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FRANK J SEILER RESEARCH LAB UNITED STATES AIR FORCE A--ETC F/0 5/2  
A RESEARCH ACTIVITIES MANAGEMENT SYSTEM.(U)  
FEB 80 J S WILKES

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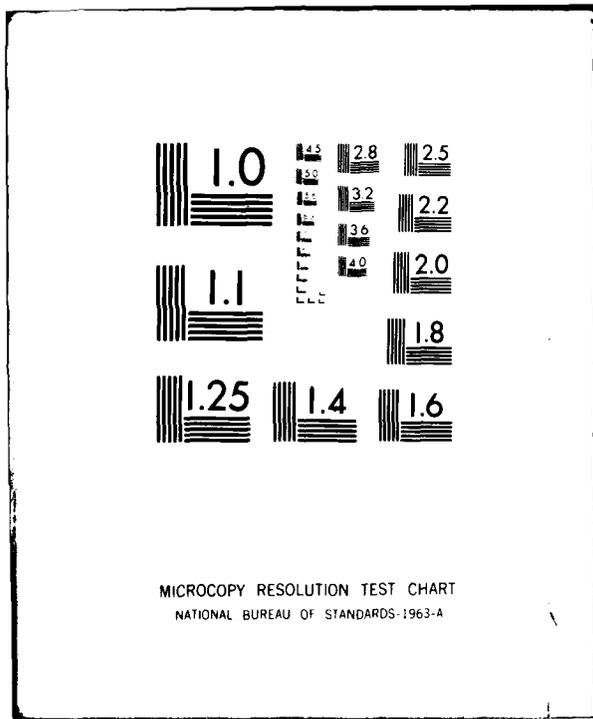
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**FRANK J. SEILER RESEARCH LABORATORY**

**TECHNICAL REPORT FJSRL-TR-80-0007**

**FEBRUARY 1980**

**A RESEARCH ACTIVITIES  
MANAGEMENT SYSTEM**

**John S. Wilkes**

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JUL 15 1980**

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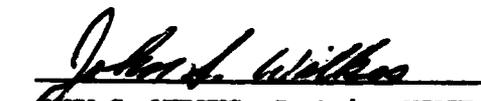
This document was prepared by the Electrochemistry Division, Directorate of Chemical Sciences, Frank J. Seiler Research Laboratory, United States Air Force Academy, CO. The research was conducted under Project Work Unit Number 2303-F2-10, Organic and Inorganic Electrochemical Measurements, Captain John S. Wilkes, USAFR, was the Project Scientist in charge of the work.

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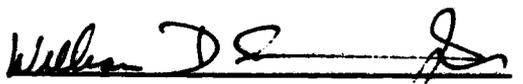
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This report has been reviewed by the Chief Scientist and is releasable to the National Technical Information Service (NTIS). At NTIS it will be available to the general public, including foreign nations.

This technical report has been reviewed and is approved for publication.

  
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A RESEARCH ACTIVITIES MANAGEMENT SYSTEM

By

Captain John S. Wilkes, USAFR

FEBRUARY 1980

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Directorate of Chemical and Atmospheric Sciences  
Air Force Office of Scientific Research  
Air Force Systems Command  
Bolling AFB, DC 20332

and

Directorate of Chemical Sciences  
Frank J. Seiler Research Laboratory  
Air Force Systems Command  
USAF Academy, CO 80840

ABSTRACT

A Research Activities Management System is described. It is a computerized storage and retrieval system that allows the manager of a scientific or engineering research organization to receive an organized accounting of the research activities of the organization. The scope of the data base and the nature of the items comprising the data base are defined. Examples of the use of the system are presented, using the research activities of a chemistry basic research laboratory as the data base.

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PREFACE

This report documents work performed as part of an AFOSR Reserve project under the direction of Dr. Donald Ball (AFOSR) and Lt Colonel Kenneth Siegenthaler (FJSRL/NC). The author is a mobilization augmentee reservist assigned to the Air Force Office of Scientific Research. The project was performed at the Frank J. Seiler Research Laboratory, using their research records as a data base and their computer facilities to implement the system described in this report. The author wishes to thank Colonel M.D. Bacon for his helpful comments and suggestions.

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## I. INTRODUCTION

A manager requires a knowledge of how effective his organization is in meeting its objectives in order to direct his financial and personnel resources in the best way. The manager of a basic research program is at a disadvantage in this respect because the value of a basic research effort is usually not known for many years. Since no precise measurement of research productivity can be made, certain indicators of productivity (publications, patents, etc.) are most often used to evaluate a research effort. Unfortunately, there is no consensus on which research activities comprise the best indicators of the future value of a current research program. In fact, it is probable that meaningful productivity indicators for one discipline (e.g. chemistry) are not the same for another (e.g. aero-engineering).

This report describes a system for collection, organization, storage and retrieval of "research activities", which will be called the Research Activities Management System (RAMS). Research activity is defined here as any technical activity of a research organization that is a product of or contributes to the research effort. The qualitative and quantitative evaluation of the research activities would be a measure of research productivity, but how that evaluation should be made will not be addressed. The system described here provides an organized and flexible data base, which is a necessary requirement for a subsequent productivity evaluation. The nature of research productivity will be the subject of a future study.

The system is basically a computerized recording and retrieval system. The inputs to RAMS are all of the things researchers do to accomplish their mission. RAMS is a tool that allows management to analyze research activities conveniently and rapidly. The output of RAMS

are records (lists) of research activities that may be generated for a large number of specific purposes. Lists may be generated according to names of persons (the researchers), types of activities (e.g. publications), date, task, work unit or any combination of any number of these.

## II. THE MODEL

The model chosen for development of a system for analyzing research activity was the Chemical Sciences Directorate of the Frank J. Seiler Research Laboratory (FJSRL). FJSRL is an Air Force Systems Command Laboratory under the Air Force Office of Scientific Research. The laboratory conducts basic research in the areas of chemistry, applied math, and aero-engineering. There are several attractions to using FJSRL as a model for analysis of research activity. First, the mission of FJSRL is solely in the area of basic research. There are no 6.2 or 6.3 programs as in other Air Force laboratories. Second, the research programs are conducted in a manner similar to research in industrial and academic laboratories. Thus, a system patterned after FJSRL could be used in a wide variety of situations. Finally, the research records of the Chemical Sciences directorate were readily available to the author.

Even though RAMS was devised for a chemistry research program at a military laboratory, the inputs could be from a research program in any discipline in any type laboratory. The major limitation to the scope of the system derives from the fact that the model was a basic research program. Analysis of advanced development programs, where hardware or specific test milestones are the important outputs, would require modifications to the list of inputs to the system.

### III. TYPES OF RESEARCH ACTIVITIES

Researchers engage in a wide variety of activities that directly and indirectly contribute toward their research objectives. Some Activities are "housekeeping" functions (supply ordering, budget planning, etc.), which are overhead that one attempts to minimize. The working definition of "research activity" contained in the Introduction excludes such overhead activities, even though they are important to the functioning of the program. The feature that distinguishes the items to be considered research activities is that each requires the technical ability or training of a scientist or engineer. The most important activities of a researcher are creative thought and experimentation, but creativity is impossible to quantify. The activities listed below are documentable events attributable to individuals or groups that could be used as indicators of productivity.

