THE NATIONAL CLIMATIC CENTER, ASHEVILLE, NORTH CAROLINA

Explanation:

- Stations with data ending as of July 1976 probably are continuing to operate, but because changes are occurring in the National Weather Service solar radiation data program, data after 1975 should be verified by contacting the National Climatic Center, Asheville, N. C.
- When two stations are listed in the same location, the hourly magnetic tape deck 280 may contain data from both stations.
- "TO DATE" is valid as of July 1976.
- "X" prefix in the Station Number indicates a cooperative station.

STATE / STATION NUMBER	STATION LOCATION	TYPE CHART	TABULATED				REMARKS	MAGNETIC TAPE				NOTE
			HOURLY DATA		DAILY DATA			TAPE DECK 280 HOURLY DATA		TAPE DECK 480 DAILY DATA		
			BEGIN	END	BEGIN	END		BEGIN	END	BEGIN	END	
ALASKA												
25308	ANNETTE ISLAND	CIR.			7/49	7/75				7/52	7/75	
27502	BARROW	ROLL	4/51	9/74				1/57	3/57	7/52	10/74	(B)
26625	BETHEL	ROLL	1/50	11/75			ROLL BEGAN 10/49	1/57	3/57	7/52	10/75	(B)
26411	FAIRBANKS	ROLL	8/31	7/76			ROLL BEGAN 1/42	1/57	3/57	7/52	TO DATE	(B)
X5733	MATANUSKA	ROLL	11/55	7/76			ROLL BEGAN 4/54	1/57	3/57	12/54	TO DATE	(C)
X6870	PALMER				3/67	7/76	TOTAL NET EXCHANGE 6/72 - 12/75			1/67	TO DATE	
ARIZONA												
X3120	FORT HUACHUCA									6/56	8/56	
X5471	MESA				8/73	7/76				8/73	TO DATE	
X6180	PAGE	ROLL	6/59	6/70	6/59	7/76	ROLL BEGAN 1/59			1/59	TO DATE	(A)
23183	PHOENIX	ROLL	6/49	7/52	4/73	7/76	ROLL 6/49 - 7/76	7/52	6/67	7/52	TO DATE	(D)
X8815	TUCSON		3/59	7/76			NIP 4/61 - 12/75 7 OBSERVATIONS ON CLEAR DAYS	1/57	4/57	8/55	TO DATE	(B)
ARKANSAS												
13963	LITTLE ROCK	CIR.	7/49 4/73	3/52 7/76			CIR. 7/49 - 6/76 (FEW BREAKS)			11/52	TO DATE	

NOTE: (A) HOURLY DATA TABULATED BUT NOT ON MAG TAPE.

(B) ADDITIONAL HOURLY DATA ON PUNCH CARDS BUT NOT ON MAG TAPE.

(C) CHARTS ARE IN THE NCC BUT HOURLY DATA UNWORKED.

(D) HOURLY DATA DISCONTINUED IN 1967. CHARTS CAN BE WORKED.

STATE / STATION NUMBER	STATION LOCATION	TYPE CHART	TABULATED: HOURLY DATA BEGIN	HOURLY DATA END	DAILY DATA BEGIN	DAILY DATA END	REMARKS	MAGNETIC TAPE: TAPE DECK 280 HOURLY DATA BEGIN	TAPE DECK 280 HOURLY DATA END	TAPE DECK 480 DAILY DATA BEGIN	TAPE DECK 480 DAILY DATA END	NOTE
CALIFORNIA												
X1732	CHINA LAKE		10/50	10/75						10/71	TO DATE	
X4279	CHINA LAKE							1/57	2/57	7/52	9/71	
X2294	DAVIS				9/42	7/76				7/52	TO DATE	
X2718	EL CENTRO				2/63	7/76				2/63	TO DATE	
91393	FRESNO	ROLL	10/28	7/52	4/73	7/76	ROLL BEGAN 1/42	7/52	8/67	7/52	TO DATE	(D)
23174	LOS ANGELES AP	ROLL/CIR.			12/51 4/73	12/52 12/73	CIR. 1/51 - 12/61; ROLL 12/61 - 6/68; CIR. 6/68 - 6/76	1/62	6/67	12/51	TO DATE	
93134	LOS ANGELES CO	ROLL/CIR.			4/49	6/74	CIR. 12/49 - 6/68 ROLL 6/68 - 7/74			7/52	6/74	(E)
X7473	RIVERSIDE		6/33 1/59	4/55 3/76				1/57	4/57	7/52	TO DATE	
23236	SANTA MARIA	ROLL	1/49	7/52	4/73	1/75	ROLL 1/49 - 1/75			7/52	10/54	
23273	SANTA MARIA							7/52	3/69	11/55	10/75	(D)
COLORADO												
23066	GRAND JUNCTION	CIR.			5/49 4/73	7/52 7/76	CIR. 4/49 - 6/76			7/52	TO DATE	
X3492	GRAND LAKE	ROLL	2/48 4/55	12/52 11/55	5/55	9/55	ROLL 1/53 - 9/53	1/57	4/57	7/52	12/58	
CONNECTICUT												
14740	WINDSOR LOCKS									11/59	1/62	
DISTRICT OF COLUMBIA												
X9285	WASHINGTON	ROLL	7/09	8/53			ROLL 1/42 - 8/53			7/52	7/53	
93722	WASHINGTON	ROLL					ROLL 8/53 - 11/60			8/53	11/60	

NOTE: (D) HOURLY DATA DISCONTINUED IN 1967. CHARTS CAN BE WORKED.

(E) HOURLY DATA UNWORKED AND CHARTS ARE CONSIDERED UNRELIABLE.

STATE / STATION NUMBER	STATION LOCATION	TYPE CHART	TABULATED				REMARKS	MAGNETIC TAPE				NOTE
			HOURLY DATA		DAILY DATA			TAPE DECK 280 HOURLY DATA		TAPE DECK 480 DAILY DATA		
			BEGIN	END	BEGIN	END		BEGIN	END	BEGIN	END	
DISTRICT OF COLUMBIA (CONTD)												
93725	WASHINGTON	ROLL/CIR.	10/50	9/52			ROLL 8/50 - 9/52 CIR. 9/52 - 8/58			7/52	2/53	
93734	WASHINGTON - STERLING, VA.	ROLL	4/73	7/76			ROLL 11/60 - 7/76	7/52	TO DATE	12/60	TO DATE	
FLORIDA												
12832	APALACHICOLA	ROLL	1/49 4/73	7/52 11/75			ROLL 5/49 - 11/75	7/52	11/75	7/52	11/75	
X3311	GAINESVILLE		10/29	12/33	4/46 1/55	7/51 12/73				.3/57	12/73	
12883	LAKELAND	CIR.			4/73	11/74	CIR. 10/63 - 11/74			10/63	11/74	
12839	MIAMI	ROLL	2/49 4/73	7/52 7/76	7/30	11/40	ROLL 2/49 - 7/76	7/52	TO DATE	7/52	TO DATE	
X8753	TALLAHASSEE		*2/63	12/66			*SCATTERED REPORTS FROM 4/56 - 7/59			3/54	11/56	
93805	TALLAHASSEE	ROLL	*10/68	7/76			*MISSING DATA: 9/71 - 5/72 9/73 - 11/73	11/74	TO DATE	1/69	TO DATE	(B)
12842	TAMPA	CIR.			4/49 4/73	7/52 5/74	CIR. 4/49 - 5/74			7/52	5/74	
GEORGIA												
13874	ATLANTA	CIR.			3/49 4/73	7/52 10/74	CIR. 4/49 - 9/74			7/52	10/74	
X3941	GRIFFIN				4/50	2/66				7/52	2/66	
HAWAII												
21504	HILO		4/56 3/61	5/56 7/62						3/61	7/62	
X6198	MAUNA LOA		12/57	11/75						[illegible]	TO DATE	(A)

NOTE: (A) HOURLY DATA TABULATED BUT NOT ON MAG TAPE.

