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MATHEMATICS AND COMPUTERS

SYSTEM OF AUTOMATIC PROCESSING AND INDEXING OF REPORTS

By
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July 12, 1961

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ABSTRACT

July 12, 1961

The rapidly increasing volume of new data in scientific and technical fields demands faster and better ways to communicate the new information to those concerned. This report describes a working system, System of Automatic Processing and Indexing of Reports (SAPIR), for doing this. SAPIR makes use of the Keyword-in-Context Index principle, by which certain keywords, together with surrounding words that act as modifiers, are selected from the titles of the technical publications. These keywords with their modifiers serve as index entries from each title, therefore, there will be as many index entries generated as there are keywords contained in the title.

The index entries are sorted alphabetically by the keywords. The first letters of the keywords in each of the index entries form a column in the printed format, which makes scanning for the sought-after item easier. The SAPIR system is automatic and the list of citations is machine-generated on an IBM 1401 Computer.

SYSTEM OF AUTOMATIC PROCESSING AND INDEXING OF REPORTS*

Lester Douglas Turner¹ and James Henry Kennedy

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Livermore, California

INTRODUCTION

The Technical Information Division of the University of California, Lawrence Radiation Laboratory publishes a biweekly list of report citations (Unclassified Reports Title List). These reports are concerned with nearly every branch of science and technology. Each list contains an average of 500 citations of technical reports and papers. (See sample page in appendix II.) In each citation all or part of the following items are contained: (1) report number, (2) classification, (3) corporate author(s), (4) title, (5) author(s), (6) date, (7) number of pages, (8) secondary report no.(s), and (9) abstract.

These citations are grouped by subject category. The degree of usefulness of such a list is in inverse relation to the amount of effort required to find items of interest. Subject grouping usually requires considerable time and effort by the user, because, unfortunately, subject material never fits into any one preassigned category, but may justifiably be located in several subject categories, depending on the user's and indexer's viewpoint.

In areas of new information, however, relatively rough clues can answer the user's needs. Such clues can be generated entirely by machine in the form of a series of extractions, each containing a keyword as its nucleus. To facilitate quick reference to the sought-after information from the great volume of new reports, an indexing system was designed which makes use of this machine approach. This system has been named "SAPIR" (System of Automatic Processing and Indexing of Reports). SAPIR was designed to produce an easily used index to a list of documents.

*Work performed under the auspices of the U. S. Atomic Energy Commission.

¹Now at the George S. May Co., San Francisco.

INDEX TO REPORTS

The simplest format of a quickly assembled index might be an alphabetical listing of keywords. This is easy to do with computers, but when dealing with a variety of subjects as is the case in the Unclassified Reports Title List, the pertinency of such single words could, for the most part, be determined only by referring to the statement from which the keyword had been selected. This unsatisfactory procedure can be eliminated almost entirely by listing the selected keywords together with surrounding words that act as modifiers pointing up the more specific sense in which a keyword was used. This type of index has been called "Keyword-In-Context Index" or KWIC Index,* and can be provided by automatic computers.

KWIC indexing may be done using the keywords in a title, abstract, or the complete text. Keywords are those words that define or characterize the subject or subjects of a document.

The LRL Unclassified Reports Title List is made up of two sections. The first contains the grouped citations of the reports, with the title indented. The citations can be grouped alphabetically, by subject, or in any other manner desired. At LRL they are grouped under broad subject headings such as chemistry, physics, etc. The SAPIR program assigns a seven-digit number to each citation. The first three digits of this identification number are the sequence number for a particular report in the issue. The final four digits of the identification number indicate the volume and issue of the Unclassified Reports Title List (the first two are the volume number and the last two are the issue number). For example, 099 0314 is the reference number for the 99th report listed in Part I of Vol. 3, issue 14 of the Unclassified Reports Title List. The last four digits of the identification number will also be used to identify the reports at a later date in the cumulative KWIC index. Thus, each report is uniquely identified.

The second section of the List contains the index. Each index entry is preceded by the same seven-digit identification number that was assigned to the citation from whose title the index entry was taken. This machine-prepared

*"Keyword-In-Context Index for Technical Literature (KWIC)," International Business Machine Corporation, Advanced System Development Division, H. P. Luhn, Yorktown Heights, New York, August 1959.

index provides the individual user with a subject-searching tool, something that has never been possible before.

The index entries in the Unclassified Reports Title List are in alphabetical order, using the first letter of the keyword, and are in the title's context, as shown in appendix I. This facilitates locating any reports with relevance to the user's field of interest. After locating a keyword which, along with the modifying words, indicates a report of possible interest, the user notes the sequence number (first three digits of the identification number). The user then turns to this sequence number in the first section of the list and there reads the complete report citation.

The SAPIR system for generating an index to reports also incorporates part of the activities required for generating library cards. The operation of SAPIR is described in succeeding sections.

