LIBRARY ARCHIVE
FILE COPY

NOAA Technical Memorandum NMFS

DECEMBER 1982

REVISED UPDATE AND RETRIEVAL SYSTEM FOR THE CALCOFI OCEANOGRAPHIC DATA FILE

Lawrence E. Eber
and
Nancy Wiley

LA JOLLA N.M.F.S. SOUTH CENTER LIBRARY
file copy
SEP 05 1990

NOAA-TM-NMFS-SWFC-24

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Southwest Fisheries Center

NOAA Technical Memorandum NMFS

The National Oceanic and Atmospheric Administration (NOAA), organized in 1970, has evolved into an agency which establishes national policies an manages and conserves our oceanic, coastal, and atmospheric resources. An organizational element within NOAA, the Office of Fisheries is responsible for fisheries policy and the direction of the National Marine Fisheries Service (NMFS).

In addition to its formal publications, the NMFS uses the NOAA Technical Memorandum series to issue informal scientific and technical publications when complete formal review and editorial processing are not appropriate or feasible. Documents within this series, however, reflect sound professional work and may be referenced in the formal scientific and technical literature.

NOAA Technical Memorandum NMFS

This TM series is used for documentation and timely communication of preliminary results, imterim reports, or special purpose information; and have not received complete formal review, editorial control, or detailed editing.

DECEMBER 1982

REVISED UPDATE AND RETRIEVAL SYSTEM FOR THE CALCOFI OCEANOGRAPHIC DATA FILE

Lawrence E. Eber
Southwest Fisheries Center
National Marine Fisheries Service
La Jolla, CA 92038

and

Nancy Wiley
Southwest Fisheries Center
National Marine Fisheries Service
Tiburon, CA 94920

NOAA-TM-NMFS-SWFC-24

U.S. DEPARTMENT OF COMMERCE
Malcolm Baldrige, Secretary
National Oceanic and Atmospheric Administration
John V. Byrne, Administrator
National Marine Fisheries Service
William G. Gordon, Assistant Administrator for Fisheries

REVISED UPDATE AND RETRIEVAL SYSTEM FOR THE CALCOFI OCEANOGRAPHIC DATA FILE

L.E. Eber and Nancy Wiley

PREFACE

This report supersedes Administrative Report No. LJ-76-16 of the Southwest Fisheries Center (SWFC), entitled "A Retrieval and Display System for the CalCOFI Oceanographic Data File," by Eber and Wiley. The need for revision of that report arose from the fact that most of the retrieval options described therein are no longer available owing to substantive modifications in the retrieval software.

Certain portions of the earlier report containing background information about the CalCOFI program and procedures used in assembling the SWFC version of the oceanographic data file have been carried over to this revision.

INTRODUCTION

Oceanographic observations have been made over an extensive grid of stations in the California Current region since 1949. The grid was designed during development of a systematic sampling program to determine the major spawning areas of the Pacific sardine off the coasts of the United States and Baja California, Mexico. With the demise of the sardine, emphasis in the program was redirected toward the Northern Anchovy.

Most of the work involved in collection, processing and analysis of these observations was performed by Scripps Institution of Oceangraphy (SIO), National Marine Fisheries Service (NMFS) and California Department of Fish and Game (CF&G), (Kramer, et al. 1972).

The physical and chemical data from CalCOFI surveys have been compiled by SIO into data reports (listed in Appendix 1), which include values of temperature, salinity and oxygen tabulated at observed and at standard depths, and computed values of sigma-t, thermosteric anomaly and geopotential anomaly at standard depths. Some observations of phosphorus, nitrite, nitrate and silicon are also included. Physical and chemical data for the years 1949 through 1959 were also published in Oceanic Observations of the Pacific.[1]

These data have been used by many investigators working on problems associated with the California Current. Some of the data have been presented graphically as horizontal and vertical sections in the CalCOFI Atlas Series

[1]Oceanic Observations of the Pacific, published by SIO, is a series of annual volumes of oceanographic data collected in the Pacific Ocean and its adjacent seas.

(Anom., 1963; Wyllie, J.G., 1966; Wyllie, J.G. and R.J. Lynn, 1971; Thomas, W.H. and D.L.R. Seibert, 1974; Eber, L.E., 1977; Lynn, R.J., K.A. Bliss and L.E. Eber, 1982). There remains, however, a large amount of untapped information in the CalCOFI data resource which warrants the development of a system for convenient and economical retrieval.

REASSEMBLY OF THE CALCOFI OCEANOGRAPHIC FILE

Oceanographic data were processed initially by the Data Collection and Processing Group (DCPG) at SIO and subsequently archived at the National Oceanographic Data Center (NODC). The NODC format for oceanographic station data is a BCD card-image format extended to 120 characters. An oceanographic station is represented by a master "card" containing station identification and surface observations followed by detail "cards" containing subsurface data at observed or standard (interpolated) depths.

The Automatic Data Processing unit at SWFC obtained, from SIO, copies of CalCOFI oceanographic data on magnetic tape in the NODC format, for the period 1950-1968. The data were partitioned into 5 sections of the CalCOFI station pattern and ordered by year, month and station number within each section.

The first step taken in reassembling this file was to transfer the data to the Burroughs B6700 disk at which time the 120 character format was shortened to 90 characters, by deleting certain fields not required by SWFC. Then the file was subjected to an editing procedure in which format, sequence, syntax and identification errors were diagnosed and corrected. This process did not include an inspection of the parameter values (temperature, salinity, etc.). When the editing was completed the 5 sections were merged and the file was resorted into chronological order by cruise code.

Data retrieval from large disk or tape files in character (card-image) formats can be slow and inefficient. Consequently, a packed binary format was designed which would reduce the size of the oceanographic file by about 75%. A description of this format is given in Appendix 2. An ALGOL program, PACKOCEAN, was written and used to convert the abridged NODC format to the new packed binary format and to create a new oceanographic file containing all the cruises from 1950 through 1968.

In the next decade, issuance of fully processed oceanographic data from ongoing CalCOFI cruises began to lag. To assuage the needs of SWFC for current data, an arrangement was made with DCPG to obtain copies of the oceanographic data from completed cruises at a preliminary stage of the processing. The data were obtained in a card format used by DCPG and transferred to B6700 disk files. These data did not include the computed density parameters (sigma-t, etc.) or interpolations to standard depths. Consequently, a copy of the FORTRAN program used by DCPG to perform these computations was procured, translated into ALGOL and incorporated, along with much of PACKOCEAN, into a program named OCEANDATA/UPDATE. This program has been used to convert the DCPG card format to the SWFC packed binary format and update the CalCOFI oceanographic file with data from cruises in the period 1969 through 1978.

THE CALCOFI STATION PLAN - DATA COVERAGE

The CalCOFI station pattern is shown in Figure 1. It was based on line 80, which extends seaward off Point Conception, California in a direction 30 degrees south of west. This is approximately perpendicular to the California coastline between Point Conception and Cape Mendocino. Other principal, or cardinal, lines were laid out parallel to line 80 on either side at intervals of 120 nautical miles. The added lines were numbered using increments of 10, increasing southward and decreasing northward.

Two intermediate, or ordinal, lines were inserted between each pair of cardinal lines, at intervals of 40 nautical miles. This corresponds to a line number increment of 3.333..., which results in fractional line numbers for all ordinal lines. By convention, however, ordinal line numbers have been rounded off to end in 3's and 7's.

Stations on CalCOFI lines were established with reference to a perpendicular through line 80, intersecting at a point about 40 nautical miles off the coast. This intersection of the perpendicular with line 80 was designated station 60, as were its intersections with each of the other lines, both cardinal and ordinal. Other stations on each line were laid out initially at intervals of 40 nautical miles, numbered by increments of 10, increasing in the offshore direction. This scheme provided for insertion of intermediate stations at intervals as small as 4 nautical miles without requiring fractional increments between station numbers.

Conventional station codes were made up of a line number and a station number, separated by a decimal point. For example, 80.60 refers to station 60 on line 80. For computer processing the conventional code was modified to a six digit integer (with leading zero optional) composed of a 3 digit line number followed by a 3 digit station number. Thus, station code 80.60 would be changed to either 080060 or 80060. Station codes in the SWFC version of the CalCOFI oceanographic data file are in the modified form.

The station pattern shown in Figure 1 has been used in planning CalCOFI surveys since 1950. Coverage of the pattern by survey cruises has varied considerably over the years owing to changes in sampling strategy, availability of ship time and other factors. In general, the cruises were conducted monthly during the 1950's and quarterly during the 1960's. Since 1969, cruises have been limited to every third year.

Table 1 contains the station codes for all CalCOFI stations which were occupied on six or more cruises in the period 1950-1978. The geographical location is given for each station, along with a list of the cruises on which it was occupied.

Recent innovations in sampling strategy devised particularly for anchovy eggs involve higher spacial resolution, and require greater precision in designating station locations than was possible under the convention of rounding off line and station numbers to the nearest integer. Consequently, CalCOFI line and station numbers are presently specified to one decimal place

for purposes of laying out cruise tracks. A computer procedure derived by Eber and Hewitt (1979) has been implemented to facilitate determination of latitude and longitude of any station specified with fractional values for line and station number.

DATA RETRIEVAL FROM THE OCEANOGRAPHIC DATA FILE - CCFIHYDRO

Software for retrieval of CalCOFI data from the SWFC packed binary file provides a variety of retrieval options, referred to here as data selection modes, or run modes. Designation of these options was based both on anticipated application requirements and on the data format in the packed binary file. Each record in this file represents one CalCOFI station and consists of three parts: (1) surface data which includes time and location identification fields and wind, weather and sea state observations, (2) physical and chemical parameters at observed depths, and (3) interpolated physical and chemical parameters and computed density parameters at standard depths.

An ALGOL program, CCFIHYDRO, was designed to extract data from the packed binary file in accordance with selection criteria based on station codes, cruise codes and standard or observed depths. The output produced by this program can be in one of three forms: (1) a subfile of selected records copied intact from the packed binary source file, (2) a working file containing observed and/or interpolated values of subsurface physical and chemical parameters at selected stations and/or cruises, (3) a printout of the surface data (surface observations and identification fields) for selected stations and/or cruises.

Data selection in CCFIHYDRO is controlled by one or more sets of data selection cards containing station lists, cruise lists or depth lists which are submitted at run time. Selection modes which create subfiles are the most efficient in terms of computer time but allow only one kind of selection criteria, either stations or cruises. A subfile created by one run of CCFIHYDRO can be used as input for subsequent runs.

Working files are created under selection modes for which all three criteria--stations, cruises and depths--may be required. Data in these files are organized by cruises and contain values for six parameters: temperature, salinity, oxygen, sigma-t, thermosteric anomaly and geopotential anomaly along with CalCOFI station number, year, month, day and depth. These files are written in a simple binary format which can be readily converted to a card-image (EBCDIC) or ASCII format for transfer to tape or to another computer.

Data selection modes which involve surface data produce only printer output and are provided as a means of indexing selected segments of the oceanographic file and displaying weather and sea conditions at times when subsurface observations were taken.

CCFIHYDRO incorporates an external procedure, UNPACKV, for actual extraction and unpacking of the bit-fields which store parameter values in the packed binary file. UNPACKV is efficient, involving no conversions from one

number base to another, and provides for extraction of any parameter in the source file. It can be linked to any ALGOL or FORTRAN main program to perform retrieval functions outside the scope of CCIFHYDRO. Documentation on CCFIHYDRO and UNPACKV is given in Appendices 3 and 4.

Three ancillary programs written for manipulation of workfiles created by CCFIHYDRO are MAKOCNSUB, ADDSTN and PRTOCNDAT. MAKOCNSUB extracts data from workfiles using either cruises, stations or depths as selection criteria. The extracted data are put into smaller workfiles. This program provides an alternate way of selecting data for workfiles which might be used as input for contouring by EDMAP2.[2] ADDSTN merges two workfiles, producing a third workfile in which the merged station codes are stored in ascending order within cruises just as in the two input files. PRTOCNDAT copies workfiles to the printer, or to disk or tape. In each case the simple binary format is converted to a character format (EBCDIC OR ASCII). One or more of these output options may be specified at run time. Documentation on MAKOCNSUB, ADDSTN, PRTOCNDAT and six additional utility programs is given in Appendix 5.

The specifications and options which set the data selection modes in CCFIHYDRO are submitted at run time by means of a run specification card and one or more sets of data selection cards. In the next two sections these control cards are described in detail.

CCFIHYDRO RUN SPECIFICATION CARD

The run specification card has six fields. The first field is reserved for a user title, which must be entered in cols. 1-24. The title may be any EBCDIC (or ASCII) string. The first 12 cols. of the title will be copied into identification records of workfiles created during the run. This provides a means of identifying outputs.

The remaining five fields are entered in free-field format, using one or more spaces as field delimiters. The symbol (#) terminates processing of the run specification card and may be used at any point after the fourth field. Default specifications will be assigned for the remaining fields.

Valid entries for the run specification card are listed in Table 2. Any entry in fields 2, 3 or 4 which does not conform to this table will result in program termination. Unrecognized entries in any other field will result in assignment of the default value for that field. The specifications in fields 2, 3 and 4 determine the data selection mode for a particular run. Valid combinations of entries in these fields are shown in Table 3. Each mode imposes restrictions on the choice of entries for field 5 and on the contents of data selection cards. The program does not check whether specifications in fields 2-4 constitute a valid combination. Consequently, one which does not conform to Table 3, may produce unpredictable results.

[2]EDMAP2 is an ALGOL program for analysis and contouring of environmental data fields on a two dimensional grid. Documentation on this program is contained in NOAA Tech. Memo. NMFS-SWFC-18, April 1982.

Data selection modes comprise three groups, each associated with a different kind of output. In the first six modes (Table 3) the only elements extracted from the source file are the station data, including ship's position, station code, date, time and surface weather and sea state observations. This information is output to a printer in tabular format. In the next nine modes (7-15) six subsurface data parameters are extracted and output to a disk file in a simple binary format. In the last two modes (17-18) complete records are extracted from the source file and copied to a subfile on disk without change of format, and key identification fields from the records are printed.

The second group of data selection modes (7-15) were intended to provide flexible selection criteria for retrieval from the source file and to facilitate mapping the oceanographic parameters on horizontal and vertical sections, using the analysis and contouring program EDMAP2. For this purpose, the specification in field 2 is interpreted as the Y-coordinate and that in field 3, as the X-coordinate of a two-dimensional grid representing the section. For the purpose of simply extracting data from the source file to create a working file, however, many of the data selection modes are redundant, and most data selection requirements can be satisfied with modes 7 or 8 for standard depths and modes 13 or 14 for observed depths. Descriptions of valid specification parameters for each field are given below.

Field 1 (Cols. 1-24):

(Title) Any character string. Cols. 1-12 will be copied into identification records of output files in run modes 7-15.

Field 2:

DEPTH Specifies standard or observed depths as 1st criteria (1st set of data selection cards) for data retrieval in run modes 7-15. Also designates depth as the Y-coordinate for mapping.

DISTN Specifies station codes as the 1st criteria for data retrieval in run modes 7-15. Also designates distance normal to the coast (along CalCOFI lines) as the Y-coordinate for mapping.

DISTP Specifies station codes as the 1st criteria for data retrieval in run modes 7-15. Also designates distance parallel to the coast (across CalCOFI lines) as the Y-coordinate for mapping.

SUBFIL Specifies that a subfile is to be created by copying records intact from the source (packed binary) file, using either station codes or cruise codes as selection criteria as specified in Field 3.

Field 3

TIME Specifies cruise codes as the 2nd criteria (2nd set of data selection cards) for data retrieval in run modes 7-15, and the sole

criteria in run mode 18. Also designates time as the X-coordinate for mapping.

DISTN Specifies station codes as the 2nd criteria for data selection in run modes 1-15. Also designates distance normal to the coast (along CalCOFI lines) as the X-coordinate for mapping.

DISTP Specifies station codes as the 2nd criteria for data selection in run modes 1-15. Also designates distance parallel to the coast (across CalCOFI lines) as the X-coordinate for mapping.

STATIONS Specifies station codes as the sole criteria for data selection in run mode 17. It may be used in place of either DISTN or DISTP for other modes when the alignment of the stations to be selected has no special significance.

CRUISES Specifies cruise codes as the sole criteria for data selection in run mode 18. It may be used in place of TIME under all circumstances.

Field 4:

STAT Specifies that surface data will be extracted from selected source file records and printed. The surface elements include ship's position, date and time of observation, depth to bottom, wind, weather and sea state. Run mode will be set in the range 1-6 depending on entries in Fields 2 and 3.

STD Specifies that temperature, salinity, oxygen, sigma-t, thermosteric anomaly and geopotential anomaly at standard depths will be extracted from selected source records and stored in a working file (OCNDAT) on disk. Run mode will be set in the range 7-12, depending on entries in Fields 2 and 3.

OBS, OBSTD Specifies that temperature, salinity, oxygen and sigma-t at observed depths, or at observed and standard depths, will be extracted from selected source file records and stored in a working file (OCNDAT) on disk. Run mode will be set in the range 13-15, depending on entries in Fields 2 and 3.

ALL Specifies that selected source records will be copied intact into a subfile (SUBFIL) on disk. Run mode will be set to 17 or 18 depending on the entry in Field 3. The entry in Field 2 must be SUBFIL.

Field 5:

(Cruise code) Designates a single cruise for data selection from the source file.

(Station code) Designates a single station for data selection from the source file.

(Std Depth) Designates a single standard depth for data selection from the source file.

0 Specifies either that all cruises are to be accepted for a station

list submitted as the 2nd set of data selection cards (all odd-numbered modes), or that all stations are to be accepted for a cruise list submitted as the 2nd set of data selection cards (run modes 2, 8 or 14), or that data will be extracted from selected source records only for standard depth = 0 meters (run modes 10 and 12).

1 Specifies that a cruise list is being submitted as the 3rd set of data selection cards (odd-numbered modes only).

Field 6:

CONCAT Causes records selected from the source file to be concatenated with an existing subfile on disk. Run modes 17 and 18.

PRTREC Causes all fields in records selected from the source file to be printed in a format similar to that used in the SIO Physical and Chemical Data Reports (Appendix 1).

WRTREC Causes all fields in records selected from the source file to be written to a file (tape or disk) in ASCII code.

PRWREC Causes the actions described for both PRTREC and WRTREC to occur.

Terminates processing of the run specification card. It can be entered anytime after Field 4: default values will be assigned to unspecified Fields. The default for Field 5 is 0 and for Field 6 is NOT CONCAT.

CCFIHYDRO DATA SELECTION CARDS

One or more sets of data selection cards must be submitted with each run. They are to be inserted just after the run specification card in the Job set-up (Appendix 3). Data selection cards contain lists of depths, station codes, cruise codes or consecutive sequence numbers. The kind(s) of data selection cards appropriate for each run mode are indicated in Table 3.

Data selection cards must be submitted in a fixed-field format given by

(10(X1,I6,X1)) for ALGOL syntax.

The first field (cols. 2-7) on the first card of each set must contain the number of subsequent entries submitted in that set. For example, if a set of data selection cards contains 27 station codes then the number in the first field of the first card in the set would be 27.

For run modes 1, 2, 3, 5 and 11 the 1st set of data selection cards must have a single entry, which will be either 0 (run modes 1, 2, 3, 5) or a standard depth value (run mode 11).

Stations should be entered on data selection cards as 5 or 6 digit station codes in either ascending or descending order. Cruises should be entered as 4 digit year-month codes in chronological order. Standard depths

should be entered in order of increasing depth. Sequence numbers (run modes 13-15) should be entered as consecutive integers starting with 1. They are used by CCFIHYDRO as array indices when storing observed depth values extracted from source records. The highest sequence number submitted determines the maximum number of observed depths for which data will be extracted.

A maximum of 300 entries is allowed for each set of data selection cards.

CCFIHYDRO SOURCE FILES AND OUTPUT FILES

CCFIHYDRO uses four files in the performance of its data retrieval function. The internal names are CCFI, SUBFIL, OCNDAT and CALTAP. These are equated to directory names of physical files on disk or tape at run time.

CCFI is the CalCOFI source file in the SWFC packed binary format. It must always be available for input when CCFIHYDRO is run.

SUBFIL is one of the output file option created in run modes 17-18. It has the same format as CCFI. A SUBFIL created in one run can be re-designated as a source file (CCFI) for subsequent runs.

CALTAP is a second output file options created in run modes 17-18. It will contain all of the information available in the source file (CCFI) for specified stations or cruises, in ASCII format. This option is invoked when either WRTREC or PRWREC are entered in the sixth field of the run specification card.

OCNDAT is the output file created in run modes 7-15. It will contain one or more data sets, each consisting of a header, or identification, record, followed by a varying number of data records. OCNDAT files created under odd-numbered run modes will have one data set for each selected cruise. Under even-numbered modes there will be one data set for each of one or more sequences of cruises as specified by data selection cards.

The data records in a data set each contain nine fields. The first field will have either station codes (for odd-numbered run modes) or cruise codes (for even-numbered run modes). The second field will contain a 6-digit code representing a year-month-day code (YYMMDD). The third field will contain depth in meters. The remaining six fields will contain temperature, salinity, oxygen, sigma-t, thermosteric anomaly and geopotential anomaly, respectively. A zero value for any parameter (except geopotential anomaly at 500 meters) denotes missing data.

OCNDAT files can be submitted as input to the analysis and contouring program EDMAP2 for making vertical sections (depth vs. distance or time) or horizontal sections at standard depths, for any of the six data fields.

REFERENCES

Anonymous. 1963. CalCOFI Atlas of 10-meter temperatures and salinities 1949 through 1959. Calif. Coop. Oceanic Fish. Invest., Atlas. No. 1, DCPG, MLR Prog., SIO.

Eber, L.E. 1977. Contoured depth-time charts (0 to 200 m, 1950 to 1966) of temperature, salinity, oxygen and sigma-t at 23 CalCOFI stations in the California Current. Calif. Coop. Oceanic Fish. Invest., Atlas No. 25, DCPG, MLR Prog., SIO.

Kramer, D., M.J. Kalin, E.G. Stevens, J.R. Thrailkill and J.R. Zweifel. 1972. Collecting and processing data in fish eggs and larvae in the California Current Region. NOAA Tech. Rept. NMFS Circ. 370, 38 p.

Lynn, R.J., K.A. Bliss and L.E. Eber. 1982. Vertical and horizontal distributions of seasonal mean temperature, salinity, sigma-t, stability, dynamic height, oxygen and oxygen saturation in the California Current, 1950-1978. Calif. Coop. Oceanic Fish. Invest., Atlas No. 30, MLR Prog., SIO.

Thomas, W.H. and D.L.R. Seibert. 1974. Distribution of nitrate, nitrite, phosphate and silicate in the California Current region, 1969. Calif. Coop. Oceanic Fish. Invest., Atlas No. 20, DCPG, MLR Prog., SIO.

Wyllie, J.G. 1966. Geostrophic flow of the California Current at the surface and at 200 meters. Calif. Coop. Oceanic Fish. Invest., Atlas No. 4, DCPG, MLR Prog., SIO.

Wyllie, J.G. and R.J. Lynn. 1971. Distribution of temperature and salinity at 10 meters, 1960-69 and mean temperature, salinity and oxygen at 150 meters, 1950-1968 in the California Current. Calif. Coop. Oceanic Fish. Invest., Atlas No. 15, DCPG, MLR Prog., SIO.

Appendix 1. List of Physical and Chemical Data Reports from MLR and CalCOFI-Cruises, Issued By Scripps Institution of Oceanography.

Research cruises in the California Current region conducted by the Marine Life Research (MLR) Program of SIO, in cooperation with the U.S. Fish and Wildlife Service, were initiated in March 1949. The original survey pattern and station numbering scheme was abandoned after the first 10 MLR cruises, at which time the pattern shown in Figure 1 was adopted. The Physical and Chemical Data Reports continued to bear MLR cruise numbers until May 1952, when the CalCOFI cruise designations were added. As indicated in the Introduction, the physical and chemical data from cruises made from 1949-1959, inclusive, were subsequently published in Oceanic Observations of the Pacific (see footnote 1). The Data Reports for cruises prior to April 1953 contain parameter values for standard depths only. Subsequent Data Reports included parameter values for both observed and standard depths. MLR cruise numbers were dropped after 1958. In some cases, the Data Reports cover more than one cruise.

Cruise CCOFI	Cruise MLR	Period of Observation	SIO Ref.	Date of Report
(5002)	11	Jan. 31-Feb. 19, 1950	none	Feb. 19, 1951
(5003)	12	Mar. 2-17, 1950	none	Mar. 28, 1951
(5004)	13	Apr. 4-17, 1950	none	May 21, 1951
(5005)	14	May 3-18, 1950	51-17	Aug. 15, 1951
(5006)	15	June 6-23, 1950	51-19	Aug. 20, 1951
(5007)	16	July 6-24, 1950	51-28	Aug. 30, 1951
(5008)	17	Aug. 5-19, 1950	51-32	Dec. 26, 1951
(5009)	18	Sept. 6-22, 1950	51-37	Nov. 1, 1951
(5010)	19	Oct. 11-20, 1950	51-29	Sept. 12, 1951
(5011)	20	Nov. 9-28, 1950	51-47	Nov. 15, 1951
(5101)	21	Jan. 9-29, 1951	51-55	Dec. 15, 1951
(5102)	22	Feb. 6-25, 1951	52-6	Feb. 20, 1952
(5202)	34*	Feb. 6-23, 1952	52-24	May 1, 1952
(5203)	35	Mar. 5- Apr. 3, 1952	52-36	July 15, 1952
(5204)	36	April 2-28, 1952	52-37	July 30, 1952
5205	(37)	May 9-26, 1952	56-24	Aug. 17, 1956
5206	(38)	June 3-21, 1952	56-27	Oct. 22, 1956
5207	(39)	July 2-24, 1952	56-32	Oct. 29, 1956
5208	(40)	Aug. 8-19, 1952	57-2	Jan. 22, 1957
5209	(41)	Sept. 4-19, 1952	57-10	Feb. 26, 1957
5210	(42)	Oct. 8-22, 1952	57-13	March 19, 1957
5211	(43)	Nov. 6-21, 1952	57-22	May 14, 1957
5301	(44)	Jan. 6-22, 1953	57-32	Aug. 7, 1957
5302	(45)	Feb. 4-26, 1953	57-33	Aug. 15, 1957
5303	(46)	Mar. 6-Apr. 5, 1953	57-37	Sept. 3, 1957
5304	(47)	Mar. 31-Apr. 19, 1953	58-13	Feb. 20, 1958
5305	(48)	Apr. 29-May 30, 1953	58-14	Mar. 1, 1958
5306	(49)	June 3-July 3, 1953	58-15	July 1, 1958
5307	(50)	July 8-27, 1953	58-23	Aug. 1, 1958
5308	(51)	Aug. 5-30, 1953	58-23	Aug. 1, 1958
5309	(52)	Sept. 9-19, 1953	58-44	Aug. 1, 1958
5310	(53)	Oct. 7-24, 1953	58-44	Aug. 1, 1958
5311	(54)	Nov. 9-14, 1953	58-44	Aug. 1, 1958
5312	(55)	Dec. 1-13, 1953	58-44	Aug. 1, 1958
5401	(56)	Jan. 5-Feb. 4, 1954	58-38	Aug. 1, 1958
5402	(57)	Feb. 2-16, 1954	58-38	Aug. 1, 1958
5403	(58)	Mar. 3-Apr.5, 1954	58-65	Sept. 15, 1958
5404	(59)	Apr.7-May 13, 1954	58-65	Sept. 15, 1958
5405	(60)	May 5-24, 1954	59-15	Mar. 1, 1959
5406	(61)	June 2-23, 1954	59-16	Mar. 1, 1959
5407	(62)	July 7-23, 1954	59-35	Jan. 26, 1959
5408	(63)	Aug. 18-Sept.10, 1954	59-42	May 18, 1959
5409	(64)	Sept. 18-Oct. 17, 1954	59-43	June 1, 1959
5410	(65)	Oct. 6-24, 1954	59-43	June 1, 1959
5411	(66)	Nov. 10-16, 1954	60-1	Sept. 10, 1959
5412	(67)	Nov. 30-Dec. 16, 1954	60-1	Sept. 10, 1959

* Physical and chemical data reports apparently were not issued for MLR cruises 23-33.