(B) ADDITIONAL HOURLY DATA ON PUNCH CARDS BUT NOT ON MAG TAPE.

STATE		TYPE CHART	TABULATED				REMARKS	MAGNETIC TAPE				
			HOURLY DATA		DAILY DATA			TAPE DECK 280 HOURLY DATA		TAPE DECK 480 DAILY DATA		
STATION NUMBER	STATION LOCATION		BEGIN	END	BEGIN	END		BEGIN	END	BEGIN	END	NOTE
IDAHO												
24131	BOISE	CIR.			8/49 4/73	7/52 7/76	CIR. 8/49 - 7/76			7/52	TO DATE	
X9294	TWIN FALLS	ROLL	1/30	9/50			ROLL 1/42 - 9/50			7/52	8/52	
ILLINOIS												
X5023	ARGONNE NAT. LAB.	ROLL	9/23	4/76			ROLL 1/42 - 12/42			1/57	TO DATE	
INDIANA												
93819	INDIANAPOLIS	CIR.			11/49 4/73	12/52 11/74	CIR. 11/49 - 11/74			7/52	3/75	
IOWA												
X0201	AMES	ROLL	7/59	8/72						7/59	8/72	(A)
KANSAS												
13985	DODGE CITY	ROLL	6/49 4/73	6/52 7/76			ROLL 6/49 - 7/76	7/52	TO DATE	7/52	TO DATE	
X4972	MANHATTAN		3/57	7/76						4/57	TO DATE	
KENTUCKY												
X4741	LEXINGTON		6/67	6/76			BROKEN PERIOD OF RECORD			3/68	TO DATE	
93820	LEXINGTON				10/50 1/57	12/54 7/62				7/57	12/61	
LOUISIANA												
13941	LAKE CHARLES	ROLL	4/49 4/73	6/52 7/76			ROLL 4/49 - 7/76			7/52	10/61	
03937	LAKE CHARLES							7/52	TO DATE	11/61	TO DATE	
X8067	RUSTON		4/63	7/76						5/65	TO DATE	
X8445	SHREVEPORT		4/57	4/65						4/57	4/64	

NOTE: (A) HOURLY DATA TABULATED BUT NOT ON MAG TAPE.

STATE / STATION NUMBER	STATION LOCATION	TYPE CHART	TABULATED: HOURLY DATA BEGIN	HOURLY DATA END	DAILY DATA BEGIN	DAILY DATA END	REMARKS	MAGNETIC TAPE: TAPE DECK 280 HOURLY DATA BEGIN	TAPE DECK 280 HOURLY DATA END	TAPE DECK 480 DAILY DATA BEGIN	TAPE DECK 480 DAILY DATA END	NOTE
MAINE												
14607	CARIBOU	ROLL	4/49 4/73	7/52 7/76			ROLL 4/49 - 7/76	7/52	TO DATE	7/52	TO DATE	
14764	PORTLAND	CIR.	3/49 4/73	7/52 4/75			CIR. 3/49 - 4/75			7/52	4/75	
MARYLAND												
X8010	SALISBURY				7/73	2/76				7/73	TO DATE	
X9070	UPPER MARBORO		2/63	1/73			BROKEN PERIOD OF RECORD			8/69	1/73	
MASSACHUSETTS												
14753	BLUE HILL	ROLL	1/33 1/59	9/52 7/76				7/52	TO DATE	7/52	TO DATE	
94701	BOSTON	ROLL	1/47	11/68			ROLL 1/53 - 11/68	7/52	11/68	7/52	11/68	
X2456	EAST WAREHAM		6/42	12/56						7/52	12/56	
MICHIGAN												
X2393	EAST LANSING		12/42	5/60						1/53	5/60	
X2395	EAST LANSING		6/60	6/71						6/60	6/71	
14847	SAULT STE. MARIE	ROLL/CIR.	6/50	7/52	4/73	5/75	ROLL 7/50 - 8/58 CIR. 8/58 - 5/75	7/52	8/58	7/52	6/75	
MINNESOTA												
14926	SAINT CLOUD	CIR.			8/49 4/73	8/58 4/75	CIR. 5/49 4/75			7/54	4/75	
MISSOURI												
13983	COLUMBIA	ROLL	2/44 7/73	12/53 7/76			ROLL 1/50 - 7/76			7/52	12/70	
03945	COLUMBIA							7/52	TO DATE	1/71	TO DATE	

STATE / STATION NUMBER	STATION LOCATION	TYPE CHART	TABULATED: HOURLY DATA BEGIN	HOURLY DATA END	DAILY DATA BEGIN	DAILY DATA END	REMARKS	MAGNETIC TAPE: TAPE DECK 280 HOURLY DATA BEGIN	TAPE DECK 280 HOURLY DATA END	TAPE DECK 480 DAILY DATA BEGIN	TAPE DECK 480 DAILY DATA END	NOTE
MONTANA												
24034	GLASGOW	CIR.			1/50	12/52	CIR. 1/50 - 12/74 STATION NUMBER CHANGED 10/55 TO 94008			7/52	10/55	
94008	GLASGOW	CIR.			4/73	12/74				11/55	12/74	
24143	GREAT FALLS	ROLL	4/49	8/67	1/52 1/68	12/56 5/75	ROLL 4/49 - 4/75	7/52	8/67	7/52	5/75	(D)
NEBRASKA												
14971	LINCOLN	ROLL	7/15	12/59			ROLL 1/42 - 12/59			11/57	12/59	
14939	LINCOLN							8/52	12/59	8/52	8/55	
94918	NORTH OMAHA	ROLL	8/56	7/76				6/57	TO DATE	6/57	TO DATE	
NEVADA												
23154	ELY	ROLL	6/49	7/76				12/51	7/67	12/51	TO DATE	(D)
23169	LAS VEGAS	CIR.			3/49	7/76				7/52	TO DATE	
23185	RENO				4/73	7/76				12/65	TO DATE	
NEW JERSEY												
X7941	SEABROOK		1/50 8/56	12/53 9/57	5/49	12/59				7/52	9/57	
NEW MEXICO												
23050	ALBUQUERQUE	ROLL	10/39 8/49	1/42 7/76			ROLL 8/49 - 7/76 NIP 4/61 - 12/75	7/52	TO DATE	7/52	TO DATE	
NEW YORK												
X3177	GENEVA		1/64	7/76						1/69	TO DATE	
X4177	ITHACA		10/34	1/51	2/51	6/76				7/52	TO DATE	

NOTE: (D) HOURLY DATA DISCONTINUED IN 1967. CHARTS CAN BE WORKED.