The activities are organized in outline form:

#### OUTLINE 1

- I. Publications. Printed material authored by researchers describing work done partially or wholly at the organization being evaluated.
  - A. Journals. Broadly defined to include all publications printed on a regular basis by an outside organization (publisher or scientific society).
    1. Refereed. A publication where approval is required by a third party (e.g. peer reviewer) as a condition for acceptance.
      - a. Full Paper. Generally the most complete description of results published in a primary journal.
      - b. Communication. An abbreviated report, usually published much faster than a full paper.
      - c. Letter. A very short report or an actual letter.
      - d. Scientific Review. A report of the literature and current work in a selected technical area. Usually published in a secondary journal.

- e. Book Review. A critical analysis of a book or other publication.
  - f. Extended Abstract. An abstract or full text of a presentation that is published as a record of a meeting where the presentation was made. This does not include publication of the same work submitted for publication separately.
  - g. Other.
2. Not Refereed. A publication where approval is given by a second party (e.g. editor), usually as a matter of course.
- a. Full Paper.
  - b. Communication.
  - c. Letter.
  - d. Scientific Review.
  - e. Book Review.
  - f. Extended Abstract.
  - g. Other.
- B. Technical Reports. A USAF publication which is reviewed internally and is approved for public release (unless classified) through NTIS. Has TR and government accession numbers.
- C. Technical Memorandums. A USAF publication which is reviewed internally, but is not approved for public release. Has a TM number but no government accession number.
- D. Books. A bound publication that is clearly not a journal or technical report, but may be part of a series.
- 1. Complete Book. A whole volume authored or co-authored by laboratory personnel.
  - 2. Chapter. A clearly delineated section of a book attributed wholly or in part to laboratory personnel.
  - 3. Other.
- E. Other Publications. Any printed material not covered by the categories listed above.

II. Patents. U.S. or otherwise.

- A. Applied For. Written disclosure submitted to USAF for consideration for patent application. Disclosures submitted by USAF to the U.S. Patent Office are also in this category.
- B. Granted. By the U.S. Patent Office.

III. Presentations. An oral presentation of research at any level.

- A. Technical Paper. A presentation at an organized scientific meeting.
  - 1. Contributed. A technical paper presented at the initiative of the author. Generally there is no technical review.
  - 2. Invited. A technical paper presented by invitation from a meeting organizer.
- B. Seminars. Similar to a technical paper but not presented at an organized meeting.
  - 1. Internal. Presented to an audience consisting largely of in-house personnel.
  - 2. External. Presented to an outside organization.
- C. Briefings. Contains less technical detail than a seminar and is not presented at a scientific meeting. Generally presented to management or to visitors.
  - 1. Internal.
  - 2. External.
- D. Other Presentations.

IV. Evaluations and Reviews. Written opinions by S & E personnel of items outlined below.

- A. Journal Manuscripts. Manuscripts submitted for publication by persons outside the organization.
  - 1. From Editor. A peer review of a manuscript requested by an editor.
  - 2. From Author. A more informal evaluation of a manuscript requested by the author.

- B. Proposals. Technical proposals from outside sources where funding is requested. Written evaluations are made based on technical content.
  - 1. Grant Proposals. Evaluations of proposals forwarded by funding agencies.
  - 2. IR&D. Evaluation of Independent Research and Development proposals received from industry
  
- V. Research Coordination. A broad category of activities whereby technical personnel interact with the scientific community to the benefit of the research mission.
  - A. Scientific Meetings. A meeting, usually organized by a scientific society, where research results are presented.
    - 1. Paper Presented. Research presented as a technical paper as well as attended meeting.
    - 2. No Paper Presented. Attended meeting only.
  - B. Planning/Coordination Meetings. Visits to academic, government or industrial organizations for the benefit of the research program. Includes almost all visits except scientific meetings.
  - C. Visitors Received. From outside organizations as outlined below.
    - 1. Academic.
    - 2. Government.
    - 3. Industry.
  - D. Other. Miscellaneous research coordination.
  
- VI. Awards. Awards recognizing technical achievement by individuals or the organization as a whole.
  - A. Individual.
  - B. Organization.
  
- VII. Professional Training. Courses or workshops that improve the technical qualifications of researchers.

#### IV. THE COMPUTERIZED RAMS ACCOUNTING

In order to manipulate the RAMS data base conveniently, research activities data are stored in a disc based computer retrieval system. The program for recording, manipulating and retrieving the data is a BASIC program called "NCLIT", which was originally devised as a bibliographic storage program. NCLIT operates on a Digital Equipment Corporation PDP 11/10 mini-computer using an RSX-11M operating system.

Since NCLIT can retrieve entries according to keywords, a set of keyword codes have been assigned to the types of research activities listed earlier. The use of the keyword codes allows selection of a list of any specific type of research activity or a list of a combination of types according to a Boolean logic statement made by the user. The keyword codes are listed below in an abbreviated outline of types of research activities.

#### OUTLINE 2

##### KEYWORD CODES FOR RESEARCH ACTIVITIES

#### I. PUBLICATIONS [ P ]

##### A. Journals [ PJ ]

##### 1. Refereed [ PJR ]

- a. Full Paper [ PJRP ]
- b. Communication [ PJRC ]
- c. Letter [ PJRL ]
- d. Scientific Review [ PJRR ]
- e. Book Review [ PJRB ]
- f. Extended Abstract [ PJRA ]
- g. Other [ PJRO ]

##### 2. Not Refereed [ PJU ]

- a. Full Paper [ PJUP ]
- b. Communication [ PJUC ]
- c. Letter [ PJUL ]

- d. Scientific Review [ PJUR ]
- e. Book Review [ PJUB ]
- f. Extended Abstract [ PJUA ]
- g. Other [ PJUO ]

B. Technical Reports [ PR ]

C. Technical Memorandums [ PM ]

D. Books [ PB ]

- 1. Complete Book [ PBB ]
- 2. Chapter [ PBC ]
- 3. Other [ PBO ]

E. Other Publications [ PO ]

II. PATENTS [ I ]

A. Applied For [ IA ]

B. Granted [ IG ]

III. PRESENTATIONS [ S ]

A. Technical Papers [ SP ]

- 1. Contributed [ SPC ]
- 2. Invited [ SPI ]

B. Seminars [ SS ]

- 1. Internal [ SSI ]
- 2. External [ SSE ]

C. Briefings [ SB ]

- 1. Internal [ SBI ]
- 2. External [ SBE ]

D. Other Presentations [ SO ]

IV. EVALUATIONS & REVIEWS [ E ]

A. Journal Manuscripts [ EJ ]

- 1. From Editor [ EJE ]
- 2. From Author [ EJA ]

B. Proposals [ EP ]

- 1. Grant Proposals [ EPG ]
- 2. IR&D [ EPI ]

V. RESEARCH COORDINATION [ C ]

A. Scientific Meetings [ CM ]

1. Paper Presented [ CMP ]
2. No Paper Presented [ CMN ]

B. Planning/Coordination Meetings [ CP ]

C. Visitors Received [ CV ]

1. Academic [ CVA ]
2. Government [ CVG ]
3. Industry [ CVI ]

D. Other [ CO ]

VI. AWARDS [ A ]

A. Individual [ AI ]

B. Organization [ AL ]

VII. PROFESSIONAL TRAINING [ T ]

The NCLIT retrieval program is self-prompting, so that once the user is signed-on to the system he need only answer questions to implement a search. In the section of this report that follows, several examples of the use of RAMS are presented. The data base was derived from eight director's activities reports of the Frank J. Seiler Research Laboratory Chemical Sciences Directorate. Much of the output shown are line printer listings or CRT screen copies (labeled CRT-1, etc.) which are much less clear than what is actually seen when operating the system.