Cruise CCOFI	Cruise MLR	Period of Observation	SIO Ref.	Date of Report
5501	(58)	Jan. 13-29, 1955	59-36	Oct. 15, 1959
5502	(69)	Feb. 9-23, 1955	59-36	Oct. 15, 1959
5503	(70)	Mar. 8-22, 1955	59-37	May 1, 1959
5504	(71)	Apr. 5-22, 1955	59-37	May 1, 1959
5505	(72)	May 12-June 7, 1955	59-44	May 18, 1959
5507	(74)	July 8-23, 1955	59-46	May 18, 1959
5509	(76)	Sept. 10-25, 1955	59-47	May 19, 1959
5510	(77)	Oct. 16-30, 1955	60-2	June 15, 1959
5511	(78)	Nov. 8-20, 1955	60-3	July 1, 1959
5512	(79)	Nov. 29-Dec. 16, 1955	60-4	July 15, 1959
5601	-	Jan. 5-18, 1956	60-5	Aug. 27, 1959
5602	-	Feb. 3-21, 1956	60-5	Aug. 27, 1959
5603	-	Mar. 4-19, 1956	60-6	Nov. 11, 1959
5604	-	Apr. 5-27, 1956	60-6	Nov. 11, 1959
5605	-	May 4-22, 1956	60-34	Apr. 20, 1960
5606	-	May 26-June 25, 1956	60-34	Apr. 20, 1960
5607	-	July 6-25, 1956	60-35	Apr. 27, 1960
5608	-	Aug. 7-19, 1956	60-35	Apr. 27, 1960
5609	-	Sept. 5-17, 1956	60-35	Apr. 27, 1960
5610	-	Sept. 27-Oct. 5, 1956	60-35	Apr. 27, 1960
5611	-	Oct. 30-Nov. 5, 1956	60-35	Apr. 27, 1960
5612	-	Nov. 24-Dec. 21, 1956	61-22	Apr. 24, 1961
5701	(92)	Jan. 4-19, 1957	58-22	Mar. 5, 1958
5702	(93)	Feb. 6-26, 1957	58-22	Mar. 5, 1958
5703	(94)	Mar. 6-30, 1957	58-24	Aug. 1, 1958
5704	(95)	Apr. 5-30, 1957	58-24	Aug. 1, 1958
5705	(96)	May 9-23, 1957	58-33	July 15, 1958
5706	(97)	June 5-23, 1957	58-33	July 15, 1958
5707	(98)	July 8-Aug. 3, 1957	58-63	Aug. 20, 1958
5708	(99)	Aug. 9-27, 1957	58-63	Aug. 20, 1958
5709	(100)	Sept. 4-21, 1957	58-64	Sept. 15, 1958
5710	(101)	Oct. 4-Nov. 8, 1957	58-64	Sept. 15, 1958
5711	(102)	Nov. 16-25, 1957	58-64	Sept. 15, 1958
5712	(103)	Dec. 12-20, 1957	58-64	Sept. 15, 1958
5801	-	Jan. 8-Feb. 2, 1958	59-3	Jan. 15, 1959
5802	-	Feb. 7-24, 1958	59-8	Feb. 1, 1959
5803	-	Feb. 27-Mar. 21, 1958	59-8	Feb. 1, 1959
5804	-	Mar. 30-Apr. 27, 1958	59-14	Mar. 1, 1959
5805	(108)	May 3-22, 1958	59-28	Dec. 10, 1958
5806	-	June 4-26, 1958	59-29	Jan. 5, 1959
5807	-	June 30-July 22, 1958	59-33	Feb. 24, 1959
5808	-	Aug. 6-21, 1958	59-48	Mar. 11, 1959
5809	(112)	Sept. 4-19, 1958	58-84	Dec. 1, 1958
5810	-	Oct. 8-Nov. 6, 1958	59-49	Apr. 17, 1959
5811	-	Nov. 13-24, 1958	59-50	Apr. 22, 1959
5812	-	Dec. 1-11, 1958	59-50	Apr. 22, 1959
5901	-	Jan. 7-29, 1959	59-58	Sept. 17, 1959
5902	-	Feb. 6-28, 1959	60-13	Oct. 21, 1959
5903	-	Mar. 11-28, 1959	60-36	Feb. 15, 1960

Cruise CCOFI	Cruise MLR	Period of Observation	SIO Ref.	Date of Report
5904	-	Apr. 7-26, 1959	60-37	June 29, 1960
5905	-	May 6-27, 1959	60-38	Apr. 26, 1960
5906	-	June 3-30, 1959	60-39	Apr. 15, 1960
5907	-	July 9-Aug. 3, 1959	60-40	July 6, 1960
5908	-	Aug. 13-31, 1959	61-19	Sept. 12, 1961
5909	-	Sept. 9-Oct. 1, 1959	61-19	Sept. 12, 1961
5910	-	Oct. 8-30, 1959	61-20	Apr. 24, 1961
5911	-	Nov. 16-25, 1959	61-21	Apr. 24, 1961
5912	-	Dec. 9-19, 1959	61-21	Apr. 24, 1961
6001	-	Jan. 8-Feb. 13, 1960	61-23	June 20, 1961
6002	-	Feb. 11-Mar. 3, 1960	62-3	Aug. 18, 1961
6003	-	Mar. 10-29, 1960	62-5	Aug. 18, 1961
6004	-	Mar. 29-Apr. 30, 1960	62-6	Aug. 10, 1961
6005	-	May 13-29, 1960	62-7	Aug. 18, 1961
6006	-	June 14-30, 1960	62-8	Aug. 18, 1961
6007-8	-	July 12-Aug. 14, 1960	62-9	May 1, 1962
6008	-	Aug. 10-22, 1960	62-10	May 17, 1962
6009	-	Sept. 9-21, 1960	62-10	May 17, 1962
6009-10	-	Sept. 22-Oct. 22, 1960	62-10	May 17, 1962
6101-2	-	Jan. 5-Feb. 20, 1961	61-24	June 29, 1961
6103	-	Mar. 8-13, 1961	62-15	Dec. 28, 1961
6104-5	-	Apr. 4-May 12, 1961	62-15	Dec. 28, 1961
6105	-	May 17-29, 1961	62-15	Dec. 28, 1961
6107-8	-	June 27-Aug. 1, 1961	62-16	July 26, 1962
6108	-	Aug. 13-28, 1961	62-16	July 26, 1962
6109	-	Aug. 31-Sept. 19, 1961	62-17	July 26, 1962
6110-11	-	Oct. 10-Nov. 12, 1961	62-17	July 26, 1962
6201-2	-	Jan. 12-Feb. 15, 1962	62-26	Nov. 19, 1962
6203-4	-	Mar. 15-May 2, 1962	63-9	Feb. 15, 1963
6207-8	-	July 10-Aug. 29, 1962	62-23	Oct. 4, 1962
6210-11	-	Oct. 5-Nov. 18, 1962	63-25	Aug. 22, 1963
6212	-	Dec. 17-19, 1962	63-25	Aug. 22, 1963
6301-2	-	Jan. 10-Feb. 23, 1963	64-2	Mar. 5, 1963
6304	-	Apr. 9-May 24, 1963	64-13	Mar. 2, 1964
6306	-	June 25-26, 1963	64-13	Mar. 2, 1964
6307	-	July 10-Aug. 8, 1963	64-18	May 25, 1964
6309	-	Sept. 3-29, 1963	64-18	May 25, 1964
6310	-	Oct. 2-29, 1963	65-1	Oct. 9, 1964
6311	-	Nov. 28-29, 1963	65-1	Oct. 9, 1964
6311 (El Golfo)		Nov. 9-Dec. 7, 1963	65-1	Oct. 9, 1964
6401	-	Jan. 9-Mar. 4, 1964	65-7	Apr. 5, 1965
6404	-	Apr. 10-May 1, 1964	66-20	Sept. 1, 1966
6407	-	June 15-Aug. 4, 1964	66-20	Sept. 1, 1966
6410	-	Oct. 2-Nov. 1, 1964	65-18	Oct. 5, 1965
6501	-	Jan. 6-Feb. 18, 1965	66-4	Dec. 9, 1965
6504	-	Mar. 31-Apr. 24, 1965	67-16	(undated)
6505 (El Golfo II)		May 14-June 17, 1965	67-16	(undated)
6507	-	June 15-Aug. 11, 1965	67-17	(undated)
6509	-	Aug. 31-Sept. 25, 1965	67-17	(undated)

Cruises CCOFI	MLR	Period of Observation	SIO Ref.	Date of Report
6601	-	Jan. 12-Feb. 7, 1966	68-3	(undated)
6602	-	Feb. 15-Mar. 6, 1966	68-3	(undated)
6604	-	Mar. 26-May 3, 1966	68-3	(undated)
6605	-	May 5-29, 1966	68-3	(undated)
6606	-	June 12-July 1, 1966	68-3	(undated)
6607	-	July 8-29, 1966	68-21	(undated)
6608	-	Aug. 5-25, 1966	68-21	(undated)
6609	-	Sept. 7-24, 1966	68-21	(undated)
6610	-	Oct. 8-27, 1966	69-2	(undated)
6611	-	Nov. 10-13, 1966	69-2	(undated)
6612	-	Dec. 2-19, 1966	69-2	(undated)
6707	-	June 19-July 20, 1967	69-8	(undated)
6712	-	Dec. 5-20, 1967	69-8	(undated)
6801	-	Jan. 7-26, 1968	71-3	(undated)
6804	-	Apr. 23-May 6, 1968	71-3	(undated)
6806	-	May 31-June 22, 1968	71-3	(undated)
6901	-	Jan. 7-30, 1969	76-14	Sept. 1, 1976
6902	-	Jan. 26-Mar. 11, 1969	76-14	Sept. 1, 1976
6904	-	Apr. 2-26, 1969	77-22	Nov. 1, 1977
6905	-	May 5-29, 1969	77-22	Nov. 1, 1977
6906	-	June 9-28, 1969	77-22	Nov. 1, 1977
6907	-	July 10-29, 1969	79-7	May 15, 1979
6908	-	Aug. 6-Sept. 8, 1969	79-7	May 15, 1979
6909	-	Sept. 11-Oct. 7, 1969	79-7	May 15, 1979
6910	-	Oct. 9-Nov. 8, 1969	79-29	Feb. 15, 1980
6912	-	Nov. 13-Dec. 17, 1969	79-29	Feb. 15, 1980
7008	-	Aug. 17-Oct. 2, 1970	79-30	Feb. 15, 1980
7102	-	Feb. 8-Apr. 5, 1971	79-30	Feb. 15, 1980
7201	-	Jan. 3-26, 1972	80-21	Oct. 15, 1980
7202	-	Feb. 1-27, 1972	80-21	Oct. 15, 1980

Appendix 2: The Packed Binary Format for the CalCOFI Oceanographic Data File

The packed binary format for data from Nansen casts or STD or CTD data obtained at CalCOFI stations was designed primarily to reduce the size of the file stored on magnetic tape. This was accomplished in part by use of the binary format and in part by use of variable length records. Each record contains identification fields, sea state and surface weather observations, measured and computed parameter values at both observed and standard depths. The number of depths varies considerably from record to record, which accounts for the variation in record length. To convert the file to fixed length records with no other change in format would require a record size of 300 (48 bit) words. Most of the records, however, are less than half this size.

The first six words (36 char) of each record contain location-time identification fields and ship code, all in ASCII characters. The next three words (18 char = 144 bits) contain surface observations along with depth to the bottom, depth of the cast and the total number of four word (observed depth) groups and three word (standard depth) groups to follow in the record. These groups are ordered by increasing depth and are intermixed throughout the record. A four-bit field at the right hand end (least significant bits) of the first word in each observed or standard depth group contains a type code. Code values of 3 or 4 indicate observed depths and 6 or 7 indicate standard depths.

The location of record elements in the following list are given in terms of a consecutive word number within each group and the bit field location within each word. The bits are numbered 0 to 47 beginning with the right-most bit of a word; however, the elements are accessed from left to right (high order to low order bits) in each word.

--- IDENTIFICATION GROUP: 36 CHAR ---

Element	Form	Char. Field
CalCOFI Station	LLLSSS	1-6
Year-Month-Day Code	YYMMDD	7-12
Latitude-Deg. and min. (decimal point implied; H="N" or "S")	DDMM.MH	13-18
Longitude-Deg. and Min. (decimal point implied; H = "E" or "W")	DDDMM.MH	19-25
Marsden Square	MSQ	26-28
Hour (decimal point implied)	HH.H	29-31
Ship Code	SS	32-33
Blank	bbb	34-36

--- SURFACE OBSERVATIONS GROUP: 3 WORDS ---

Element	Word	Bit-Field
Water Color	1	47-41
Water Transparency	1	40-34
Wave Direction - Deg.	1	33-27
Wave Height Flag 1 = wave height unknown	1	26
Sea State or Wave Height Code 1 = sea state 2 = wave height	1	25
Wave Height-Meters (Sea State)	1	24-21
Wave Period Flag 1 = wave period unknown	1	20
Wave Period - Sec.	1	19-16
Wind Direction - Deg.	1	15-9
Wind Speed - Beaufort before 1969, knots since 1969	1	8-2
Zero Fill	1	1-0
Depth to Bottom - Fathoms before 1969, meters since 1969	2	47-33
Depth of Cast - hundreds of meters	2	32-26
No. of Obs and STD Depths	2	25-18
Barom. Pressure - Millibars	2	17-6
Zero Fill	2	5-0
Dry Bulb Temperature - °C	3	47-37
Wet Bulb Temperature - °C	3	36-26
Cloud Type Code	3	25-21
Cloud Amount Code	3	20-16
Visibility - Naut. Mi.	3	15-11
Weather Code	3	10-3
Zero Fill	3	2-0

--- OBSERVED DEPTH DATA GROUP: 4 WORDS ---

Element	Word	Bit Field
Depth Reliability Code 1 = doubtful	1	47
Observed Depth - Meters	1	46-34
Sigma-t - g/L	1	33-19
Sound Velocity - M/Sec.	1	18-4
Observed Depth Code - 3 or 4	1	3-0
Temperature Reliability Code 1 = doubtful	2	47
Sea Water Temperature - °C	2	46-30
Salinity Reliability Code - 1 = doubtful	2	29
Sea Water Salinity -	2	28-12
Oxygen Reliability Code -		

1 = doubtful		11
Dissolved Oxygen - ml/L	2	10-0
Phosphate - Phosphorus - μg at/L	3	47-32
Total Phorphorus - μg at/L	3	31-16
pH	3	15-0
Nitrite - Nitrogen - μg at/L	4	47-32
Nitrate - Nitrogen - μg at/L	4	31-16
Silicate - Silicon - μg at/L	4	15-0

--- STANDARD DEPTH DATA GROUP: 3 WORDS ---

Element	Word	Bit Field
Depth Reliability Code - 1 = doubtful	1	47
Standard Depth - Meters	1	46-34
Sigma-T g/L	1	33-19
Sound Velocity - M/Sec.	1	18-4
Standard Depth Code - 6 or 7	1	3-0
Temperature Reliability Code - 1 = doubtful	2	47
Sea Water Temperature - °C	2	46-30
Salinity Reliability Code - 1 = doubtful	2	29
Sea Water Salinity - o/oo	2	28-12
Oxygen Reliability Code - 1 = doubtful	2	11
Dissolved Oxygen - ml/L	2	10-0
Thermosteric Anomaly - cl/ton	3	47-26
Geopotential Anomaly - Dyn. Meters	3	25-10
Zero Fill	3	9-0

There are no specific codes to identify missing data in the packed binary file. Whenever a record element was missing in the original source file, the associated bit field in the binary file was zero-filled. Zero values can be interpreted as missing data for most of the important elements without ambiguity.

APPENDIX 3: Deck Set-Up for CCFIHYDRO

The general assemblage of control and data cards needed to run the program on the Burroughs B7800 is as follows:

```
? BEGIN JOB
? RUN SERVICE/OPINFO
  TAPENAME, 9/800, RING IN, PURGE, OU
? RUN CCFIHYDRO
? FILE CCFI (FILE ATTRIBUTES)
? FILE SUBFIL (FILE ATTRIBUTES)
? FILE OCNDAT (FILE ATTRIBUTES)
? FILE CALTAP (TITLE = TAPENAME)
? DATA
  RUN SPECIFICATION CARD
  DATA SELECTION CARDS
? END JOB
```

The SERVICE/OPINFO cards are needed only if tape output (FILE CALTAP) is required. CCFI is the input file in packed binary format. Only one of the three following file cards are needed, depending on the output desired. The format and entries for run specification and data selection cards are described in the main body of this document.

The following example illustrates the kind of retrieval application for which the program was designed. The object will be to extract data at standard depths from 0 to 200 meters at stations on Line 90 out to station 100, and to separate the data by month and store it in 12 working files in the simple binary format.

A direct approach to this task is to set up the control card specifications for data selection mode #7 (see Table 3) and prepare one set of data selection cards for the standard depths, a second set for the Line 90 stations and 12 sets of cruise cards, one for each month. Then the job could be done with 12 runs of CCIFHYDRO, one for each month. The task can be performed much more efficiently, however, by making a preliminary run to create a SUBFIL which will include only the desired stations.

The job assembly for the preliminary run is listed below:

```
? BEGIN JOB
? RUN CCFIHYDRO
? FILE CCFI (TITLE = CCOFI/PAKDAT)
? FILE SUBFIL (TITLE = SUBFIL/LINE90)
? DATA
  (RUN SPECIFICATION CARD-b means space)
bLINEb90bSUBFILbbbbbbbbbSUBFILbSTATIONSbALLb#
(1st set of data selection cards - stations)
```

```
bbbbbllbb090028bb090030bb090032b
b090037bb090045bb090053bb090060b
b090070bb090080bb090090bb090100b


? END JOB
```

Fields 5 and 6 of the specification card are not needed for this run. Fields on data selection cards should be entered continuously in cols. 1 through 80. In the example above, this would require all of one card and the first 16 cols. of a second card. The station list includes 11 stations. The small letter "b" in the example indicates a blank space. The output file, SUBFIL/LINE90 is much smaller than the source file, CCOFI/PAKDAT, and will be used as the input file for the remaining 12 runs. The job assembly listed below is for the January data. That for other months would be similar.

```
? BEGIN JOB
? RUN CCFIHYDRO
? FILE CCFI (TITLE = SUBFIL/LINE90)
? FILE OCNDAT (TITLE = OCNDAT/LINE90/JAN)
? DATA
  (RUN SPECIFICATION CARD)
bLINEb90bJANbCRUISESbbbbDEPTHbDISTNbSTDb1b#
```

(1 set of data selection cards - depths)

```
bbbbb10bbbbb000bbbbb010bbbbb020b
bbbb030bbbbb050bbbbb075bbbbb100b
bbbb125bbbbb150bbbbb200
```

(2nd set of data selection cards - stations. These will be the same as the 1st set for the preliminary run, shown above)

(3rd set of data selection cards - cruises. Only a few cruises are included for brevity)

```
bbbbb08bbbb6001bbbb6101bbbb6201b
bbb6301bbbb6401bbbb6501bbbb6601b
bbbb6701
```

The output file, OCNDAT/LINE 90/JAN, resulting from this run will contain data from 8 January cruises for 11 stations on Line 90.

Appendix 4: Data Extraction from the Packed Binary Oceanographic File With Procedure UNPACKV

UNPACKV is an ALGOL procedure designed to unpack bit-fields and extract data values from records read from the packed binary data file. It must be bound or compiled into a host program and the host program must contain an input routine to read records from the source file into an array which will be passed to the procedure as a parameter. UNPACKV has seven parameters, described below in the order that they must be entered in the procedure statement.

VRBL — Integer code number of the data parameter to be extracted--see parameter list.

SAMTYPE — Character string denoting the group in the source record from which the sample is to be extracted. Valid entries are:

"STAT" for parameters in the surface observations;
"OBS" for data at observed depths only;
"STD" for data at standard depths only;
"OBSTD" for data at both observed and standard depths.

MINDPTH — Integer value specifying minimum depth for extracting data.

MAXDPTH — Integer value specifying the maximum depth for extracting data.

REC — Name of an INTEGER array into which a record from the source file has been read.

NUMWORDS — Integer variable which has been assigned the length of the record in 48-bit words.

VRBLIST — Name of a REAL array into which the data values extracted by UNPACKV will be stored.

DPTHLIST — Name of a REAL array into which the depths of the extracted data values will be stored by UNPACKV. The elements of this array will correspond one for one with those of VRBLIST.

NUMDPTHS — Integer variable returned by UNPACKV with the number of depths for which data were extracted.

The data parameters corresponding to the code values of VRBL are listed below. Note that only certain SAMTYPE entries are associated with each code value. If an invalid combination is submitted, UNPACKV will return a value of -1 for NUMDPTHS and no data will be extracted. If "STAT" is entered for SAMTYPE then the procedure will return 1 for NUMDPTHS and 0 in the first element of DPTHLIST.

VRBL	SAMTYPE	SAMPLE RETURNED IN VRBLIST
1	STAT	Water - 4 digits, 1st-2nd: Transparency 3rd-4th: Color
2	STAT	Waves - 7 digits 1st: if=1, 5th digit is sea state, otherwise wave height 2nd: if=1, period unknown 3rd: if=1, height unknown 4th: period 5th: sea state or wave height 6th-7th: direction.
3	STAT	Wind - 4 digits, 1st-2nd: direction 3rd-4th: speed in Beaufort (before 1969) or knots (since 1969)
4	STAT	Depth to bottom - fathoms (before 1969) or meters (since 1969).
5	STAT	Depth of cast.
6	STAT	Number of depths (OBS + STD)
7	STAT	Barometric pressure.
8	STAT	Air temperature - dry bulb.
9	STAT	Air temperature - wet bulb.
10	STAT	Clouds - 3 digits, 1st: if=1, type unknown 2nd: amount 3rd: type.
11	STAT	Visibility
12	STAT	Weather - 3 digits, 1st: if=1, WMO code 4501 used if=0, WMO code 4677 used 2nd-3rd: weather code
13	OBS, STD or OBSTD	Sigma-t
14	OBS, STD or OBSTD	Sound velocity
15	OBS, STD or OBSTD	Observed or standard depth code: 3 or 4 = observed depth, 6 or 7 = standard depth.
16	OBS, STD or OBSTD	Temperature
17	OBS, STD or OBSTD	Salinity
18	OBS, STD or OBSTD	Oxygen
19	OBS	Phosphorous - phosphate
20	OBS	Total phosphorus
21	OBS	pH
22	OBS	Nitrite - nitrogen
23	OBS	Nitrate - nitrogen
24	OBS	Silicate - silicon
25	STD	Thermosteric anomaly
26	STD	Geopotential anomaly

UNPACKV does not extract fields from the identification group of a packed binary record. These fields are all character strings (see Appendix 2) and

can be obtained from the array into which the record was read, as will be shown in the example to follow, which is based on the input routine from CCFIHYDRO.

EXAMPLE

```
BEGIN COMMENT READ PACKED BINARY FILE:
  FILE CCFI (KIND=1, MAXRECSIZE = 20, BLOCKSIZE = 60,
     AREASIZE = 60, FILETYPE = 6);
  ARRAY REC [0:300], DPTHLIST [0:50], VRBLIST [0:26, 0:50];
  INTEGER VRBL, MINDPTH, MAXDPTH, NUMWORDS, NUMDPTHS, STNCODE,
     YYMMDD, HR, MSQ;
  REAL SAMTYPE, LATD, LATM, NS, LOND, LONM, EW, SHIP;
  BOOLEAN READIT;
  LABEL NXTREC, EOF;
NXTREC:
  READIT:= READ (CCFI, 300, REC);
  COMMENT THIS STATEMENT READS A RECORD INTO ARRAY REC AND STORES
     THE VALUE OF THE I/O DESCRIPTOR IN READIT.  THE I/O DESCRIPTOR
     CONTAINS THE STATUS OF THE I/O ACTION, INCLUDING THE LENGTH OF
     THE RECORD AND WHETHER AN END OF FILE WAS REACHED;
  IF REAL (READIT.[9:1]) = 1 THEN GO TO EOF;
  NUMWORDS: = REAL (READIT.[47:20]);
  COMMENT THIS IS THE RECORD LENGTH;
  READ (REC, <2I6, I2, I3, A1, 2I3, A1, I3, I2, A2>, STNCODE,
     YYMMDD, LATD, LATM, NS, LOND, LONM, EW, MSQ, HR, SHIP);
  COMMENT THIS ASSIGNS THE ID FIELDS TO INTEGER OR REAL VARIABLES.
     THEN MINUTES OF LAT AND LON ARE CHANGED TO DEGREES AND THE DECIMAL
     PLACES RESTORED WHERE APPROPRIATE;
  LATD: = LATD + LATM/600;
  LOND: = LOND + LONM/600; HR: = HR/10;
  MINDPTH: = 0; MAXDPTH: = 500;
  SAMTYPE: = "STAT";
  FOR VRBL: = 1 STEP 1 UNTIL 12 DO
  UNPACKV (VRBL,SAMTYPE, 0, 0, REC, NUMWORDS, VRBLIST [VRBL, *],
     DPTHLIST, NUMDPTHS);
  COMMENT THE FIRST CALL TO UNPACKV GETS THE ID FIELDS AND SURFACE
     OBSERVATIONS;
  SAMTYPE: = "OBSTD";
  FOR VRBL: = 13 STEP 1 UNTIL 18 DO
  UNPACKV (VRBL, SAMTYPE, MINDPTH, MAXDTH, REC, NUMWORDS,
    VRBLIST [VRBL,*], DPTHLIST, NUMDPTHS);
  COMMENT THE NEXT CALL GETS THE DATA PARAMETERS THAT ARE IN BOTH
     OBS DEPTH AND STD DEPTH GROUPS;
  SAMTYPE: = "OBS";
  FOR VRBL: = 19 STEP 1 UNTIL 24 DO
  UNPACKV (VRBL, SAMTYPE, MINDPTH, MAXDPTH, REC, NUMWORDS,
     VRBLIST[VRBL,*], DPTHLIST, NUMDPTHS);
  COMMENT THE THIRD CALL GETS DATA PARAMETERS AT OBS DEPTHS ONLY:
  SAMTYPE: = "STD";
  FOR VRBL: = 25, 26 DO
  UNPACKV (VRBL, SAMTYPE, MINDPTH, MAXDPTH, REC, NUMWORDS,
     VRBLIST [VRBL,*], DPTHLIST, NUMDPTHS);
```

```
  COMMENT NOW ALL 26 FIELDS ARE STORED IN ARRAY VRBLIST.  THIS DATA
     MUST BE PROCESSED BEFORE READING THE NEXT RECORD;
  GO TO NXTREC;
EOF: END.
```

Appendix 5: Utility Programs for OCNDAT Files

The OCNDAT file format has fields for the six data parameters which occur most frequently in the CalCOFI oceanographic data file: temperature, salinity, oxygen, sigma-t, thermosteric anomaly and geopotential anomaly. It provides also for the identification parameters: station code, depth, year, month, day and cruise code. It excludes all other identification fields, all of the surface observations and the nutrients.