STATE / STATION NUMBER	STATION LOCATION	TYPE CHART	TABULATED: HOURLY DATA BEGIN	HOURLY DATA END	DAILY DATA BEGIN	DAILY DATA END	REMARKS	MAGNETIC TAPE: TAPE DECK 280 HOURLY DATA BEGIN	TAPE DECK 280 HOURLY DATA END	TAPE DECK 480 DAILY DATA BEGIN	TAPE DECK 480 DAILY DATA END	NOTE
NEW YORK (CONTD)												
94706	NEW YORK, CP									7/52	12/70	
94728	NEW YORK, CP	ROLL	4/24	7/52			ROLL 1/42 - 5/75	7/52	5/75	1/71	5/75	
X7493	SAYVILLE		10/49	12/63						7/52	11/63	
X7518	SCHENECTADY				2/51	6/59				7/52	5/59	
04729	UPTON		6/49	7/57				7/52	10/52	7/52	6/57	
NORTH CAROLINA												
13745	CAPE HATTERAS	ROLL	1/49	7/52			ROLL AVAILABLE 1/49 - 7/76; STATION NUMBER CHANGE 3/57 TO 93729			7/52	2/57	
93729	CAPE HATTERAS	ROLL	7/73	7/76				7/52	TO DATE	3/57	TO DATE	
13723	GREENSBORO	CIR.			1/51 4/73	12/53 12/75	CIR. 7/49 - 12/75			7/52	12/75	
X7079	RALEIGH		4/50	6/51	1/57	5/59				1/57	5/59	
NORTH DAKOTA												
24011	BISMARCK	ROLL	6/50	7/52	4/73	7/76	ROLL 6/50 - 7/76	7/52	TO DATE	7/52	TO DATE	
OHIO												
14820	CLEVELAND	ROLL/CIR.	1/50	7/52	9/50	7/53	ROLL 6/49 - 7/53 CIR. 3/55 - 3/75	7/52	7/53	7/52	3/75	
X1788	COLUMBUS		1/51	7/58						7/52	9/57	
X6882	PUT-IN-BAY		4/42	11/52						7/52	8/53	
OKLAHOMA												
13967	OKLAHOMA CITY	CIR.			5/49 4/73	12/52 2/75	CIR. 5/49 - 2/75			7/52	2/75	
X8501	STILLWATER		4/50 1/59	12/53 12/67						7/52	12/67	

STATE / STATION NUMBER	STATION LOCATION	TYPE CHART	TABULATED					MAGNETIC TAPE				
			HOURLY DATA		DAILY DATA		REMARKS	TAPE DECK 280 HOURLY DATA		TAPE DECK 480 DAILY DATA		NOTE
			BEGIN	END	BEGIN	END		BEGIN	END	BEGIN	END	
OREGON												
94224	ASTORIA	CIR.			3/73	7/76	CIR. 1/53 - 6/76			1/53	TO DATE	
X1860	CORVALLIS				5/59	7/64				7/57	7/64	
24225	MEDFORD	ROLL	4/49	6/52	4/73	11/74	ROLL 4/49 - 11/74	12/51	8/67	12/51	12/74	(D)
PACIFIC												
60703	CANTON IS.	ROLL	12/49	9/67			BROKEN PERIOD OF RECORD	1/57	3/57	7/52	12/67	
21603	JOHNSTON IS.	ROLL	10/74	7/76				10/74	TO DATE	10/74	TO DATE	
40604	KWAJALEIN IS.	ROLL	2/74	3/75				2/74	3/75	2/74	3/75	
40710	MAJURO IS.	ROLL	12/74	7/76						11/74	TO DATE	
41606	WAKE IS.	ROLL	10/50	7/76			BROKEN PERIOD OF RECORD	11/74	TO DATE	7/52	TO DATE	(B)
PENNSYLVANIA												
X8454	STATE COLLEGE		1/41	6/76						7/52	TO DATE	
RHODE ISLAND												
X5230	NEWPORT-EPPLEY		*6/73	4/76	6/37	6/76	*PERIOD BROKEN			7/52	TO DATE	
SOUTH CAROLINA												
13880	CHARLESTON	ROLL	8/49 4/73	7/52 7/76			ROLL 8/49 - 7/76	7/52	TO DATE	7/52	TO DATE	
SOUTH DAKOTA												
X1076	BROOKINGS				12/69	3/76				1/70	TO DATE	
24090	RAPID CITY	CIR.			5/49 4/73	12/52 3/75	CIR. 5/49 - 3/75			7/52	3/75	

NOTE: (B) ADDITIONAL HOURLY DATA ON PUNCH CARDS BUT NOT ON MAG TAPE.

(D) HOURLY DATA DISCONTINUED IN 1967. CHARTS CAN BE WORKED.

STATE / STATION NUMBER	STATION LOCATION	TYPE CHART	TABULATED					MAGNETIC TAPE				
			HOURLY DATA		DAILY DATA		REMARKS	TAPE DECK 280 HOURLY DATA		TAPE DECK 480 DAILY DATA		NOTE
			BEGIN	END	BEGIN	END		BEGIN	END	BEGIN	END	
TENNESSEE												
13897	NASHVILLE	ROLL	1/42 4/73	7/52 7/76			ROLL 1/42 - 7/76	7/52	TO DATE	7/52	TO DATE	
03841	OAK RIDGE		1/49	7/76				7/52	8/52	7/52	TO DATE	(A)
TEXAS												
23041	BIG SPRING	CIR.			5/49	6/52	CIR. 6/49 - 11/53			4/53	11/53	
12919	BROWNSVILLE	ROLL	1/49 4/73	7/52 7/76			ROLL 1/49 - 7/76	7/52	TO DATE	7/52	TO DATE	
23044	EL PASO	ROLL	5/49 4/73	7/52 7/76			ROLL 5/49 - 7/76	7/52	TO DATE	7/52	TO DATE	
13961	FORT WORTH		1/49	7/52						7/52	4/53	
03927	FORT WORTH	ROLL	4/73	7/74			ROLL 1/49 - 7/74	7/52	7/74	5/53	7/74	
12962	HONDO	CIR.			2/75	7/76				2/75	TO DATE	
23023	MIDLAND	CIR.			4/73	5/75	CIR. 11/53 - 5/75			11/53	5/75	
12921	SAN ANTONIO	CIR.			3/49 4/73	12/52 11/74	CIR. 3/49 - 1/47			7/52	11/74	
13901	STEPHENVILLE	ROLL	10/74	7/76				10/74	TO DATE	10/74	TO DATE	
UTAH												
X2864	FLAMING GORGE	ROLL	6/59	7/70	6/59	7/76	CIR. 6/59 - 8/70			6/59	TO DATE	(A)
X7603	SALT LAKE CITY	ROLL	10/46	12/52						7/52	7/53	
X0302	SALT LAKE CITY		9/59	8/66						9/59	8/66	
24127	SALT LAKE CITY	ROLL			7/66	12/74	ROLL 7/66 - 2/75			7/66	2/75	(C)
VERMONT												
14742	BURLINGTON	CIR.			4/73	7/76	CIR. 7/62 - 10/65; 9/67 - 12/73 & 3/76 - 6/76			1/63	TO DATE	

NOTE: (A) HOURLY DATA TABULATED BUT NOT ON MAG TAPE.

(C) CHARTS ARE IN THE NCC BUT HOURLY DATA UNWORKED.

STATE STATION NUMBER	STATION LOCATION	TYPE CHART	TABULATED HOURLY DATA BEGIN	HOURLY DATA END	DAILY DATA BEGIN	DAILY DATA END	REMARKS	MAGNETIC TAPE TAPE DECK 280 HOURLY DATA BEGIN	TAPE DECK 280 HOURLY DATA END	TAPE DECK 480 DAILY DATA BEGIN	TAPE DECK 480 DAILY DATA END	NOTE
VIRGINIA												
X3422	GLOUCESTER PT.		1/71 3/74	10/71 12/75						1/71	TO DATE	
WASHINGTON												
24226	NORTH HEAD	CIR.			7/49	7/52	CIR. 7/49 - 1/53			7/52	1/53	
X6768	PROSSER				4/53 6/61 4/65	4/57 9/63 12/73				4/53	12/73	
X6784	PULLMAN		5/55	4/70						5/55	4/70	
X7018	RICHLAND				1/55	7/76	STATION NUMBER CHANGED TO 94140			7/65	TO DATE	
X7478	SEATTLE, U. OF WASH.				7/50 3/57	9/54 7/74				7/52	7/74	
24233	SEATTLE-TACOMA	ROLL	12/49	9/50	4/73	7/76	ROLL 12/49 - 7/76	12/51	5/67	12/51	TO DATE	(D)
24157	SPOKANE	CIR.			5/49 3/73	7/52 7/76	CIR. 5/49 - 9/52 & 9/54 - 7/76			7/52	TO DATE	
WEST INDIES												
10707	LA CHORRERA, PANAMA									3/54	11/55	
11807	SWAN IS., W.I.	ROLL	3/49	12/75			BROKEN PERIOD OF RECORD	11/74	TO DATE	7/52	TO DATE	(B)
WISCONSIN												
14837	MADISON	ROLL	4/11 4/73	7/52 7/56			ROLL 1/40 - 10/40; 7/43 - 5/44 & 1/51 - 7/76	7/52	TO DATE	7/52	TO DATE	
WYOMING												
24021	LANDER	CIR.			7/49 4/73	7/52 5/75	CIR. 7/49 - 5/75			7/52	5/75	

NOTE: (B) ADDITIONAL HOURLY DATA ON PUNCH CARDS BUT NOT ON MAG TAPE.