In the screen copies shown below it is sometimes difficult to separate what the computer is putting-out and what the operator is putting in. As an aid to understand the operation of the system, all operator inputs have been boxed, thus an N means that the operator hit the "N" key on the console, then he hit the "RETURN" key (which transmits "N" to the computer).



This provides instructions for setting-up a search routine. Each research activity entry in the data file may be retrieved by combinations of keywords. All entries are identified by the keyword JW4, so that is entered to obtain all entries. The retrieval can take considerable time, depending on the speed of the computer, number of keywords being searched and number of items retrieved.

```
TITLE SEARCH (Y OR N)? [N]
REFERENCE ORDER
  1 -- REFERENCE #
  2 -- ALPHAB
  3 -- CHRONOLOGICAL? [1]
CITATION FORMAT (1 -- FULL      2 -- BIBLIOGRAPHIC)? [2]
LISTING DEVICE (1 -- TERMINAL   2 -- LINE PRINTER   3 -- DEFER CHOICE TILL AFTER SEARCH)? [3]
```

CRT-4

The program asks for some more decisions. Title Search: Keywords may be searched-for in the titles of the entries or in separate keyword lists attached to each entry. Since JW4 is in the keyword list of each entry, no title search was requested. Reference Order: The listing of the research activities may be made according to a sequence number (option 1), alphabetically by name of participant (option 2) or chronologically (3). Citation Format: The full format (option 1) presents all information recorded about a research activity entry. The bibliographic format (option 2) is an abbreviated version. Listing Device: If the listing is known to be short and a hard-copy is not required choose option 1. If the listing will be long or a printed copy is desired choose option 2. Option 3 will do the search, display the number of items found and give you the choice of options 1 and 2 again.

The listing shown on the next page is a sample of many pages of line printer output. The heading states the keyword used to obtain the list and the number of items retrieved. The number to the left of each item is a sequence number, which indicates its position in the data file. The one or two lines next to the reference number contains the name(s) of

SEARCH RESULTS  
\*\*\*\*\*

142 REFERENCES SELECTED      SEARCH STRING: JW4

298    MYERS L.E., DAVIS L.P., LENGENFELDER, DYK C.J., "CHEMICAL GENERATION OF O<sub>2</sub>(DELTA)", TECHNICAL PAPER, 10 4 (1979).

ASSOCIATED KEYWORDS:    JW4  
                          F4  
                          01  
                          OCT  
                          USAF ACADEMY  
                          SPI

CHEM ABSTRACT CITATION: <NONE ENTERED>

299    MYERS L., DAVIS L., LENGENFELDER D., DYK C., SIEGENTHALER K., WILKES J., THORPE W., "AFOSR MOLECULAR DYNAMICS RESEARCH CONFERENCE", SCIENTIFIC MEETING, 10 4 (1979).

ASSOCIATED KEYWORDS:    JW4  
                          OCT  
                          USAF  
                          CMP

CHEM ABSTRACT CITATION: <NONE ENTERED>

300    THORPE W., CARPER W., "CHEMILUMINESCENT SPECTRA OF GROUP IV HALIDES", TECHNICAL PAPER, 10 4 (1979).

ASSOCIATED KEYWORDS:    JW4  
                          F4  
                          02  
                          OCT  
                          USAF  
                          SPI

CHEM ABSTRACT CITATION: <NONE ENTERED>

301    SHACKELFORD S., HILDRETH R., DRUEHLINGER M., "MECHANISMS AND PRODUCT CONTROL IN XENON DIFLUORIDE FLUORINATION AS REVEALED BY THE NORBORNENE MODEL", TECHNICAL PAPER, 9 3 (1979).

ASSOCIATED KEYWORDS:    JW4  
                          F3  
                          03  
                          SEP  
                          AVIGNON  
                          SPC

CHEM ABSTRACT CITATION: <NONE ENTERED>

the participant(s) for the research activity, the title of the activity, the type of activity and the date the activity was accomplished. The "associated keywords" are keywords that provide further information about the activity and/or facilitate searches. The keyword codes listed in outline 2 are included, as well as task, work unit, location, etc.. Every entry has JW4 as a keyword.

REPRINT (Y OR N)?

CRT-5

The program asks if you want another copy of the listing.

SEARCH ROUTINE:

SEARCH PARAMETERS ARE SPECIFIED ACCORDING TO THE FOLLOWING SYSTEM:

CRT-6

PARAMETER ENTERED	FUNCTION
ABC	SEARCHES FOR KEYWORDS AND TITLES (IF DESIRED) THAT ARE EXACTLY ABC
<ABC	SEARCHES FOR KEYWORDS AND TITLES (IF DESIRED) THAT END WITH ABC
ABC>	SEARCHES FOR KEYWORDS AND TITLES (IF DESIRED) THAT BEGIN WITH ABC
<ABC>	SEARCHES FOR KEYWORDS AND TITLES (IF DESIRED) THAT CONTAIN ABC
OR	PERFORMS A BOOLEAN "OR" BETWEEN PREVIOUS AND FOLLOWING SEARCH RESULTS

NOTE: BOOLEAN "AND" IS IMPLIED BETWEEN PARAMETERS IF "OR" IS NOT SPECIFIED

SEARCH PARAMETER 1 <OR TO EXIT?>

The program allows you to set up another search.

NCLIT OPTIONS

CRT-7

```

1 --- LITERATURE SEARCH
2 --- ADD/EDIT REFERENCE(S) AND JOURNAL(S)
3 --- DELETE REFERENCE(S)
4 --- LIST REFERENCE(S)
5 --- SYSTEM SHUP
6 --- SYSTEM INITIALIZE/CLEAR
7 --- SYSTEM LOAD
8 --- SYSTEM EDIT/CLEANUP/UNLOAD
9 --- EXIT SYSTEM

```

OPTION? 9

PROGRAM TERMINATED VIA OPERATOR REQUEST

BYE FROM NCLIT

READY  
BYE

>BYE

HAVE A GOOD MORNING  
18-JAN-80 10:15 778: LOGGED OFF

Finally, the original option list reappears. Option 9 allows exit from the system (if desired).

Example B: Search All Research Activities of an Individual.