THE SYSTEM

The essential elements of this system (see flow chart, appendix III) are:

1. Flexowriter* or key punch operation
 - a. Generation of library cards
 - b. Generation of punched paper tape with control symbols for computer operation
2. IBM 1401 computer operation
 - a. First phase
 1. Citation list printing on continuous multilith masters
 2. Title records generation (tape)
 - b. Second phase
 1. Title records processing
 - a. Nonsignificant word table
 - b. Table search
 - c. Index entry extraction
 - d. Card punching (per index entry)
 - c. Index entry tape sorting
 - d. Print sorted index entries on continuous multilith masters
3. Reproduce, collate, and distribute list with the SAPIR index.

*Trademark of Friden, Inc., San Leandro, California.

FLEXOWRITER PRODUCTION OF CATALOG CARDS

The key punch or Flexowriter equipment which is part of any computer installation can be used by a library or information division for more than one purpose. With one keyboard operation, the key punch or Flexowriter produces cards or a tape, which in turn can be used to produce catalog cards, indexes, lists of citations, etc. The Information Division at LRL has Flexowriters, which are used as the initial machine in the SAPIR system.

The Flexowriter is an all-electric, heavy-duty writing machine which incorporates a tape punch and a tape reader. This unit produces punched paper tape, which has been denoted as a "common language" medium in integrated data-processing systems.

When a new report or document is received at the Technical Information Division, a holdings card (information on number of copies, date received, etc.) is made and the report is sent to the Flexowriter operator.

The Flexowriter operator types the citation information for the report on a 3 x 5 card (from continuous paper stock). As this is being accomplished, the machine simultaneously produces a punched paper tape of the information, in code. The card is typed in the usual format of a library card, except that a control symbol is put at the beginning and end of the title, and another control symbol is put at the end of the complete citation. These symbols eventually serve as signals which enable the computer to establish the proper format when preparing the Unclassified Reports Title List.

If the card is typed without errors, the tape will likewise be without error and will be ready for the automatic reproduction process. The typed card is proof-read and corrections made, if necessary. The operator then makes a duplicate tape from the original tape and sends both tapes, the card, and the report to the subject specialist. The subject specialist edits the descriptive cataloging of the Flexowriter operator and, if desired, writes subject headings on the card.

The paper tapes and the card are returned to the Flexowriter operator. If there are no corrections to be made, or if no subject headings were given to the report, the two ends of one of the tapes are spliced to form a loop. If corrections or additions must be made, they can be easily added to the tape. The operator simply runs the original tape through the machine, with the punch mechanism on thus producing a duplicate tape, up to the point where

corrections or additions are to be made. The operator stops the tape at this point, types in the corrected or additional information, and then resumes running the original tape at the point where it is again satisfactory. When the new tape has been made and proofed, it is then formed into a loop.

The looped tape is placed in the Flexowriter tape reader, the Start Read Key is depressed and the machine automatically produces as many copies of the original card as desired. Continuous card stock is used.

The other corrected paper tape, with the citation of the report, is used as the basic input media for the IBM 1401 SAPIR program, which creates the publication of the Unclassified Reports Title List.

Flexowriter card reproduction offers the following advantages over other methods:

1. Minimum of personnel and handling is required.
2. Continuous card stock eliminates insertion problems.
3. No "top-writing line" problem such as exists in typing individual cards.
4. Tape to produce an average card costs 1/30 of a cent, compared with a stencil or master costing a minimum of two cents.
5. No erasures show on cards since tapes are correct before running.
6. Tapes are more easily stored than stencils.
7. Pin-feed platen keeps spacing uniform throughout.
8. Additional encoded tapes can be made simultaneously, with or without the same information, while existing tapes are reproducing card sets.
9. Continuous card stock keeps cards together until final filing into the catalogs.
10. The Flexowriter and punched paper tapes can be used for other work as well.
11. The Flexowriter can be operated intermittently or continuously with no messy "clean-up" or make-ready problems.

Although Flexowriter card reproduction has many advantages over other methods, the punched paper tape is not compatible with IBM equipment. Therefore, time-consuming conversion steps (paper-tape-to-paper-tape, and paper-tape-to-magnetic-tape) are required before the tape can be used in a computer program. This disadvantage can be corrected in one of three ways: (1) by changing the bit configuration of the Flexowriter to that of the IBM 1401

computer; (2) by using a computer program to, in effect, perform the bit configuration change; or (3) punch the citation on IBM cards, thus eliminating the use of punched paper tape.

INPUT DATA FOR THE IBM 1401

Paper Tapes

The individual paper tapes for the citations can be grouped in any manner desired. At LRL they are grouped into broad subject categories. Just before publishing time, the grouped paper tapes are fed through the Flexowriter, thus producing one continuous paper tape which contains all the citations of the individual tapes. This paper tape, with the use of a specially wired board, is converted on the paper-tape-to-paper-tape converter (LE 5369-1 and LE 4984-1) to a new paper tape whose punched-hole configurations are compatible with the IBM 1401 bit configuration. The new paper tape is then converted (on the Tally paper-tape-to-magnetic-tape converter) to a magnetic tape. During conversion, the control symbol used at the end of each citation causes a record gap between each citation on the magnetic tape. The magnetic tape now contains the input data to the first phase of the computer operation.