Logical records in OCNDAT files consist of nine 32-bit fields for a record length of 36 bytes. The physical record size (BLOCKSIZE) is 40 logical records, or 1440 bytes. For applications which do not require the excluded elements, the OCNDAT format is more efficient and easier to use than the packed binary format described in Appendix 2.

OCNDAT files are composed of one or more data sets, each of which begins with two header records. The first header record has a character string field of 28 bytes, containing file identification, followed by 2 integer fields of 32 bits each. The latter contain a data set sequence number and the number of data records in the data set, respectively. The second header record contains a single character string field of 36 bytes which identifies the data set. Data records each contain nine integer fields as described below:

1st. Six-digit CalCOFI station code or four-digit cruise code.
2nd. Six-digit year-month-day code.
3rd. Depth (meters).
4th. Temperature * 1000 (°C).
5th. Salinity * 1000 (o/oo).
6th. Dissolved oxygen * 1000 (ml/L).
7th. Sigma-t * 1000 (g/L).
8th. Thermosteric anomaly * 100 (cl/Ton).
9th. Geopotential anomaly * 10000 (Dyn. Meters).

The high order bit in each 32-bit field of an OCNDAT data record is sign bit. Negative values are represented by two's-complement notation.

Several utility programs have been written to manipulate OCNDAT files. They are described in the following sections.

1. PRTOCNDAT

This program copies an OCNDAT file to an EBCDIC (or ASCII) disk file or to an EBCDIC (or ASCII) tape file and/or prints it. The file names and attributes declared in the program for disk and tape are:

```
FILE OCNEBC (KIND=DISK, MAXRECSIZE=72, BLOCKSIZE=1440, UNITS=
  CHARACTERS, AREASIZE=30, FLEXIBLE).

FILE OCNTAP (KIND=TAPE9, MAXRECSIZE=72, BLOCKSIZE=1440, UNITS=
```

CHARACTERS, EXTMODE=EBCDIC, LABELTYPE=OMITTEDEOF).

The two header records for each data set in the OCNDAT file are written as a single header record in the output file with the format: (4A6, C4, 2I4, 6A6). Data records are written as 8 byte fields with the format: (3I8, 4F8.3, F8.2, F8.4).

A control card must be submitted at run time with one or more of the output options "PRINT", "DISK" and/or "TAPE." The format for the control card is (3A6).

The option(s) may be entered in any order but must be right justified in each field. If "TAPE" is one of the options submitted, the program will copy 1 or more OCNDAT files into a single tape file. The TITLES of each file to be copied to tape must be entered on one or more subsequent data cards in the following format (I6,X1,3(4A6),X1/(X7,3(4A6),X1)) where the first field (I6) must contain the number of files (right justified) to be copied and the respective TITLES, up to 23 characters in length, should begin in columns 8, 32 or 56 and each one terminate with a period. The program output will list the name of every file copied. The deck set-up is shown in the following examples.

Example 1:

```
?BEGIN JOB
?RUN PRTOCNDAT
?FILE OCNDAT (TITLE=OCNDAT/LINE 90/JAN)
?DATA
bPRINTbbDISK
?END JOB
```

Example 2:

```
?BEGIN JOB
?RUN PRTOCNDAT
?DATA
bbTAPE
bbbbb2bOCNDAT/LINE90/JAN.bbbbbbOCNDAT/LINE90/FEB.
?END JOB
```

The 1st example prints the file named in the FILE card and also copies it to a new, EBCDIC disk file. The 2nd example copies two files to a single file on tape. No FILE card is needed because the files copied are named in the data cards.

2. MAKOCNSUB

This program copies selected records from an OCNDAT file to a new file in the same format. The selection criteria are either station codes, cruise codes or standard depth codes. The internal name of the output file is OCNSUB; it is declared with the same attributes as OCNDAT. The selection parameter along with others must be submitted on a control card at run time. Valid entries for the selection parameter are "STATIONS", "CRUISES" and "STDbDEPTH." It should be entered, left justified, in the first field (cols.

1-12) of the control card. Entries in all subsequent fields must be right justified, when applicable. If the selection parameter is "STDbDEPTH", the second field (cols. 13-18) must contain a valid standard depth code. Otherwise it is left blank. The third field (cols. 19-24) is for a print option and will cause all the data records, copied to the new file, to be printed if "PRINT" is entered. The next four fields have 6 characters each (cols. 25-48) and will be copied into the first 4 words of each header record of the new file, for identification. However, if OCNSUB is going to be used as a source file for the contouring program EDMAP2, the 4th and 5th fields will be interpreted by that program as the y and x coordinates, respectively, of a rectangular grid to which the data from OCNSUB will be fitted. In this case, valid entries for the 4th field (cols. 25-30) are "bDEPTH", "bDISTN" and "bDISTP", which will be interpreted as depths, station numbers and line numbers. Similarly, valid entries for the 5th field (cols. 31-36) are "bDISTN", "bDISTP" "bbTIME", which will be interpreted as station numbers, line numbers and months. The 6th and 7th fields are optional in any case. If "STATIONS" or "CRUISES" is entered as the selection parameter, a station list or cruise list must be submitted, following the control card. The format is (10(X1,I6,X1)) in which the first field must contain an integer specifying the number of station codes or cruise codes to follow. The list may take one or more cards. All fields are right justified. The deck set-up for running MAKOCNSUB is shown in the following examples.

Example 1:

```
?BEGIN JOB
?RUN MAKOCNSUB
?FILE OCNDAT (TITLE=OCNDAT/ALLSTN/JAN)
?FILE OCNSUB (TITLE=OCNDAT/LINE90/JAN)
?DATA
  (Run control card)
STATIONSbbbbbbbbbbNOPRNTbDEPTHbDISTNbLINEb90JAN
  (station list card)
bbbbbb6bb090032bb090037bb090045 bb090053bb090060bb090070
?END JOB
```

Example 2:

```
?BEGIN JOB
?RUN MAKOCNSUB
?FILE OCNDAT(TITLE=OCNDAT/ALLSTNS/JAN)
?FILE OCNSUB(TITLE=OCNDAT/10METERS/JAN)
? DATA
  (Run control card)
STDbDEPTHbbbbbb010bPRINTbDISTPbDISTNbSTDb10MbJAN
?END JOB
```

In the 1st example, data for 6 stations on Line 90 will be extracted from an OCNDAT file containing all January stations and copied to a new file. The data records will not be printed. In the 2nd example, data at the 10 meter depth will be extracted for all stations from the same file. In this case the selection criteria is specified in the second field of the control card, and no other data cards are needed.

3. ADDSTN

This program merges two OCNDAT files and creates a new file in the same format. OCNDAT files are normally structured such that each data set in the file contains a number of stations, sequentially ordered by ascending station codes, for one cruise. There are a varying number of records for each station, ordered by increasing depth. The data sets are ordered by ascending cruise code within the file. The program designates the two existing files as OLDFIL and ADDFIL, and the new file as NEWFIL. The procedure, essentially, is to copy records from OLDFIL to NEWFIL and insert records from ADDFIL when appropriate. If ADDFIL contains a cruise (data set) not in OLDFIL, the entire cruise is inserted. If the same cruise is in both OLDFIL and ADDFIL, then each station for that cruise found in ADDFIL and not found in OLDFIL is inserted in NEWFIL. When the same station is found in both files, only the one from OLDFIL will be copied. The program requires one data card to be submitted at run time with the format (4A6), containing a character string which will be inserted into header records on NEWFIL for data set identification. Data set sequence numbers and record counts, will be tallied and entered in NEWFIL header records by the program. The deck set-up for running ADDSTN is shown in the following example.

Example:

```
?BEGIN JOB
?RUN ADDSTN
?FILE OLDFIL (TITLE=OCNDAT/102STNS)
?FILE ADDSTNS (TITLE=OCNDAT/36STNS)
?FILE NEWFIL (TITLE=OCNDAT/138STNS)
?DATA
bDEPTHbDISTNb138STNSbALL
?END JOB
```

In this example records for 36 stations in ADDFIL will be merged, cruise by cruise, with records for 102 stations in OLDFIL to create a NEWFIL of 138 stations. The printer output will include all header records read from OLDFIL and ADDFIL and written to NEWFIL.

4. SORTOCNDAT

This program sorts the records in an OCNDAT file using station code as a sorting key and creates a new file in the same format. The new file will consist of a single data set in which the records are ordered by ascending station codes. Cruise codes contained in the header records of the original file will not be in the new file. Up to 16000 stations can be sorted. The internal name of the sorted file is OCNSEQ. No control or data cards are required at run time. SORTOCNDAT is a prerequisite to MEANOCNSEQ, which is described in the next section. The deck set-up for running the program is shown in the following example.

Example:

```
?BEGIN JOB
?RUN SORTOCNDAT
?FILE OCNDAT (TITLE=OCNDAT/ALLSTNS/JAN)
```

```
?FILE OCNSEQ (TITLE=OCNSEQ/ALLSTNS/JAN)
?END JOB
```

The printer output will include the header records for each data set in the input file and a count of stations and records sorted.

5. MEANOCNSEQ

This program computes means and standard deviations at standard depths for each station on OCNSEQ files created by SORTOCNDAT. The outputs are stored in three new files, OCNMEA, OCNDEV and OCNCNT created in the OCNDAT format. The 4th through 9th fields of data records in OCNDAT files contain values of temperature, salinity, oxygen, sigma-t, thermosteric anomaly and geopotential anomaly. The corresponding fields in the new files will contain the means, standard deviations and counts of those parameters. The computation is straightforward for all of the data parameters except geopotential anomaly (9th field). In the OCNDAT files, the value stored in this field in any record was obtained by integration of specific volume anomaly from the surface to the depth represented by that record. MEANOCNSEQ computes the mean geopotential anomaly, for a station, at each standard depth from 0 to 500 meters. Then, the mean value at each depth is replaced by its difference from the mean value at 500 meters. The reference level for the mean values or geopotential anomaly is therefore changed from 0 to 500 meters, so that transports in upper layers, relative to that at 500 meters, can be computed from gradients between adjacent stations. For inshore stations which do not go to 500 meters, provision is made for supplying the requisite 500 meter reference values via data cards at run time. Determination of such values can be made by extrapolation from deeper stations farther offshore. MEANOCNSEQ will do the extrapolation automatically for all stations which do not reach 500 meters if the option AUTO is entered on a control card at run time. The procedure involves the two nearest stations outward from the shallow station on the same CalCOFI line. The increment of geopotential anomaly between the maximum depth of the shallow station and 500 meters is determined by extrapolation from the two deeper stations.

The program does not compute standard deviations for geopotential anomaly. A control card must be submitted at run time to designate options for printer output and the 500 meter reference level values. The control card format is: (2A6). If "bPRINT" is entered in the 1st field (cols. 1-6), the three output files will be printed. Otherwise they will not. If "bbAUTO" is entered in the 2nd field, the 500 meter reference values for shallow stations will be computed automatically. Otherwise, they must be submitted in one or more data card(s) following the control card. The format is:(X16,8R8.0) where the 1st field must contain the number of stations for which reference values are entered. The station codes and associated reference values are entered in subsequent pairs of field.

The deck set-up for MEANOCNSEQ is shown in the following example.

Example:

```
?BEGIN JOB
?RUN MEANOCNSEQ
?FILE OCNSEQ (TITLE=OCNSEQ/ALLSTNS/JAN)
```

```
?FILE OCNMEA (TITLE=OCNMEA/ALLSTNS/JAN)
?FILE OCNDEV (TITLE=OCNDEV/ALLSTNS/JAN)
?FILE OCNCNT (TITLE=OCNCNT/ALLSTNS/JAN)
?DATA
   (printer control card)
bPRINT
   (reference level data cards)
OCTbMEANSbbbbbbbbbbbbbb2bb082047bbbb.862bb083051bbbb.860.
```

In this example, the output files will be printed and 500 meter reference level data are given for two stations, 82047 and 83051. The portion of the card preceding the first field (cols. 1-16) contains identification for visual reference only.

6. INTERPSTNS

This program performs horizontal interpolation from irregularly spaced stations on CalCOFI lines to regularly spaced points of a grid, superimposed on the CalCOFI station pattern. The interpolations are made only for points on the inshore side of station 60, on each line. The purpose of the program is to prepare source data files for the contouring program EDMAP2, so as to avoid introducing bias in horizontal gradients of the gridded data fields produced by that program. INTERPSTNS reads data from file OCNMEA, which can be any file with the OCNDAT format, and creates a new file, OCNSTN. Control cards submitted at run time designate whether the output file will be printed, and specify the points on the CalCOFI lines to which the interpolations will be made. The first control card has the format: (A6), and will invoke the print option if the entry is "bPRINT". Subsequent control cards have the format: (10R8.0). The first field (cols. 1-8) must contain the interval, specified in station number units, for the interpolated values. The second field must contain the number of CalCOFI lines in the input file. Subsequent pairs of fields will contain line numbers followed by station numbers which designate the closest inshore points to which values will be interpolated. A designated point may be inshore of the first station on a line, in which case extrapolation will be used. The deck set-up is shown in the following example.

Example:

```
?BEGIN JOB
?RUN INTERPSTNS
?FILE OCNMEA (TITLE=OCNDAT/LINES80TO100)
?FILE OCNSTN (TITLE=OCNSTN/LINES80TO100)
?DATA
   (printer  control card)
bPRINT
   (right boundary control cards)
bbbbb2.5bbbbbbb3bbbbb080bbbb52.5bbbbb090bbbb27.5bbbbb100bbb30.0
?END JOB
```

For this example, it is assumed that the input file contains data for only three lines. If a station is encountered which is not on one of the lines designated in the control cards, the program will terminate. The 1st control card specifies that the output file will be printed. The 2nd one

specifies that interpolations will be made at intervals of 2.5 station units beginning with station 52.5 on line 80, 27.5 on line 90 and 30.0 on line 100. If a point for interpolation is coincident with an actual station, the data is simply copied from the input file to the output file.

7. INTERPSIGT

This program computes the depth of a designated value of sigma-t at each station in an OCNDAT file and determines the values of data parameters at that depth. Salinity and oxygen are computed by linear interpolation from standard depths. Temperature is computed from the designated sigma-t value and the interpolated salinity. Acceleration potential is computed from the formula:

$$\text{Acc.Pot.}=(GP)+D*(SPV(S,T,D)-SPV(35,0,D))$$

where D is the depth of the designated sigma-t surface, (GP) is the interpolated value of geopotential anomaly at D, SPV(S,T,D) is the specific volume at the interpolated salinity and temperature at depth D, and SPV (35,0,D) is the specific volume at standard values of salinity and temperature, at depth D. These values are used to create a new file, OCNSIG, in the same format as the input file, OCNSTN, except that the depth of the designated sigma-t replaces sigma-t in the 7th field and acceleration potential replaces geopotential anomaly in the 9th field, and there will be only one record for each station. A control card must be submitted at run time with the designated value of sigma-t and a 12-character string which will be inserted in header records of the output file for identification. The control card format is: (R6.0,2A6), in which the first field must contain the sigma-t value and the two alpha fields must contain the character string. The deck set-up is shown in the following example.

Example:

```
?BEGIN JOB
?RUN INTERPSIGT
?FILE OCNSTN (TITLE=OCNSTN/LINES80TO100)
?FILE OCNSIG (TITLE=OCNSIG/LINES80TO100)
?DATA
   (control card)
bb25.8bSIGT258bJan
?END JOB
```

This example uses the output of INTERPSTNS for input and computes values of data parameters at depths where sigma-t = 25.8.

8. FIT/HARMONICS

This program computes annual and semi-annual harmonic coefficients for data parameters in OCNDAT files by the method of least squares. The coefficients are related to the data parameters by the formula:

$$Y = A1*COS(X)+B1*SIN(X)+A2*COS(2X)+B2*SIN(2X)+C$$

where Y is the data parameter, X is the time coordinate on an annual cycle,

and A1, B1, A2, B2 and C are the coefficients. In computing the latter, X is determined from the year-month-day code in the second field of OCNDAT records. The input file will generally contain data from all available cruises for one or more stations. It must have been created by SORTOCNDAT, which sorts OCNDAT files by station code and combines data sets. Coefficients are computed for each of the six OCNDAT data parameters at each standard depth to 600 meters for each station, provided the sufficiency criterion is met. This requires that a station must have been occupied at least once in each of the six periods: Jan. 1-Feb. 28, Mar. 1-Apr. 28, Apr. 29-June 26, June 27-Aug. 24, Aug. 25-Oct. 22, Oct. 23-Dec. 20. The period Dec. 21-31 is a time of little or no CalCOFI activity. The above criterion is based on the premise that a least squares fit for five coefficients can be computed with only six data values provided they are reasonably spaced through the year. The output of the program will be stored in file HMCOEF in which each record has a length of 32 (32-bit) fields. Each record represents one depth and records are ordered by depth for each station. The 1st field of each record contains station code, the 2nd field contains depth. The remainder of the record is made up of six groups of 5 fields each which contain the five coefficients, A1, B1, A2, B2 and C respectively. The six groups represent the six data parameters temperature, salinity, oxygen, sigma-t, thermosteric anomaly and geopotential anomaly. A control card must be submitted at run time designating whether the output file is to be printed. The format is: (A6), and the entry "bPRINT" will invoke the print option. The deck set-up is shown in the following example.

Example:

```
? BEGIN JOB
? RUN FIT/HARMONICS
? FILE OCNSEQ (TITLE=OCNSEQ/ALLCRUISES/LINE90)
? FILE HMCOEF (TITLE=HMCOEF/ALLCRUISES/LINE90)
? DATA
   (print control card)
bPRINT
? END JOB.
```

9. HARMDEVS

This program computes the deviations of data values in OCNDAT or OCNSEQ (sorted by station code) files from corresponding values determined with harmonic coefficients computed by FIT/HARMONICS. All stations in the input file of data values must be represented in the file of harmonic coefficients, HMCOEF. The program identifies the first station on the input data file, then spaces through the reference file of coefficients until that station is found. The coefficients are used to compute a value for each data parameter at each depth and deviations from the corresponding data values are obtained. The deviations are either stored directly, as anomalies, on the output file, or accumulated for computing standard deviations, depending upon output options set at run time. If HARMDEVS is used to get anomalies, the input should be an OCNDAT file containing data from one or more cruises, each represented by a separate data set in the file. If it is used for standard deviations, the input should be an OCNSEQ file created by SORTOCNDAT with the data from all cruises sorted by station code in a single data set. The format of the output file, OCNDEV, will correspond to that of the input data file. A third output

option is available which stores the counts of data values accumulated for standard deviation in a second output file, OCNCNT. The format of the control card is: (2A6), where the 1st field is for a print option and the 2nd field is for the output option. If "bPRINT" is entered in the 1st field, the output file(s) will be printed. If the entry in the 2nd field is "bbANOM", the anomaly option will be invoked. If it is "bbSDEV", the standard deviation option will be invoked. If it is "bbCNTS" then both standard deviations and counts will be output. Parameter values computed with the harmonic coefficients will represent the date designated by the year-month-day codes in the corresponding data records. The deck set-up is shown in the following example.

Example:

```
? BEGIN JOB
? RUN HARMDEVS
? FILE OCNSEQ (TITLE=OCNDAT/TENCRUISES/LINE90)
? FILE HMCOEF (TITLE=HMCOEF/ALLCRUISES/LINE90)
? FILE OCNDEV (TITLE=OCNDEV/TENCRUISES/LINE90)
? DATA
   (run control card)
bPRINTbbANOM
? END JOB.
```

TABLE 1. CALCOFI STATIONS OCCUPIED ON SIX OR MORE CRUISES DURING 1950-1978

40040	7	40060	15	40090	15	43050	14	47055	11	50050	13	50070	20
41	44.7N	41	4.7N	40	4.7N	40	50.4N	40	5.1N	39	40.8N	39	0.8N
124	39.1W	126	11.1W	128	27.4W	124	59.5W	124	55.9W	124	8.1W	125	37.3W
5108	6004	5003	5207	5003	5207	5003	5207	5003	5107	5108	6001	5002	5207
5207	6902	5004	5606	5004	5606	5004	5606	5004	5606	5206	6004	5003	5406
5606	7205	5005	5807	5005	5807	5005	5807	5005	5804	5207	6007	5004	5508
5807		5007	6001	5006	6001	5007	5910	5007	5807	5406	6902	5005	5606
		5008	6004	5007	6004	5008	6004	5008	6004	5606	7205	5006	5807
		5009	6902	5008	6902	5009	6902	5009		5806	7207	5007	5910
		5107	7205	5009	7205	5108	7207			5910		5008	6001
		5108		5107								5009	6004
40045	9											5107	6902
												5108	7205
41	34.7N							47060	14				
125	2.2W					43060	14			50055	14		
		40070	16	40100	10			39	55.1N				
5004	5107					40	30.4N	125	18.4W	39	30.8N		
5005	5606	40	44.7N	39	44.7N	125	45.0W			124	30.5W	50080	20
5007	5807	126	56.8W	129	12.4W			5003	5108				
5008	6004					5003	5108	5004	5207	5002	5009	38	40.8N
5009		5003	5108	5003	5008	5004	5606	5005	5606	5003	5107	126	21.6W
		5004	5207	5004	5009	5005	5807	5007	5807	5004	5508		
		5005	5606	5005	5107	5007	5910	5008	6004	5005	5606	5002	5207
		5006	5807	5006	6001	5008	6004	5009	6902	5006	5910	5003	5606
		5007	6001	5007	6902	5009	6902	5107	7207	5007	6001	5004	5807
40050	14	5008	6004			5107	7207			5008	6004	5005	5907
		5009	6902									5006	5910
41	24.7N	5107	7205									5007	6001
125	25.2W											5008	6004
				40110	9			50047	6			5009	6902
5003	5108					47050	7			50060	20	5107	7205
5004	5207			39	24.7N			39	46.8N			5108	7207
5005	5606	40080	16	129	57.1W	40	15.1N	123	54.6W	39	20.8N		
5007	5807					124	33.3W			124	52.8W		
5008	6004	40	24.7N	5003	5008			5108	5910				
5009	6902	127	42.2W	5004	5009	5108	5807	5206	6001	5002	5206		
5107	7205			5005	5107	5207	6902	5207	6004	5003	5207	50090	19
		5003	5108	5006	5508	5606	7207			5004	5606		
		5004	5207	5007		5804				5005	5807	38	20.8N
		5005	5606							5006	5910	127	5.7W
		5006	5807							5007	6001		
		5007	6001							5008	6004	5002	5009
		5008	6004							5009	6902	5003	5107
		5009	6902							5107	7205	5004	5207
		5107	7205							5108	7207	5005	5406
												5006	5508
												5007	5606
												5008	5807

CALCOFI STATIONS OCCUPIED ON SIX OR MORE CRUISES DURING 1950-1978

50090 CON'T

5910 6902
6001 7205
6004

50100 12

38 0.8N
127 49.6W

5002 5008
5003 5009
5004 5107
5005 6001
5006 6902
5007 7205

50110 9

37 40.8N
128 33.3W

5002 5007
5003 5008
5004 5009
5005 5107
5006

50120 11

37 20.8N
129 16.8W

5002 5008
5003 5009
5004 5508
5005 6902
5006 7205
5007

50130 8

37 0.8N
130 0.1W

5002 5006
5003 5007
5004 5008
5005 5009

53052 7

39 2.5N
123 52.0W

5108 5910
5206 6001
5406 6004
5807

53055 9

38 56.5N
124 5.3W

5108 5910
5206 6001
5207 6004
5606 6902
5807

53060 6

38 46.5N
124 27.4W

5807 6004
5910 6902
6001 7207

57051 7

38 29.1N
123 21.9W

5108 5910
5206 6001
5207 6004
5807

57055 10

38 21.1N
123 39.5W

5108 5807
5206 5910
5207 6001
5406 6004
5606 6902

57060 6

38 11.1N
124 1.5W

5807 6004
5910 6902
6001 7207

60052 69

37 52.8N
123 1.6W

5108 5206
5109 5207
5110 5208
5111 5209
5112 5210
5204 5211

60052 CON'T

5304 6301
5305 6304
5306 6401
5307 6407
5308 6501
5506 6507
5508 6601
5510 6607
5707 6612
5801 6801
5804 6806
5805 6901
5806 6902
5807 6905
5810 6907
5901 6910
5907 6912
5910 6912
6001 7202
6004 7203
6007 7207
6009 7412
6101 7801
6104 7803
6107 7804
6110 7805
6201 7807
6203 7808
6210

60060 89

37 36.8N
123 36.5W

5002 5105
5003 5106
5004 5107
5005 5108
5006 5109
5007 5110
5008 5111
5009 5112
5101 5204
5104 5206

60060 CON'T

5207 6110
5209 6201
5210 6203
5211 6210
5304 6301
5305 6304
5306 6401
5307 6407
5308 6501
5404 6507
5405 6601
5406 6607
5407 6612
5408 6801
5506 6806
5510 6901
5604 6902
5606 6905
5707 6907
5801 6908
5804 6910
5807 6912
5810 7202
5901 7203
5904 7205
5905 7207
5907 7412
5910 7501
6001 7801
6004 7803
6007 7804
6009 7805
6101 7807
6104 7808
6107

60070 80

37 16.8N
124 19.9W

5002 5006
5003 5007
5004 5008
5005 5009

60070 CON'T

5104 6101
5105 6104
5106 6107
5107 6110
5108 6201
5109 6203
5110 6210
5111 6301
5112 6304
5204 6401
5206 6407
5207 6501
5209 6507
5210 6601
5211 6607
5304 6612
5305 6801
5307 6806
5308 6901
5506 6902
5508 6905
5510 6907
5604 6908
5606 6910
5707 6912
5804 7202
5807 7203
5810 7205
5901 7207
5904 7412
5907 7503
5910 7801
6001 7803
6004 7805
6007 7807
6009 7808

60080 79

36 56.8N
125 3.2W

5002 5005
5003 5006
5004 5007

60080 CON'T

5008 6004
5009 6007
5104 6009
5105 6101
5106 6104
5107 6107
5108 6110
5109 6201
5110 6203
5111 6210
5112 6301
5204 6304
5206 6401
5207 6407
5209 6501
5210 6507
5211 6601
5304 6607
5305 6612
5307 6801
5308 6806
5405 6901
5406 6902
5407 6905
5408 6907
5506 6910
5510 6912
5604 7203
5606 7205
5804 7207
5807 7503
5810 7507
5901 7801
5904 7805
5907 7807
5910 7808
6001

CALCOFI STATIONS OCCUPIED ON SIX OR MORE CRUISES DURING 1950-1978

60090 75

36 36.8N
125 46.3W

5002 5905
5003 5907
5004 5910
5005 6001
5006 6004
5007 6007
5008 6009
5009 6101
5104 6104
5105 6107
5106 6110
5107 6201
5108 6203
5109 6210
5111 6301
5112 6304
5204 6401
5205 6407
5206 6501
5207 6507
5209 6601
5210 6607
5211 6612
5304 6801
5305 6806
5307 6901
5308 6902
5506 6905
5510 6907
5604 6910
5606 6912
5804 7203
5805 7205
5806 7503
5807 7805
5810 7807
5901 7808
5904