This type of search will provide a list of all research activities in which a particular individual participated. It will be assumed here that the sign-on has been completed. If not, see example A.

MCITY OPTIONS

CRT-8

- 1 --- LITERATURE SEARCH
- 2 --- ADD/EDIT REFERENCE(S) AND JOURNAL(S)
- 3 --- DELETE REFERENCE(S)
- 4 --- LIST REFERENCE(S)
- 5 --- SYSTEM DUMP
- 6 --- SYSTEM INITIALIZE/CLEAR
- 7 --- SYSTEM LOAD
- 8 --- SYSTEM EDIT/CLEAR/UNLOAD
- 9 --- EXIT SYSTEM

OPTION? [1]

Option 1 was chosen as usual.

SEARCH ROUTINE:

CRT-9

SEARCH PARAMETERS ARE SPECIFIED ACCORDING TO THE FOLLOWING SYSTEM:

PARAMETER ENTERED	FUNCTION
ABC	SEARCHES FOR KEYWORDS AND TITLES (IF DESIRED) THAT ARE EXACTLY ABC
<ABC	SEARCHES FOR KEYWORDS AND TITLES (IF DESIRED) THAT END WITH ABC
ABC)	SEARCHES FOR KEYWORDS AND TITLES (IF DESIRED) THAT BEGIN WITH ABC
<ABC)	SEARCHES FOR KEYWORDS AND TITLES (IF DESIRED) THAT CONTAIN ABC
OR	PERFORMS A BOOLEAN "OR" BETWEEN PREVIOUS AND FOLLOWING SEARCH RESULTS

NOTE: BOOLEAN "AND" IS IMPLIED BETWEEN PARAMETERS IF "OR" IS NOT SPECIFIED

```
SEARCH PARAMETER 1  <CR TO EXIT)? [JW4]
SEARCH PARAMETER 2  ? <DAVIS>
SEARCH PARAMETER 3  ?
```

The key word JW4 specifies the research activities file. The keyword < Davis > is the name of the participant. The < and > are necessary to separate "Davis" from other names if there were more than one participant.

TITLE SEARCH (Y OR N)? **N**

CRT-10

REFERENCE ORDER

- 1 -- REFERENCE #
- 2 -- ALPHA
- 3 -- CHRONOLOGICAL? **3**

CITATION FORMAT (1 -- FULL 2 -- BIBLIOGRAPHIC)? **2**

LISTING DEVICE (1 -- TERMINAL 2 -- LINE PRINTER 3 -- DEFER CHOICE TILL AFTER SEARCH)? **2**

No title search was requested and a full format listing in chronological order on the line printer was ordered.

The listing on the next page is a sample of three pages of output.

The procedure for exiting is the same as in example A, starting with CRT-6, and is not repeated here.

Example C: Search of All Journal Publications in a Task Area.

This search will provide a list of articles published in refereed journals which came from a specified task.

**NCLIT OPTIONS**

CRT-11

- 1 --- LITERATURE SEARCH
- 2 --- ADD/EDIT REFERENCE(S) AND JOURNAL(S)
- 3 --- DELETE REFERENCE(S)
- 4 --- LIST REFERENCE(S)
- 5 --- SYSTEM DUMP
- 6 --- SYSTEM INITIALIZE/CLEAR
- 7 --- SYSTEM LOAD
- 8 --- SYSTEM EDIT/CLEANUP/UNLOAD
- 9 --- EXIT SYSTEM

OPTION? **1**

Option 1 chosen as usual.

**SEARCH ROUTINE:**

**SEARCH PARAMETERS ARE SPECIFIED ACCORDING TO THE FOLLOWING SYSTEM:**

CRT-12

**PARAMETER ENTERED**

**FUNCTION**

ABC	SEARCHES FOR KEYWORDS AND TITLES (IF DESIRED) THAT ARE EXACTLY ABC
<ABC	SEARCHES FOR KEYWORDS AND TITLES (IF DESIRED) THAT END WITH ABC
ABC)	SEARCHES FOR KEYWORDS AND TITLES (IF DESIRED) THAT BEGIN WITH ABC
<ABC)	SEARCHES FOR KEYWORDS AND TITLES (IF DESIRED) THAT CONTAIN ABC
OR	PERFORMS A BOOLEAN 'OR' BETWEEN PREVIOUS AND FOLLOWING SEARCH RESULTS

**NOTE: BOOLEAN 'AND' IS IMPLIED BETWEEN PARAMETERS IF 'OR' IS NOT SPECIFIED**

SEARCH PARAMETER 1 (CR TO EXIT)? **123**  
SEARCH PARAMETER 2 ? **123**  
SEARCH PARAMETER 3 ? **123**  
SEARCH PARAMETER 4 ?

SEARCH RESULTS  
←←←←←←←←←←←←←←←←

11 REFERENCES SELECTED      SEARCH STRING: JW4. <DAVIS>

415      CHANNELL R., DAVIS L., SIEGENTHALER K., "EXPERIMENTAL INVESTIGATIONS OF XEF2 AS A SAFE SOURCE OF FLUORINE", TECHNICAL PAPER, 4 26 (1979).

ASSOCIATED KEYWORDS:    JW4  
                              F4  
                              02  
                              SWARM-CJWS  
                              DURANGO  
                              SPC

CHEM ABSTRACT CITATION: <NONE ENTERED>

303      DAVIS L., GUIDRY R., "A MINDO/3 STUDY OF NITROBENZENE", AUST. J. CHEM., 32 1369-74 (1979).

ASSOCIATED KEYWORDS:    JW4  
                              JW1  
                              F4  
                              02  
                              PJRP  
                              MO CALCULATION

CHEM ABSTRACT CITATION: <NONE ENTERED>

407      DAVIS L., "TASK F4", BRIEFING, 5 3-4 (1979).

ASSOCIATED KEYWORDS:    JW4  
                              AFOSR(KRAVITZ)  
                              SBE

CHEM ABSTRACT CITATION: <NONE ENTERED>

299      MYERS L., DAVIS L., LENGENFELDER D., DYMEK C., SIEGENTHALER K., WILKES J., THORPE W., "AFOSR MOLECULAR DYNAMICS RESEARCH CONFERENCE", SCIENTIFIC MEETING, 10 4 (1979).

ASSOCIATED KEYWORDS:    JW4  
                              OCT  
                              USAF  
                              CMP

The keyword JW4 was chosen to specify the research activities file. The keyword F2 indicates the Electrochemistry task using the MASIS project code (in this case project 2303-F2). The keyword PJR> specifies publications in refereed journals according to the scheme in outline 2: The ">" indicates that keyword codes having any letter after the R will be searched. Thus PJRC (communications), PJRP (full papers), etc. will be searched. Reference to outline 2 will show the possible retrieval categories within the PJR group.

TITLE SEARCH (Y OR N)?  N

CRT-13

REFERENCE ORDER

- 1 -- REFERENCE #
- 2 -- ALPHA
- 3 -- CHRONOLOGICAL?  2

CITATION FORMAT (1 -- FULL 2 -- BIBLIOGRAPHIC)?  1

LISTING DEVICE (1 -- TERMINAL 2 -- LINE PRINTER 3 -- DEFER CHOICE TILL AFTER SEARCH)  2

No title search was requested. A full format listing in alphabetical order on the line printer was requested.