Punched Cards

If key punch equipment is used instead of the Flexowriter, there is a service routine for transferring data from the IBM punched cards to magnetic tape on the 1401. However, various control symbols have to be punched on each card in addition to the report citations. The control symbols are punched in column 1.

A "C" precedes a nontitle line or the middle lines of a title with more than 2 lines, e.g., the first line of a report citation containing the report number and classification. A "B" is inserted at column 1 on the same card that contains the beginning of the title. An "E" indicates to the computer that that card contains the last line of the title. An "R" is inserted at column 1 when the punched card is to contain the last line of the citation. Note that the title appears on a line or lines by itself. The rest of the citation appears on the following lines. If the title is one line in length, i.e., one punched card or less, then the control symbol is a "T". An "F" indicates the end of the group of citations.

COMPUTER OPERATION

Due to the 4000-character storage capacity limitation of the 1401 computer, and because of the large table of nonsignificant words that must be kept stored in the memory during processing, it was necessary to divide the over-all program into three phases: listing, index entry generation, and sorting.

First Phase (Listing)

The carriage return mark of the Flexowriter is converted to an IBM 1401 record mark (†) which facilitates the movement of each line of the citation to the designated print or tape-write area. It is during this phase that the seven-digit reference number is assigned and that the sequence number (three-digit portion of the reference number) is incremented. The last four digits in the reference number are supplied by a data card placed after the last card of the first-phase program deck. The program edits each line, removes the control symbols, indents the title, prints page headings and page numbers, and generates a record gap on the tape after each title is written on tape unit no. 2.

The computer program for this phase also contains subroutines for tape-read and tape-write errors. In case of such error, the first 80 positions of the citation in question are printed so that the citation can be identified, corrected, and included in the next list to be published.

After the last citation is processed, the paper is advanced on the printer (1403) and a caption is printed, which indicates the completion of the first phase. Tape unit no. 1 (input) rewinds and unloads, tape unit no. 2 rewinds only, and the computer is set for the second phase.

A flow diagram and a listing of SAPIR phase 1 are contained in appendixes IV and V, respectively.

Second Phase (Index Entry Generation)

This program loads the nonsignificant word table (articles, conjunctions, prepositions, etc.). Each word in the title of a citation is compared with the words contained in the nonsignificant word table. Coordinate table search is used in order to reduce the time required for this search, i.e., the title word is compared only with the group of nonsignificant words having the same number of characters. The space (blank) between words is used for control and, through a series of tests, the word lengths are defined. If the

title word being searched is determined to be a keyword (i. e., the title word does not match any of the words in the nonsignificant word table), it becomes an index entry. A card is punched for each index entry. This card contains the 7-digit reference number plus 60 characters of the report title, with the keyword displayed in a central position and in the context of the title in which it appears. The punch-console stackers automatically alternate in case one is full so that no interruption of processing will occur. After the last citation is processed, the paper is advanced on the printer and a caption is printed, which indicates the end of the second phase.

A flow chart and a listing of SAPIR phase 2 are contained in appendixes VI and VII, respectively.

Third Phase (Index Entry Sort)

Besides alphabetically sorting the 15 columns of keywords on two tape units (nos. 2 and 3), the computer shifts the first three digits of the reference number so that there is a blank between the first three digits and the last four digits, e. g., 0990311 = 099 0311. This is done in order to make the sequence number easier to remember when referring from the index to the citation. The computer also prints the page numbers and a page caption on each page.

The IBM 1401 SAPIR sort program can be used to sort the punched cards (1200 - 1500 per run) for periodic, quarterly, or semiannual integrated index-entry generation purposes, in addition to its regular use with the biweekly list. However, since the sorting time increases geometrically with the size of the file to be sorted, an IBM 709 could be used to reduce the time required for the sort operation.

REPRODUCTION

The printed continuous multilith masters are removed from the printer and are forwarded to the Graphic Arts Department for reproduction. The Technical Information Division, upon receipt of the collated, finished product, distributes the issues.

APPLICATIONS

Although the index and systems operation is currently being used only for the Unclassified Reports Title List, other possibilities for its use are being investigated.

For instance, there is no reason why this index could not be provided with every subject bibliography that is prepared by the Technical Information Division. Most such bibliographies are very difficult to use if they are voluminous or if they do not have an adequate index.

For collections of drawings, photographs, catalog cards, or specifications, a KWIC index using the SAPIR program could be used in order to disseminate the information and yet have the index located at every potential user's desk. A caption or small abstract could be written for each drawing or photograph. This, plus an identifying number, would be recorded on paper tape. The latter would be used in SAPIR as the input media.

The SAPIR program is not limited to just indexing titles. If enough memory capacity is available in the IBM 1401, an index can also be provided from the titles, abstracts, table of contents, or text.

Since the punched paper tape can be transmitted, the preparation and indexing of a given set of records may be accomplished in many different geographical locations. Thus, the actual SAPIR program may be operated on the IBM 1401 at a central location and the Flexowriter operation could be accomplished at other offices. With the SAPIR program, a listing and an index for any type of records may be prepared.

These applications will be described in more detail in future reports.