60100 45

36 16.8N
126 29.1W

5002 5408
5003 5804
5004 5810
5005 6001
5006 6007
5007 6009
5008 6101
5009 6104
5104 6107
5105 6110
5106 6201
5107 6203
5111 6301
5205 6304
5206 6401
5207 6407
5210 6501
5211 6507
5305 6601
5307 6801
5308 6902
5406 7205
5407

60110 17

35 56.8N
127 11.8W

5002 5105
5003 5106
5004 5107
5005 5209
5006 5210
5007 5211
5008 5305
5009 5804
5104

60120 27

35 36.8N
127 54.3W

5002 6104
5003 6107
5004 6110
5005 6201
5006 6203
5007 6210
5008 6301
5009 6304
5106 6407
5107 6501
5305 6507
6007 6902
6009 7205
6101

60130 9

35 16.8N
128 36.7W

5002 5007
5003 5008
5004 5009
5005 5106
5006

60140 14

34 56.8N
129 18.8W

6007 6203
6009 6210
6101 6301
6104 6304
6107 6407
6110 6501
6201 6507

60160 14

34 16.8N
130 42.6W

6007 6203
6009 6210
6101 6301
6104 6304
6107 6407
6110 6501
6201 6507

60180 14

33 36.8N
132 5.8W

6007 6203
6009 6210
6101 6301
6104 6304
6107 6407
6110 6501
6201 6507

60200 13

32 56.8N
133 28.2W

6007 6203
6009 6210
6101 6301
6104 6304
6107 6501
6110 6507
6201

61055 15

37 36.5N
123 7.2W

5002 5101
5003 5104
5004 5105
5005 5106
5006 5107
5007 5109
5008 5110
5009

63052 67

37 18.6N
122 37.1W

5108 6009
5111 6101
5112 6104
5204 6107
5205 6110
5206 6201
5207 6203
5208 6210
5209 6301
5210 6304
5211 6401
5304 6407
5305 6501
5306 6507
5307 6601
5308 6607
5407 6612
5408 6801
5510 6806
5707 6901
5801 6902
5804 6905
5807 6907
5810 6908
5901 6910
5904 6912
5907 7201
5910 7202

63052 CON'T

7203 7803
7207 7804
7412 7805
7501 7807
7503 7808
7801

63055 63

37 12.6N
122 50.1W

5108 6210
5109 6301
5110 6304
5111 6401
5112 6407
5204 6501
5205 6507
5206 6601
5207 6607
5208 6612
5209 6801
5210 6806
5211 6901
5304 6902
5305 6905
5306 6907
5307 6908
5308 6910
5404 6912
5405 7201
5406 7202
5510 7203
5707 7412
6001 7501
6004 7503
6009 7801
6101 7803
6104 7804
6107 7805
6110 7807
6201 7808
6203

63057 10

37 8.6N
122 58.7W

5006 5105
5007 5107
5008 5109
5101 5110
5104 6001

63060 48

37 2.6N
123 11.7W

5707 6601
5801 6607
5807 6612
5810 6801
5901 6806
5904 6902
5907 6905
5910 6907
6001 6908
6004 6910
6009 6912
6101 7201
6104 7202
6107 7203
6110 7207
6201 7412
6203 7501
6210 7503
6301 7801
6304 7803
6401 7804
6407 7805
6501 7807
6507 7808

CALCOFI STATIONS OCCUPIED ON SIX OR MORE CRUISES DURING 1950-1978

63065 10

36 52.6N
123 33.3W

5108 5306
5205 5604
5206 5606
5207 6912
5305 7202

63067 7

36 48.6N
123 41.9W

5006 5105
5007 5106
5101 5107
5104

63070 28

36 42.6N
123 54.8W

5707 6907
5807 6908
5810 6910
5901 6912
5907 7202
5910 7203
6001 7207
6004 7503
6607 7510
6612 7801
6801 7803
6901 7805
6902 7807
6905 7808

63080 23

36 22.6N
124 37.7W

5604 6902
5707 6907
5807 6908
5810 6910
5905 6912
5907 7203
5910 7207
6001 7503
6004 7801
6607 7805
6801 7807
6901

63090 21

36 2.6N
125 20.5W

5807 6905
5901 6907
5904 6908
5907 6912
5910 7203
6004 7207
6607 7503
6801 7805
6806 7807
6901 7808
6902

67050 64

36 47.2N
122 3.4W

5108 5112
5109 5204
5110 5205
5111 5206

67050 CON'T

5207 6407
5208 6501
5209 6507
5211 6601
5304 6607
5305 6612
5306 6801
5308 6806
5404 6901
5405 6902
5406 6905
5407 6907
5408 6908
5506 6910
5510 6912
6001 7201
6004 7202
6009 7203
6101 7207
6104 7412
6107 7501
6110 7503
6201 7801
6203 7803
6210 7804
6301 7805
6304 7807
6401 7808

67055 74

36 37.2N
122 24.9W

5006 5204
5007 5205
5008 5206
5101 5207
5104 5208
5105 5209
5106 5210
5107 5211
5108 5304
5111 5305
5112 5306

67055 CON'T

5307 6501
5308 6507
5506 6601
5510 6607
5604 6612
5606 6801
5707 6806
5801 6901
5804 6902
5807 6905
5904 6907
5907 6908
5910 6910
6001 6912
6004 7201
6009 7202
6101 7203
6104 7501
6107 7503
6110 7507
6201 7801
6203 7803
6301 7804
6304 7805
6401 7807
6407 7808

67060 50

36 27.2N
122 46.4W

5707 6104
5801 6107
5804 6110
5807 6201
5810 6203
5901 6301
5904 6304
5907 6401
5910 6407
6001 6501
6004 6507
6009 6601
6101 6607

67060 CON'T

6612 7203
6801 7207
6806 7412
6901 7501
6902 7503
6905 7510
6907 7801
6908 7803
6910 7804
6912 7805
7201 7807
7202 7808

67065 31

36 17.2N
123 7.8W

5006 5211
5007 5305
5101 5306
5104 5307
5105 5308
5106 5406
5107 5407
5108 5408
5111 5506
5112 5604
5205 5606
5206 5810
5207 5907
5208 6912
5209 7202
5210

67070 28

36 7.2N
123 29.1W

5707 6907
5804 6908
5807 6912
5810 7202
5901 7203
5907 7207
5910 7412
6001 7501
6004 7503
6607 7801
6612 7803
6801 7805
6902 7807
6905 7808

67080 23

35 47.2N
124 11.7W

5604 6907
5707 6908
5804 6912
5807 7203
5810 7207
5907 7412
5910 7503
6001 7801
6004 7803
6607 7805
6901 7807
6902

67090 23

35 27.2N
124 54.2W

5804 6907
5807 6908
5901 6912
5904 7203
5907 7207
5910 7503
6004 7801
6607 7803
6806 7805
6901 7807
6902 7808
6905

70051 15

36 10.9N
121 43.6W

5108 5305
5111 5306
5112 5308
5207 5405
5208 6001
5209 7201
5211 7202
5304

70052 11

36 8.9N
121 47.8W

5406 5807
5407 5904
5408 5907
5510 5910
5803 6004
5804

CALCOFI STATIONS OCCUPIED ON SIX OR MORE CRUISES DURING 1950-1978

70053	74	70060	92	70060	CON'T	70070	CON'T	70080	CON'T	70090	CON'T	70110	19
36	6.9N	35	52.9N	7807	7808	7202	7801	6501	7202	6304	6908	34	12.9N
121	52.1W	122	21.9W			7203	7803	6507	7203	6401	6910	125	52.6W
						7205	7804	6601	7205	6407	6912		
5002	6104	5002	5810			7207	7805	6607	7207	6501	7201	5002	5105
5003	6107	5003	5901			7412	7807	6612	7412	6507	7202	5003	5106
5004	6110	5004	5904	70070	89	7501	7808	6801	7503	6601	7203	5004	5107
5005	6201	5005	5907			7503		6806	7507	6607	7205	5005	5305
5006	6203	5006	5910	35	32.9N			6901	7510	6612	7207	5006	5508
5007	6210	5007	6001	123	4.4W			6902	7801	6801	7503	5007	5804
5008	6301	5008	6004					6905	7803	6806	7801	5008	6902
5009	6304	5009	6007	5002	5801			6908	7805	6901	7803	5009	6905
5101	6401	5010	6009	5003	5803	70080	91	6910	7807	6902	7805	5010	6908
5104	6407	5101	6101	5004	5804			6912	7808	6905	7807	5104	
5105	6501	5104	6104	5005	5807	35	12.9N	7201		6907	7808		
5106	6507	5105	6107	5006	5810	123	46.7W						
5107	6601	5106	6110	5007	5901								
5204	6607	5107	6201	5008	5904	5002	5405						
5205	6612	5108	6203	5009	5907	5003	5406					70120	25
5206	6801	5109	6301	5010	5910	5004	5407	70090	78	70100	43		
5304	6806	5110	6304	5101	6001	5005	5408					33	52.9N
5305	6901	5111	6401	5104	6004	5006	5506	34	52.9N	34	32.9N	126	34.2W
5306	6902	5112	6407	5105	6007	5007	5510	124	28.8W	125	10.8W		
5307	6905	5204	6501	5106	6009	5008	5604					5003	6104
5308	6907	5205	6507	5107	6101	5009	5606	5002	5604	5002	6007	5004	6107
5506	6908	5206	6601	5108	6104	5010	5711	5003	5606	5003	6009	5005	6110
5508	6910	5207	6607	5109	6107	5101	5801	5004	5801	5004	6101	5006	6201
5510	6912	5208	6612	5110	6110	5104	5803	5005	5803	5005	6104	5007	6203
5604	7201	5209	6801	5111	6201	5105	5804	5006	5804	5006	6107	5008	6210
5606	7202	5210	6806	5112	6203	5106	5807	5007	5805	5007	6110	5009	6301
5707	7203	5211	6901	5204	6210	5107	5810	5008	5806	5008	6201	5010	6304
5711	7207	5304	6902	5205	6301	5108	5904	5009	5807	5009	6203	5106	6401
5805	7412	5305	6905	5206	6304	5109	5907	5010	5810	5010	6210	5107	6501
5806	7501	5306	6907	5207	6401	5110	5910	5101	5901	5104	6301	5305	6507
5810	7503	5307	6908	5208	6407	5111	6001	5104	5904	5105	6304	6007	6902
6001	7801	5308	6910	5209	6501	5112	6004	5105	5907	5106	6401	6101	
6001	7803	5405	6912	5210	6507	5204	6007	5106	5910	5107	6407		
6004	7804	5406	7201	5211	6601	5205	6009	5107	6001	5205	6501		
6007	7805	5407	7202	5304	6607	5206	6101	5109	6004	5206	6507		
6009	7807	5408	7203	5305	6612	5207	6104	5110	6007	5305	6601		
6101	7808	5506	7205	5306	6801	5208	6107	5205	6009	5306	6801	70130	10
		5510	7207	5308	6806	5209	6110	5206	6101	5406	6902		
		5604	7412	5506	6901	5210	6201	5207	6104	5804	6905	33	32.9N
		5606	7501	5508	6902	5211	6203	5304	6107	5807	6908	127	15.6W
		5707	7503	5510	6905	5304	6210	5305	6110	5810	6912		
		5711	7801	5604	6908	5305	6301	5306	6201	6001		5003	5007
		5803	7803	5606	6910	5306	6304	5506	6203			5004	5008
		5804	7804	5707	6912	5307	6401	5508	6210			5005	5009
		5807	7805	5711	7201	5308	6407	5510	6301			5006	5010

CALCOFI STATIONS OCCUPIED ON SIX OR MORE CRUISES DURING 1950-1978

70130 CON'T

5106 5508

70200 12

31 12.9N
132 1.4W

6007 6201
6009 6203
6101 6210
6104 6301
6107 6304
6110 6507

73050 19

35 38.6N
121 15.3W

5108 5304
5111 5305
5112 5306
5204 5307
5205 5308
5206 5510
5207 5707
5208 6912
5209 7202
5210

73051 13

35 36.6N
121 19.6W

5006 5104
5007 5105
5008 5107
5101 5711

73051 CON'T

5902 6004
6001 6010
6002

73053 55

35 32.6N
121 28.1W

5707 6401
5711 6407
5801 6501
5803 6507
5804 6601
5807 6607
5810 6612
5901 6801
5902 6806
5902 6901
5904 6902
5907 6905
5910 6907
6001 6908
6001 6910
6002 6912
6002 7201
6004 7202
6010 7203
6101 7412
6104 7501
6107 7801
6110 7803
6201 7804
6203 7805
6210 7807
6301 7808
6304

73060 79

35 18.6N
121 57.7W

5108 6010
5109 6101
5110 6104
5111 6107
5112 6110
5205 6201
5206 6203
5207 6210
5208 6301
5209 6304
5210 6401
5304 6407
5305 6501
5306 6507
5307 6601
5308 6607
5405 6612
5406 6801
5407 6806
5408 6901
5506 6902
5510 6905
5604 6907
5606 6908
5707 6910
5711 6912
5801 7201
5803 7202
5804 7203
5807 7412
5810 7501
5901 7507
5902 7510
5904 7801
5907 7803
5910 7804
6001 7805
6002 7807
6003 7808
6004

73061 7

35 16.6N
122 1.9W

5006 5105
5007 5106
5101 5107
5104

73070 37

34 58.6N
122 39.9W

5506 6901
5604 6902
5606 6905
5707 6907
5804 6908
5807 6910
5810 6912
5901 7201
5902 7202
5904 7203
5905 7412
5907 7501
5910 7801
6001 7803
6002 7804
6004 7805
6607 7807
6612 7808
6801

73080 26

34 38.6N
123 21.9W

5506 5904
5804 5907
5807 5910
5810 6001

73080 CON'T

6004 7201
6607 7202
6901 7203
6902 7412
6905 7801
6907 7803
6908 7805
6910 7807
6912 7808

73090 26

34 18.6N
124 3.7W

5506 6907
5803 6908
5804 6910
5810 6912
5904 7201
5907 7202
5910 7203
6004 7503
6601 7801
6607 7803
6901 7805
6902 7807
6905 7808

77051 59

35 1.3N
120 55.1W

5108 5207
5109 5208
5110 5209
5111 5304
5112 5305
5204 5306
5205 5307
5206 5506

77051 CON'T

5510 6612
5707 6801
5902 6806
6001 6901
6002 6902
6004 6905
6010 6907
6101 6908
6104 6910
6107 6912
6110 7201
6201 7202
6203 7203
6210 7412
6301 7501
6304 7801
6401 7803
6407 7804
6501 7805
6507 7807
6601 7808
6607

77053 7

34 57.3N
121 3.5W

5203 6001
5902 6002
5911 6401
5912

77055 94

34 53.3N
121 11.9W

5006 5104
5007 5105
5008 5106
5101 5107

77055 CON'T

5108 5910
5109 5912
5110 6001
5111 6002
5112 6004
5203 6010
5204 6101
5205 6104
5206 6107
5207 6110
5208 6201
5209 6203
5210 6210
5211 6301
5304 6304
5305 6401
5306 6407
5307 6501
5308 6507
5401 6601
5402 6607
5403 6612
5404 6801
5405 6806
5406 6901
5407 6902
5408 6905
5410 6907
5506 6908
5510 6910
5604 6912
5606 7201
5707 7202
5801 7203
5803 7412
5805 7501
5807 7503
5810 7801
5901 7803
5902 7804
5904 7805
5907 7807
5908 7808

CALCOFI STATIONS OCCUPIED ON SIX OR MORE CRUISES DURING 1950-1978

77057	16	77065	30	77080	31	80052	90	80053	11	80055	CON'T	80060	CON'T
34	49.3N	34	33.3N	34	3.3N	34	25.0N	34	23.0N	5801	6304	5109	5904
121	20.3W	121	53.9W	122	56.5W	120	35.6W	120	39.8W	5802	6307	5110	5905
										5803	6310	5111	5906
5203	6110	5006	5208	5506	6907	5108	6009	5902	6207	5804	6401	5112	5907
5204	6201	5007	5209	5707	6908	5109	6101	5911	6401	5805	6407	5201	5908
5902	6203	5101	5210	5804	6910	5110	6102	5912	6407	5806	6501	5202	5910
6001	6210	5104	5211	5807	6912	5111	6104	6001	7202	5807	6507	5203	5911
6002	6301	5105	5304	5810	7201	5112	6107	6002	7412	5810	6601	5204	5912
6101	6304	5106	5305	5904	7202	5201	6110	6004		5811	6607	5205	6001
6104	6501	5107	5306	5907	7203	5202	6201			5812	6612	5206	6002
6107	6507	5108	5307	5910	7412	5203	6203			5901	6707	5207	6003
		5109	5308	6001	7507	5203	6210			5902	6801	5208	6004
		5110	5506	6004	7510	5204	6301			5904	6806	5209	6006
		5111	5604	6601	7801	5205	6304	80055	124	5907	6901	5210	6007
		5112	6004	6607	7803	5206	6307			5908	6902	5211	6009
77060	47	5205	6407	6901	7805	5207	6310	34	19.0N	5910	6904	5301	6101
		5206	7201	6902	7807	5208	6401	120	48.1W	5911	6905	5302	6102
34	43.3N	5207	7202	6904	7808	5209	6407			5912	6907	5303	6104
121	32.9W			6905		5210	6501	5002	5302	6001	6908	5304	6107
						5211	6507	5003	5303	6002	6910	5305	6110
5203	6407					5301	6601	5004	5304	6004	6912	5306	6201
5204	6601					5302	6607	5005	5305	6007	7201	5307	6203
5707	6607	77070	37			5303	6612	5006	5306	6009	7202	5308	6207
5801	6612			77090	28	5304	6707	5007	5307	6101	7203	5502	6210
5803	6801	34	23.3N			5305	6801	5008	5308	6102	7412	5504	6301
5804	6806	122	14.8W	33	43.3N	5306	6806	5101	5401	6104	7501	5506	6304
5805	6901			123	38.0W	5307	6901	5102	5402	6107	7801	5508	6307
5807	6902	5606	6612			5308	6902	5103	5403	6110	7803	5510	6310
5810	6905	5707	6901	5506	6904	5504	6902	5104	5404	6201	7804	5512	6401
5901	6907	5804	6902	5707	6905	5506	6904	5105	5405	6203	7805	5602	6407
5902	6908	5807	6905	5803	6907	5510	6905	5106	5406	6210	7807	5604	6501
5904	6910	5810	6907	5804	6908	5512	6907	5108	5408	6301	7808	5606	6507
5907	6912	5901	6908	5807	6910	5712	6908	5109	5410			5704	6601
5908	7201	5902	6910	5810	6912	5801	6910	5110	5502			5707	6607
5910	7202	5904	6912	5904	7201	5803	6912	5111	5504			5710	6612
5911	7203	5905	7201	5907	7202	5804	7201	5112	5506			5711	6707
5912	7501	5906	7202	5910	7203	5805	7201	5201	5508	80060	123	5712	6801
6001	7801	5907	7203	6004	7801	5806	7202	5202	5510			5801	6806
6002	7803	5910	7501	6601	7803	5807	7202	5203	5511	34	9.0N	5802	6901
6003	7804	5911	7801	6607	7805	5810	7203	5204	5512	121	9.0W	5803	6902
6004	7805	5912	7803	6901	7807	5811	7207	5205	5602			5804	6904
6006	7807	6001	7804	6902	7808	5812	7412	5206	5604	5002	5101	5805	6905
6010	7808	6002	7805			5901	7412	5207	5606	5003	5102	5806	6907
6401		6401	7807			5904	7801	5208	5704	5004	5103	5807	6908
		6407	7808			5907	7803	5209	5707	5005	5104	5810	6910
		6607				5908	7804	5210	5710	5006	5106	5811	6912
						5910	7807	5211	5711	5007	5107	5901	7201
						6007	7808	5301	5712	5008	5108	5902	7202

CALCOFI STATIONS OCCUPIED ON SIX OR MORE CRUISES DURING 1950-1978

80060 CON'T

7203	7801
7205	7803
7207	7804
7412	7805
7501	7807
7507	7808
7510	

80070 123

33 49.0N
121 50.6W

5002	5304
5003	5305
5004	5306
5005	5307
5006	5308
5007	5401
5008	5402
5101	5403
5102	5404
5103	5405
5104	5407
5106	5408
5107	5410
5108	5502
5109	5504
5110	5506
5111	5508
5112	5510
5201	5512
5202	5602
5203	5604
5204	5606
5205	5704
5206	5707
5207	5710
5208	5711
5209	5712
5210	5801
5211	5803
5301	5804
5302	5805
5303	5806

80070 CON'T

5807	6501
5810	6507
5901	6601
5902	6607
5904	6612
5907	6707
5908	6801
5910	6806
5911	6901
5912	6904
6001	6905
6002	6907
6004	6908
6007	6910
6009	6912
6101	7201
6102	7202
6104	7203
6107	7205
6110	7207
6201	7412
6203	7501
6207	7503
6210	7801
6301	7803
6304	7804
6307	7805
6310	7807
6401	7808
6407	

80080 111

33 29.0N
122 32.0W

5002	5103
5003	5104
5004	5106
5005	5107
5006	5108
5007	5109
5008	5110
5101	5111
5102	5112

80080 CON'T

5201	6004
5202	6007
5203	6009
5204	6101
5205	6102
5206	6104
5207	6107
5208	6110
5209	6201
5210	6203
5211	6207
5301	6210
5302	6301
5303	6304
5304	6307
5306	6310
5307	6401
5308	6407
5502	6501
5504	6507
5506	6601
5510	6607
5512	6612
5602	6707
5604	6801
5606	6806
5704	6901
5707	6902
5710	6904
5712	6905
5801	6907
5803	6908
5804	6910
5805	6912
5806	7201
5807	7202
5810	7203
5812	7205
5901	7207
5902	7412
5904	7501
5905	7801
5907	7803
5908	7805
5910	7807
6001	7808
6002	

80090 117

33 9.0N
123 13.3W

5002	5510
5003	5512
5004	5602
5005	5604
5006	5606
5007	5704
5008	5707
5101	5710
5102	5712
5103	5802
5104	5803
5106	5804
5107	5805
5109	5806
5110	5807
5111	5810
5112	5901
5201	5902
5202	5904
5204	5906
5205	5907
5206	5908
5207	5910
5208	6001
5209	6002
5210	6003
5211	6004
5301	6006
5303	6007
5304	6009
5305	6101
5306	6104
5307	6107
5308	6110
5401	6201
5403	6203
5404	6207
5405	6210
5406	6301
5408	6304
5410	6307
5412	6310
5504	6401
5506	6407
5508	6501

80090 CON'T

6507	6912
6601	7201
6607	7202
6612	7203
6707	7205
6801	7207
6806	7412
6901	7501
6902	7801
6904	7803
6905	7805
6907	7807
6908	7808
6910	

80100 51

32 49.0N
123 54.4W

5002	5301
5003	5303
5004	5304
5005	5305
5006	5306
5007	5307
5008	5308
5102	5905
5103	6007
5104	6009
5106	6101
5107	6104
5109	6107
5110	6110
5111	6201
5201	6203
5202	6207
5203	6210
5205	6301
5206	6304
5207	6401
5208	6407
5209	6501
5210	6507
5211	6601

80100 CON'T

6801

80110 19

32 29.0N
124 35.3W

5002	5106
5003	5107
5004	5201
5005	5304
5006	5305
5007	5401
5008	5508
5102	5804
5103	6207
5104	

80120 27

32 9.0N
125 16.1W

5002	6101
5003	6104
5004	6107
5005	6110
5006	6201
5007	6203
5008	6207
5102	6210
5103	6301
5104	6304
5304	6401
5305	6501
5905	6507
6007	

80130 14

31 49.0N
125 56.7W

5002	5102
5003	5103
5004	5104
5005	5304
5006	5305
5007	5804
5008	6207

80200 14

29 29.0N
130 37.2W

6007	6207
6009	6210
6101	6301
6104	6304
6107	6407
6110	6501
6201	6507

82047 63

34 14.2N
120 0.5W

5307	5410
5309	5412
5310	5604
5311	5606
5312	5704
5401	5707
5402	5710
5403	5801
5404	5804
5405	5807
5406	5810
5407	5901
5408	5902

CALCOFI STATIONS OCCUPIED ON SIX OR MORE CRUISES DURING 1950-1978

82047 CON'T

5904 6801
5907 6806
5908 6901
5910 6902
5911 6904
6001 6905
6002 6907
6003 6908
6004 6910
6005 6912
6006 7201
6401 7202
6407 7203
6501 7801
6507 7803
6601 7804
6607 7807
6612 7808
6707

83040 11

34 14.7N
119 22.2W

5302 5502
5303 5506
5304 5509
5305 5511
5306 7202
5307

83042 8

34 10.7N
119 30.5W

6401 7804
7602 7805
7801 7807
7803 7808

83043 75

34 8.7N
119 34.7W

5111 5804
5112 5807
5205 5810
5206 5811
5301 5901
5302 5902
5303 5904
5304 5907
5305 5908
5306 5910
5307 5911
5308 5912
5309 6001
5310 6002
5311 6003
5312 6004
5401 6005
5402 6006
5403 6501
5404 6507
5405 6601
5406 6607
5407 6612
5408 6707
5410 6801
5412 6806
5502 6901
5504 6902
5506 6904
5510 6905
5512 6907
5602 6908
5604 6910
5606 6912
5704 7201
5707 7202
5710 7602
5801

83048 12

33 58.7N
119 55.5W

5301 5307
5302 5308
5303 5309
5304 5310
5305 5311
5306 5312

83051 64

33 52.7N
120 8.0W

5011 5810
5301 5901
5302 5902
5303 5904
5304 5907
5305 5908
5306 5910
5307 6001
5308 6004
5309 6401
5310 6501
5311 6507
5312 6601
5401 6607
5402 6612
5403 6707
5404 6801
5405 6806
5406 6901
5407 6902
5408 6904
5410 6905
5412 6907
5502 6908
5504 6910
5510 6912
5512 7202
5801 7203
5804 7712
5807 7801

83051 CON'T

7803 7807
7804 7808

83055 65

33 44.7N
120 24.6W

5002 5901
5004 5902
5005 5904
5006 5907
5007 5908
5101 5910
5102 6001
5104 6004
5105 6401
5106 6501
5109 6507
5110 6601
5204 6607
5205 6612
5206 6707
5301 6801
5302 6806
5303 6901
5304 6902
5305 6905
5306 6908
5307 6912
5308 7201
5309 7202
5310 7203
5311 7507
5312 7712
5604 7801
5606 7803
5801 7804
5804 7807
5807 7808
5810

83060 106

33 34.7N
120 45.3W

5002 5801
5004 5804
5005 5807
5006 5810
5007 5811
5008 5901
5011 5902
5101 5903
5102 5904
5104 5905
5105 5906
5110 5907
5204 5908
5205 5910
5206 5911
5301 5912
5302 6001
5303 6002
5304 6003
5305 6004
5306 6005
5307 6006
5308 6010
5311 6104
5312 6107
5401 6110
5402 6201
5403 6203
5404 6301
5405 6307
5406 6310
5408 6401
5410 6404
5412 6501
5502 6504
5506 6507
5509 6601
5510 6607
5511 6612
5512 6707
5602 6801
5604 6806
5606 6901
5704 6902
5707 6904

83060 CON'T

6905 7510
6907 7712
6908 7801
6910 7803
6912 7804
7201 7805
7202 7807
7203 7808

83070 63

33 14.7N
121 26.6W

5002 5910
5004 6001
5005 6004
5006 6501
5007 6507
5008 6601
5011 6607
5101 6612
5104 6707
5105 6801
5204 6806
5205 6901
5206 6902
5304 6904
5305 6905
5306 6907
5504 6908
5506 6910
5604 6912
5606 7201
5704 7202
5707 7203
5710 7412
5801 7501
5807 7503
5810 7712
5901 7801
5902 7803
5904 7804
5907 7805
5908 7807