(D) HOURLY DATA DISCONTINUED IN 1967. CHARTS CAN BE WORKED.

STATE / STATION NUMBER	STATION LOCATION	TYPE CHART	TABULATED HOURLY DATA BEGIN	TABULATED HOURLY DATA END	TABULATED DAILY DATA BEGIN	TABULATED DAILY DATA END	REMARKS	MAGNETIC TAPE TAPE DECK 280 HOURLY DATA BEGIN	MAGNETIC TAPE TAPE DECK 280 HOURLY DATA END	MAGNETIC TAPE TAPE DECK 480 DAILY DATA BEGIN	MAGNETIC TAPE TAPE DECK 480 DAILY DATA END	NOTE
WYOMING (CONTD)												
X5410	LARAMIE		5/59	6/69	7/69	5/76				12/57	TO DATE	
FOREIGN												
X3020	AKLAVIK, NWT CANADA		4/52 9/56	3/52 12/59	5/49	12/53				7/52	12/59	
X3114	DARTMOUTH-HALIFAX, NS, CAN.		5/57	12/59						12/57	12/59	
X3168	EDMONTON, ALBT. CAN.		4/52 9/56	4/53 12/59	5/49	12/53				7/52	12/59	
X3500	MOOSONEE, ONT. CANADA		7/57	12/59						7/57	12/59	
X3520	NANAIMO, BC, CANADA		1/59	12/59						1/59	12/59	
X3542	NORMANDIN, QUEBEC, CAN.		11/57	12/59						11/57	12/59	
X3632	OTTAWA, ONT. CANADA		4/52 9/56	4/53 12/59	6/49	12/54				7/52	12/59	
X3684	RESOLUIE, NWT, CANADA	ROLL	1/50 7/57	2/51 11/59			ROLL 4/49 - 9/57			7/57	11/59	
X3700	SCARBORO, ONT. CANADA		9/59	12/59						9/59	12/59	
X3752	SUFFIELD, ALBT, CANADA		1/59	12/59						1/59	12/59	
X3864	TORONTO, ONT. CANADA		9/45 1/50 9/56	12/46 12/53 12/59	9/45	12/53				5/54	12/59	
X3932	VANCOUVER, BC, CANADA		1/59	12/59						1/59	12/59	
X3966	WINNIPEG, MAN. CANADA		4/49 9/56	4/50 12/59	5/49	12/53				7/52	12/59	
X4424	KEFLAVIK, ICELAND	ROLL	10/50	7/53			ROLL 10/50 - 9/51			7/52	9/52	

APPENDIX B

SOLAR RADIATION OBSERVING STATIONS

WITH DATA NOT ARCHIVED AT THE

NATIONAL CLIMATIC CENTER, ASHEVILLE, NORTH CAROLINA

STATE	STATION LOCATION	EQUIPMENT TYPE, MFG. MODEL	RECORD FORM	PERIOD OF RECORD
ALABAMA				
		UNIVERSITIES		
	AUBURN AGRICULTURE EXPERIMENT STATION AUBURN	PYRANOMETER, EPPLEY	TABULATED	1964-PRESENT
		PRIVATE		
	LOCKHEED-HUNTSVILLE HUNTSVILLE	PYRHELIOMETER, HYCAL	STRIP CHARTS	10/75-PRESENT
		TENNESSEE VALLEY AUTHORITY		
	NATIONAL FERTILIZER DEVELOPMENT CENTER MUSCLE SHOALS	PYRANOMETER, EPPLEY 8-48	TAPE & PRINTOUT	1968-PRESENT
	BROWNS FERRY NUCLEAR PLANT DECATUR	PYRANOMETER, EPPLEY 8-48; RADIOMETER	TAPE & PRINTOUT	1967-PRESENT
	COLBERT STEAM PLANT TUSCUMBIA	PYRANOMETER, EPPLEY 8-48; RADIOMETER	TAPE & PRINTOUT	12/75-PRESENT
	WIDOWS CREEK STEAM PLANT STEVENSON	PYRANOMETER, EPPLEY 8-48;	TAPE & PRINTOUT	11/75-PRESENT
		U. S. ARMY		
	U. S. ARMY MISSILE COMMAND REDSTONE ARSENAL	PYRANOMETER, EPPLEY PSP (PYRHELIOMETER/HORIZONTAL SURFACE)	STRIP CHART (2INCHES PER HOUR)	2/76-PRESENT
ALASKA				
		OTHER		
	SMITHSONIAN RADIATION LABORATORY BARROW	PYRANOMETER, EPPLEY PSP HORIZONTALLY & AT VARIOUS ANGLES	SPECTRAL PUBLISHED	1968-9/75
ARIZONA				
		UNIVERSITIES		
	NORTHERN ARIZONA UNIVERSITY FLAGSTAFF	PYRANOMETER, INTERNATIONAL SCIENTIFIC INDUSTRIES	STRIP CHART	1974-1975

APPENDIX B

(CONTINUED)

STATE	STATION LOCATION	EQUIPMENT TYPE, MFG. MODEL	RECORD FORM	PERIOD OF RECORD
ARIZONA (CONTD)				
		PRIVATE		
	DESERT SUNSHINE EXPOSURE TESTS, INC. PHOENIX	PYRANOMETER, EPPLEY PSP & 50, SPECTROLAB-SR-75		1969-PRESENT
		PYRHELIOMETERS, EPPLEY NIP	STRIP CHART, DIGITAL RECORD & TABULATED	
	(DATA: DAILY SOLAR RADIATION IN LANGLEYS, TEMPERATURE, HUMIDITY, HOURS OF SUNSHINE, SEVERAL TYPES OF EXPOSURE. PERIOD OF RECORD; ABOUT 1970 TO PRESENT. PUBLISHED MONTHLY.)			
	MOTOROLA CORP. PHOENIX	PYRANOMETER PYRHELIOMETER	CASSETTE DISK	10/74-PRESENT
	GM PROVING GROUND	EPPLEY		1966-1974
		DEPARTMENT OF INTERIOR		
	LAKE MOJAVE	EPPLEY		1959-1961
		U. S. FOREST SERVICE		
	CASTLE CREEK			1966-1974
	SEVEN SPRINGS			1966-1974
		U. S. ARMY		
	YUMA	EPPLEY		1961-1974
	FORT HUACHUCA			1966-1974
CALIFORNIA				
		UNIVERSITIES		
	● LAWRENCE BERKELEY LABS BERKELEY	PYRANOMETER, EPPLEY PSP; PYRHELIOMETER, RADIOMETRICS CIRCUMSOLAR TELESCOPE, LAWRENCE BERKELEY	DIGITAL MAG TAPE	6/75-PRESENT (INTERMITTANT)
	● LAWRENCE BERKELEY LABS CHINA LAKE	(SAME TYPE EQUIPMENT AS BERKELEY)	DIGITAL MAG TAPE	7/76-PRESENT
	JET PROPULSION LABORATORY PASADENA	PYRANOMETERS, SPECTROLAB SR-75; KENDALL RADIOMETER SYSTEM MARK 3, JET PROPULSION LAB	MAG TAPE	6/74-PRESENT
	● LAWRENCE LIVERMORE LABORATORY LIVERMORE	PYRANOMETER, EPPLEY 8-48	STRIP CHART TABULATED	1/74-PRESENT
	● ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION CENTER			