ACKNOWLEDGMENT

We are grateful for the assistance of Gale G. Marshall, Clarence Badger, and Joseph L. Brady, Jr., of the Computation Division, who gave their time generously. Robert L. Swenson, Electronics Engineering Department, ably assisted in the tape conversion phases.

APPENDIX I.

KWIC Index Page

002 0426	MMONIUM DIURANATES PART	A. THE UO3 HYDRATES PART B. THE AMMO
003 0426	THOD FOR MONITORING THE	ACTIVITY OF OXYGEN IN A HOT TRAPPED
004 0426		ALIGNMENT CHARTS FOR TRANSPORT PROPE
002 0426	D URANIUM TRIOXIDES AND	AMMONIUM DIURANATES PART A. THE UO3
002 0426	03 HYDRATES PART B. THE	AMMONIUM DIURANATES.
006 0426	ER TYPE REACTOR COOLANT	ANALYTICAL REQUIREMENTS AND PROBLEMS
007 0426		TABLE OF ATOMIC MASSES.
002 0426	. THE UO3 HYDRATES PART	B. THE AMMONIUM DIURANATES.
001 0426	FOR USE IN CRITICALITY	CALCULATIONS.
006 0426		CALDER TYPE REACTOR COOLANT ANALYTIC
003 0426	A POSSIBLE GALVANIC	CELL METHOD FOR MONITORING THE ACTIV
004 0426	ALIGNMENT	CHARTS FOR TRANSPORT PROPERTIES VISC
003 0426	TRAPPED SODIUM COOLANT	CIRCUIT.
004 0426	UCTIVITY, AND DIFFUSION	COEFFICIENTS FOR NONPOLAR GASES AND
009 0426	ADIONUCLIDES PRESENT IN	COLLING WATER FROM THE NRX REACTOR.
008 0426	LUORIDE-SODIUM FLUORIDE	COMPLEX.
004 0426	TIES VISCOSITY, THERMAL	CONDUCTIVITY, AND DIFFUSION COEFFICI
012 0426	F SOME PRPELLANT FLUIDS	CONTAINING HYDROGEN.
006 0426	CALDER TYPE REACTOR	COOLANT ANALYTICAL REQUIREMENTS AND
003 0426	IN A HOT TRAPPED SODIUM	COOLANT CIRCUIT.
001 0426	AND HYDROGEN FOR USE IN	CRITICALITY CALCULATIONS.
001 0426	ESTIMATED	DENSITIES OF PLUTONIUM AND HYDROGEN
004 0426	AND GAS MIXTURES AT LOW	DENSITY.
004 0426	ERMAL CONDUCTIVITY, AND	DIFFUSION COEFFICIENTS FOR NONPOLAR
011 0426		DIFFUSION-CONTROLLED DISSOLUTION OF
008 0426	MEASUREMENT OF	DISSOCIATION PRESSURE OF MOLYBDENUM
011 0426	DIFFUSION-CONTROLLED	DISSOLUTION OF ZIRCONIUM IN MOLTEN U
002 0426	TRIOXIDES AND AMMONIUM	DIURANATES PART A. THE UO3 HYDRATES
002 0426	ES PART B. THE AMMONIUM	DIURANATES.
001 0426		ESTIMATED DENSITIES OF PLUTONIUM AND
012 0426	RTIES OF SOME PRPELLANT	FLUIDS CONTAINING HYDROGEN.
008 0426	YBDENUM FLUORIDE-SODIUM	FLUORIDE COMPLEX.
010 0426	AN OXIDATION-REDUCTION	FLUORIDE PRECIPITATION METHOD.
008 0426	PRESSURE OF MOLYPDENUM	FLUORIDE-SODIUM FLUORIDE COMPLEX.
003 0426	A POSSIBLE	GALVANIC CELL METHOD FOR MONITORING
004 0426	FOR NONPOLAR GASES AND	GAS MIXTURES AT LOW DENSITY.
004 0426	EFFICIENTS FOR NONPOLAR	GASES AND GAS MIXTURES AT LOW DENSIT
003 0426	ACTIVITY OF OXYGEN IN A	HOT TRAPPED SODIUM COOLANT CIRCUIT.
002 0426	AND STRUCTURES OF SOME	HYDRATED URANIUM TRIOXIDES AND AMMON
002 0426	RANATES PART A. THE UO3	HYDRATES PART B. THE AMMONIUM DIURAN
001 0426	SITIES OF PLUTONIUM AND	HYDROGEN FOR USE IN CRITICALITY CALC

APPENDIX II.