The listing on the next page shows the result of the search. See example A, starting out CRT-6, for exit procedure.

Example D: Search of All Technical Papers Presented from a Work-Unit within a Task.

NCLIT OPTIONS  
-----

CRT-14

- 1 --- LITERATURE SEARCH
- 2 --- ADD/EDIT REFERENCE(S) AND JOURNAL(S)
- 3 --- DELETE REFERENCE(S)
- 4 --- LIST REFERENCE(S)
- 5 --- SYSTEM DUMP
- 6 --- SYSTEM INITIALIZE/CLEAR
- 7 --- SYSTEM LOAD
- 8 --- SYSTEM EDIT/CLEANUP/UNLOAD
- 9 --- EXIT SYSTEM

OPTION?  1

Option 1 was chosen as usual.

SEARCH RESULTS  
←←←←←←←←←←←←←←←←

4 REFERENCES SELECTED      SEARCH STRING: JW4, F2, PJR>

- 305      CARPIO R., KING L., KIBLER F., FANNIN A., "CONDUCTIVITIES OF ALCL3-RICH MOLTEN ALCL3-LICL MIXTURES", J. ELECTROCHEM. SOC.,  
126 1650 (1979).  
ASSOCIATED KEYWORDS:    JW4  
                              F2  
                              Ø9  
                              PJRP  
CHEM ABSTRACT CITATION: <NONE ENTERED>
- 306      CARPIO R., KING L., LINDSROM R., NARDI J., HUSSEY C., "DENSITY, ELECTRIC CONDUCTIVITY AND VISCOSITY OF SEVERAL  
N-ALCYPYRIDINIUM HALIDES AND THEIR MIXTURES WITH ALCL3", J. ELECTROCHEM. SOC., 126 1644 (1979).  
ASSOCIATED KEYWORDS:    JW4  
                              F2  
                              Ø9  
                              PJRP  
CHEM ABSTRACT CITATION: <NONE ENTERED>
- 307      HUSSEY C., KING L., WILKES J., "AN ELECTROCHEMICAL STUDY OF THE FE(III)/FE(II) ELECTRODE REACTION IN THE ALCL3 +  
N-(N-BUTYL)PYRIDINIUM CHLORIDE MOLTEN SALT SYSTEMS", J. ELECTROANAL. CHEM. INTERFACIAL ELECTROCHEM., 102 321 (1979).  
ASSOCIATED KEYWORDS:    JW4  
                              F2  
                              10  
                              PJRP  
CHEM ABSTRACT CITATION: <NONE ENTERED>
- 364      HUSSEY C., KING L., CARPIO R., "THE ELECTROCHEMISTRY OF COPPER IN A ROOM TEMPERATURE ACIDIC CHLORALUMINATE MELT", J.  
ELECTROCHEM. SOC., 126 1029 (1979).  
ASSOCIATED KEYWORDS:    JW4  
                              F2  
                              10  
                              PJRP  
CHEM ABSTRACT CITATION: <NONE ENTERED>

SEARCH ROUTINE:

CRT-15

SEARCH PARAMETERS ARE SPECIFIED ACCORDING TO THE FOLLOWING SYSTEM:

PARAMETER ENTERED	FUNCTION
ABC	SEARCHES FOR KEYWORDS AND TITLES (IF DESIRED) THAT ARE EXACTLY ABC
:ABC	SEARCHES FOR KEYWORDS AND TITLES (IF DESIRED) THAT END WITH ABC
ABC>	SEARCHES FOR KEYWORDS AND TITLES (IF DESIRED) THAT BEGIN WITH ABC
(ABC)	SEARCHES FOR KEYWORDS AND TITLES (IF DESIRED) THAT CONTAIN ABC
OR	PERFORMS A BOOLEAN 'OR' BETWEEN PREVIOUS AND FOLLOWING SEARCH RESULT

NOTE: BOOLEAN 'AND' IS IMPLIED BETWEEN PARAMETERS IF 'OR' IS NOT SPECIFIED

```

SEARCH PARAMETER 1 (OR TO EXIT)? JW4
SEARCH PARAMETER 2 ?
SEARCH PARAMETER 3 ?
SEARCH PARAMETER 4 ?
SEARCH PARAMETER 5 ?

```

The keyword JW4 specifies the research activities data file. The keywords F4 and 01 specify the task area F4 and work unit 01 respectively, using MASIS nomenclature (i.e., 2303-F4-01, "Chemiluminescent Gas Phase Reactions"). The keyword SP> specifies all contributed and invited technical papers (see outline 2).

TITLE SEARCH (Y OR N)? N

CRT-16

REFERENCE ORDER

- 1 -- REFERENCE 0
- 2 -- ALPHA
- 3 -- CHRONOLOGICAL? 3

CITATION FORMAT (1 -- FULL 2 -- BIBLIOGRAPHIC)? 1

LISTING DEVICE (1 -- TERMINAL 2 -- LINE PRINTER 3 -- DEFER CHOICE TILL AFTER SEARCH)? 2

No title search requested. A full format listing in chronological order on the line printer was requested.

The listing on the next page shows the result of the search. See example A, starting at CRT-6, for exit procedure.

SEARCH RESULTS  
+++++  
+++++

3 REFERENCES SELECTED      SEARCH STRING: JW4, F4, 01, SP>

418    DYMEK C., KAVIS L., PUGH H., MYERS L., LENGENFELDER D., "CHEMICAL GENERATION OF O2(1 DELTA G)", TECHNICAL PAPER, 4 26 (1973).

ASSOCIATED KEYWORDS:    JW4  
                              F4  
                              01  
                              SWARM-CUBAS  
                              DURANGO  
                              SPC

CHEM ABSTRACT CITATION: <NONE ENTERED>

388    LENGENFELDER D., "PARAMETER VARIATION STUDIES ON THE PRODUCTION OF SINGLET DELTA OXYGEN", TECHNICAL PAPER, 5 5 (1973).

ASSOCIATED KEYWORDS:    JW4  
                              F4  
                              01  
                              ACS MEET IN MIN.  
                              SPC

CHEM ABSTRACT CITATION: <NONE ENTERED>

298    MYERS L.E., DAVIS L.P., LENGENFELDER, DYMEK C.J., "CHEMICAL GENERATION OF O2(1DELTA)", TECHNICAL PAPER, 10 4 (1973).

ASSOCIATED KEYWORDS:    JW4  
                              F4  
                              01  
                              OCT  
                              USAF ACADEMY  
                              SPI

CHEM ABSTRACT CITATION: <NONE ENTERED>

Example E: Search for Visitors Received.