APPENDIX B

(CONTINUED)

STATE	STATION LOCATION	EQUIPMENT TYPE, MFG. MODEL	RECORD FORM	PERIOD OF RECORD
CALIFORNIA (CONTD)				
	THORNTON	PYRANOGRAPH		1963-1968
	UPPER LAKE	PYRANOGRAPH		1970-1972
	WILLOWS	PYRANOGRAPH		1958-1967
		BAY AREA AIR POLLUTION DISTRICT		
	FREMONT	PYRANOGRAPH		1971-1971
	LIVERMORE	PYRANOGRAPH		1970-1970
	OAKLAND	PYRANOGRAPH		1970-1971
	PITTSBURG	PYRANOGRAPH		1970-1973
	REDWOOD CITY	PYRANOGRAPH		1970-1973
	RICHMOND	PYRANOGRAPH		1970-1973
	SAN JOSE	PYRANOGRAPH		1970-1972
		U. S. GOVERNMENT		
		DEPARTMENT OF AGRICULTURE		
	BRAWLEY	EPPLEY		1962-1972
	LOMPOC	EPPLEY		1950
		U. S. BUREAU OF RECLAMATION		
	COACHELLA	PYRANOGRAPH		1967-1973
		DEPARTMENT OF INTERIOR		
	BARRETT RESERVATION	EPPLEY		1959-1961
	SALTON SEA	EPPLEY		1967-1968
	SANDY BEACH	EPPLEY		1961-1962
	SAN VICENTE	EPPLEY		1957-1959
	CHALLENGE (U. S. FOREST SERVICE)	EPPLEY		
		DEPARTMENT OF DEFENSE		
		U. S. ARMY		
	HIGH POINT			1972
	JOLON			1969
	SODA SPRINGS SNO LAB	EPPLEY		1946
		U. S. NAVY		
	POINT MUGU	EPPLEY		

APPENDIX B

(CONTINUED)

STATE	STATION LOCATION	EQUIPMENT TYPE, MFG. MODEL	RECORD FORM	PERIOD OF RECORD
CALIFORNIA (CONTD)				
	UNIVERSITY OF CALIFORNIA DAVIS STATION AT COON CREEK			1961-1966
	UNIVERSITY OF CALIFORNIA EXTENTION SERVICE BLYTHE	(DATA UNAVAILABLE FOR THIS REPORT)		
	SAN DIEGO STATE UNIV. SAN DIEGO	PYRANOMETER, EPPLEY 8-48	STRIP CHART	3/74-PRESENT
	SCRIPPS INSTITUTE OF OCEANOGRAPHY LA JOLLA	EPPLEY		1928-1950
	HOPKINS MARINE STATION PACIFIC GROVE	PYRHELIOMETER		11/70-PRESENT
		STATE & METROPOLITAN		
	METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA LOS ANGELES	PYRANOMETER, WEATHERMEASURE CORP. R413 STAR (72 JUNCTION)	STRIP CHART	9/75-PRESENT
		CALIFORNIA DEPT. OF WATER RESOURCES		
	ALTURAS	PYRANOGRAPH		1958-1964
	ARVIN FRICK	PYRANOGRAPH		1959-1965
	BAKERSFIELD	PYRANOGRAPH		1969-1970
	BERENDA	PYRANOGRAPH		1962-1963
	BUTTONWILLOW	PYRANOGRAPH		1965-1966
	COVELO	PYRANOGRAPH		1966-1969
	CUMMINGS VALLEY	PYRANOGRAPH		1965-1972
	FINLEY	PYRANOGRAPH		1972-1973
	GERBER	PYRANOGRAPH		1973
	GLENBURN	PYRANOGRAPH		1963-1966
	GUADALUPE	PYRANOGRAPH		1961-1964
	KERMAN	PYRANOGRAPH		1964-1964
	LOS BANOS EQUIP. YARD	PYRANOGRAPH		1959-1962
	MAZE BRIDGE	PYRANOGRAPH		1962-1965
	MCARTHUR	PYRANOGRAPH		1958-1958
	NEWVILLE	PYRANOGRAPH		1966-1970
	OLD RIVER	PYRANOGRAPH		1965-1967
	RED BLUFF	PYRANOGRAPH		1967-1969
	REDDING	PYRANOGRAPH		1958-1958
	RUTH RES	PYRANOGRAPH		1967-1967
	SAN LUIS OBISPO	PYRANOGRAPH		1969
	SOLEDAD	PYRANOGRAPH		1953
	STOCKTON	PYRANOGRAPH		1960-1961

APPENDIX B

(CONTINUED)

STATE	STATION LOCATION	EQUIPMENT TYPE, MFG. MODEL	RECORD FORM	PERIOD OF RECORD
COLORADO				
		UNIVERSITIES		
	UNITED STATES AIR FORCE ACADEMY	PYRANOMETER, EPPLEY		11/75-PRESENT
		PRIVATE		
	KAMAN SCIENCES CORP. COLORADO SPRINGS	PYRANOMETER, EPPLEY PSP	TABULATED	2/75-6/75 11/75-12/75
DELAWARE				
		UNIVERSITIES		
	UNIVERSITY OF DELAWARE NEWARK	PYRANOMETER, EPPLEY 8-48 TILT	TABULATED HOURLY	1/74-PRESENT
		PYRANOMETER, EPPLEY 8-48 HORIZONTAL		11/74-PRESENT
FLORIDA				
		UNIVERSITIES		
	UNIVERSITY OF FLORIDA GAINESVILLE	PYRANOMETER, EPPLEY 8-48	STRIP CHART	1954-PRESENT
		PYRANOMETER, EPPLEY 10-JUNCTION	STRIP CHART	1954-PRESENT
	FLORIDA SOLAR ENERGY CENTER CAPE CANAVERAL	PYRANOMETER, EPPLEY PSP; PYRHELIOMETER, EPPLEY NIP	STRIP CHART, CASSETTE TAPE, TABULATED COMPUTER PRINTOUTS	BEGIN OPERATION 7/76
		DEPARTMENT OF AGRICULTURE		
	UNIVERSITY OF FLORIDA EXPERIMENT STATION QUINCY		DAILY	1964-PRESENT
		NATIONAL AERONAUTICS & SPACE ADMINISTRATION		
	J. F. KENNEDY SPACE CENTER LAUNCH COMPLEX 39B	MKIII YELLOTT, EQUATORIAL MOUNT	STRIP CHART ON MICROFILM	6/66-PRESENT
		MK-I-G YELLOTT	STRIP CHART ON MICROFILM	6/66-PRESENT
	J. F. KENNEDY SPACE CENTER LAUNCH COMPLEX 39A	MKIII YELLOTT, EQUATORIAL MOUNT	STRIP CHART ON MICROFILM	6/66-PRESENT
		MK-I-G YELLOTT	STRIP CHART ON MICROFILM	1966-PRESENT

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(CONTINUED)