Page From List of Report Citations

0010426

AERE-M-802 (RPT UNCLASSIFIED)
UKAEA. RESEARCH GROUP. ATOMIC ENERGY RESEARCH
ESTABLISHMENT, HARWELL, ENGLAND
ESTIMATED DENSITIES OF PLUTONIUM AND HYDROGEN FOR USE
IN CRITICALITY CALCULATIONS.
E E JACKSON AND E WAIT DECEMBER 1960 5P

0020426

AERE-R-3411 (RPT UNCLASSIFIED)
UKAEA. RESEARCH GROUP. ATOMIC ENERGY RESEARCH
THE INFRARED SPECTRA AND STRUCTURES OF SOME HYDRATED
URANIUM TRIOXIDES AND AMMONIUM DIURANATES PART A.
THE UO3 HYDRATES PART B. THE AMMONIUM DIURANATES.
A M DEANE NOVEMBER 1960 24P
(APPROVED FOR PUBLICATION)

0030426

ARERE-R-3037 (RPT UNCLASSIFIED)
UKAEA. RESEARCH GROUP. ATOMIC ENERGY RESEARCH
ESTABLISHMENT, HARWELL, BERKS, ENGLAND
A POSSIBLE GALVANIC CELL METHOD FOR MONITORING THE
ACTIVITY OF OXYGEN IN A HOT TRAPPED SODIUM COOLANT
CIRCUIT.
G W HORSLEY NOVEMBER 1959 13P

0040426

NASA-TR-R-81 (RPT UNCLASSIFIED)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LEWIS
RESEARCH CENTER, CLEVELAND, OHIO
ALIGNMENT CHARTS FOR TRANSPORT PROPERTIES VISCOSITY,
THERMAL CONDUCTIVITY, AND DIFFUSION COEFFICIENTS FOR
NONPOLAR GASES AND GAS MIXTURES AT LOW DENSITY.
R S BROKAW 1961 23P

0050426

NAA-SR-6095 (RPT UNCLASSIFIED)
ATOMICS INTERNATIONAL DIV, NORTH AMERICAN AVIATION INC,
CANOGA PARK, CALIF
VAPORIZATION OF ZIRCONIUM OXIDE.
M M NAKATA, R L MCKISSON AND B D POLLOCK APRIL 15,

APPENDIX III

Basic Flow Chart for SAPIR

Flow Chart of SAPIR Phase 1

APPENDIX V

Listing of SAPIR Phase 1

CLEAR STORAGE 1 ,008015,022026,030034,041,045,053,0570731026
 CLEAR STORAGE 2 L072116,110106,1051178101/199,027A0750291027800102708026/0991,001/001117100
 BCGTSTRAP CARD ,008015,022029,056063/056029 0240671056

PG	LIN	CT	LABEL	OP	A OPERAND	B OPERAND	D	LOC	INSTRUCTION	COMMENTS	KWIC1
1	010			CTL	331						
1	020			ORG	2500						
1	030										
1	040										
1	050	7	BEGIN	SW	0001	0101		2500		001 101	
1	060	7		SW	0201	0400		2507		201 400	
1	070	7		SW	1600	1900		2514		600 200	
1	080	1		R				2521		1	
1	090	7		MCH	0004	0354		2522		004 354	
1	100	7		MCH	0347	0276		2529		347 276	
1	110	2		CC			1	2536		F	
1	120	1		W				2538		2	
1	130	4		CS	0299			2539		/ 299	
1	140	2		CC			K	2543		F K	
1	150	7		MCH	0399	0257		2545		M 399 257	
1	160	1		W				2552		2	
1	165	4		CS	0299			2553		/ 299	
1	166	4		SW	0201			2557		201	
1	170	2		CC			L	2561		F L	
1	180	8	START	MCH	101	0400	R	2563		M 11 400 R	
1	181	5		B	TRERR		L	2571		B P10 L	
1	182	4		CW	TITBEG			2576		1 198	
1	184	4		CW	RECEND			2580		1 197	
1	200	5		B	EOF		K	2584		B P78 K	
2	010	7		MCH	0354	0222		2589		M 354 222	
2	020	1		W				2596		2	
2	030	4		CS	0299			2597		/ 299	
2	040	7	TESTS	MCM	0000	1 1900		2601		P 0#0 200	
2	050	4		SAR	RESET1			2608		C 189	
2	060	4		SBR	KR3			2612		H 099	
2	070	7		A	CON10M	0100		2616		A M95 100	
2	075	8		B	LASREC	0000	3	2623		B 617 0#0	
2	080	8	G01	B	002	0000	1	2631		B 625 0#0	
2	090	8		BWZ	003	TITBEG	1	2639		V 499 198 1	
2	100	7		MCM	0000	1 0219		2647		P 0#0 219	
2	110	4		SBR	KR3			2654		H 099	
2	120	7		MCH	0337	0000	3	2658		M 337 0#0	
2	130	5	PRINT	B	PGEND		-	2665		B A20 -	
2	140	1		W				2670		2	
2	150	4		CS	0299			2671		/ 299	
2	160	8		BWZ	008	RECEND	1	2675		V 863 197 1	
2	170	7	TOVAB	MCH	0189	XR1		2683		M 189 0E9	
3	020	4		CS	1999			2690		/ 299	
3	030	4		SW	1900			2694		200	
3	032	4		CS	1999			2698		/ 299	
3	034	4		SW	1900			2702		200	
3	040	4		B	TESTS			2706		B 001	
3	050	4	TRERR	SBR	3AR1 +003			2710		H P42	
3	060	7		MCH	0009	CNTR9		2714		M 190 358	