**NCIT OPTIONS**

CRT-17

- 1 --- LITERATURE SEARCH
- 2 --- ADD/EDIT REFERENCE(S) AND JOURNAL(S)
- 3 --- DELETE REFERENCE(S)
- 4 --- LIST REFERENCE(S)
- 5 --- SYSTEM DUMP
- 6 --- SYSTEM INITIALIZE/CLEAR
- 7 --- SYSTEM LOAD
- 8 --- SYSTEM EDIT/CLEAR/UNLOAD
- 9 --- EXIT SYSTEM

OPTION? **1**

Option 1 chosen as usual.

**SEARCH ROUTINE:**

CRT-18

SEARCH PARAMETERS ARE SPECIFIED ACCORDING TO THE FOLLOWING SYSTEM:

<u>PARAMETER ENTERED</u>	<u>FUNCTION</u>
ABC	SEARCHES FOR KEYWORDS AND TITLES (IF DESIRED) THAT ARE EXACTLY ABC
<ABC	SEARCHES FOR KEYWORDS AND TITLES (IF DESIRED) THAT END WITH ABC
ABC>	SEARCHES FOR KEYWORDS AND TITLES (IF DESIRED) THAT BEGIN WITH ABC
<ABC>	SEARCHES FOR KEYWORDS AND TITLES (IF DESIRED) THAT CONTAIN ABC
OR	PERFORMS A BOOLEAN 'OR' BETWEEN PREVIOUS AND FOLLOWING SEARCH RESULTS

NOTE: BOOLEAN 'AND' IS IMPLIED BETWEEN PARAMETERS IF 'OR' IS NOT SPECIFIED

SEARCH PARAMETER 1 <CR TO EXIT>? **JW4**  
SEARCH PARAMETER 2 ? **CV**  
SEARCH PARAMETER 3 ?

Keyword JW4 specifies the research activities data file. The keyword CV> specifies visitors from all types of institutions (see outline 2).

**TITLE SEARCH (Y OR N)? **N****

CRT-19

REFERENCE ORDER  
1 --- REFERENCE #  
2 --- ALPHA  
3 --- CHRONOLOGICAL? **2**

CITATION FORMAT (1 -- FULL 2 -- BIBLIOGRAPHIC)? **1**

LISTING DEVICE (1 -- TERMINAL 2 -- LINE PRINTER 3 -- DEFER CHOICE TILL AFTER SEARCH)? **2**

No title search requested. A full format listing in alphabetical order was requested on the line printer.

The listing on the next page is part of the result of the search.  
See example A, starting at CRT-6, for exit procedure.

Example F: An Overly Restrictive Search.

Specifying too many keywords can result in a search where no items are found. A search that is so specific that it excludes everything is shown below

MCLIT OPTIONS

CRT-20

- 1 --- LITERATURE SEARCH
- 2 --- ADD EDIT REFERENCE(S) AND JOURNAL(S)
- 3 --- DELETE REFERENCE(S)
- 4 --- LIST REFERENCE(S)
- 5 --- SYSTEM DUMP
- 6 --- SYSTEM INITIALIZE/CLEAR
- 7 --- SYSTEM LOAD
- 8 --- SYSTEM EDIT/CLEANUP/UNLOAD
- 9 --- EXIT SYSTEM

OPTION?  1

Option 1 chosen as usual.

SEARCH ROUTINE:

SEARCH PARAMETERS ARE SPECIFIED ACCORDING TO THE FOLLOWING SYSTEM:

CRT-21

PARAMETER ENTERED

FUNCTION

ABC	SEARCHES FOR KEYWORDS AND TITLES (IF DESIRED) THAT ARE EXACTLY ABC
<ABC	SEARCHES FOR KEYWORDS AND TITLES (IF DESIRED) THAT END WITH ABC
ABC>	SEARCHES FOR KEYWORDS AND TITLES (IF DESIRED) THAT BEGIN WITH ABC
<ABC>	SEARCHES FOR KEYWORDS AND TITLES (IF DESIRED) THAT CONTAIN ABC
OR	PERFORMS A BOOLEAN 'OR' BETWEEN PREVIOUS AND FOLLOWING SEARCH RESULTS

NOTE: BOOLEAN 'AND' IS IMPLIED BETWEEN PARAMETERS IF 'OR' IS NOT SPECIFIED

```
SEARCH PARAMETER 1  <CR TO EXIT?>  JW4
SEARCH PARAMETER 2  ? <CARPIO>
SEARCH PARAMETER 3  ? F3
SEARCH PARAMETER 4  ? 05
SEARCH PARAMETER 5  ? PJRP
SEARCH PARAMETER 6  ?
```

The keyword JW4 specifies the research activities data file. The keywords <CARPIO>, F3, 05, and PJRP specify a name, task, work unit and a book review published in a refereed journal respectively.

SEARCH RESULTS  
+++++

32 REFERENCES SELECTED      SEARCH STRING: Jw4, CV>

322 ALLEN G., "DIGITAL EQUIPMENT CORP.", VISITOR, 10 12 (1979).

ASSOCIATED KEYWORDS: Jw4  
FJSRL/NC  
CVI

CHEM ABSTRACT CITATION: <NONE ENTERED>

340 ATKINS R., "NAVAL WEAPONS CENTER, CHINA LAKE", VISITOR, X X (1979).

ASSOCIATED KEYWORDS: Jw4  
F3  
SEM: "NITROAROMATIC & NI  
CVG

CHEM ABSTRACT CITATION: <NONE ENTERED>

318 BALL D., ARMSTRONG R., "AFOSR", VISITOR, 10 2 (1979).

ASSOCIATED KEYWORDS: Jw4  
FJSRL/NC  
CVG

CHEM ABSTRACT CITATION: <NONE ENTERED>

381 BALL D., ARMSTRONG R., "AFOSR", VISITOR, 6 8 (1979).

ASSOCIATED KEYWORDS: Jw4  
FJSRL  
SEM: THE AF CHEMISTRY BA  
CVG

CHEM ABSTRACT CITATION: <NONE ENTERED>

TITLE SEARCH (Y OR N)?  N

CRT-22

REFERENCE ORDER

- 1 -- REFERENCE #
- 2 -- ALPHA
- 3 -- CHRONOLOGICAL?  3

CITATION FORMAT (1 -- FULL 2 -- BIBLIOGRAPHIC)?  1

LISTING DEVICE (1 -- TERMINAL 2 -- LINE PRINTER 3 -- DEFER CHOICE TILL AFTER SEARCH)?  2

A full format listing in chronological order was requested on the line printer with no title research.

SEARCH RESULTS  
\*\*\*\*\*

0 REFERENCES SELECTED      SEARCH STRING: JW4 <CARPIO> F3 05 PJRB

No items satisfying that combination of keywords were found.

Example F: Use of the Logical "OR".

If one wishes to search for entries using multiple keywords the use of the logical AND and OR is helpful. As indicated in the search routine instructions displayed on the screen, the logical AND is implied between each keyword entered. Thus, the Boolean expression for example E would be JW4 \* <CARPIO>\* F3 \* 05 \* PJRB (where \* = AND). This means that every one of those keywords must be associated with an item in order for the search to find it.