83070 CON'T

7808

83080 62

32 54.7N
122 7.7W

5002 5907
5003 5908
5004 5910
5005 6001
5006 6004
5007 6507
5011 6601
5101 6607
5104 6612
5204 6707
5205 6801
5206 6806
5304 6901
5305 6902
5306 6904
5404 6905
5405 6907
5406 6908
5504 6910
5506 6912
5604 7201
5606 7202
5704 7203
5707 7412
5710 7501
5803 7712
5807 7801
5810 7803
5901 7805
5902 7807
5904 7808

CALCOFI STATIONS OCCUPIED ON SIX OR MORE CRUISES DURING 1950-1978

83090 57

32 34.7N
122 48.7W

5002 5910
5003 6001
5004 6004
5005 6501
5006 6507
5007 6601
5011 6607
5101 6707
5104 6801
5204 6806
5205 6901
5206 6902
5304 6904
5305 6905
5306 6907
5504 6908
5506 6910
5604 6912
5606 7201
5707 7202
5710 7203
5712 7412
5807 7501
5810 7801
5901 7803
5902 7805
5904 7807
5907 7808
5908

85038 13

34 1.0N
119 2.0W

5108 5203
5109 5207
5110 5208
5111 5209
5112 5210
5201 5211
5202

85039 23

33 59.0N
119 6.1W

5301 5403
5302 5404
5303 5405
5304 5406
5305 5407
5306 5408
5307 5410
5308 5412
5309 5509
5311 5511
5312 7602
5402

85040 27

33 57.0N
119 10.3W

5103 5211
5107 5301
5108 5302
5109 5303
5110 5304
5111 5305
5112 5306
5201 5307
5202 5308
5203 5309
5207 5311
5208 5312
5209 7602
5210

85045 21

33 47.0N
119 31.1W

5301 5401
5302 5402
5303 5403
5304 5404
5305 5405
5306 5406
5307 5407
5308 5408
5309 5410
5311 5412
5312

85050 27

33 37.0N
119 51.8W

5103 5301
5108 5302
5109 5303
5110 5304
5111 5305
5112 5306
5201 5307
5202 5308
5203 5309
5207 5311
5208 5312
5209 5509
5210 5511
5211

85055 22

33 27.0N
120 12.5W

5301 5401
5302 5402
5303 5403
5304 5404
5305 5405
5306 5406
5307 5407
5308 5408
5309 5410
5311 5412
5312 6407

85060 24

33 17.0N
120 33.1W

5108 5302
5110 5303
5111 5304
5201 5305
5202 5306
5203 5307
5207 5308
5208 5311
5209 5509
5210 5511
5211 6407
5301 6904

85070 6

32 57.0N
121 14.3W

5103 5202
5108 5203
5201 5207

87035 60

33 49.4N
118 37.7W

5002 5512
5003 5801
5004 5804
5005 5807
5006 5810
5007 5901
5101 5902
5102 5904
5104 5908
5105 5910
5204 6001
5205 6004
5206 6501
5301 6507
5302 6601
5303 6607
5304 6612
5305 6707
5306 6801
5307 6806
5308 6901
5309 6902
5311 6904
5312 6905
5502 6907
5504 6908
5506 6910
5509 6912
5510 7202
5511 7203

87036 12

33 47.4N
118 41.9W

5602 7712
5604 7801
5606 7803
5704 7804
5707 7807
7602 7808

87040 92

33 39.4N
118 58.5W

5002 5801
5003 5804
5004 5807
5005 5810
5006 5811
5007 5812
5101 5901
5102 5902
5104 5904
5105 5907
5204 5908
5205 5910
5206 5911
5301 5912
5302 6001
5303 6002
5304 6003
5305 6004
5306 6005
5307 6006
5308 6501
5309 6507
5311 6601
5312 6607
5401 6612
5402 6707
5403 6801
5404 6806
5405 6901
5406 6902
5407 6904
5408 6905
5410 6907
5412 6908
5502 6910
5504 6912
5506 7201
5510 7202
5512 7203
5602 7602
5604 7712
5606 7801
5704 7803
5707 7804
5710 7805

87040 CON'T

7807 7808

87045 57

33 29.4N
119 19.1W

5301 6507
5302 6601
5303 6607
5304 6612
5305 6707
5306 6801
5307 6806
5308 6901
5309 6902
5311 6904
5312 6905
5509 6907
5510 6908
5511 6910
5707 6912
5710 7201
5801 7202
5804 7203
5807 7501
5810 7507
5901 7602
5902 7712
5904 7801
5907 7803
5908 7804
5910 7805
6001 7807
6004 7808
6501

CALCOFI STATIONS OCCUPIED ON SIX OR MORE CRUISES DURING 1950-1978

87050	60	87055	CON'T	87060	CON'T	87070	CON'T	87090	50	90028	CON'T	90032	121
33	19.4N	5710	5907	6004	6908	7201	7801	31	59.4N	5308	6005	33	21.1N
119	39.8W	5801	5908	6005	6910	7202	7803	122	23.6W	5310	6006	118	2.6W
		5804	5910	6006	6912	7203	7804			5312	6007		
5002	5502	5807	6001	6504	7201	7412	7805	5002	6001	5401	6008	5002	5602
5005	5504	5810	6004	6507	7202	7501	7807	5004	6004	5402	6010	5003	5604
5007	5506	5901	6801	6607	7203	7712	7808	5005	6507	5403	6101	5004	5606
5101	5510	5902	7201	6612	7412			5006	6607	5404	6104	5005	5704
5104	5512	5904	7202	6707	7503			5007	6707	5405	6107	5006	5707
5105	6501			6801	7712			5101	6801	5406	6110	5007	5710
5204	6507			6806	7801			5104	6806	5407	6201	5008	5712
5205	6601			6901	7803	87080	62	5105	6901	5408	6203	5009	5802
5206	6607			6902	7804			5204	6902	5410	6207	5101	5803
5301	6612	87060	92	6904	7805	32	19.4N	5304	6904	5412	6211	5102	5804
5302	6707			6905	7807	121	42.9W	5305	6905	5502	6302	5103	5807
5303	6806	32	59.4N	6907	7808			5306	6907	5504	6304	5104	5809
5304	6901	120	21.0W			5002	5908	5504	6908	5506	6307	5105	5810
5305	6902					5004	5910	5506	6910	5509	6310	5106	5811
5306	6904	5002	5412			5005	6001	5604	6912	5510	6401	5107	5812
5307	6905	5003	5502			5006	6004	5707	7202	5511	6404	5108	5901
5308	6907	5004	5504	87070	60	5007	6501	5710	7203	5512	6407	5109	5901
5309	6908	5005	5506			5101	6507	5712	7412	5712	6410	5110	5902
5311	6910	5006	5509	32	39.4N	5104	6607	5807	7501	5804	6501	5111	5902
5312	6912	5007	5510	121	2.0W	5105	6612	5810	7507	5807	6504	5201	5903
5401	7201	5008	5511			5204	6707	5902	7801	5810	6507	5202	5904
5402	7202	5101	5512	5002	5804	5205	6801	5904	7803	5811	6607	5203	5905
5403	7203	5104	5602	5003	5807	5206	6806	5907	7805	5812	6610	5204	5906
5404	7712	5105	5604	5004	5810	5304	6901	5908	7807	5901	6612	5205	5907
5405	7801	5204	5606	5005	5902	5305	6902	5910	7808	5902	6707	5206	5908
5406	7803	5205	5707	5006	5904	5306	6904			5903	6801	5207	5909
5407	7804	5206	5710	5007	5907	5404	6905			5904	6806	5208	5910
5408	7805	5301	5801	5008	5908	5405	6907			5905	6901	5209	5911
5410	7807	5302	5804	5101	5910	5406	6908			5906	6902	5210	5912
5412	7808	5304	5807	5104	6001	5504	6910	90028	103	5907	6904	5211	6001
		5305	5810	5105	6004	5506	6912			5908	6905	5301	6002
		5306	5811	5204	6507	5604	7201	33	29.1N	5910	6907	5302	6003
		5307	5812	5205	6607	5606	7202	117	46.1W	5911	6908	5303	6004
		5308	5902	5206	6612	5704	7203			5912	6910	5304	6005
87055	28	5309	5904	5304	6707	5707	7412	5108	5208	6001	6912	5305	6006
		5311	5905	5305	6801	5710	7501	5109	5209	6002	7202	5306	6007
33	9.4N	5401	5906	5306	6806	5801	7510	5110	5210	6003	7207	5307	6008
120	0.4W	5402	5907	5504	6901	5803	7712	5111	5211	6004		5308	6010
		5403	5908	5506	6902	5807	7801	5201	5301			5310	6101
5301	5307	5404	5910	5604	6904	5810	7803	5202	5302			5312	6104
5302	5308	5405	5911	5702	6905	5902	7805	5203	5303			5502	6107
5303	5309	5406	5912	5704	6907	5904	7807	5204	5304			5504	6110
5304	5311	5407	6001	5707	6908	5907	7808	5205	5305			5506	6201
5305	5312	5408	6002	5710	6910			5206	5306			5510	6203
5306	5707	5410	6003	5801	6912			5207	5307			5512	6207

CALCOFI STATIONS OCCUPIED ON SIX OR MORE CRUISES DURING 1950-1978

90032 CON'T		90037 CON'T		90037 CON'T		90045 CON'T		90045 CON'T		90053 CON'T		90053 CON'T	
6211	6801	5201	5809	6806	7207	5210	6002	7801	7805	5111	5812	6905	7210
6302	6806	5202	5810	6901	7210	5211	6003	7803	7807	5112	5901	6907	7412
6304	6901	5203	5811	6902	7503	5301	6004	7804		5201	5902	6908	7712
6307	6902	5204	5812	6904	7602	5302	6005			5202	5903	6910	7801
6310	6904	5205	5901	6905	7712	5303	6006			5203	5904	6912	7803
6401	6905	5206	5902	6907	7801	5304	6007			5204	5905	7202	7804
6404	6907	5207	5903	6908	7803	5305	6008			5205	5906	7203	7805
6407	6908	5208	5904	6910	7804	5306	6010	90050	35	5206	5907	7205	7807
6410	6910	5209	5905	6912	7805	5307	6101			5207	5908	7207	7808
6501	6912	5211	5906	7202	7807	5308	6104	32	45.1N	5208	5910		
6504	7202	5301	5907	7203	7808	5310	6105	119	16.6W	5209	5911		
6507	7203	5302	5908	7205		5312	6107			5210	5912		
6607	7205	5303	5909			5502	6110	5303	5901	5211	6001		
6610	7207	5304	5910			5504	6201	5304	5902	5301	6002	90060	126
6612	7210	5305	5911			5506	6203	5305	5903	5302	6003		
6707		5306	5912			5510	6211	5306	5904	5303	6004	32	25.1N
		5307	6001	90039	7	5512	6302	5307	5907	5304	6005	119	57.6W
		5308	6002			5602	6304	5308	5908	5305	6006		
		5310	6003	33	7.1N	5604	6307	5310	5909	5306	6007	5002	5301
		5312	6004	118	31.5W	5606	6310	5312	5910	5307	6008	5004	5302
90033	7	5401	6005			5702	6401	5410	5911	5308	6010	5005	5303
		5402	6006	6902	6908	5704	6404	5412	5912	5310	6101	5006	5304
33	19.1N	5403	6007	6904	6910	5707	6407	5502	6001	5312	6104	5007	5305
118	6.7W	5404	6008	6905	6912	5710	6410	5504	6002	5401	6107	5008	5306
		5405	6010	6907		5712	6501	5712	6003	5402	6110	5009	5307
7712	7805	5406	6101			5802	6504	5807	6004	5403	6201	5101	5308
7801	7807	5407	6104			5803	6507	5809	6005	5404	6203	5102	5310
7803	7808	5408	6107			5804	6607	5810	6006	5405	6211	5103	5312
7804		5410	6110			5805	6610	5811	6207	5406	6302	5104	5502
		5412	6201	90045	129	5806	6612	5812		5407	6304	5105	5504
		5502	6203			5807	6707			5408	6307	5106	5506
		5504	6211	32	55.1N	5809	6801			5506	6310	5107	5510
		5506	6302	118	56.1W	5810	6806			5508	6401	5108	5512
90037	139	5508	6304			5811	6901			5509	6404	5109	5602
		5510	6307	5002	5108	5812	6902	90053	132	5510	6407	5110	5604
33	11.1N	5512	6310	5003	5109	5901	6904			5511	6410	5111	5606
118	23.2W	5602	6401	5004	5110	5902	6905	32	39.1N	5512	6501	5112	5704
		5604	6404	5005	5111	5903	6907	119	28.9W	5602	6504	5201	5707
5002	5103	5606	6407	5006	5112	5904	6908			5604	6507	5202	5710
5003	5104	5702	6410	5007	5201	5905	6910	5002	5102	5606	6607	5203	5712
5004	5105	5704	6501	5008	5202	5906	6912	5003	5103	5704	6610	5204	5802
5005	5106	5707	6504	5009	5203	5907	7202	5004	5104	5710	6612	5205	5803
5006	5107	5710	6507	5101	5204	5908	7203	5005	5105	5712	6707	5206	5807
5007	5108	5712	6607	5102	5205	5909	7205	5006	5106	5802	6801	5207	5809
5008	5109	5802	6610	5103	5206	5910	7207	5007	5107	5803	6806	5208	5810
5009	5110	5803	6612	5104	5207	5911	7210	5008	5108	5807	6901	5209	5811
5101	5111	5804	6707	5105	5208	5912	7602	5009	5109	5810	6902	5210	5812
5102	5112	5807	6801	5106	5209	6001	7712	5101	5110	5811	6904	5211	5902

CALCOFI STATIONS OCCUPIED ON SIX OR MORE CRUISES DURING 1950-1978

90060 CON'T

5903	6407
5904	6410
5905	6501
5906	6504
5907	6507
5908	6607
5909	6610
5910	6612
5911	6707
5912	6801
6001	6806
6002	6901
6003	6902
6004	6904
6005	6905
6006	6907
6007	6908
6008	6910
6010	6912
6101	7202
6104	7203
6107	7205
6110	7207
6201	7210
6203	7501
6207	7507
6211	7712
6302	7801
6304	7803
6307	7804
6310	7805
6401	7807
6404	7808

90070 132

32	5.1N
120	38.3W

5002	5009
5004	5101
5005	5102
5006	5103
5007	5104
5008	5105

90070 CON'T

5106	5803
5107	5807
5108	5809
5109	5810
5110	5811
5111	5812
5201	5902
5202	5903
5203	5904
5204	5905
5205	5906
5206	5907
5207	5908
5208	5909
5209	5910
5210	5911
5211	5912
5301	6001
5302	6002
5303	6003
5304	6004
5305	6005
5306	6006
5307	6007
5308	6008
5310	6010
5401	6101
5402	6104
5403	6107
5404	6110
5405	6201
5406	6203
5407	6207
5408	6211
5410	6302
5412	6304
5502	6307
5506	6310
5510	6401
5512	6404
5602	6407
5604	6410
5606	6501
5704	6504
5707	6507
5710	6607
5712	6612
5802	6707

90070 CON'T

6801	7205
6806	7207
6901	7210
6902	7412
6904	7501
6905	7712
6907	7801
6908	7803
6910	7804
6912	7805
7202	7807
7203	7808

90080 112

31	45.1N
121	18.9W

5002	5504
5004	5510
5006	5512
5007	5602
5008	5604
5009	5606
5101	5704
5102	5707
5103	5710
5104	5712
5105	5801
5106	5803
5107	5807
5108	5810
5201	5811
5202	5812
5203	5902
5204	5903
5205	5904
5206	5905
5207	5906
5301	5907
5302	5908
5303	5909
5304	5910
5305	5911
5306	5912

90080 CON'T

6001	6610
6002	6612
6003	6707
6004	6801
6005	6806
6006	6901
6007	6902
6008	6904
6010	6905
6101	6907
6104	6908
6107	6910
6110	6912
6201	7202
6203	7203
6207	7205
6210	7207
6302	7210
6304	7412
6307	7501
6310	7503
6401	7510
6404	7712
6407	7801
6410	7803
6501	7804
6504	7805
6507	7807
6607	7808

90090 110

31	25.1N
121	59.4W

5002	5103
5003	5104
5004	5105
5005	5106
5006	5107
5007	5108
5008	5201
5009	5202
5101	5203
5102	5204

90090 CON'T

5205	6104
5206	6107
5207	6110
5301	6201
5303	6203
5304	6207
5305	6210
5306	6301
5401	6304
5404	6307
5405	6310
5504	6401
5508	6404
5510	6407
5604	6410
5606	6501
5704	6504
5707	6507
5710	6607
5712	6610
5801	6612
5802	6707
5803	6801
5806	6806
5807	6901
5810	6902
5902	6904
5903	6905
5904	6907
5905	6908
5907	6910
5908	6912
5909	7202
5910	7203
5912	7205
6001	7207
6002	7210
6003	7412
6004	7501
6005	7801
6006	7803
6007	7804
6008	7805
6010	7807
6101	7808

90100 67

31	5.1N
122	39.7W

5002	6104
5003	6107
5004	6110
5005	6201
5006	6203
5007	6207
5008	6210
5009	6301
5101	6304
5102	6401
5103	6404
5104	6407
5105	6410
5106	6501
5107	6504
5108	6507
5204	6607
5206	6610
5207	6707
5304	6801
5305	6901
5306	6904
5909	6907
5912	6910
6001	7205
6002	7210
6003	7412
6004	7501
6005	7801
6006	7803
6007	7804
6008	7807
6010	7808
6101	

90110 28

30	45.1N
123	19.9W

5002	5107
5003	5304
5004	5305
5005	5401
5006	5905
5007	5909
5008	6207
5009	6507
5101	6610
5102	6612
5103	6707
5104	7804
5105	7807
5106	7808

90120 45

30	25.1N
123	59.9W

5002	6110
5003	6201
5004	6203
5005	6207
5006	6210
5007	6301
5008	6304
5009	6401
5101	6407
5102	6501
5103	6507
5104	6610
5105	6612
5304	6707
5305	6901
5508	6904
5909	6907
6007	6910
6010	7205
6101	7210
6104	7804
6107	7807

CALCOFI STATIONS OCCUPIED ON SIX OR MORE CRUISES DURING 1950-1978

90120 CON'T

7808

90130 11

30 5.1N
124 39.8W

5009 6612
5304 6707
5305 7804
5804 7807
5905 7808
6207

90140 27

29 45.1N
125 19.6W

6007 6501
6010 6507
6101 6612
6104 6707
6107 6901
6110 6904
6201 6907
6203 6910
6207 7205
6210 7210
6301 7804
6304 7807
6401 7808
6407

90160 22

29 5.1N
126 38.7W

5009 6207
5304 6210
5305 6301
6007 6304
6010 6401
6101 6407
6104 6501
6107 6507
6110 7804
6201 7807
6203 7808

90180 19

28 25.1N
127 57.3W

6007 6301
6010 6304
6101 6401
6104 6407
6107 6501
6110 6507
6201 7804
6203 7807
6207 7808
6210

90200 17

27 45.1N
129 15.5W

6007 6201
6010 6203
6101 6207
6104 6210
6107 6301
6110 6304

90200 CON'T

6401 7804
6501 7807
6507

93028 101

32 54.8N
117 23.7W

5108 5811
5109 5812
5110 5901
5111 5902
5112 5903
5201 5904
5202 5905
5203 5906
5204 5907
5205 5908
5206 5909
5207 5910
5208 5911
5209 5912
5210 6001
5211 6002
5301 6003
5302 6004
5303 6005
5304 6007
5305 6008
5306 6010
5307 6102
5308 6104
5310 6107
5312 6110
5502 6201
5504 6203
5506 6207
5510 6210
5512 6302
5801 6304
5804 6307
5807 6310
5809 6401
5810 6404

93028 CON'T

6410 6905
6501 6907
6507 6907
6601 6909
6604 6909
6607 6910
6610 6910
6612 6912
6801 6912
6806 7202
6901 7202
6902 7203
6902 7602
6904 7808
6905

93029 13

32 52.8N
117 27.8W

6001 7712
6002 7801
6006 7803
6102 7804
6107 7807
6110 7808
7602

93030 134

32 50.8N
117 31.9W

5002 5103
5003 5104
5004 5105
5005 5106
5006 5107
5007 5108
5101 5109
5102 5110

93030 CON'T

5111 5809
5112 5810
5201 5811
5202 5812
5203 5901
5204 5902
5205 5903
5206 5904
5207 5905
5208 5906
5209 5907
5210 5908
5211 5909
5301 5910
5302 5911
5303 5912
5304 6001
5305 6002
5306 6003
5307 6004
5308 6005
5310 6006
5312 6007
5401 6008
5402 6010
5403 6102
5404 6104
5405 6107
5406 6110
5407 6201
5408 6203
5410 6207
5412 6210
5502 6301
5504 6302
5506 6304
5510 6307
5512 6310
5602 6401
5604 6404
5606 6410
5704 6501
5707 6507
5709 6601
5710 6604
5801 6607
5804 6610
5807 6612

93030 CON'T

6801 7203
6806 7205
6901 7412
6902 7602
6904 7712
6905 7801
6907 7803
6909 7804
6910 7805
6912 7807
7202 7808

93035 22

32 40.8N
117 52.4W

5811 6005
5812 6901
5902 6902
5903 6904
5905 6905
5906 6907
5910 6908
5911 6910
5912 6912
6002 7202
6003 7602

93040 122

32 30.8N
118 12.8W

5002 5103
5003 5104
5004 5105
5005 5106
5006 5107
5007 5108
5101 5109
5102 5110

93040 CON'T

5112 5907
5201 5908
5202 5909
5203 5910
5204 5911
5205 5912
5206 6001
5207 6002
5208 6003
5209 6004
5210 6005
5211 6006
5301 6007
5302 6008
5303 6010
5304 6102
5305 6104
5306 6107
5307 6110
5308 6201
5310 6203
5312 6207
5408 6210
5502 6302
5504 6304
5506 6307
5510 6310
5512 6401
5602 6404
5604 6410
5606 6501
5704 6504
5707 6507
5709 6601
5710 6604
5801 6607
5804 6610
5807 6612
5809 6707
5810 6801
5811 6806
5812 6901
5901 6902
5902 6904
5903 6905
5904 6907
5905 6908
5906 6910

CALCOFI STATIONS OCCUPIED ON SIX OR MORE CRUISES DURING 1950-1978

93040 CON'T

6912	7803
7203	7804
7602	7805
7712	7807
7801	7808

93050 127

32 10.8N
118 53.6W

5003	5308
5004	5310
5005	5312
5006	5401
5007	5402
5101	5404
5102	5405
5103	5406
5104	5407
5105	5408
5106	5410
5108	5412
5109	5502
5110	5504
5111	5506
5112	5510
5201	5512
5202	5602
5203	5604
5204	5606
5205	5704
5206	5707
5207	5709
5208	5710
5209	5801
5210	5804
5211	5807
5301	5809
5302	5810
5303	5811
5304	5812
5305	5901
5306	5902
5307	5903

93050 CON'T

5904	6404
5905	6410
5906	6501
5907	6507
5908	6601
5909	6604
5910	6607
5911	6610
5912	6612
6001	6707
6002	6801
6003	6806
6004	6901
6005	6902
6006	6904
6007	6905
6008	6907
6010	6908
6102	6910
6104	6912
6107	7202
6110	7203
6201	7712
6203	7801
6207	7803
6210	7804
6302	7805
6307	7807
6310	7808
6401	

93060 103

31 50.8N
119 34.3W

5003	5105
5004	5106
5005	5108
5006	5201
5007	5202
5101	5203
5102	5204
5103	5205
5104	5206

93060 CON'T

5207	6104
5301	6107
5302	6110
5304	6201
5306	6203
5504	6207
5506	6210
5510	6302
5602	6307
5604	6310
5606	6401
5704	6404
5707	6410
5710	6501
5801	6504
5804	6507
5807	6601
5809	6604
5810	6607
5811	6610
5812	6612
5901	6707
5902	6801
5903	6806
5904	6901
5905	6902
5906	6904
5907	6905
5908	6907
5909	6908
5910	6910
5911	6912
5912	7202
6001	7203
6002	7510
6003	7712
6004	7801
6005	7803
6006	7804
6007	7805
6008	7807
6010	7808
6102	

93070 102

31 30.8N
120 14.8W

5002	5909
5005	5910
5006	5911
5007	5912
5101	6001
5102	6002
5103	6003
5104	6004
5105	6005
5106	6006
5108	6007
5201	6008
5202	6010
5203	6102
5204	6107
5205	6110
5206	6201
5207	6203
5304	6207
5306	6210
5403	6302
5404	6304
5405	6307
5504	6310
5602	6401
5604	6404
5606	6410
5704	6501
5707	6504
5710	6507
5801	6601
5804	6604
5807	6607
5809	6612
5810	6707
5811	6801
5812	6806
5901	6901
5902	6902
5903	6904
5904	6905
5905	6907
5906	6908
5907	6910
5908	6912

93070 CON'T

7202	7801
7203	7803
7412	7804
7501	7805
7503	7807
7712	7808

93080 96

31 10.8N
120 55.2W

5002	5904
5005	5905
5006	5906
5007	5907
5101	5908
5102	5909
5103	5910
5104	5911
5105	5912
5106	6001
5107	6002
5108	6003
5204	6004
5205	6005
5206	6006
5207	6007
5304	6008
5306	6010
5504	6102
5604	6104
5606	6107
5704	6110
5707	6201
5710	6203
5801	6207
5804	6210
5807	6302
5810	6304
5811	6307
5812	6310
5901	6401
5902	6404
5903	6410

93080 CON'T

6501	6908
6504	6910
6507	6912
6601	7202
6604	7203
6607	7412
6612	7501
6707	7507
6801	7712
6806	7801
6901	7803
6902	7804
6904	7805
6905	7807
6907	7808

93090 84

30 50.8N
121 35.4W

5002	5901
5005	5902
5006	5903
5007	5904
5101	5905
5102	5906
5103	5907
5104	5908
5105	5909
5204	5912
5207	6001
5304	6002
5306	6003
5404	6004
5405	6005
5406	6006
5504	6007
5604	6008
5606	6010
5704	6102
5707	6104
5710	6107
5807	6110
5810	6201

93090 CON'T

6203	6901
6207	6902
6210	6904
6302	6905
6310	6907
6401	6908
6404	6910
6410	6912
6504	7202
6507	7203
6601	7412
6604	7501
6607	7801
6610	7803
6612	7804
6707	7805
6801	7807
6806	7808

93100 39

30 30.8N
122 15.5W

5909	6404
5912	6410
6002	6504
6003	6604
6004	6610
6005	6612
6006	6707
6007	6801
6008	6901
6010	6904
6102	6907
6104	6910
6107	7202
6110	7412
6201	7801
6203	7803
6207	7804
6210	7807
6302	7808
6401	

CALCOFI STATIONS OCCUPIED ON SIX OR MORE CRUISES DURING 1950-1978

93110 8

30 10.8N
122 55.4W

5909 7202
6610 7804
6612 7807
6707 7808

93120 13

29 50.8N
123 35.2W

5909 6907
6302 6910
6610 7202
6612 7804
6707 7807
6901 7808
6904

93140 8

29 10.8N
124 54.4W

6707 6910
6901 7804
6904 7807
6907 7808

94029 13

32 45.5N
117 23.0W

6001 6104
6003 6107
6004 6110

94029 CON'T

6201 7203
6307 7807
6501 7808
6507

94030 25

32 43.5N
117 27.1W

6004 6904
6010 6905
6101 6908
6301 6909
6304 7201
6310 7202
6401 7203
6404 7205
6507 7207
6712 7803
6804 7804
6806 7805
6902