PG	LIN	CT	LABEL	OP	A OPERAND	B OPERAND	D	LOC	INSTRUCTION	COMMENTS	KWIC1
3	070	5	BKSP1	CU	(U1		B	2721	U (U1 B		
3	080	8		MCW	(U1	0400	R	2726	M (U1 400 R		
3	090	5		B	GO		L	2734	B P43 L		
3	100	4	BAR1	B	0000			2739	B 000		
3	110	7	GO	S	CON1	CNTR9		2743	S 355 358		
3	120	8		B	PCH1	CNTR9	+	2750	B P62 358 +		
3	130	4		B	BKSP1			2758	B P21		
3	140	7	PCH1	MCW	0479	0180		2762	M 479 180		
3	150	1		P				2769	4		
3	160	4		CS	0180			2770	/ 180		
3	170	4		B	NEW2			2774	B B40		
4	110	5	EOF	CU	(U2		M	2778	U (U2 M		
4	112	5		B	TwERR		L	2783	B +05 L		
4	114	5		CU	(U1		U	2788	U (U1 U		
4	120	5		CU	(U2		R	2793	U (U2 R		
4	130	2		CC			1	2798	F 1		
4	140	7		MCW	2017	0260		2800	M -17 260		
4	150	1		W				2807	2		
4	160	4		CS	0299			2808	/ 299		
4	170	4		SW	0201			2812	, 201		
4	180	1		H				2816	.		
4	190	4	LASREC	SW	RECEM			2817	, 197		
4	200	4		B	GO1			2821	B C31		
5	010	4	GO2	SW	TITBEG			2825	, 198		
5	020	7		MCM	0001	1 0222		2829	P 0+1 222		
5	030	4		SBR	XR3			2836	H 099		
5	040	7		MCM	0001	1 0000	2	2840	P C+1 0-0		
5	050	4		SBR	XR2			2847	H 094		
5	060	7	GO4	A	CCN20M	0095		2851	A M99 095		
5	070	8		B	TITEND	0000	2	2858	B R25 0-0		
5	080	8		B	GO5	0000	2	2866	B Q88 0-0	-	
5	090	7		A	CCN20	0095		2874	A 084 095		
5	100	7		LCA	0337	0000	2	2881	L 337 0-0		
5	110	7	GO5	MCW	0337	0000	3	2888	M 337 0+0		
5	120	4		B	PRINT			2895	B 065		
5	130	7	GO3	MCM	0000	1 0222		2899	P 0+0 222		
5	140	4		SBR	XR3			2906	H 099		
5	150	7		MCM	0000	1 0000	2	2910	P 0+0 0-0		
5	155	4		SBR	XR2			2917	H 094		
5	160	4		B	GO4			2921	B Q51		
5	180	7	TITEND	A	CCN10	0095		2925	A 082 095		
5	190	7		LCA	0337	0000	2	2932	L 337 0-0		
5	200	7		A	CON10M	0100		2939	A M95 100		
6	010	7		MCW	0337	0000	3	2946	M 337 0+0		
6	020	4		CU	TITBEG			2953	I 198		
6	030	7		MCW	0354	1606		2957	M 354 W06		
6	040	7		LCA	0360	0000	2	2964	L 360 0-0		
6	050	8		MCW	(U2	1600	W	2971	M (U2 W00 W		
6	060	5		B	TwERR		L	2979	B +05 L		
6	080	7		LCA	0186	XR2		2984	L 186 094		
6	082	4		CS	1899			2991	/ Y99		
6	084	1		CS				2995	/		
6	086	1		CS				2996	/		

PG	LIN	CT	LABEL	OP	A OPERAND	B OPERAND	D	LOC	INSTRUCTION	COMMENTS	KWIC1
6	088	4		SW	1600			2997	B WCO		
6	090	4		B	PRINT			3001	B 065		
6	100	4	TwERR	SBR	BAR2 +003			3005	H 044		
6	110	7		MCW	CON4	CNTR4		3009	M 191 357		
6	120	7		MCW	CON2	CNTR2		3016	M 361 356		
6	130	5	EKSP2	CU	LU2		B	3023	U LU2 B		
6	140	8	MTT2	MCW	LU2	1600	W	3028	M LU2 W00 W		
6	150	5		B	ERASE		L	3036	B +45 L		
6	160	4	BAR2	B	0000			3041	B 000		
6	170	7	ERASE	S	CON1	CNTR2		3045	S 355 356		
6	180	8		B	REWT	CNTR2	+	3052	B +64 356 +		
6	190	4		B	BKSP2			3060	B +23		
6	200	7	REWT	MCW	CON2	CNTR2		3064	M 361 356		
7	010	5		CU	LU2		B	3071	U LU2 B		
7	020	5		CU	LU2		E	3076	U LU2 E		
7	030	7		S	CON1	CNTR4		3081	S 355 357		
7	040	8		B	PCH2	CNTR4	+	3088	B A00 357 +		
7	050	4		B	MTT2			3096	B +28		
7	060	7	PCH2	MCW	1679	0180		3100	M W79 180		
7	070	1		P				3107	4		
7	080	4		CS	0180			3108	/ 180		
7	090	4		SW	0101			3112	, 101		
7	100	4		B	BAR2			3116	B +41		
7	150	1	PGEND	W				3120	2		
7	160	4		CS	0299			3121	/ 299		
7	170	4		SW	0201			3125	, 201		
7	180	7	NEWPG	MCW	0372	0229		3129	M 372 229		
7	190	2		CC			K	3136	F K		
7	200	1		W				3138	2		
8	010	4		CS	0299			3139	/ 299		
8	020	4		SW	0201			3143	, 201		
8	030	2		CC			I	3147	F 1		
8	040	7		A	CON1	NC		3149	A 355 335		
8	050	8		B	G00	0333	O	3156	B 874 333 0		
8	060	7		MCS	0335	0278		3164	Z 335 278		
8	070	7	G0F	MCW	0341	0274		3171	M 341 274		
8	080	1		W				3178	2		
8	090	4		CS	0299			3179	/ 299		
8	100	4		SW	0201			3183	, 201		
8	110	7		MCW	0399	0257		3187	M 399 257		
8	120	2		CC			K	3194	F K		
8	130	1		W				3196	2		
8	140	4		CS	0299			3197	/ 299		
8	150	4		SW	0201			3201	, 201		
8	160	2		CC			L	3205	F L		
8	170	8		BWZ	NEWREC	RECEND	I	3207	V 819 197 1		
8	180	4		B	TCVAB			3215	B 083		
8	190	7	NEWREC	LCA	0183	XR1		3219	L 183 089		
8	200	7		LCA	0186	XR2		3226	L 186 094		
9	010	7		A	CON1	0350		3233	A 355 350		
9	020	4	NEW2	CS	1599			3240	/ V99		
9	030	1		CS				3244	/		
9	040	1		CS				3245	/		