Often it is desirable to search for items where the presence of any one of a number of possible keywords will trigger a retrieval. For example, one may wish to search for all publications or technical papers by an individual named Davis. The Boolean expression would be <DAVIS> \* (P> + SP>) (where + = OR). Such a search is shown below.

NCLTY OPTIONS

CRT-23

- 1 --- LITERATURE SEARCH
- 2 --- ADD/EDIT REFERENCE(S) AND JOURNAL(S)
- 3 --- DELETE REFERENCE(S)
- 4 --- LIST REFERENCE(S)
- 5 --- SYSTEM DUMP
- 6 --- SYSTEM INITIALIZE/CLEAR
- 7 --- SYSTEM LOAD
- 8 --- SYSTEM EDIT/CLEANUP/UNLOAD
- 9 --- EXIT SYSTEM

OPTION# 1

Option 1 is chosen to initiate a search routine.

SEARCH ROUTINE:

CRT-24

SEARCH PARAMETERS ARE SPECIFIED ACCORDING TO THE FOLLOWING SYSTEM:

PARAMETER ENTERED	FUNCTION
ABC	SEARCHES FOR KEYWORDS AND TITLES (IF DESIRED) THAT ARE EXACTLY ABC
<ABC	SEARCHES FOR KEYWORDS AND TITLES (IF DESIRED) THAT END WITH ABC
ABC>	SEARCHES FOR KEYWORDS AND TITLES (IF DESIRED) THAT BEGIN WITH ABC
<ABC>	SEARCHES FOR KEYWORDS AND TITLES (IF DESIRED) THAT CONTAIN ABC
OR	PERFORMS A BOOLEAN 'OR' BETWEEN PREVIOUS AND FOLLOWING SEARCH RESULTS

NOTE: BOOLEAN 'AND' IS IMPLIED BETWEEN PARAMETERS IF 'OR' IS NOT SPECIFIED

SEARCH PARAMETER 1	<CR TO EXIT>? JW4
SEARCH PARAMETER 2	? <DAVIS>
SEARCH PARAMETER 3	? P.J
SEARCH PARAMETER 4	? OR
SEARCH PARAMETER 5	? JW4
SEARCH PARAMETER 6	? <DAVIS>
SEARCH PARAMETER 7	? SP
SEARCH PARAMETER 8	?

The search program interprets the OR keyword as an OR operating on the entire group of keywords before it and after it. This peculiarity means that some keywords must be entered twice. It is often helpful to write the simplest Boolean expression for the desired search, then expand it into the form that the program recognizes. Equation 1 does this for the example demonstrated above, where the simplest expression is on the left and the useable expression is on the right. A rudimentary knowledge of the rules of Boolean algebra is required to devise expressions such as equation 1.

$$JW4 * <DAVIS> * (P>+SP>) = (JW4 * <DAVIS> * P>) + (JW4 * <DAVIS> * SP>) \quad EQ-1$$

TITLE SEARCH (Y OR N)?

CRT-25

REFERENCE ORDER

1 -- REFERENCE #

2 -- ALPHA

3 -- CHRONOLOGICAL?

CITATION FORMAT (1 -- FULL 2 -- BIBLIOGRAPHIC)?

LISTING DEVICE (1 -- TERMINAL 2 -- LINE PRINTER 3 -- DEFER CHOICE TILL AFTER SEARCH)?

A full format listing in chronological order was requested on the line printer, with no title search.

The listing on the next page shows the result of the search. Note that both journal publications and technical papers are listed, and each item has the name DAVIS associated with it.

See example A, starting with CRT-6 for exit procedures.

#### V. ESTABLISHING AND MAINTAINING THE DATA BASE ENTERING RESEARCH

##### ACTIVITY DATA:

The nature of the data base is largely dependent on the user of the system. Whatever the source of the data, the research activities must be entered into the disc-based data file in a way that the program can recognize. This section describes the format and procedures by which the data base may be set-up and updated.

There are two ways in which a new research activity item may be put into the data file. Procedure A is done entirely by the NCLIT program, where the operator only needs to answer questions generated by the program. The disadvantage is that it is a rather slow procedure if more than one entry is being made, since they are entered one at a time. In procedure B many entries are made in a separate data file, using a strict format, then the entire file is put into the system by NCLIT. This procedure is useful when more than one entry is to be made in a session.

SEARCH RESULTS  
\*\*\*\*\*

7 REFERENCES SELECTED      SEARCH STRING: JW4. <DAVIS>, PJ> OR JW4. <DAVIS>, SP>

415      CHANNELL R., DAVIS L., SIEGENTHALER K., "EXPERIMENTAL INVESTIGATIONS OF XEF2 AS A SAFE SOURCE OF FLUORINE", TECHNICAL PAPER, 4 26 (1979).

ASSOCIATED KEYWORDS:    JW4  
                              F4  
                              02  
                              SWARM-CUAS  
                              DURANGO  
                              SPC

CHEM ABSTRACT CITATION: <NONE ENTERED>

303      DAVIS L. GUIDRY R., "A MINDO/3 STUDY OF NITROBENZENE", AUSTR. J. CHEM., 32 1369-74 (1979).

ASSOCIATED KEYWORDS:    JW4  
                              JW1  
                              F4  
                              02  
                              PJR  
                              MO CALCULATION

CHEM ABSTRACT CITATION: <NONE ENTERED>

298      MYERS L.E., DAVIS L.P., LENGENFELDER, DYMEK C.J., "CHEMICAL GENERATION OF O2 (DELTA)", TECHNICAL PAPER, 10 4 (1979).

ASSOCIATED KEYWORDS:    JW4  
                              F4  
                              01  
                              OCT  
                              USAF ACADEMY  
                              SPI

CHEM ABSTRACT CITATION: <NONE ENTERED>

Procedure A: (Input of one item)

The sign-on process is accomplished as shown in example A, fig. 1.

NCLIT OPTIONS

CRT-26

-----  
1 --- LITERATURE SEARCH  
2 --- ADD/EDIT REFERENCE(S) AND JOURNAL(S)  
3 --- DELETE REFERENCE(S)  
4 --- LIST REFERENCE(S)  
5 --- SYSTEM DUMP  
6 --- SYSTEM INITIALIZE/CLEAR  
7 --- SYSTEM LOAD  
8 --- SYSTEM EDIT/CLEANUP/UNLOAD  
9 --- EXIT SYSTEM

OPTION?  2

Option 2 is chosen, which initiates the data entry process.

SECURED OPTION  
\*\*\*\*\*

CRT-27

ENTER SECURITY CODE?  NCLIT

The data base can be compromised by unauthorized access, so a security code must be entered to go any further. In the example the security code is "NCLIT".

ADDITION/EDIT ROUTINE  
\*\*\*\*\*

CRT-28

OPTIONS AVAILABLE:

1 --- ADD/EDIT REFERENCE  
2 --- ADD/EDIT JOURNAL SPECIFICATION  
3 --- EXIT

OPTION?  1

EDIT OR ADD?  ADD

Since the NCLIT program is primarily designed for the storage of journal references, some of the questions will not be appropriate to the type of research activity actually being entered. The Appendix lists formats for all types of research activities. Comparison of the format for journals with the format of the particular type of research activity will indicate the proper response. In the example shown above,

a technical report is being entered. The CODEN for technical reports is D3REP3 (from the appendix). In place of volume number the TR number is entered. In place of page number the total number of pages is entered. A blank is entered for chem abstract citation. Similar substitutions are made for entry of other research activities.