94032 8

32 39.5N
117 35.3W

6910 7501
6912 7503
7210 7507
7412 7510

97030 48

32 15.4N
117 8.8W

5108 5502
5109 5504
5110 5506
5111 5510
5112 5512
5201 5801
5202 5804
5203 5807
5205 5810
5206 5901
5207 5904
5208 5907
5209 5908
5211 5910
5301 6001
5302 6004
5303 7202
5304 7712
5305 7801
5306 7803
5307 7804
5308 7805
5310 7807
5312 7808

97032 72

32 11.4N
117 17.0W

5002 5107
5004 5108
5005 5109
5006 5110
5007 5111
5011 5112
5101 5201
5102 5202
5103 5203
5104 5204
5105 5206
5106 5207

97032 CON'T

5208 5904
5209 5907
5210 5908
5211 5910
5301 6001
5302 6002
5502 6003
5504 6004
5506 6005
5510 6006
5512 6707
5602 6801
5604 6901
5606 6902
5704 6904
5707 6906
5709 6907
5710 6909
5712 6910
5801 6912
5804 7201
5807 7202
5810 7412
5901 7501

97035 36

32 5.4N
117 29.2W

5303 6901
5304 6902
5305 6904
5306 6906
5307 6907
5308 6909
5310 6910
5312 6912
6507 7201
6601 7202
6607 7203
6612 7412
6707 7501
6801 7507
6806 7510
6901 7712
6902 7801
6904 7803
6906 7804
6907 7805
6909 7807
6910 7808
6912

97035 CON'T

7801 7805
7803 7807
7804 7808

97040 101

31 55.4N
117 49.5W

5002 5310
5004 5312
5005 5401
5006 5402
5007 5403
5101 5404
5102 5405
5103 5406
5104 5407
5105 5408
5106 5410
5107 5412
5108 5502
5109 5504
5110 5506
5111 5510
5112 5512
5201 5602
5202 5604
5203 5606
5204 5704
5205 5707
5206 5709
5207 5710
5208 5801
5209 5804
5210 5807
5211 5810
5301 5901
5302 5904
5303 5907
5304 5908
5305 5910
5306 6001
5307 6004
5308 6501

97040 CON'T

6507 7201
6601 7202
6607 7203
6612 7412
6707 7501
6801 7507
6806 7510
6901 7712
6902 7801
6904 7803
6906 7804
6907 7805
6909 7807
6910 7808
6912

97050 90

31 35.4N
118 30.1W

5002 5210
5005 5211
5006 5301
5007 5302
5101 5303
5102 5304
5103 5305
5104 5306
5105 5307
5106 5308
5107 5310
5108 5312
5109 5502
5111 5504
5112 5506
5201 5510
5202 5512
5203 5602
5204 5604
5205 5606
5206 5702
5207 5704
5208 5707
5209 5709

97050 CON'T

5710 6902
5801 6904
5804 6906
5807 6907
5810 6909
5901 6910
5904 6912
5907 7201
5908 7202
5910 7203
6001 7412
6004 7501
6501 7503
6507 7507
6601 7712
6607 7801
6612 7803
6707 7804
6801 7805
6806 7807
6901 7808

97060 87

31 15.4N
119 10.5W

5002 5207
5005 5301
5006 5302
5007 5304
5101 5305
5102 5306
5103 5401
5104 5402
5105 5403
5106 5404
5107 5405
5108 5406
5201 5504
5202 5510
5203 5602
5204 5604
5205 5606
5206 5704

CALCOFI STATIONS OCCUPIED ON SIX OR MORE CRUISES DURING 1950-1978

97060 CON'T

5707	6607
5709	6612
5710	6707
5801	6801
5804	6806
5807	6901
5810	6902
5811	6904
5812	6906
5901	6907
5902	6909
5903	6910
5904	6912
5905	7201
5906	7202
5907	7203
5908	7501
5910	7507
6001	7712
6002	7801
6003	7803
6004	7804
6005	7805
6006	7807
6507	7808
6601	

97070 65

30 55.4N
119 50.7W

5002	5203
5005	5204
5006	5205
5007	5206
5101	5207
5102	5304
5103	5306
5104	5504
5105	5602
5107	5606
5108	5704
5201	5707
5202	5709

97070 CON'T

5710	6902
5801	6904
5804	6906
5807	6907
5810	6909
5901	6910
5904	6912
5907	7201
5908	7202
5910	7203
6001	7412
6004	7501
6507	7507
6601	7801
6607	7803
6612	7804
6707	7805
6801	7807
6806	7808
6901	

97080 65

30 35.4N
120 30.8W

5002	5405
5005	5406
5006	5504
5007	5604
5101	5606
5102	5704
5103	5707
5104	5710
5105	5801
5106	5804
5107	5807
5108	5810
5204	5901
5205	5904
5206	5907
5207	5908
5304	5910
5306	6001
5404	6004

97080 CON'T

6501	6910
6507	6912
6601	7201
6607	7202
6612	7203
6707	7412
6801	7507
6806	7801
6901	7803
6902	7804
6904	7805
6906	7807
6907	7808
6909	

97090 54

30 15.4N
121 10.8W

5002	5904
5005	5907
5006	5908
5007	5910
5101	6001
5102	6004
5103	6507
5104	6601
5105	6607
5106	6901
5107	6902
5204	6904
5205	6906
5206	6907
5207	6909
5304	6910
5306	6912
5504	7201
5604	7202
5606	7203
5704	7412
5707	7507
5710	7510
5807	7801
5901	7803

97090 CON'T

7804	7807
7805	7808

100029 44

31 43.2N
116 42.6W

5108	5307
5109	5308
5110	5310
5111	5312
5112	5401
5201	5402
5202	5403
5203	5404
5204	5405
5205	5406
5206	5407
5207	5410
5208	5412
5209	5502
5210	5504
5211	5506
5301	5510
5302	5512
5303	5908
5304	7201
5305	7202
5306	7207

100030 102

31 41.2N
116 46.6W

5002	5009
5003	5011
5004	5101
5005	5102
5006	5103
5007	5104

100030 CON'T

5105	6010
5106	6101
5108	6104
5109	6107
5110	6110
5111	6201
5112	6203
5202	6207
5203	6211
5204	6302
5205	6304
5206	6307
5207	6310
5208	6401
5209	6407
5210	6501
5211	6507
5301	6601
5302	6607
5303	6612
5304	6707
5305	6801
5306	6806
5307	6901
5308	6902
5310	6904
5312	6906
5502	6907
5504	6909
5506	6910
5510	6912
5512	7201
5710	7202
5801	7203
5804	7205
5807	7207
5810	7210
5901	7507
5904	7712
5907	7801
5908	7803
5910	7804
6001	7805
6004	7807
6008	7808

100035 47

31 31.2N
117 6.9W

5508	6901
5804	6902
6008	6904
6010	6906
6101	6907
6104	6909
6107	6910
6110	6912
6201	7201
6203	7202
6207	7203
6211	7205
6302	7207
6304	7210
6307	7501
6310	7507
6401	7712
6407	7801
6501	7803
6507	7804
6601	7805
6607	7807
6612	7808
6707	

100040 106

31 21.2N
117 27.1W

5002	5107
5003	5108
5004	5109
5005	5110
5007	5111
5009	5112
5101	5201
5102	5202
5103	5204
5104	5205
5105	5206
5106	5207

100040 CON'T

5208	6110
5209	6201
5210	6203
5211	6207
5301	6211
5302	6302
5303	6304
5304	6307
5305	6310
5306	6401
5307	6407
5308	6501
5310	6507
5312	6601
5502	6607
5504	6612
5510	6707
5512	6801
5602	6806
5604	6901
5606	6902
5704	6904
5707	6906
5710	6907
5712	6909
5801	6910
5804	6912
5807	7201
5810	7202
5901	7203
5904	7205
5907	7207
5908	7507
5910	7510
6001	7712
6004	7801
6008	7803
6010	7804
6101	7805
6104	7807
6107	7808

CALCOFI STATIONS OCCUPIED ON SIX OR MORE CRUISES DURING 1950-1978

100050	114	!	100050	CON'T	!	100060	CON'T	!	100070	CON'T	!	100080	99	!	100080	CON'T	!	100090	CON'T
		!			!			!			!			!			!		
31	1.2N	!	6707	7202	!	5903	6601	!	5203	5910	!	30	1.2N	!	7501	7804	!	6401	7201
118	7.3W	!	6801	7203	!	5904	6607	!	5204	6001	!	120	7.4W	!	7507	7805	!	6407	7202
		!	6806	7205	!	5905	6612	!	5205	6004	!			!	7712	7807	!	6501	7203
5002	5407	!	6901	7207	!	5906	6707	!	5206	6008	!	5003	5807	!	7801	7808	!	6507	7205
5003	5408	!	6902	7507	!	5907	6801	!	5207	6010	!	5004	5810	!	7803		!	6601	7207
5004	5410	!	6904	7712	!	5908	6806	!	5208	6101	!	5005	5901	!			!	6607	7210
5005	5412	!	6906	7801	!	5910	6901	!	5209	6104	!	5007	5904	!			!	6901	7507
5007	5502	!	6907	7803	!	6001	6902	!	5210	6107	!	5009	5907	!			!	6902	7801
5009	5504	!	6909	7804	!	6002	6904	!	5211	6110	!	5101	5908	!			!	6904	7803
5101	5508	!	6910	7805	!	6003	6906	!	5301	6201	!	5102	5910	!	100090	95	!	6906	7804
5102	5510	!	6912	7807	!	6004	6907	!	5302	6203	!	5103	6001	!			!	6907	7805
5103	5512	!	7201	7808	!	6006	6909	!	5303	6207	!	5104	6004	!	29	41.2N	!	6909	7807
5104	5602	!			!	6008	6910	!	5304	6211	!	5105	6008	!	120	47.1W	!	6910	7808
5105	5604	!			!	6010	6912	!	5305	6302	!	5106	6010	!			!	6912	
5106	5704	!			!	6101	7201	!	5306	6304	!	5107	6101	!	5002	5508	!		
5107	5707	!			!	6104	7202	!	5307	6307	!	5109	6104	!	5003	5510	!		
5108	5710	!	100060	113	!	6107	7203	!	5308	6310	!	5110	6107	!	5004	5604	!		
5109	5801	!			!	6110	7205	!	5310	6401	!	5111	6110	!	5005	5704	!		
5110	5804	!	30	41.2N	!	6201	7207	!	5312	6407	!	5201	6203	!	5007	5710	!	100100	37
5111	5807	!	118	47.5W	!	6203	7210	!	5401	6501	!	5202	6207	!	5009	5801	!		
5112	5812	!			!	6207	7412	!	5402	6507	!	5203	6211	!	5101	5804	!	29	21.2N
5201	5901	!	5003	5211	!	6211	7507	!	5403	6601	!	5204	6302	!	5102	5807	!	121	26.7W
5202	5904	!	5004	5301	!	6302	7712	!	5404	6612	!	5205	6304	!	5103	5810	!		
5203	5907	!	5005	5302	!	6304	7801	!	5405	6707	!	5206	6307	!	5104	5901	!	5002	6104
5204	5908	!	5007	5303	!	6307	7803	!	5406	6801	!	5207	6310	!	5105	5904	!	5003	6107
5205	5910	!	5009	5304	!	6310	7804	!	5407	6806	!	5208	6401	!	5106	5905	!	5004	6110
5206	6001	!	5101	5305	!	6401	7805	!	5408	6901	!	5209	6407	!	5107	5906	!	5005	6201
5207	6004	!	5102	5306	!	6407	7807	!	5410	6902	!	5210	6501	!	5109	5907	!	5007	6203
5208	6008	!	5103	5307	!	6501	7808	!	5412	6904	!	5211	6507	!	5110	5908	!	5009	6211
5209	6010	!	5104	5308	!	6507		!	5502	6906	!	5301	6607	!	5201	5910	!	5101	6302
5210	6101	!	5105	5310	!			!	5504	6907	!	5302	6612	!	5202	6001	!	5103	6304
5211	6104	!	5106	5312	!			!	5508	6909	!	5303	6707	!	5203	6002	!	5104	6401
5301	6107	!	5107	5502	!			!	5510	6910	!	5304	6801	!	5204	6003	!	5105	6501
5302	6110	!	5108	5504	!			!	5512	6912	!	5305	6806	!	5205	6004	!	5107	6507
5303	6201	!	5109	5510	!	100070	114	!	5602	7201	!	5306	6901	!	5206	6006	!	5204	6601
5304	6203	!	5110	5512	!			!	5604	7202	!	5307	6902	!	5207	6010	!	5206	6607
5305	6207	!	5111	5602	!	30	21.2N	!	5704	7203	!	5308	6904	!	5301	6101	!	5207	7205
5306	6211	!	5112	5604	!	119	27.5W	!	5710	7205	!	5312	6906	!	5304	6104	!	5306	7210
5307	6302	!	5201	5704	!			!	5801	7207	!	5502	6907	!	5305	6107	!	5804	7804
5308	6304	!	5202	5707	!	5003	5105	!	5804	7210	!	5504	6909	!	5306	6110	!	6008	7807
5310	6307	!	5203	5710	!	5004	5106	!	5805	7503	!	5510	6910	!	5401	6201	!	6010	7808
5312	6310	!	5204	5801	!	5005	5108	!	5806	7507	!	5512	6912	!	5403	6203	!	6101	
5401	6401	!	5205	5804	!	5007	5109	!	5807	7712	!	5602	7201	!	5404	6207	!		
5402	6407	!	5206	5807	!	5009	5110	!	5810	7801	!	5604	7202	!	5405	6211	!		
5403	6501	!	5207	5811	!	5101	5111	!	5901	7803	!	5704	7203	!	5406	6302	!		
5404	6507	!	5208	5812	!	5102	5112	!	5904	7805	!	5710	7205	!	5410	6304	!		
5405	6607	!	5209	5901	!	5103	5201	!	5907	7807	!	5801	7207	!	5412	6307	!		
5406	6612	!	5210	5902	!	5104	5202	!	5908	7808	!	5804	7210	!	5504	6310	!		

CALCOFI STATIONS OCCUPIED ON SIX OR MORE CRUISES DURING 1950-1978

100110	11	103030	CON'T	103035	CON'T	103040	CON'T	103050	CON'T	103060	CON'T	103080	52
29	1.2N	5310	6004	5602	6806	5512	6901	6612	7201	6907	7507	29	26.9N
122	6.2W	5312	6607	5604	6901	5602	6902	6707	7202	6909	7712	119	44.1W
		5401	6612	5606	6902	5604	6904	6801	7203	6910	7801		
5002	5101	5402	6707	5704	6904	5606	6906	6806	7207	6912	7803	5101	5910
5003	5104	5403	6806	5707	6906	5704	6907	6901	7507	7201	7805	5103	6001
5004	5105	5404	6901	5710	6907	5707	6909	6902	7712	7202	7807	5104	6004
5005	5804	5405	6902	5801	6909	5710	6910	6904	7801	7203	7808	5105	6607
5007	6507	5406	6904	5804	6910	5801	6912	6906	7803	7207		5106	6612
5009		5407	6906	5807	6912	5804	7201	6907	7804			5204	6707
		5408	6907	5810	7201	5807	7202	6909	7805			5205	6801
		5410	6909	5901	7202	5810	7203	6910	7807			5206	6901
		5412	6910	5904	7203	5901	7207	6912	7808			5304	6902
		5502	6912	5907	7207	5904	7501			103070	51	5305	6904
100120	26	5504	7201	5908	7507	5907	7503					5306	6906
		5506	7202	5910	7712	5908	7507			29	46.9N	5404	6907
28	41.2N	5510	7203	6001	7801	5910	7510			119	4.4W	5405	6909
122	45.5W	5512	7207	6004	7803	6001	7712	103060	69			5406	6910
		5801	7412	6607	7804	6004	7801			5101	6004	5504	6912
5002	6105	5804	7507	6612	7805	6607	7803	30	6.9N	5103	6607	5506	7201
5003	6107	5807	7712	6707	7808	6612	7804	118	24.7W	5104	6612	5604	7202
5004	6110	5901	7801	6801		6707	7805			5105	6707	5704	7203
5005	6201	5904	7803			6801	7807	5101	5804	5106	6801	5710	7207
5007	6203	5907	7804			6806	7808	5103	5807	5204	6901	5804	7507
5101	6211	5908	7805					5104	5810	5205	6902	5807	7712
5104	6302	5910	7807					5105	5901	5206	6904	5810	7801
5105	6304	6001	7808	103040	82			5106	5902	5304	6906	5901	7803
5404	6401							5204	5903	5305	6907	5904	7805
5804	6501			30	46.9N	103050	56	5205	5904	5306	6909	5907	7807
6008	6507			117	4.7W			5304	5905	5504	6910	5908	7808
6010	7205					30	26.9N	5305	5906	5506	6912		
6101	7210	103035	67	5101	5307	117	44.7W	5306	5907	5604	7201		
				5103	5308			5401	5908	5704	7202		
		30	56.9N	5104	5310	5101	5701	5402	5910	5707	7203		
		116	44.6W	5105	5312	5103	5704	5403	6001	5710	7207	103090	22
				5106	5401	5104	5707	5404	6002	5801	7412		
103030	68	5103	5210	5109	5402	5105	5710	5405	6003	5804	7507	29	6.9N
		5104	5211	5110	5403	5106	5712	5406	6004	5807	7712	120	23.6W
31	6.9N	5105	5304	5111	5404	5204	5801	5502	6005	5810	7801		
116	24.5W	5106	5305	5112	5405	5205	5804	5504	6006	5901	7803	5204	5810
		5109	5306	5204	5406	5304	5807	5506	6607	5904	7805	5205	5901
5109	5209	5110	5307	5205	5407	5305	5810	5512	6612	5907	7807	5206	5904
5110	5210	5111	5308	5208	5408	5306	5901	5602	6707	5908	7808	5304	5907
5111	5211	5112	5310	5209	5410	5502	5904	5604	6801	5910		5305	5908
5112	5304	5204	5312	5210	5412	5504	5907	5701	6806			5306	5910
5204	5305	5205	5502	5211	5502	5506	5908	5704	6901			5506	6001
5205	5306	5206	5504	5304	5504	5512	5910	5707	6902			5604	6004
5206	5307	5208	5510	5305	5506	5602	6001	5710	6904			5804	7507
5208	5308	5209	5512	5306	5510	5604	6607	5801	6906			5807	7510

CALCOFI STATIONS OCCUPIED ON SIX OR MORE CRUISES DURING 1950-1978

103090 CON'T

7807 7808

105032 8

30 45.2N
116 21.2W

5108 5207
5201 5301
5202 5302
5203 5303

105035 17

30 39.2N
116 33.2W

5002 5108
5003 5201
5004 5202
5005 5203
5006 5207
5007 5301
5009 5302
5011 5303
5102

105040 9

30 29.2N
116 53.2W

5102 5207
5108 5301
5201 5302
5202 5303
5203

105050 9

30 9.2N
117 33.1W

5102 5207
5108 5301
5201 5302
5202 5303
5203

105060 9

29 49.2N
118 12.9W

5102 5207
5108 5301
5201 5302
5202 5303
5203

105070 7

29 29.2N
118 52.6W

5102 5207
5201 5301
5202 5303
5203

105080 7

29 9.2N
119 32.1W

5102 5207
5108 5301
5201 5302
5202 5303
5203

107032 60

30 27.5N
116 9.8W

5109 5907
5110 5908
5111 5910
5112 6001
5204 6004
5205 6607
5206 6612
5208 6707
5209 6712
5210 6806
5211 6901
5304 6902
5305 6904
5306 6906
5307 6907
5308 6909
5310 6910
5312 6912
5502 7201
5504 7202
5506 7203
5510 7207
5512 7507
5701 7712
5801 7801
5804 7803
5807 7804
5810 7805
5901 7807
5904 7808

107035 78

30 21.5N
116 21.8W

5103 5112
5104 5204
5105 5205
5109 5206
5110 5208
5111 5209

107035 CON'T

5210 5810
5211 5901
5304 5904
5305 5907
5306 5908
5307 5910
5308 6001
5310 6004
5312 6607
5401 6612
5402 6707
5403 6712
5404 6806
5405 6901
5406 6902
5407 6904
5408 6906
5410 6907
5412 6909
5502 6910
5504 6912
5506 7201
5510 7202
5512 7203
5602 7207
5604 7507
5606 7712
5704 7801
5707 7803
5710 7804
5801 7805
5804 7807
5807 7808

107040 70

30 11.5N
116 41.8W

5101 5112
5103 5204
5104 5205
5105 5206
5110 5208
5111 5209

107040 CON'T

5210 5910
5211 6001
5304 6004
5305 6607
5306 6612
5307 6707
5308 6712
5310 6806
5312 6901
5502 6902
5504 6904
5506 6906
5510 6907
5512 6909
5602 6910
5604 6912
5606 7201
5701 7202
5704 7203
5707 7207
5710 7501
5801 7507
5804 7712
5807 7801
5810 7803
5901 7804
5904 7805
5907 7807
5908 7808

107050 66

29 51.5N
117 21.6W

5101 5401
5103 5402
5104 5403
5105 5404
5204 5405
5205 5406
5206 5502
5304 5504
5305 5506
5306 5512

107050 CON'T

5602 6712
5604 6806
5606 6901
5701 6902
5704 6904
5707 6906
5710 6907
5801 6909
5802 6910
5803 6912
5804 7201
5807 7202
5810 7203
5901 7207
5904 7507
5907 7510
5908 7712
5910 7801
6001 7803
6004 7804
6607 7805
6612 7807
6707 7808

107060 70

29 31.5N
118 1.3W

5101 5606
5103 5701
5104 5704
5105 5707
5204 5710
5205 5712
5206 5801
5304 5802
5305 5803
5306 5804
5502 5805
5504 5806
5506 5807
5512 5810
5602 5901
5604 5902

107060 CON'T

5903 6902
5904 6904
5905 6906
5906 6907
5907 6909
5908 6910
5910 6912
6001 7201
6002 7202
6003 7203
6004 7207
6005 7412
6006 7507
6607 7712
6612 7801
6707 7803
6712 7805
6806 7807
6901 7808

107070 57

29 11.5N
118 40.8W

5101 5801
5103 5804
5104 5807
5105 5810
5204 5901
5205 5902
5206 5904
5304 5907
5305 5908
5306 5910
5404 6001
5405 6002
5406 6003
5504 6004
5506 6005
5604 6006
5606 6607
5704 6612
5707 6707
5710 6712

CALCOFI STATIONS OCCUPIED ON SIX OR MORE CRUISES DURING 1950-1978

107070 CON'T

6901 7203
6902 7207
6904 7507
6906 7801
6907 7803
6909 7805
6910 7807
6912 7808
7201

107080 47

28 51.5N
119 20.2W

5101 6001
5103 6004
5104 6607
5105 6612
5204 6707
5205 6901
5206 6902
5304 6904
5305 6906
5504 6907
5506 6909
5604 6910
5606 6912
5704 7201
5707 7202
5710 7203
5804 7207
5807 7507
5810 7801
5901 7803
5904 7805
5907 7807
5908 7808
5910

107090 19

28 31.5N
119 59.5W

5304 5904
5305 5907
5506 5908
5604 5910
5606 6001
5707 6004
5804 7507
5807 7807
5810 7808
5901

110033 52

29 51.2N
115 51.9W

5108 5403
5109 5404
5110 5405
5111 5406
5112 5407
5201 5408
5202 5410
5204 5412
5205 5502
5206 5504
5207 5506
5208 5508
5209 5510
5210 5512
5211 5801
5302 5804
5303 5807
5304 5810
5305 5901
5306 5904
5307 5907
5308 5908
5310 5910
5312 6001
5401 6004
5402 7507

110035 104

29 47.2N
115 59.8W

5002 5606
5003 5704
5004 5707
5005 5710
5006 5801
5007 5804
5009 5807
5011 5810
5101 5901
5102 5904
5103 5907
5104 5908
5105 5910
5108 6001
5109 6004
5110 6010
5111 6102
5112 6105
5201 6107
5202 6111
5203 6201
5204 6203
5205 6207
5206 6211
5207 6302
5208 6304
5209 6307
5210 6310
5211 6401
5302 6407
5303 6501
5304 6507
5305 6601
5306 6607
5307 6612
5308 6707
5310 6712
5312 6806
5502 6901
5504 6902
5506 6904
5510 6906
5512 6907
5602 6909
5604 6910

110035 CON'T

6912 7712
7202 7801
7203 7803
7205 7804
7207 7805
7210 7807
7507 7808

110040 116

29 37.2N
116 19.7W

5002 5307
5003 5308
5004 5310
5005 5312
5007 5401
5009 5402
5101 5403
5102 5404
5103 5405
5104 5406
5105 5407
5108 5408
5109 5410
5110 5412
5111 5502
5112 5504
5201 5506
5202 5508
5203 5510
5204 5512
5205 5602
5206 5604
5207 5606
5208 5701
5209 5704
5210 5707
5211 5710
5302 5801
5303 5804
5304 5807
5305 5810
5306 5901

110040 CON'T

5904 6707
5907 6712
5908 6806
5910 6901
6001 6902
6004 6904
6008 6906
6010 6907
6102 6909
6105 6910
6107 6912
6111 7201
6201 7202
6203 7203
6207 7205
6211 7207
6302 7210
6304 7501
6307 7507
6310 7712
6401 7801
6407 7803
6501 7804
6507 7805
6601 7807
6612 7808

110050 108

29 17.2N
116 59.2W

5002 5110
5003 5111
5004 5112
5005 5201
5007 5202
5009 5203
5101 5204
5102 5205
5103 5206
5104 5207
5105 5208
5108 5209
5109 5210

110050 CON'T

5211 6201
5301 6203
5302 6207
5303 6211
5304 6302
5305 6304
5306 6307
5307 6310
5308 6401
5310 6407
5312 6501
5502 6507
5504 6601
5506 6607
5510 6612
5512 6707
5602 6712
5604 6806
5606 6901
5701 6902
5704 6904
5707 6906
5710 6907
5801 6909
5803 6910
5804 6912
5807 7201
5810 7202
5901 7203
5904 7205
5907 7207
5908 7210
5910 7503
6001 7507
6004 7712
6008 7801
6010 7803
6102 7804
6105 7805
6107 7807
6111 7808

110060 126

28 57.2N
117 38.7W

5002 5408
5003 5410
5004 5412
5005 5502
5007 5504
5009 5506
5101 5508
5102 5510
5103 5512
5104 5602
5105 5604
5107 5606
5108 5701
5109 5704
5110 5707
5111 5710
5112 5801
5201 5802
5202 5803
5203 5804
5204 5807
5205 5810
5206 5902
5207 5903
5208 5904
5209 5905
5210 5906
5211 5907
5301 5908
5302 5910
5303 6001
5304 6002
5305 6003
5306 6004
5307 6005
5308 6006
5310 6008
5312 6010
5401 6102
5402 6105
5403 6107
5404 6111
5405 6201
5406 6203
5407 6207

CALCOFI STATIONS OCCUPIED ON SIX OR MORE CRUISES DURING 1950-1978

110060 CON'T	
6211	6906
6302	6907
6304	6909
6307	6910
6310	6912
6401	7201
6407	7202
6501	7203
6507	7205
6601	7207
6607	7210
6612	7507
6707	7712
6712	7801
6806	7803
6901	7805
6902	7807
6904	7808