PG	LIN	CT	LABEL	OP	A OPERAND	B OPERAND	D	LCC	INSTRUCTION COMMENTS	KWIC1
9	050	1		CS				3246	/	
9	060	1		CS				3247	/	
9	070	1		CS				3248	/	
9	080	1		CS				3249	/	
9	090	1		CS				3250	/	
9	100	1		CS				3251	/	
9	110	1		CS				3252	/	
9	120	1		CS				3253	/	
9	130	1		CS				3254	/	
9	140	4		SW	0400			3255	B 400	
9	150	4		B	START			3259	B N63	
9	160	2	GOB	CC			K	3263	F K	
9	170	5		B	NEWPG		-	3265	B A29 -	
9	180	4		B	NEWREC			3270	B 819	
9	190	8	GOD	B	GCE	0334	0	3274	B 893 334 0	
9	200	7		MCS	0335	0277		3282	Z 335 277	
10	010	4		B	GCF			3289	B A71	
10	020	7	GCE	MCS	0335	0276		3293	Z 335 276	
10	030	4		B	GCF			3300	B A71	
11	010	3	XR1	DCW	0089		400	0089		
11	020	3	XR2	DCW	0094		W07	0094		
11	030	3	XR3	DCW	0099		000	0099		
11	040	3	FOURCO	DCW	0183		400	0183		
11	050	3	ONES07	DCW	0186		W07	0186		
11	060	3	RESET1	DCW	0189		000	0189		
11	070	1	CON9	DCW	0190		9	0190		
11	080	1	CON4	DCW	0191		4	0191		
11	090	1	RECEND	DC	0197		R	0197		
11	100	1	TITBEG	DC	0198		B	0198		
11	120	3	NC	DCW	0335		1	0335		
11	130	2	BB	DCW	0337			0337		
11	140	4	PAGE	DCW	0341		PAGE	0341		
11	150	6	PAGE1	DCW	0347		PAGE 1	0347		
11	160	7	REFWC	DCW	0354		0010000	0354		
11	170	1	CON1	DCW	0355		1	0355		
11	180	1	CNTR2	DCW	0356		0	0356		
11	190	1	CNTR4	DCW	0357		0	0357		
11	200	1	CNTR9	DCW	0358		0	0358		
12	010	1	DASH	DCW	0359		-	0359		
12	020	1	GMMW	DCW	0360			0360		
12	030	1	CON2	DCW	0361		2	0361		
12	040	11	NOTE	DCW	0372		*MICROCARDS	0372		
12	050	27	HEADER	DCW	0399		UC LRL UNCLASSIFIED REPORTS	0399		
12	060	18	FINIS	DCW	2017		END OF FIRST PHASE	2017		
12	190	2	CON20	DCW	0084		20	0084		
12	200	2	CON10	DCW	0082		10	0082		
12	210	4	CON20M	DCW	2499		1980	2499		
12	220	4	CON'OM	DCW	2495		1990	2495		
13	010			END	BEGIN				/ N00 080	

Flow Chart of SAPIR Phase 2

APPENDIX VII

Listing of SAPIR Phase 2

CLEAR STORAGE 1 ,008015,022026,030034,041,045,053,0570731026
 CLEAR STORAGE 2 L072116,110106,1051178101/199,027A0750291027800102708026/0991,001/001117100
 BCCSTRAP CARD ,008015,022029,056063/056029 ,0240671056