STATE	STATION LOCATION	EQUIPMENT TYPE, MFG. MODEL	RECORD FORM	PERIOD OF RECORD
FLORIDA (CONTD)				
	J. F. KENNEDY SPACE CENTER RURAL STATION	PYRANOMETER, EPPLEY	STRIP CHART	1965-PRESENT
ILLINOIS				
		UNIVERSITIES		
	WESTERN ILLINOIS UNIVERSITY MACOMB		HOURLY DATA RECORD ON 7-DAY CHARTS	1/73-PRESENT
		OTHER		
	ILLINOIS STATE WATER SURVEY URBANA	PYRANOGRAPH, WEATHERMEASURE R401	UNANALYZED STRIP CHARTS	1966-PRESENT
	● ARGONNE NATIONAL LAB LEMONT	PYRANOMETERS, EPPLEY 8-48 OCCULTING DISK ON EQUATORIAL MOUNT, DIFFUSE AND TOTAL	STRIP CHART AND PRINTOUTS	6/75-PRESENT
INDIANA				
		UNIVERSITIES		
	PURDUE UNIVERSITY WEST LAFAYETTE	PYRANOMETER, EPPLEY PSP	HOURLY ON COMPUTER & HARD COPY	1968-PRESENT
KENTUCKY				
		TENNESSEE VALLEY AUTHORITY		
	PARADISE STEAM PLANT DRAKESBORO	PYRANOMETER, EPPLEY 8-48, RADIOMETER	TAPE & PRINTOUT	1967-PRESENT
	SHAWNEE STEAM PLANT PADUCAH	PYRANOMETER, EPPLEY 8-48, RADIOMETER	TAPE & PRINTOUT	LATE 1975-PRESENT
MARYLAND				
		UNIVERSITIES		
	UNIVERSITY OF MARYLAND COLLEGE PARK	PYRANOMETER, EPPLEY 50-JUNCTION	ANALOGUE RECORDS HOURLY TABULATIONS, EXCEPT 2/74-4/75	2/69-PRESENT

● ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION CENTER

APPENDIX B

(CONTINUED)

STATE	STATION LOCATION	EQUIPMENT TYPE, MFG. MODEL	RECORD FORM	PERIOD OF RECORD
MARYLAND (CONTD)				
		NATIONAL AERONAUTICS & SPACE ADMINISTRATION		
	GODDARD SPACE FLIGHT CENTER GREENBELT	PYRHELIOMETER, EPPLEY NIP; PYRANOMETERS, EPPLEY PSP & 8-48	TAPE & PRINTOUT	2/75-PRESENT
		OTHER		
	SMITHSONIAN RADIATION BIOLOGY LABORATORY ROCKVILLE	PYRANOMETERS, EPPLEY PSP	SPECTRAL PUBLISHED	1968-1975
MASSACHUSETTS				
		OTHER		
	GROVER CLEVELAND SCHOOL BOSTON	PYRANOMETER, EPPLEY 8-48	PRINTED TAPE	5/74-5/75
MICHIGAN				
		UNIVERSITIES		
	UNIVERSITY OF MICHIGAN ANN ARBOR	PYRANOMETER CHARTS		1962-PRESENT
	UNIVERSITY OF MICHIGAN 4 STATIONS IN WESTERN MICHIGAN	PYRANOMETERS	HOURLY ON MAGNETIC TAPE IN FUTURE	10/72-PRESENT
		PRIVATE		
	SMITH, HINCHMAN & GRYLLS ASSOCIATES, INC. DETROIT	2 PYRANOMETER, EPPLEY PSP; PYRHELIOMETER, EPPLEY	EVERY 15 MINUTES TAPE	1975-PRESENT
MINNESOTA				
		UNIVERSITIES		
	UNIVERSITY OF MINNESOTA ST. PAUL	PYRANOMETER, EPPLEY; KIPP & ZONEN	CIR. CHARTS	1965-PRESENT

APPENDIX B

(CONTINUED)

STATE	STATION LOCATION	EQUIPMENT TYPE, MFG. MODEL	RECORD FORM	PERIOD OF RECORD
MISSOURI		ENVIRONMENTAL PROTECTION AGENCY		
	ENVIRONMENTAL PROTECTION AGENCY ST. LOUIS	PYRANOMETERS, EPPLEY PYRGEOMETERS, EPPLEY PYRHELIOMETERS, EPPLEY	MAG TAPE	7/72-PRESENT
NEBRASKA		PRIVATE		
	LAMBDA INSTRUMENTS CORPORATION LINCOLN	PYRANOMETER, EPPLEY 10-JUNCTION & L2-500		4/75-5/75
NEVADA		UNIVERSITIES		
	DESERT RESEARCH INSTITUTE UNIVERSITY OF NEVADA BOULDER CITY	PYRANOMETER, EPPLEY PSP; PYRHELIOMETER, EPPLEY NIP	CHARTS & DIGITAL	2/74-PRESENT 12/74-PRESENT
	DESERT RESEARCH INSTITUTE UNIVERSITY OF NEVADA RENO	PYRANOMETER, EPPLEY PSP; PYRHELIOMETER, EPPLEY NIP	CHARTS & DIGITAL	4/74-PRESENT
	UNIVERSITY OF NEVADA RENO	PYRANOGRAPH R401	CHARTS	2/72-PRESENT
		DEPARTMENT OF INTERIOR		
	LAKE MEAD	EPPLEY		1952-1953
NEW JERSEY		UNIVERSITIES		
	● COOK COLLEGE RUTGERS UNIVERSITY NEW BRUNSWICK	PYRANOMETER, EPPLEY 645-48	STRIP CHART	10/47-1972 SPOTTY DURING 1961, 1962, AND 1972. RETURN TO OPERATION LATE 1976
NEW MEXICO		OTHER		
	● SANDIA LAB ALBUQUERQUE	PYRANOMETERS, EPPLEY PSP; HORIZONTAL AND TRACKING PYRHELIOMETERS, EPPLEY, NIP	MAG TAPE	7/76-PRESENT (IRREGULAR DATA SINCE 1973)
		UNIVERSITIES		
	● SOLAR ENERGY GROUP, LASL LOS ALAMOS	PYRANOMETERS, EPPLEY 8-48 AT 45 AND 60 DEGREES	MAG TAPE	1974-PRESENT
	● LAWRENCE BERKELEY LABS ALBUQUERQUE	PYRANOMETER, EPPLEY PSP; PYRHELIOMETER, RADIOMETRICS CIRCUMSOLAR TELESCOPE, LAWRENCE BERKELEY	DIGITAL MAG TAPE	5/76-PRESENT
	● ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION CENTER			

APPENDIX B

(CONTINUED)