110070	95
28	37.2N
118	18.0W
5002	5304
5003	5305
5004	5306
5005	5502
5007	5504
5009	5506
5101	5510
5102	5512
5103	5602
5104	5604
5105	5606
5107	5704
5201	5707
5202	5710
5203	5712
5204	5801
5205	5804
5206	5807
5207	5810
5301	5902
5303	5904

110070 CON'T	
5907	6601
5908	6607
5910	6612
6001	6707
6002	6712
6003	6901
6004	6902
6005	6904
6006	6906
6008	6907
6010	6909
6102	6910
6105	6912
6107	7201
6111	7202
6201	7203
6203	7205
6207	7207
6211	7210
6302	7507
6304	7510
6307	7801
6310	7803
6401	7805
6407	7807
6501	7808
6507	

110080	91
28	17.2N
118	57.2W
5002	5201
5003	5202
5004	5204
5005	5205
5007	5206
5009	5207
5101	5301
5102	5304
5103	5305
5104	5401
5105	5403
5107	5404

110080 CON'T	
5405	6304
5406	6307
5502	6310
5504	6401
5510	6407
5512	6501
5602	6507
5604	6601
5606	6607
5704	6612
5707	6707
5710	6712
5801	6901
5804	6902
5807	6904
5810	6906
5901	6907
5904	6909
5907	6910
5908	6912
5910	7201
6001	7202
6004	7203
6008	7205
6010	7207
6102	7210
6105	7501
6107	7507
6111	7801
6201	7803
6203	7805
6207	7807
6211	7808
6302	

110090	62
27	57.2N
119	36.3W
5002	5009
5003	5101
5004	5102
5005	5103
5007	5104

110090 CON'T	
5105	5907
5107	5910
5201	6001
5202	6004
5204	6008
5205	6010
5206	6102
5207	6105
5304	6107
5305	6110
5404	6201
5504	6203
5506	6207
5508	6211
5510	6302
5604	6304
5606	6307
5704	6310
5707	6401
5801	6407
5804	6501
5810	6507
5901	6601
5904	6607
5905	7807
5906	7808

110100	26
27	37.2N
120	15.2W
5002	6010
5003	6101
5004	6105
5005	6107
5007	6110
5009	6201
5101	6203
5102	6211
5103	6302
5104	6304
5105	6401
5401	6501
6008	6507

110110	9
27	17.2N
120	54.0W
5002	5009
5003	5103
5004	5104
5005	5105
5007	

110120	15
26	57.2N
121	32.8W
5404	6203
6008	6211
6010	6302
6101	6304
6105	6401
6107	6501
6111	6507
6201	

113030	80
29	22.9N
115	18.2W
5202	5305
5203	5306
5204	5307
5205	5308
5206	5309
5207	5310
5208	5312
5209	5411
5210	5502
5211	5504
5301	5505
5302	5510
5303	5512
5304	5602

113030 CON'T	
5608	6302
5609	6304
5708	6307
5709	6310
5710	6401
5801	6407
5804	6501
5807	6507
5808	6607
5809	6612
5810	6707
5901	6712
5904	6901
5907	6902
5908	6904
5909	6906
5910	6907
6001	6909
6004	6910
6008	6912
6010	7201
6102	7202
6107	7203
6111	7207
6201	7412
6203	7507

113035	92
29	12.9N
115	37.9W
5003	5202
5004	5203
5005	5204
5006	5208
5007	5209
5009	5211
5011	5301
5101	5302
5102	5303
5103	5304
5104	5305
5105	5308
5106	5309

113035 CON'T	
5310	5901
5312	5904
5401	5907
5402	5908
5403	5909
5404	5910
5405	6001
5406	6004
5407	6607
5408	6612
5410	6707
5412	6712
5502	6806
5504	6901
5506	6902
5510	6904
5512	6906
5602	6907
5604	6909
5606	6910
5608	6912
5609	7201
5701	7202
5704	7203
5707	7207
5708	7503
5709	7507
5710	7712
5804	7801
5807	7803
5808	7804
5809	7807
5810	7808

113040	75
29	2.9N
115	57.6W
5101	5203
5102	5204
5103	5205
5105	5206
5106	5207
5202	5208

CALCOFI STATIONS OCCUPIED ON SIX OR MORE CRUISES DURING 1950-1978

113040 CON'T

5209	5901
5210	5904
5211	5907
5302	5908
5303	5909
5304	5910
5305	6001
5306	6004
5307	6607
5308	6612
5310	6707
5312	6712
5502	6901
5504	6902
5506	6904
5510	6906
5512	6907
5602	6909
5604	6910
5606	6912
5701	7201
5704	7202
5707	7203
5708	7207
5709	7507
5710	7712
5801	7801
5804	7803
5807	7804
5808	7807
5809	7808
5810	

113050 76

28	42.9N
116	37.0W

5101	5203
5102	5205
5103	5206
5104	5207
5105	5301
5106	5302
5202	5303

113050 CON'T

5304	6001
5305	6002
5306	6003
5401	6004
5402	6005
5403	6006
5404	6607
5405	6612
5406	6707
5502	6712
5504	6806
5506	6901
5512	6902
5602	6904
5604	6906
5606	6907
5701	6909
5704	6910
5707	6912
5710	7201
5801	7202
5803	7207
5804	7507
5807	7510
5810	7712
5901	7801
5902	7803
5904	7804
5907	7805
5908	7807
5910	7808

113060 74

28	22.9N
117	16.2W

5101	5204
5102	5205
5103	5206
5104	5207
5105	5302
5106	5303
5202	5304
5203	5305

113060 CON'T

5306	6003
5412	6004
5502	6005
5504	6006
5506	6607
5512	6612
5602	6707
5604	6712
5606	6806
5701	6901
5704	6902
5707	6904
5710	6906
5801	6907
5803	6909
5804	6910
5807	6912
5810	7201
5901	7202
5902	7203
5903	7207
5904	7501
5905	7507
5906	7712
5907	7801
5908	7803
5910	7805
6001	7807
6002	7808

113070 62

28	2.9N
117	55.3W

5101	5206
5102	5207
5103	5303
5104	5304
5105	5305
5106	5306
5202	5404
5203	5405
5204	5406
5205	5502

113070 CON'T

5504	6612
5506	6707
5512	6712
5602	6901
5604	6902
5606	6904
5704	6906
5707	6907
5710	6909
5801	6910
5804	6912
5807	7201
5810	7202
5901	7203
5904	7207
5907	7507
5908	7801
5910	7803
6001	7805
6004	7807
6607	7808

113080 38

27	42.9N
118	34.3W

5506	6707
5604	6712
5606	6901
5704	6902
5707	6904
5710	6906
5804	6907
5807	6909
5810	6910
5901	6912
5904	7201
5907	7202
5908	7203
5910	7207
6001	7507
6004	7801
6607	7803
6612	7805

113080 CON'T

7807	7808

113090 10

27	22.9N
119	13.2W

5804	5910
5810	6001
5901	6004
5904	7807
5907	7808

113027 14

29	11.3N
114	55.1W

5108	5608
5109	5609
5110	5708
5111	5709
5112	5808
5201	5809
5209	5909

113030 16

29	5.3N
115	7.0W

5108	5411
5109	5608
5110	5609
5111	5708
5112	5709
5208	5808
5209	5809
5309	5909

115035 32

28	55.3N
115	26.7W

5108	5909
5109	6008
5110	6010
5111	6102
5112	6107
5201	6111
5208	6201
5209	6203
5309	6207
5411	6211
5608	6302
5609	6304
5708	6401
5709	6407
5808	6501
5809	6507

115040 12

28	45.3N
115	46.4W

5002	5201
5108	5708
5109	5709
5110	5808
5111	5809
5112	5909

117026 48

28	55.6N
114	40.1W

5202	5207
5203	5208
5204	5209
5205	5210
5206	5211

117026 CON'T

5301	5710
5302	5801
5303	5804
5304	5807
5305	5808
5306	5809
5307	5810
5308	5901
5309	5904
5310	5907
5312	5908
5502	5909
5504	5910
5506	6001
5510	6004
5512	7201
5608	7202
5609	7207
5708	7507

117030 78

28	47.6N
114	55.8W

5202	5312
5203	5401
5204	5402
5205	5403
5206	5404
5207	5405
5208	5406
5209	5407
5210	5408
5211	5410
5301	5412
5302	5502
5303	5504
5304	5506
5305	5510
5306	5512
5307	5608
5308	5609
5309	5701
5310	5708

CALCOFI STATIONS OCCUPIED ON SIX OR MORE CRUISES DURING 1950-1978

117030 CON'T		117035 CON'T		117040 CON'T		117050 CON'T		117060 CON'T		117070 CON'T		118025	11
5709	6712	5808	6901	5701	6612	5904	6902	6001	6910	7507	7807	28	44.1N
5710	6804	5809	6902	5704	6707	5905	6904	6004	6912	7801	7808	114	27.7W
5801	6901	5810	6904	5707	6712	5906	6906	6607	7201	7803			
5804	6902	5901	6906	5708	6804	5907	6907	6612	7202			5208	5708
5807	6904	5904	6907	5709	6901	5908	6909	6707	7203			5209	5709
5808	6906	5907	6909	5710	6902	5910	6910	6712	7207			5309	5808
5809	6907	5908	6910	5801	6904	6001	6912	6804	7412			5408	5809
5810	6909	5909	6912	5804	6906	6002	7201	6901	7501	117080	35	5608	5909
5901	6910	5910	7201	5807	6907	6003	7202	6902	7507			5609	
5904	6912	6001	7203	5808	6909	6004	7203	6904	7801	27	7.6N		
5907	7201	6004	7207	5809	6910	6005	7207	6906	7803	118	10.9W		
5908	7203	6607	7507	5810	6912	6006	7507	6907	7807				
5909	7207	6612	7801	5901	7201	6607	7510	6909	7808	5506	6712		
5910	7412	6707	7803	5904	7202	6612	7801			5604	6902	118030	10
6001	7507	6712	7807	5907	7203	6707	7803			5606	6904		
6004	7801	6804	7808	5908	7207	6712	7807			5704	6906	28	34.1N
6607	7803			5909	7507	6804	7808			5707	6907	114	47.3W
6612	7807			5910	7801	6901		117070	57	5710	6909		
6707	7808			6001	7803					5804	6910	5208	5708
				6004	7807			27	27.6N	5807	6912	5209	5709
		117040	88	6607	7808			117	32.1W	5810	7201	5309	5808
										5901	7202	5608	5809
		28	27.6N			117060	68	5101	5801	5904	7203	5609	5909
117035	72	115	35.1W					5102	5804	5907	7207		
						27	47.6N	5103	5807	5908	7507		
28	37.6N	5101	5308	117050	71	116	53.2W	5104	5810	5910	7801		
115	15.5W	5102	5309					5105	5901	6001	7803		
		5103	5310	28	7.6N	5101	5406	5106	5904	6004	7807	118035	12
5003	5304	5104	5401	116	14.2W	5102	5502	5202	5907	6607	7808		
5004	5305	5105	5402			5103	5504	5203	5908	6612		28	24.1N
5005	5306	5106	5403	5101	5502	5104	5506	5204	5910			115	6.9W
5006	5307	5202	5404	5102	5504	5105	5512	5205	6001				
5007	5308	5203	5405	5103	5506	5106	5602	5206	6004			5208	5609
5009	5309	5204	5406	5104	5512	5202	5604	5207	6607			5209	5708
5011	5310	5205	5407	5105	5602	5203	5606	5303	6612	117090	8	5309	5709
5101	5411	5206	5408	5106	5604	5204	5701	5304	6712			5408	5808
5102	5502	5207	5410	5202	5606	5205	5704	5305	6901	26	47.6N	5411	5809
5103	5504	5208	5412	5203	5704	5206	5707	5306	6902	118	49.6W	5608	5909
5104	5510	5209	5502	5204	5707	5207	5710	5502	6904				
5105	5512	5210	5504	5205	5710	5302	5801	5504	6906	5804	5907		
5202	5608	5211	5506	5206	5801	5303	5804	5506	6907	5810	5910		
5203	5609	5301	5510	5207	5803	5304	5807	5512	6909	5901	6001		
5208	5708	5302	5512	5301	5804	5305	5810	5602	6910	5904	6004		
5209	5709	5303	5602	5302	5807	5306	5901	5604	6912				
5211	5710	5304	5604	5303	5810	5402	5904	5606	7201				
5301	5801	5305	5606	5304	5901	5403	5907	5704	7202				
5302	5804	5306	5608	5305	5902	5404	5908	5707	7203				
5303	5807	5307	5609	5306	5903	5405	5910	5710	7207				

CALCOFI STATIONS OCCUPIED ON SIX OR MORE CRUISES DURING 1950-1978

118039 40

28 16.1N
115 22.6W

5411 6607
5602 6612
5604 6707
5606 6712
5701 6804
5704 6901
5707 6902
5710 6904
5801 6906
5804 6907
5807 6909
5810 6910
5901 6912
5904 7203
5907 7207
5908 7507
5909 7801
5910 7803
6001 7807
6004 7808

119033 65

28 17.7N
114 52.5W

5208 5810
5209 5901
5602 5904
5604 5907
5606 5908
5701 5909
5704 5910
5707 6001
5708 6004
5709 6008
5710 6010
5801 6102
5804 6107
5807 6111
5808 6201
5809 6203

119033 CON'T

6207 6902
6211 6904
6302 6906
6304 6907
6307 6909
6310 6910
6401 6912
6407 7201
6501 7202
6507 7203
6601 7207
6607 7507
6612 7801
6707 7803
6712 7807
6804 7808
6901

120025 65

28 23.3N
114 14.7W

5108 5307
5109 5308
5110 5309
5111 5310
5112 5312
5201 5401
5202 5402
5203 5403
5204 5404
5205 5405
5206 5406
5207 5407
5208 5408
5209 5410
5210 5412
5211 5502
5301 5504
5302 5506
5303 5510
5304 5512
5305 5608
5306 5609

120025 CON'T

5708 5908
5709 5909
5710 5910
5804 6001
5807 6004
5808 7507
5809 7801
5810 7803
5901 7807
5904 7808
5907

120030 59

28 13.3N
114 34.3W

5108 5502
5109 5504
5110 5506
5111 5510
5112 5512
5201 5608
5202 5609
5203 5708
5204 5709
5205 5710
5206 5804
5207 5807
5208 5808
5209 5809
5210 5810
5211 5901
5301 5904
5302 5907
5303 5908
5304 5909
5305 5910
5306 6001
5307 6004
5308 7201
5309 7202
5310 7207
5312 7507
5408 7801

120030 CON'T

7803 7808
7807

120035 83

28 3.3N
114 53.8W

5002 5309
5004 5310
5005 5312
5006 5401
5007 5402
5009 5403
5011 5404
5101 5405
5102 5406
5103 5407
5104 5408
5105 5410
5107 5411
5108 5412
5109 5502
5110 5504
5111 5506
5112 5510
5201 5512
5202 5608
5203 5609
5204 5708
5205 5709
5206 5710
5207 5801
5208 5804
5209 5807
5210 5808
5211 5809
5301 5810
5302 5901
5303 5904
5304 5907
5305 5908
5306 5909
5307 5910
5308 6001

120035 CON'T

6004 7801
7201 7803
7202 7807
7207 7808
7507

120045 114

27 43.3N
115 32.8W

5002 5304
5003 5305
5004 5306
5005 5307
5006 5308
5007 5310
5009 5312
5011 5502
5101 5504
5102 5506
5103 5508
5104 5510
5105 5512
5106 5602
5107 5604
5108 5606
5109 5701
5110 5704
5111 5707
5112 5708
5201 5709
5202 5710
5203 5801
5204 5804
5205 5807
5206 5808
5207 5810
5208 5901
5209 5904
5210 5907
5211 5908
5301 5909
5302 5910
5303 6001

120045 CON'T

6004 6712
6008 6804
6010 6901
6102 6902
6105 6904
6107 6906
6111 6907
6201 6909
6203 6910
6207 6912
6211 7201
6302 7202
6304 7203
6307 7205
6310 7207
6401 7210
6407 7501
6501 7503
6507 7507
6601 7801
6607 7803
6612 7807
6707 7808

120050 128

27 33.3N
115 52.2W

5002 5109
5003 5110
5004 5111
5005 5112
5006 5201
5007 5202
5009 5203
5011 5204
5101 5205
5102 5206
5103 5207
5104 5208
5105 5209
5106 5210
5107 5211
5108 5301

120050 CON'T

5302 6001
5303 6002
5304 6003
5305 6004
5306 6005
5307 6006
5308 6008
5310 6010
5312 6102
5401 6105
5402 6107
5403 6111
5404 6201
5405 6203
5406 6207
5407 6211
5408 6302
5410 6304
5412 6307
5502 6310
5504 6401
5506 6407
5510 6507
5512 6601
5602 6607
5604 6612
5606 6707
5701 6712
5704 6804
5707 6901
5710 6902
5801 6904
5802 6906
5803 6907
5804 6909
5805 6910
5806 6912
5807 7202
5810 7203
5901 7205
5902 7207
5903 7210
5904 7412
5905 7507
5906 7801
5907 7803
5908 7807
5910 7808

CALCOFI STATIONS OCCUPIED ON SIX OR MORE CRUISES DURING 1950-1978

120055 12

27 23.3N
116 11.6W

5502 5701
5504 5704
5512 6902
5602 6906
5604 6909
5606 6912

120060 107

27 13.3N
116 31.0W

5002 5211
5003 5301
5004 5302
5005 5303
5006 5304
5007 5305
5009 5306
5011 5307
5101 5308
5102 5310
5103 5312
5104 5502
5105 5504
5106 5506
5107 5508
5108 5510
5109 5512
5110 5602
5111 5604
5112 5606
5201 5704
5202 5707
5203 5710
5204 5801
5205 5804
5206 5807
5207 5810
5208 5901
5209 5904
5210 5907

120060 CON'T

5908 6612
5910 6707
6001 6712
6004 6804
6008 6901
6010 6902
6102 6904
6105 6906
6107 6907
6111 6909
6201 6910
6203 6912
6207 7201
6211 7202
6302 7203
6304 7205
6307 7207
6310 7210
6401 7507
6407 7801
6501 7803
6507 7807
6601 7808
6607

120070 116

26 53.3N
117 9.7W

5002 5110
5003 5111
5004 5112
5005 5201
5007 5202
5009 5203
5011 5204
5101 5205
5102 5206
5103 5207
5104 5208
5105 5209
5107 5210
5108 5211
5109 5301

120070 CON'T

5302 6010
5303 6102
5304 6105
5305 6107
5306 6111
5307 6201
5308 6203
5310 6207
5312 6211
5401 6302
5402 6304
5403 6307
5404 6310
5405 6401
5406 6407
5407 6501
5408 6507
5410 6601
5412 6607
5502 6612
5504 6707
5506 6712
5510 6804
5512 6901
5602 6902
5604 6904
5606 6906
5701 6907
5704 6909
5707 6910
5710 6912
5801 7201
5804 7202
5807 7203
5810 7205
5901 7207
5904 7210
5907 7507
5908 7510
5910 7801
6001 7803
6004 7807
6008 7808

120080 109

26 33.3N
117 48.3W

5002 5707
5003 5710
5004 5801
5005 5802
5007 5803
5009 5804
5011 5805
5101 5806
5102 5807
5103 5810
5104 5901
5105 5902
5107 5903
5108 5904
5109 5906
5110 5907
5111 5908
5201 5910
5202 6001
5203 6002
5204 6003
5205 6004
5206 6005
5207 6006
5208 6008
5209 6010
5210 6102
5211 6105
5301 6107
5302 6111
5303 6201
5304 6203
5305 6207
5306 6211
5307 6302
5308 6304
5310 6307
5312 6401
5502 6407
5504 6501
5506 6507
5510 6601
5604 6607
5606 6612
5704 6712

120080 CON'T

6804 7203
6902 7205
6904 7207
6906 7210
6907 7507
6909 7801
6910 7803
6912 7807
7201 7808
7202

120090 77

26 13.3N
118 26.8W

5002 5304
5003 5305
5004 5306
5005 5307
5007 5308
5009 5310
5011 5312
5101 5403
5102 5404
5103 5405
5104 5406
5105 5407
5107 5408
5108 5410
5109 5412
5110 5502
5111 5510
5201 5710
5202 5804
5203 5807
5204 5810
5205 5901
5206 5904
5207 5907
5208 5910
5209 6001
5210 6008
5211 6010
5303 6102

120090 CON'T

6105 6407
6107 6501
6111 6507
6201 6601
6203 6607
6207 6902
6211 6906
6302 6909
6304 6912
6401

120100 28

25 53.3N
119 5.1W

5002 6008
5003 6010
5004 6102
5005 6105
5007 6107
5009 6111
5011 6201
5101 6203
5102 6211
5103 6302
5104 6304
5105 6401
5502 6501
5508 6507

120110 11

25 33.3N
119 43.3W

5002 5011
5003 5101
5004 5103
5005 5104
5007 5105
5009

120120 16

25 13.3N
120 21.5W

5401 6201
5404 6203
6008 6211
6010 6302
6102 6304
6105 6401
6107 6501
6111 6507

123037 56

27 25.0N
114 40.0W

5108 5506
5109 5510
5110 5512
5111 5801
5112 5804
5201 5807
5202 5810
5203 5901
5204 5907
5205 5908
5206 5910
5207 6001
5208 6004
5209 6607
5210 6612
5211 6707
5301 6712
5302 6902
5303 6904
5304 6906
5305 6907
5306 6909
5307 6910
5308 7201
5310 7202
5312 7203
5502 7207
5504 7507

CALGOFI STATIONS OCCUPIED ON SIX OR MORE CRUISES DURING 1950-1978

123042	113
27	15.0N
114	59.4W
5002	5407
5003	5408
5004	5410
5005	5412
5006	5502
5007	5504
5009	5506
5011	5510
5101	5512
5102	5602
5103	5604
5104	5606
5105	5701
5106	5704
5107	5707
5108	5710
5109	5801
5110	5804
5111	5807
5112	5810
5201	5901
5202	5902
5203	5903
5204	5906
5205	5907
5206	5908
5207	5910
5208	6001
5209	6002
5210	6003
5211	6004
5302	6005
5303	6006
5304	6008
5305	6010
5306	6102
5307	6107
5308	6111
5310	6201
5312	6203
5401	6207
5403	6211
5404	6302
5405	6304
5406	6307

123042 CON'T	
6310	6906
6401	6907
6407	6909
6501	6910
6507	6912
6607	7203
6612	7507
6707	7801
6712	7803
6804	7807
6902	7808
6904	

123050	83
26	59.0N
115	30.3W
5002	5211
5003	5302
5004	5303
5005	5304
5006	5305
5007	5306
5009	5307
5011	5308
5101	5310
5102	5312
5103	5402
5104	5502
5105	5504
5106	5506
5107	5510
5108	5512
5110	5602
5201	5604
5202	5606
5203	5701
5204	5704
5205	5707
5206	5710
5207	5801
5208	5804
5209	5807
5210	5810

123050 CON'T	
5901	6909
5907	6910
5908	6912
5910	7201
6001	7202
6004	7203
6607	7207
6612	7412
6707	7503
6712	7507
6804	7801
6902	7803
6904	7807
6906	7808
6907	

123055	6
26	49.0N
115	49.7W
5410	5504
5412	5512
5502	5602

123060	73
26	19.0N
116	47.4W
5002	5105
5003	5106
5004	5107
5005	5108
5006	5201
5007	5202
5009	5203
5011	5204
5101	5205
5102	5206
5103	5207
5104	5303

123060 CON'T	
5304	6001
5305	6004
5306	6607
5401	6612
5403	6707
5404	6712
5405	6804
5406	6904
5504	6906
5506	6907
5510	6909
5604	6910
5606	6912
5701	7201
5704	7202
5707	7203
5710	7207
5801	7501
5804	7507
5807	7510
5810	7801
5901	7803
5907	7807
5908	7808
5910	

123070	15
5011	5901
5704	5907
5707	5908
5710	5910
5801	6001
5804	6004
5807	6607
5810	

123080	9
25	59.0N
117	25.8W
5704	5901
5707	6001
5710	6004
5804	6607
5810	

127034	66
26	55.7N
114	6.2W
5109	5412
5110	5502
5111	5504
5201	5506
5203	5510
5204	5512
5205	5801
5206	5804
5207	5807
5208	5810
5209	5901
5210	5907
5211	5908
5301	5910
5302	6001
5303	6004
5304	6607
5305	6612
5306	6707
5307	6804
5308	6902
5310	6904
5312	6906
5401	6907
5403	6909
5404	6910
5405	6912
5406	7201
5407	7202
5408	7203
5410	7207

127034 CON'T	
7801	7807
7803	7808

127040	101
26	43.7N
114	29.4W
5002	5312
5003	5402
5004	5502
5005	5504
5006	5506
5007	5510
5009	5512
5011	5602
5101	5604
5102	5606
5103	5701
5104	5704
5105	5707
5106	5710
5108	5801
5109	5804
5110	5807
5111	5810
5201	5901
5203	5907
5204	5908
5205	5910
5206	6001
5207	6004
5208	6008
5209	6010
5210	6102
5211	6105
5301	6107
5302	6111
5303	6201
5304	6203
5305	6207
5306	6211
5307	6302
5308	6304
5310	6307

127040 CON'T	
6310	6909
6401	6910
6407	6912
6501	7201
6507	7202
6607	7203
6612	7207
6707	7412
6712	7507
6804	7801
6902	7803
6904	7807
6906	7808
6907	

127050	88
26	23.7N
115	7.9W
5002	5211
5003	5302
5004	5303
5005	5304
5007	5305
5009	5306
5011	5307
5101	5308
5102	5310
5103	5312
5104	5401
5105	5403
5106	5404
5107	5405
5108	5406
5110	5407
5201	5408
5203	5410
5204	5412
5205	5502
5206	5504
5207	5506
5208	5510
5209	5512
5210	5602