TO TERMINATE INPUT OF MULTIPLE AUTHORS, ENTER (CR)

CRT-29

AUTHOR'S LAST NAME?  (V) (U) (C) (R)  
FIRST INITIAL?  (R)  
MIDDLE INITIAL?   
AUTHOR'S LAST NAME?

REFERENCE TITLE?  OPTIMIZATION OF LiAlH<sub>4</sub>/MAGCL<sub>2</sub>/CICL<sub>2</sub> THERMAL CELLS

JOURNAL CODEN?  D3REP3

VOLUME NUMBER?  FJSEL-TR-79-11

PAGE NUMBER?  15

YEAR PUBLISHED?  1978

CHEM ABSTRACT CITATION?

TO TERMINATE INPUT OF MULTIPLE KEYWORDS, ENTER (CR)

KEYWORD?  JW4

KEYWORD?  F2

KEYWORD?  E7

KEYWORD?  F3

KEYWORD?

The keyword list provides the flags by which the item may be retrieved. The first keyword is always JW4, which identifies the entry as a part of the research activities data file. Other keywords are task, work unit, etc. as shown in the appendix. The last keyword is the appropriate activity code from outline 1.

REFERENCE NUMBER TO BE STORED IN (0 FOR FIRST AVAILABLE SPACE)?  0

CRT-30

Zero is always the response to this question.

SUPERCEDE OLD REFERENCES (Y OR N)?  N

CRT-31

N is the usual response to this question. After the program enters the item (sometimes taking several minutes), the original option list will reappear.



The appendix has guidance for entering every type of research activity listed in Outline 1. When all of the desired entries have been made, the operator exits from the editor mode and runs the NCLIT program:

```
RAMS
RAMS/RSX BASIC 002-01
READY
RUN NCLIT
```

CRT-34

The option list appears, and option 7 (system load) is selected. Since the data base can be damaged by unauthorized access, two levels of security are provided. The program asks for two security codes, which must be known by the operator. When the program requests the file name to be read, the operator enters the name he chose earlier when setting up the data file.

After the last question is answered, the entries are incorporated into the RAMS data base by NCLIT. The process can take considerable time (1/2 hour or more) if many entries are being incorporated.

OTHER OPTIONS:

The option list presented by the NCLIT program has several other features useful to the RAMS user. The capabilities of these options are described, but no detailed instructions are given because the use of the options are explained by the program after the option is selected.

#2---EDIT REFERENCE: Option #2 may be used to change any part of any item in the data base, as well as to enter a completely new item. Participant names, titles and keywords may be added or changed.

#3---DELETE REFERENCE: One or more items may be removed from the data base.

#4---LIST REFERENCES: A listing of any contiguous portion of the data base is made in either sequential, alphabetical or chronological order. The operator specifies the starting and ending sequence numbers.

#5---SYSTEM DUMP: The entire contents of the data base are listed, including a list of all keywords.

#### APPENDIX - DATA BASE FORMATS

NCLIT records items in a bibliographic format. The types of research activities not generating a bibliographic reference (almost all except publications) must be put into a format compatible with NCLIT. This section identifies standard formats for recording research activities outlined according to "Types of Research Activity" (outline 1).

The general format is: (maximum 256 characters).

NAME, "TITLE", CODEN X Y (19XX), KEYWORD, KEYWORD, ...;#

NAME: The first part of the entry must be the last name of the principle participant in the research activity. This permits alphabetization of listings. Initials or first names may follow the last name, separated by spaces. Names of co-participants may follow, separated by commas.

TITLE: The title helps to identify the specific research activity from others of its type. It is usually the title of an article or presentation. Any character may be used except the quote sign, which identifies the start and end of the title.

CODEN: The coden identifies the type of research activity. All journals have codens assigned to them. Codens for other research activities are listed with the formats in this appendix.

X: This is a number that is different for various types of research activities. For example, it is the volume number of a journal article or the numerical month of a presentation.

Y: This is a number that is also different for various types of research activities. For example, it is the page number of a journal article or the numerical day of the month of a presentation.

19XX: This is the year.

KEYWORDS: The first keyword is always JW4. The rest are task, work unit, etc. as identified in the formats in this appendix. The last is the appropriate keyword code from outline 2.

;: This signifies the end of an entry.

SPECIFIC FORMATS

I. PUBLICATIONS

A. JOURNALS

Lastname F.M., Lastname F.M., ..., "Title", CODEN Vol #  
PG (Year), JW4, task, work unit, keyword codes, RJXX;#

CODEN = journal CODEN (look up)  
F. = first initial  
M. = middle initial

B. TECHNICAL REPORTS

Lastname, F.M., "Title", D3REP3 FJSRL-TR #  
No. of PP (Year), JW4, task, W.U., PR;#

C. TECHNICAL MEMORANDUMS:

Lastname F.M., "Title", TEKMEM FJSRL-TM #  
No. of PP (Year), JW4, task, W.U., PM;#

D. BOOKS

Lastname F.M., "Title", CODEN Chap # pp  
(Year), JW4, task, W.U., PEX;#

CODEN = publishers CODEN

II. PATENTS

Lastname F.M., "Title", PATENT x No. of pp (Year) Pat No., JW4,  
Task, W.U., IX;#

III. PRESENTATIONS

Lastname F.M., "Title", CODEN Month (mm) day (dd) (Year), JW4,  
Task, W.U., Place, JW4, SXX;#

CODENS: TECPAP = technical paper  
SEMNAS = seminar  
BRFING = briefing

IV. EVALUATIONS & REVIEWS

Lastname F.M. (of evaluator), "Title of ms. or proposal and source",  
CODEN x No. of pp (Year), JW4, Task, W.U., EXX;#

CODENS: JRNILMS = journal manuscript  
GRPROP = grant proposal  
IRDFRP = I,R&D proposal

V RESEARCH COORDINATION

A & B. MEETINGS

Lastname F.M. (of attendee), "Name of Meeting", CODEN  
Month (mm) day (dd) (year), JW4, task, W.U., Month (mon),  
place, CXX;#

CODENS: SCIMTG = scientific meeting  
PLNMTG = planning/coordination meeting

C. VISITORS

Lastname F.M. (of visitor), "Organization of Visitor", VISTOR  
Month (mm) Day (dd) (year), JW4, CVX;#

VI. AWARDS

Lastname F.M. (of awardee), "Title of Award", CODEN  
Month (mm) Day (dd) (Year), JW4, task, W.U. AX;#

CODENS: AWDIND = individual award  
AWDLAB = laboratory award

VII. PROFESSIONAL TRAINING

Lastname F.M., "Title of Course", PRFING Month (mm) Day (dd)  
(Year), JW4, task, W.U., place, T;#

DATE  
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