STATE	STATION LOCATION	EQUIPMENT TYPE, MFG. MODEL	RECORD FORM	PERIOD OF RECORD
NEW YORK				
		UNIVERSITIES		
	SUNY COLLEGE OF ENVIRONMENTAL SCIENCE AND FORESTRY SYRACUSE	PYRANOMETER, MATRIX INC. MARK I-G; POTENTIOMETER, LEEDS & NORTHRUP 8690-2	DATA SHEETS	SUMMER OF 1973 SPECIAL TESTS NEAR WOODED AREA
	CORNELL UNIVERSITY AURORA	PYRANOMETER, EPPLEY 10	DAILY	1/70-12/73
	CORNELL UNIVERSITY CANTON	PYRANOMETER, EPPLEY 10	DAILY	1/70-12/73
	CORNELL UNIVERSITY ITHACA	PYRANOMETER, EPPLEY 10	DAILY-SOME PERIODS MISSING	1/35-4/74
	STATE UNIVERSITY OF NEW YORK AT ALBANY ATMOSPHERIC SCIENCES RESEARCH CENTER LAKE GEORGE	PYRANOMETER, EPPLEY 50-JUNCTION	DAILY	7/71-12/74
	STATE UNIVERSITY OF NEW YORK AT ALBANY ATMOSPHERIC SCIENCES RESEARCH CENTER WHITEFACE MT.	PYRANOMETER KIPP & ZONEN CM-2-63	DAILY	1/72-12/73
	STATE UNIVERSITY OF NEW YORK AT ALBANY ATMOSPHERIC SCIENCES RESEARCH CENTER ALBANY	PYRANOMETER KIPP & ZONEN CM-5	HOURLY AND DAILY TOTALS	3/73-12/74
		OTHER		
	E. S. DEPARTMENT SUC BROCKPORT BROCKPORT	PYRANOMETER EPPLEY 8-48	DAILY	1/70-12/73
	DEPARTMENT OF VEGETABLE CROPS GENEVA RESEARCH FARM GENEVA	PYRANOMETER, EPPLEY MODEL 2	DAILY	1/72-3/74
	NEW YORK OCEAN SCIENCE LABORATORY FORT POND BAY, MONTAUK	PYRANOMETER, EPPLEY 8-48	CHARTS	6/72-PRESENT
	GRUMMAN AEROSPACE CORPORATION BETHPAGE	PYRANOMETER, EPPLEY 8-48	STRIP CHARTS	1974 & 1975 ONLY DURING TESTS
●	BROOKHAVEN NAT. LAB UPTON	PYRANOMETER, EPPLEY 50-JUNCTION	STRIP CHARTS	1950-1958
		PYRANOMETER, EPPLEY 8-48A	STRIP CHART, TABULATIONS	1968-PRESENT
		DEPARTMENT OF ENVIRONMENTAL CONSERVATION		
	EISENHOWER PARK IKE PARK	PYRANOMETER, EPPLEY 8-48	DAILY	1/73-12/73
	FONDA	PYRANOMETER, EPPLEY 8-48	DAILY	1/73-12/73
	MAMARONECK	PYRANOMETER, EPPLEY 8-48	DAILY	1/73-12/73
	SCHENECTADY	PYRANOMETER, EPPLEY 8-48	DAILY	1/73-12/73
	WELFARE ISLAND	PYRANOMETER, EPPLEY 8-48	DAILY	1/73-12/73

● ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION CENTER

APPENDIX B

(CONTINUED)

STATE	STATION LOCATION	EQUIPMENT TYPE, MFG. MODEL	RECORD FORM	PERIOD OF RECORD
NORTH CAROLINA				
		PRIVATE		
	CAROLINA POWER & LIGHT COMPANY SOUTHPORT	PYRANOMETER, EPPLEY 8-48	TAPE	1/75-PRESENT
	CAROLINA POWER & LIGHT COMPANY APEX	PYRANOMETER, EPPLEY 8-48	TAPE	4/73-PRESENT
	NC/STRC RESEARCH TRIANGLE PARK	PYRANOMETER PYRHELIOMETER	STRIP CHART	1974
		ENVIRONMENTAL PROTECTION AGENCY		
	ENVIRONMENTAL SCIENCES RESEARCH LABORATORY EPA RESEARCH TRIANGLE PARK	PYRANOMETERS, EPPLEY PSP (16 EA.)	TAPE	7/72-PRESENT
		PYRGEOMETERS, EPPLEY (4 EA.)	TAPE	(SUMMER 1975 & 1976 MAJOR EFFORT)
		PYRHELIOMETERS, EPPLEY (4 EA.)	TAPE	
OHIO				
		DEPARTMENT OF AGRICULTURE		
	USDA-ARS-MCR COSHOCTON	PYRANOMETER, EPPLEY	CHART & HOURLY DATA	1/72-PRESENT
		NATIONAL OCEANIC & ATMOSPHERIC ADMINISTRATION		
	NATIONAL RADIATION LABORATORY, ERL CINCINNATI	PYRANOMETERS, EPPLEY UV	STRIP CHART TABULATED	1/68-2/68 7/68-6/69 BROKEN RECORD
	NATIONAL RADIATION LABORATORY, ERL FAYETTEVILLE	PYRANOMETER, EPPLEY UV	STRIP CHART TABULATED	7/68-6/69 BROKEN RECORD
PENNSYLVANIA				
		OTHER		
	LEHIGH UNIVERSITY BETHLEHEM	PYRANOMETER, EPPLEY 8-48	MAG TAPE	9/75-PRESENT

APPENDIX B

(CONTINUED)

STATE	STATION LOCATION	EQUIPMENT TYPE, MFG. MODEL	RECORD FORM	PERIOD OF RECORD
SOUTH CAROLINA				
		PRIVATE		
	CAROLINA POWER & LIGHT COMPANY HARTSVILLE	PYRANOMETER, EPPLEY 8-48	COMPUTER TAPE	5/75-PRESENT
		DEPARTMENT OF AGRICULTURE		
	CLEMSON UNIVERSITY AGRICULTURE STATION CLEMSON	PYRANOGRAPH, BELFORT	DAILY RECORD PUBLISHED THROUGH 1974	1964-PRESENT
	CLEMSON UNIVERSITY EDISTO AGRICULTURAL EXPERIMENTAL STATION BLACKVILLE	PYRANOGRAPH, BELFORT	DAILY RECORD	1968-PRESENT
	CLEMSON UNIVERSITY SAND HILL AGRICULTURAL EXPERIMENTAL STATION PONTIAC	PYRANOGRAPH, BELFORT	DAILY RECORD PUBLISHED THROUGH 1974	1965-PRESENT
		OTHER		
	● SAVANNAH RIVER LABORATORY AIKEN	PYRANOMETER, EPPLEY 8-48	STRIP CHARTS	8/74-PRESENT (APPROX.)
TENNESSEE				
		PRIVATE		
	ASG INDUSTRIES, INC. KINGSPORT	ASG INDUSTRIES, INC.	CHARTS	5/75-2/76 MONDAY THRU FRIDAY
		TENNESSEE VALLEY AUTHORITY		
	BULL RUN STEAM PLANT CLINTON	PYRANOMETER, EPPLEY 8-48; RADIOMETER	TAPE & PRINTOUT	1969-PRESENT
	CUMBERLAND STEAM PLANT CUMBERLAND CITY	PYRANOMETER, EPPLEY 8-48; RADIOMETER	TAPE & PRINTOUT	1971-PRESENT
	SEQUOYAH NUCLEAR PLANT DAISY	PYRANOMETER, EPPLEY 8-48; RADIOMETER	TAPE & PRINTOUT	1971-PRESENT
	JOHNSONVILLE STEAM PLANT NEW JOHNSONVILLE	PYRANOMETER, EPPLEY 8-48;	TAPE & PRINTOUT	12/75-PRESENT
	KINGSTON STEAM PLANT KINGSTON	PYRANOMETER, EPPLEY 8-48; RADIOMETER	TAPE & PRINTOUT	LATE 1975-PRESENT
	WATTS BAR	PYRANOMETER, EPPLEY 8-48; RADIOMETER	TAPE & PRINTOUT	1973-PRESENT
		OTHER		
	● NOAA/ATMOS.TURB. & DIFFUSION LAB OAK RIDGE	SOLARIMETERS, LITRONIC LIMITED	MAG TAPE	10/71-11/73 (INTERMITTENT)
		PYRANOMETER, EPPLEY	STRIP CHART	1953-PRESENT
		PYRANOMETER, PYRHELIOMETER RADIOMETER, UV PHOTOMETER	MAG TAPE	TO BEGIN 1/77

● ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION CENTER

APPENDIX B

(CONTINUED)