CALCOFI STATIONS OCCUPIED ON SIX OR MORE CRUISES DURING 1950-1978

127050	CON'T	127060	CON'T	130030	94	130030	CON'T	130040	126	130040	CON'T	130050	CON'T
5604	6712	5910	6910	26	29.4N	7801	7807	26	9.4N	6207	6906	5510	6302
5606	6804	6001	6912	113	29.4W	7803	7808	114	7.9W	6211	6907	5512	6304
5701	6902	6004	7201							6302	6909	5602	6307
5704	6904	6607	7202	5108	5809			5002	5407	6304	6910	5604	6310
5707	6906	6612	7203	5109	5810			5003	5408	6307	6912	5606	6401
5710	6907	6707	7207	5110	5901			5004	5410	6310	7201	5701	6407
5801	6909	6804	7507	5111	5904	130035	64	5005	5412	6401	7202	5704	6501
5804	6910	6902	7801	5201	5907			5006	5502	6407	7203	5707	6507
5807	6912	6904	7803	5202	5908	26	19.4N	5007	5504	6501	7205	5710	6601
5810	7201	6906	7807	5203	5910	113	48.7W	5009	5506	6507	7207	5801	6607
5901	7202	6907	7808	5204	6001			5011	5510	6601	7210	5804	6612
5907	7203	6909		5205	6004	5002	5305	5101	5512	6607	7412	5807	6804
5908	7207			5206	6008	5003	5306	5102	5602	6612	7507	5810	6902
5910	7501			5207	6010	5004	5307	5103	5604	6707	7510	5901	6904
6001	7507			5208	6102	5005	5308	5104	5606	6712	7801	5904	6906
6004	7801			5209	6105	5006	5310	5105	5701	6804	7803	5907	6907
6607	7803	127070	14	5210	6107	5007	5312	5106	5704	6902	7807	5908	6909
6612	7807			5211	6111	5009	5502	5107	5707	6904	7808	5910	6910
6707	7808	25	43.7N	5301	6201	5011	5504	5108	5710			6001	7201
		116	24.6W	5302	6203	5101	5506	5109	5801			6004	7202
				5303	6207	5102	5510	5110	5804			6008	7203
		5011	5901	5304	6211	5103	5512	5111	5807			6010	7205
		5704	5907	5305	6302	5105	5602	5201	5808	130050	102	6102	7207
127060	63	5707	5908	5306	6304	5106	5604	5202	5809			6105	7210
		5710	5910	5307	6307	5107	5606	5203	5810	25	49.4N	6107	7503
26	3.7N	5801	6001	5308	6310	5109	5701	5204	5901	114	46.2W	6111	7507
115	46.3W	5804	6004	5310	6401	5110	5704	5205	5902			6201	7801
		5810	6607	5312	6407	5111	5707	5206	5903	5002	5205	6203	7803
5002	5207			5401	6501	5201	5710	5207	5904	5003	5206	6207	7807
5003	5303			5402	6507	5202	5801	5208	5905	5004	5207	6211	7808
5004	5304			5403	6601	5203	5804	5209	5906	5005	5208		
5005	5305			5404	6607	5204	5807	5210	5907	5007	5209		
5007	5306	127080	9	5405	6612	5205	5808	5211	5908	5009	5210		
5009	5504			5406	6707	5206	5809	5301	5910	5011	5211		
5011	5506	25	23.7N	5407	6712	5207	5810	5302	6001	5101	5301	130060	109
5101	5510	117	2.8W	5408	6804	5208	5901	5303	6002	5102	5302		
5102	5604			5410	6902	5209	5904	5304	6003	5103	5303	25	29.4N
5103	5606	5704	5901	5412	6904	5210	5907	5305	6004	5104	5304	115	24.4W
5104	5704	5707	6001	5502	6906	5211	5908	5306	6005	5105	5305		
5105	5707	5710	6004	5504	6907	5301	5910	5308	6006	5107	5306	5002	5104
5107	5710	5804	6607	5506	6909	5302	6001	5310	6008	5108	5307	5004	5105
5108	5801	5810		5510	6910	5303	6004	5312	6010	5109	5308	5005	5107
5201	5804			5512	6912	5304	7507	5401	6102	5110	5310	5007	5108
5202	5807			5710	7201			5402	6105	5111	5312	5009	5109
5203	5810			5801	7202			5403	6107	5201	5502	5011	5110
5204	5901			5804	7203			5404	6111	5202	5504	5101	5111
5205	5907			5807	7207			5405	6201	5203	5506	5102	5201
5206	5908			5808	7507			5406	6203	5204	5508	5103	5202

CALCOFI STATIONS OCCUPIED ON SIX OR MORE CRUISES DURING 1950-1978

130060 CON'T

5203	5907
5204	5908
5205	5910
5206	6001
5207	6004
5208	6008
5209	6010
5210	6102
5211	6105
5301	6107
5302	6111
5303	6201
5304	6203
5305	6207
5306	6211
5307	6302
5308	6304
5310	6307
5312	6310
5401	6401
5402	6407
5403	6501
5404	6507
5405	6601
5406	6607
5407	6612
5408	6712
5410	6804
5412	6902
5502	6904
5504	6906
5506	6907
5510	6909
5602	6910
5604	7201
5606	7202
5701	7203
5704	7205
5707	7207
5710	7210
5801	7507
5804	7801
5807	7803
5810	7807
5901	7808
5904	

130070 45

25	9.4N
116	2.5W
5002	6008
5003	6010
5004	6102
5005	6105
5007	6107
5009	6111
5011	6201
5101	6203
5102	6207
5103	6211
5104	6302
5105	6304
5109	6307
5110	6310
5201	6401
5508	6407
5704	6501
5707	6507
5710	6601
5804	6607
5907	7205
5908	7210
5910	

130080 38

24	49.4N
116	40.5W
5002	5704
5003	5707
5004	5710
5005	5804
5007	6008
5009	6010
5011	6102
5101	6105
5102	6107
5103	6111
5104	6201
5105	6203
5201	6207

130080 CON'T

6211	6501
6302	6507
6304	6601
6307	6607
6401	7205
6407	7210

130090 20

24	29.4N
117	18.5W
5011	6302
5404	6304
6102	6401
6105	6407
6107	6501
6111	6507
6201	6601
6203	6607
6207	7205
6211	7210

130100 15

24	9.4N
117	56.3W
5011	6203
5508	6211
6010	6302
6102	6304
6105	6401
6107	6501
6111	6507
6201	

130120 13

23	29.4N
119	11.6W
5404	6203
6010	6211
6102	6302
6105	6401
6107	6501
6111	6507
6201	

133025 59

26	5.1N
112	49.1W
5108	5512
5109	5801
5110	5804
5111	5807
5201	5810
5202	5901
5203	5904
5204	5907
5205	5908
5206	5910
5207	6001
5208	6004
5209	6607
5210	6612
5211	6804
5301	6902
5302	6904
5303	6906
5304	6907
5305	6909
5306	6910
5307	6912
5308	7201
5310	7203
5312	7207
5502	7507
5504	7801
5506	7803
5510	7807

133025 CON'T

7808	
5011	5407
5101	5408
5102	5410
5104	5412
5105	5502
5106	5504
5107	5506
5108	5510
5109	5512
5110	5602
5111	5604
5201	5606
5202	5701
5203	5704
5204	5707
5205	5710
5206	5801
5207	5804
5208	5807
5209	5810
5210	5901
5211	5904
5301	5907
5302	5908
5303	5910
5304	6001
5305	6004
5306	6607
5307	6612
5308	6712
5310	6804
5312	6902
5401	6904
5402	6906
5403	6907
5404	6909
5405	6910
5406	6912

133030 CON'T

7201	7801
7202	7803
7203	7807
7207	7808
7507	

133030 85

25	55.1N
113	8.2W
133040	69
5011	5704
5101	5707
5102	5710
5103	5801
5104	5804
5105	5810
5106	5901
5107	5904
5108	5907
5201	5908
5202	5910
5203	6001
5204	6004
5205	6607
5206	6612
5207	6804
5301	6902
5302	6904
5303	6906
5304	6907
5305	6909
5306	6910
5307	6912
5308	7201
5310	7202
5312	7203
5502	7207
5504	7412
5506	7501
5512	7507
5602	7510
5604	7801
5606	7803
5701	7807

133040 CON'T

7808	

133050 59

25	15.1N
114	24.6W
5011	5707
5101	5710
5102	5801
5103	5804
5104	5807
5105	5810
5106	5901
5107	5904
5108	5907
5201	5908
5202	5910
5203	6001
5204	6004
5205	6607
5206	6902
5207	6904
5301	6906
5303	6907
5304	6909
5305	6910
5306	7201
5401	7202
5403	7203
5404	7207
5405	7507
5406	7801
5504	7803
5506	7807
5606	7808
5704	

CALCOFI STATIONS OCCUPIED ON SIX OR MORE CRUISES DURING 1950-1978

133060 42

24 55.1N
115 2.7W

5011 5907
5101 5908
5102 5910
5103 6001
5104 6004
5105 6607
5106 6902
5201 6904
5203 6906
5204 6907
5303 6909
5304 6910
5305 7201
5704 7202
5707 7203
5710 7207
5801 7507
5807 7801
5810 7803
5901 7807
5904 7808

133070 8

24 35.1N
115 40.6W

5011 5804
5704 5907
5707 5908
5710 5910

137023 91

25 33.8N
112 19.8W

5108 5807
5109 5810
5110 5901
5111 5904
5201 5907
5202 5908
5203 5910
5204 6001
5205 6004
5206 6008
5207 6010
5208 6102
5209 6105
5210 6107
5211 6111
5301 6201
5302 6203
5303 6211
5304 6302
5305 6304
5306 6310
5307 6401
5308 6407
5310 6501
5312 6507
5401 6601
5402 6607
5403 6612
5404 6712
5405 6804
5406 6902
5407 6904
5408 6906
5410 6907
5412 6909
5502 6910
5504 6912
5506 7201
5510 7202
5512 7203
5706 7207
5707 7507
5710 7801
5801 7803
5804 7807

137023 CON'T

7808

137030 86

25 19.8N
112 46.5W

5011 5801
5108 5804
5109 5807
5110 5810
5111 5901
5201 5904
5202 5907
5203 5908
5204 5910
5205 6001
5206 6004
5207 6008
5208 6010
5209 6102
5210 6105
5211 6107
5301 6110
5302 6201
5303 6203
5304 6211
5305 6302
5306 6304
5307 6310
5308 6401
5310 6407
5312 6501
5502 6507
5504 6601
5506 6607
5510 6612
5512 6712
5602 6804
5604 6902
5606 6904
5704 6906
5706 6907
5707 6909
5710 6910

137030 CON'T

6912 7507
7201 7801
7202 7803
7203 7807
7207 7808

137035 22

25 9.8N
113 5.5W

5011 5807
5101 5810
5102 5901
5103 5904
5104 5907
5105 5908
5106 5910
5107 6001
5701 6004
5801 6501
5804 7507

137040 95

24 59.8N
113 24.5W

5011 5207
5101 5301
5102 5303
5103 5304
5104 5305
5105 5306
5106 5401
5107 5403
5108 5404
5201 5405
5203 5406
5204 5502
5205 5504
5206 5506

137040 CON'T

5512 6107
5602 6111
5604 6201
5606 6203
5704 6211
5706 6302
5707 6304
5710 6310
5801 6401
5802 6407
5803 6501
5804 6507
5805 6601
5806 6607
5807 6612
5810 6712
5901 6902
5902 6904
5903 6906
5904 6907
5905 6909
5906 6910
5907 7201
5908 7202
6001 7203
6002 7207
6003 7412
6004 7501
6005 7507
6006 7801
6008 7803
6010 7807
6102 7808
6105

5011 5105
5101 5106
5102 5107
5103 5108
5104 5201

137050 CON'T

5202 6105
5203 6107
5204 6111
5205 6201
5206 6203
5207 6211
5301 6304
5303 6307
5304 6310
5305 6401
5306 6407
5506 6501
5606 6507
5704 6601
5706 6607
5710 6902
5801 6904
5804 6906
5807 6907
5810 6909
5901 6910
5904 7201
5907 7202
5908 7203
5910 7207
6001 7507
6004 7801
6008 7803
6010 7807
6102 7808

137060 62

24 19.8N
114 40.4W

5011 5204
5101 5303
5102 5304
5103 5305
5104 5404
5105 5405
5106 5704
5201 5707
5203 5710

137060 CON'T

5801 6310
5804 6401
5807 6407
5810 6501
5901 6507
5904 6601
5907 6607
5910 6902
6001 6904
6004 6906
6008 6907
6010 6909
6102 6910
6105 7201
6107 7202
6111 7203
6201 7207
6203 7507
6211 7510
6302 7801
6304 7803
6307 7807

137070 24

23 59.8N
115 18.1W

5011 6107
5707 6111
5710 6201
5804 6203
5901 6211
5904 6302
5907 6304
5910 6307
6001 6401
6004 6407
6102 6501
6105 6507

CALCOFI STATIONS OCCUPIED ON SIX OR MORE CRUISES DURING 1950-1978

137080 23

23 39.8N
115 55.8W

5704 6111
5707 6201
5710 6203
5804 6211
5901 6302
5904 6304
5907 6307
6001 6401
6004 6407
6102 6501
6105 6507
6107

140030 26

24 45.5N
112 25.4W

5109 6111
5202 6201
5301 6203
5502 6211
5512 6302
5706 6304
5801 6401
5810 6407
5901 6501
5904 6507
5908 7202
6001 7205
6004 7210

140035 20

24 35.5N
112 44.4W

5011 5604
5103 5704
5106 5801
5109 5810
5202 5901
5301 5904
5401 5908
5412 6001
5502 6004
5512 7202

140040 33

24 25.5N
113 3.3W

5011 5908
5103 6001
5106 6004
5109 6111
5202 6201
5301 6203
5502 6211
5508 6302
5512 6304
5602 6401
5604 6407
5704 6501
5706 6507
5801 7202
5810 7205
5901 7210
5904

140050 30

24 5.5N
113 41.1W

5011 6001
5103 6111
5106 6201
5109 6203
5202 6211
5301 6302
5401 6304
5602 6401
5704 6407
5706 6501
5801 6507
5810 6804
5901 7202
5904 7205
5908 7210

140060 16

23 45.5N
114 18.8W

5011 5901
5103 5904
5106 5908
5109 6001
5602 6004
5704 7202
5801 7205
5810 7210

140070 9

23 25.5N
114 56.4W

5011 5508
5103 5704
5106 5908
5109 7205

140070 CON'T

7210

140080 7

23 5.5N
115 33.9W

5011 6804
5103 7205
5106 7210
5704

143026 12

24 19.2N
111 49.4W

5202 5901
5301 5904
5502 5908
5512 6001
5801 6004
5810 7202

143030 21

24 11.2N
112 4.5W

5011 5604
5106 5702
5109 5706
5202 5801
5301 5810
5401 5901
5412 5904
5502 5908
5512 6001
5602 6004

143030 CON'T

7202

143035 19

24 1.2N
112 23.4W

5011 5702
5103 5801
5106 5810
5109 5901
5202 5904
5301 5908
5502 6001
5512 6004
5602 7202
5604

143040 14

23 51.2N
112 42.2W

5011 5810
5103 5901
5106 5904
5602 5908
5604 6001
5706 6004
5801 7202

143050 13

23 31.2N
113 19.8W

5011 5602
5103 5706
5106 5801

143050 CON'T

5810 6001
5901 6004
5904 7202
5908

143060 11

23 11.2N
113 57.3W

5011 5904
5106 5908
5602 6001
5801 6004
5810 7202
5901

147020 16

23 55.8N
111 5.3W

5109 5801
5202 5810
5301 5901
5401 5904
5412 5908
5502 6001
5512 6004
5702 7202

147025 20

23 45.8N
111 24.2W

5011 5109
5103 5202
5106 5301

147025 CON'T

5502 5810
5512 5901
5602 5904
5604 5908
5702 6001
5704 6004
5801 7202

147030 18

23 35.8N
111 43.0W

5011 5702
5106 5801
5109 5810
5202 5901
5301 5904
5401 5908
5412 6001
5502 6004
5512 7202

147040 15

23 15.8N
112 20.5W

5011 5810
5103 5901
5106 5904
5602 5908
5604 6001
5702 6004
5704 7202
5801

CALCOFI STATIONS OCCUPIED ON SIX OR MORE CRUISES DURING 1950-1978

147050 10

22 55.8N
112 58.0W

5011 5904
5106 5908
5704 6001
5810 6004
5901 7202

147060 10

22 35.8N
113 35.3W

5011 5904
5106 5908
5704 6001
5810 6004
5901 7202

150019 15

23 23.5N
110 41.0W

5109 5801
5202 5810
5301 5901
5502 5908
5512 6001
5602 6004
5604 7202
5702

150025 25

23 11.5N
111 3.5W

5011 5702
5103 5801
5106 5802
5109 5803
5202 5810
5301 5901
5401 5908
5412 6001
5502 6004
5508 7202
5512 7205
5602 7210
5604

150030 19

23 1.5N
111 22.2W

5011 5801
5103 5810
5106 5901
5109 5908
5202 6001
5301 6004
5502 7202
5512 7205
5602 7210
5604

150040 22

22 41.5N
111 59.6W

5011 5202
5103 5301
5106 5401
5109 5508

150040 CON'T

5602 5901
5604 5908
5702 6001
5801 6004
5802 7202
5803 7205
5810 7210

150050 12

22 21.5N
112 36.8W

5011 5908
5103 6001
5106 6004
5109 7202
5810 7205
5901 7210

150060 13

22 1.5N
113 14.0W

5011 5901
5103 5908
5106 6001
5109 7202
5401 7205
5508 7210
5810

150070 6

21 41.5N
113 51.1W

5011 5109
5103 7205
5106 7210

150080 7

21 21.5N
114 28.2W

5011 5508
5103 7205
5106 7210
5109

153016 17

22 55.2N
110 9.2W

5109 5708
5412 5801
5502 5810
5602 5901
5604 5908
5612 6001
5702 6004
5704 7202
5706

153020 19

22 47.2N
110 24.1W

5011 5706
5103 5708
5106 5801
5109 5810
5502 5901
5602 5908
5604 6001
5612 6004
5702 7202
5704

153030 17

22 27.2N
111 1.4W

5011 5704
5103 5706
5106 5801
5412 5810
5502 5901
5602 6001
5604 6004
5612 7202
5702

153040 15

22 7.2N
111 38.7W

5011 5706
5103 5801
5106 5810
5602 5901
5604 6001
5612 6004
5702 7202
5704

153050 13

21 47.2N
112 15.8W

5011 5801
5103 5810
5106 5901
5602 6001
5604 6004
5612 7202
5704

153060 10

21 27.2N
112 52.8W

5011 5810
5602 5901
5604 6001
5612 6004
5704 7202

157010 12

22 31.9N
109 25.8W

5011 5702
5103 5801
5106 5901
5109 6001
5412 7205
5502 7210

157020 18

22 11.9N
110 3.0W

5011 5702
5103 5706
5106 5708
5109 5801
5412 5901
5502 6001
5602 7202
5604 7205
5612 7210

157030 15

21 51.9N
110 40.2W

5011 5706
5103 5801
5106 5901
5412 6001
5502 7202
5602 7205
5604 7210
5702

157040 13

21 31.9N
111 17.2W

5011 5801
5103 5901
5106 6001
5602 7202
5604 7205
5612 7210
5706

CALCOFI STATIONS OCCUPIED ON SIX OR MORE CRUISES DURING 1950-1978

157050 11

21 11.9N
111 54.2W

5011 5901
5103 6001
5106 7202
5602 7205
5604 7210
5801

157060 9

20 51.9N
112 31.1W

5011 6001
5602 7202
5604 7205
5612 7210
5901

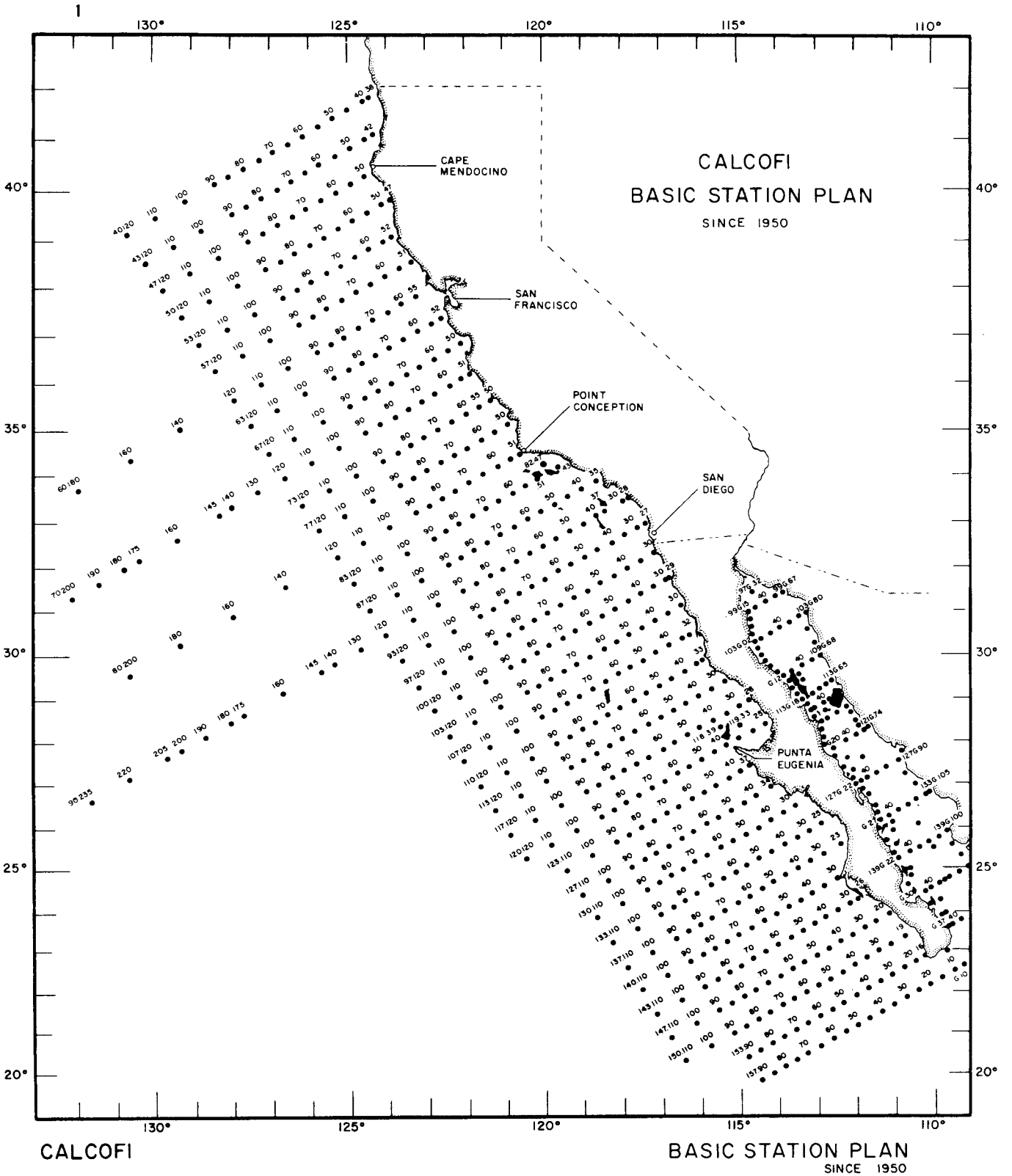
TABLE 2. CCFIHYDRO CONTROL CARD SPECIFICATIONS

FIELD 1	FIELD 2	FIELD 3	FIELD 4	FIELD 5	FIELD 6
<TITLE>	DEPTH	TIME	STAT	<STATIONCODE>	CONCAT
COL 1-24	DISTN	DISTN	STD	<CRUISECODE>	
	DISTP	DISTP	OBS	<STD DEPTH>	PRTREC
	SUBFIL	STATIONS	OBSTD	0	WRTREC
		CRUISES	ALL	1	PRWREC
				#	#

TABLE 3. CCFIHYDRO DATA SELECTION MODES

MODE	CONTROL CARD SPECIFICATIONS				DATA SELECTION CARDS		
	FIELD 2	FIELD 3	FIELD 4	FIELD 5	1st Set	2ND SET	3RD SET
1	DEPTH	DISTN OR STATIONS	STAT	CRUISECODE OR 0 OR 1	0	STATIONS	CRUISES (IF FIELD 5 = 1)
2	DEPTH	TIME OR CRUISES	STAT	STATIONCODE OR 0	0	CRUISES	NONE
3	DEPTH	DISTP	STAT	CRUISECODE OR 0 OR 1	0	STATIONS	CRUISES (IF FIELD 5 = 1)
4	DISTN	TIME OR CRUISES	STAT	0	STATIONS	CRUISES	NONE
5	DISTP	DISTN	STAT	CRUISECODE OR 0 OR 1	0	STATIONS	CRUISES (IF FIELD 5 =1)
6	DISTP	TIME OR CRUISES	STAT	0	STATIONS	CRUISES	NONE
7	DEPTH	DISTN OR STATIONS	STD	CRUISECODE OR 0 OR 1	DEPTHS	STATIONS	CRUISES (IF FIELD 5 = 1)
8	DEPTH	TIME OR CRUISES	STD	STATIONCODE OR 0	DEPTHS	STATIONS	CRUISES (IF
9	DEPTH	DISTP	STD	CRUISECODE OR 0 OR 1	DEPTHS	STATIONS	CRUISES (IF FIELD 5 = 1)
10	DISTN	TIME OR CRUISES	STD	STD DEPTH	STATIONS	CRUISES	NONE
11	DISTP	DISTN	STD	CRUISECODE OR 0 OR 1	STD DEPTH	STATIONS	CRUISES (IF FIELD 5 = 1)
12	DISTP	TIME OR CRUISES	STD	STD DEPTH	STATIONS	CRUISES	NONE
13	DEPTH	DISTN OR STATIONS	OBS OR OBSTD	CRUISECODE OR 0 OR 1	SEQ NOS	STATIONS	CRUISES (IF FIELD 5 = 1)
14	DEPTH	TIME OR CRUISES	OBS OR OBSTD	STATIONCODE OR 0	SEQ NOS	CRUISES	NONE
15	DEPTH	DISTP	OBS OR OBSTD	CRUISECODE OR 0 OR 1	SEQ NOS	STATIONS	CRUISES (IF FIELD 5 = 1)
16	-	-	-	N O T U S E D	-	-	-
17	SUBFIL	STATIONS	ALL	#	STATIONS	NONE	NONE
18	SUBFIL	CRUISES	ALL	#	CRUISES	NONE	NONE

FIGURE 1


CALCOFI
BASIC STATION PLAN
SINCE 1950
CAPE MENDOCINO
SAN FRANCISCO
POINT CONCEPTION
SAN DIEGO
PUNTA EUGENIA
130°
125°
120°
115°
110°
40°
35°
30°
25°
20°
CALCOFI
BASIC STATION PLAN
SINCE 1950

RECENT TECHNICAL MEMORANDUMS

Copies of this and other NOAA Technical Memorandums are available from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22167. Paper copies vary in price. Microfiche copies cost $3.50. Recent issues of NOAA Technical Memorandums from the NMFS Southwest Fisheries Center are listed below:

NOAA-TM-NMFS-SWFC-

14 Histological gonad analyses of late summer—early winter collections of bigeye tuna, *Thunnus obesus*, and yellowfin tuna, *Thunnus albacares*, from the Northwest Atlantic and the Gulf of Mexico.
S. R. GOLDBERG and H. HERRING-DYAL
(June, 1981)

15 Status reports on world tuna and billfish stocks.
STAFF, SWFC
(July, 1981)

16 An evaluation of tagging, marking, and tattooing techniques for small delphinids.
M. J. WHITE, JR., J. G. JENNINGS, W. F. GANDY and L. H. CORNELL
(November 1981)

17 Local stability in maximum net productivity levels for a simple model of porpoise population sizes.
T. POLACHECK
(April 1981)

18 Environmental data contouring program EDMAP2.
L. EBER
(April 1982)

19 The relationship between changes in gross reproductive rate and the current rate of increase for some simple age structured models.
T. POLACHECK
(May 1982)

20 Testing methods of estimating range and bearing to cetaceans aboard the *R/V D. S. Jordan*.
T. D. SMITH
(1982)

21 "An annotated bibliography of the ecology of co-occurring tunas (*Katsuwonus pelamis, Thunnus albacares*) and dolphins (*Stenella attenuata, Stenella longirostris* and *Delphinus delphis* in the eastern tropical Pacific"
S. D. HAWES
(November 1982)

22 Structured flotsam as fish aggregating devices.
R. S. SHOMURA and W. M. MATSUMOTO
(November 1982)

23 Abundance estimation of dolphin stocks involved in the eastern tropical Pacific yellowfin tuna fishery determined from aerial and ship surveys to 1979.
R. S. HOLT and J. E. POWERS
(November 1982)