STATE	STATION LOCATION	EQUIPMENT TYPE, MFG. MODEL	RECORD FORM	PERIOD OF RECORD
TEXAS				
		UNIVERSITIES		
	ENVIRONMENTAL STUDIES SERVICE CENTER COLLEGE STATION	PYRANOMETER, EPPLEY	HOURLY TOTALS	12/66-PRESENT NOT CONTINUOUS
	● LAWRENCE BERKELEY LABS FT. HOOD	PYRANOMETER, EPPLEY PSP; PYRHELIOMETER, RADIOMETRICS CIRCUMSOLAR TELESCOPE, LAWRENCE BERKELEY	DIGITAL MAG TAPE	7/76-PRESENT
UTAH				
		UNIVERSITIES		
	UTAH STATE UNIVERSITY LOGAN	PYRANOMETER, KIPP & ZONEN CM-3	STRIP CHART	6/68-PRESENT
VIRGINIA				
		PRIVATE		
	INTERTECHNOLOGY CORP. WARRENTON	PYRANOMETERS, HY-CAL, P8495-A DIFFERENT ANGLES	CHARTS & TAPE	2/75-PRESENT CONTRACT ENDS 5/31/76
		NATIONAL AERONAUTICS & SPACE ADMINISTRATION		
	WALLOPS FLIGHT CENTER WALLOPS ISLAND			
	LANGLEY RESEARCH CENTER HAMPTON	PYRANOMETER, WEATHERMEASURE CORP., R413	STRIP CHART	1/74-10/75
WASHINGTON				
		UNIVERSITIES		
	WASHINGTON STATE UNIVERSITY LIND	PYRANOMETER	DAILY TOTALS & MONTHLY SUMMARY SHEETS	1974-PRESENT
	WASHINGTON STATE UNIVERSITY PULLMAN	PYRANOMETER	DAILY TOTALS & MONTHLY SUMMARIES	1974-PRESENT
		OTHER		
	● BATTELLE, PACIFIC NORTHWEST LABORATORIES RICHLAND	PYRANOMETER, EPPLEY 10-JUNCTION	STRIP CHART, TABULATED HOURLY	1953-PRESENT

● ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION CENTER

STATE	STATION LOCATION	EQUIPMENT TYPE, MFG. MODEL	RECORD FORM	PERIOD OF RECORD
WISCONSIN				
		UNIVERSITIES		
	SOLAR ENERGY LABORATORY UNIVERSITY OF WISCONSIN MADISON		COMPILED DATA FROM VARIOUS SOURCES	
WASHINGTON DC				
	SMITHSONIAN RADIATION LABORATORY WASHINGTON DC	PYRANOMETER, EPPLEY PSP	SPECTRAL PUBLISHED	9/68-11/72
		FOREIGN		
PANAMA CANAL ZONE				
	SMITHSONIAN RADIATION LABORATORY BALBOA	PYRANOMETER, EPPLEY PSP	SPECTRAL PUBLISHED	3/73-12/75
		NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION		
		AIR RESOURCES LABORATORY		
ALASKA				
	POINT BARROW	PYRANOMETERS, GLOBAL AND SPECTRAL, EPPLEY, MOD II	STRIP CHART & MAG TAPE	SUMMER 1974-PRESENT
ANTARTICA				
	SOUTH POLE	PYRANOMETERS, EPPLEY, MOD II PYRHELIOMETER, EPPLEY, NIP	STRIP CHART & MAG TAPE	SUMMER/1974-PRESENT
HAWAII				
	MAUNA LOA	PYRANOMETERS, EPPLEY, MOD II PYRHELIOMETER, EPPLEY, NIP	STRIP CHART & MAG TAPE	1958-PRESENT
SAMOA				
	(LAT. S 14^{0} 15.1' LONG. W 170^{0} 33.7')	PYRANOMETERS, EPPLEY, MOD II GLOBAL AND SPECTRAL	STRIP CHART & MAG TAPE	2/76-PRESENT

ADDENDUM TO APPENDIX B

STATE	STATION LOCATION	EQUIPMENT TYPE, MFG. MODEL	RECORD FORM	PERIOD OF RECORD
CALIFORNIA				
	SAN FRANCISCO STATE UNIVERSITY PALO ALTO	PYRANOMETER, KAHL INSTRUMENTS	STRIP CHART	11/74 - PRESENT
	SOURCE: CATHERINE M. M. FELTON METEOROLOGY - CIIS SAN FRANCISCO STATE UNIVERSITY 1600 HOLLOWAY AVE. SAN FRANCISCO, CALIFORNIA 94132			
COLORADO				
	ROCKWELL INTERNATIONAL GOLDEN	RADIOMETER, EPPLEY I RADIOMETER, EPPLEY II PRECISION	10-MIN. INSTANTANEOUS	4/75 - PRESENT
NEW MEXICO				
	20 MILES S.W. FARMINGTON	PYRANOMETER MATRIX, INC.	10-MIN. INSTANTANEOUS IN LANGLEYS IN DIGITAL FORM FROM ORIGINAL MAG TAPES	6/73 - PRESENT
	10 MILES W. FARMINGTON	PYRANOMETER MATRIX, INC.	10- MIN. INSTANTANEOUS IN LANGLEYS IN DIGITAL FORM FROM ORIGINAL MAG TAPES	3/75 - PRESENT
WYOMING				
	ROCK SPRINGS	PYRANOMETER MATRIX, INC.	10-MIN. INSTANTANEOUS IN LANGLEYS IN DIGITAL FORM FROM ORIGINAL MAG TAPES	8/71-PRESENT

SOURCE FOR FOUR STATIONS ABOVE:

LOREN W. CROW
2422 SOUTH DOWNING STREET
DENVER, COLORADO 80210

APPENDIX C

METHODOLOGY USED TO SCREEN SOLAR RADIATION SITES FOR DATA TO AUGMENT THE HISTORICAL DATA AT NCC

1. A meeting between ERDA, NOAA and UAH representatives was held at the University of Alabama in Huntsville 19-23 July 1976. One of the studies of this working group selected additional solar radiation sites whose data may be a valuable adjunct to the presently archived data. Figure 4 in this report shows the stations selected as a result of this screening. The methodology used to select these stations included:

   - Examination of the locations from which data are currently archived.
   - Consideration of the new 35 station NOAA network.
   - Overlays of climatic maps to identify climatic regions which were not well represented by archived data and planned locations.
   - Detailed examination of the UAH list of stations with data not currently archived. This included examining the type of equipment used and length of record and reaching a preliminary decision that the data was acceptable for a reasonable confidence level.
   - Considering the locations where the users were most likely to need the data.
   - Weighing all of the preceding factors and selecting the most promising locations.

2. It was agreed that the data from the stations selected would require additional screening, and the following guidelines would be used in this screening:

   - Select a representative sample of the data.
   - Determine its quality for computer reduction to hourly or daily data.
   - Perform quality control of the data by comparing representative records with computed solar noon radiation data.
   - Arrive at a confidence factor for the data.

3. The data which met all of the preceding requirements at an acceptable confidence level would be prepared in standard NOAA formats for storage and retrieval for use in solar energy projects.

APPENDIX D

QUESTIONNAIRE TO IDENTIFY SOLAR RADIATION DATA

If you have Solar Radiation Data, please complete this form and mail to:

The University of Alabama in Huntsville (UAH)
Center for Environmental and Energy Studies
P. O. Box 1247
Huntsville, Alabama 35807
Attn: E. A. Carter

Location where Solar Radiation was recorded: Lat.N.____° ____'
(Use separate form for each recording site) Long.W.____° ____'

Instrument Elevation, MSL____Ft. or ____Meters

Description of recording site (urban, rural, grass, rooftop, horizontal surface, etc.)

_____

_____

Period(s) of Record_____

Type of Equipment_____

Manufacturer_____ Model Number_____

Calibration Schedule for System_____

Form of Record (disc, strip chart, tabulated, units)_____

_____

Type of Data (direct, global, spectral, inclined, etc.)_____

_____

Hourly Data_____

Other Meteorological Data Available_____

Daily Data_____

Published Data_____

Copies Attached_____

Will you release copies of the data to UAH or Marshall Space Flight Center for use in the Solar Energy Projects?_____

Reporting Organization, Name of Custodian of Records_____

Mailing Address_____

_____

Telephone Number_____