PG	LIN	CT	LABEL	OP	A OPERAND	B OPERAND	D	LCC	INSTRUCTION	COMMENTS	KWIC2
1	010			CTL	331						
1	020			CRG	1000						
1	030				* KEY-WORD-IN-CONTEXT INDEX, 2ND PHASE, PROGRAMMED						
1	040				* BY LESTER D. TURNER, 4-12-61						
1	050	7	START	SW	0109	0117		1000		109 117	
1	060	7		SW	0141	0201		1007		141 201	
1	070	7		SW	0400	0407		1014		400 407	
1	080	4		SW	0751			1021		751	
1	090	7		MCW	ZOS	CHAR		1025	M	803 189	
1	110	7		MCW	FC5	RESET		1032	M	083 210	
1	120	4		CW	SWF			1039	J	199	
1	140	8	RD2	MCW	IU2	0400	R	1043	M	IU2 400 R	
1	150	5		B	TRERR		L	1051	B	730 L	
1	160	5		B	EOF		K	1056	B	502 K	
1	164	7	NEWD	MCW	RESET	FHLF		1061	M	810 814	
1	165	7		A	CCN20	0811		1068	A	194 811	
1	166	7		MCW	RESET	XR1		1075	M	810 089	
1	167	7		MCW	XR1	LHLF		1082	M	089 818	
1	168	8	WDLOCP	B	SETE	0000	1	1089	B	558 0#0	
1	180	8		B	88	0000	1	1097	B	566 0#0	
1	190	7		MCW	XR1	RESET		1105	M	089 210	
1	200	7		A	CCN10	0090		1112	A	192 090	
2	010	7		A	CCN10	0190		1119	A	192 190	
2	020	4		B	WDLOCP			1126	B	#89	
2	030	4	TRERR	SBR	BAR1 +003			1130	H	762	
2	040	7		MCW	CCN9	CNTR9		1134	M	196 197	
2	050	5	BKSP2	CU	IU2		B	1141	G	IU2 8	
2	060	8		MCW	IU2	0400	R	1146	M	IU2 400 R	
2	070	5		B	GG		L	1154	B	763 L	
2	080	4	BAR1	B	0000			1159	B	000	
2	090	7	GO	S	CCN1	CNTR9		1163	S	195 197	
2	100	8		B	PRT	CNTR9	+	1170	B	782 197 +	
2	110	4		B	BKSP2			1178	B	741	
2	120	7	PRT	MCW	0479	0299		1182	M	479 299	
2	130	1		W				1189	2		
2	140	4		CS	0299			1190	/	299	
2	150	4		SW	0201			1194	,	201	
2	160	4		B	RD2			1198	B	#43	
2	170	7	EOF	MCW	0844	0299		1202	M	844 299	
2	180	1		W				1209	2		
2	190	4		CS	0299			1210	/	299	
2	191	4		SW	0201			1214	,	201	
2	192	7		MCW	0876	0299		1218	M	876 299	
2	194	1		W				1225	2		
2	196	4		CS	0299			1226	/	299	
2	198	4		SW	0201			1230	,	201	
2	200	7		MCW	0896	0299		1234	M	896 299	
2	202	1		W				1241	2		

PG	LIN	CT	LABEL	OP	A OPERAND	B OPERAND	D	LOC	INSTRUCTION	COMMENTS	KWIC2
2	204	4		CS	0299			1242	/ 299		
2	206	4		SW	0201			1246	, 201		
2	208	2		CC			1	1250	F 1		
3	010	5		CU	102		U	1252	U 102 U		
3	020	1		H				1257	.		
3	030	4	SETE	SW	SWE			1258	, 198		
3	032	4		B	BLNK			1262	B T11		
3	034	7	38	A	CON10	0090		1266	A 192 090		
3	036	8		B	UGH	0000	1	1273	B 593 0+0		
3	038	8		B	SETE	0000	1	1281	B 558 0+0		
3	040	4		B	BLNK			1289	B T11		
3	042	7	JGH	A	CON10	RESET +001		1293	A 192 811		
3	044	7		A	CON10	CHAR +001		1300	A 192 190		
3	046	4		B	BB			1307	B 566		
3	050	7	BLNK	MCW	CHAR	WRD		1311	M 189 185		
3	060	7		MCW	S50	XR2		1318	M 086 094		
3	070	7		A	0190	0095		1325	A 190 095		
3	075	7		MCW	RESET	XR1		1332	M 810 089		
3	090	7	ECNE	MCW	0000	0000	2	1339	M 0+0 0+0		
3	112	7		C	F15	WRD		1346	C 995 185		
3	114	5		B	KWD		U	1353	B 097 U		
3	116	7		MCW	TACCR	TBL		1358	M 998 992		
3	118	7		A	WRD	TBL		1365	A 185 992		
3	120	7		A	WRD	TBL		1372	A 185 992		
3	122	7		A	WRD	TBL		1379	A 185 992		
3	124	7		A	WRD	TBL		1386	A 185 992		
3	126	7		A	WRD	TBL		1393	A 185 992		
3	128	7		A	WRD	TBL		1400	A 185 992		
3	130	7		MCW	TBL	MCD1 +003		1407	M 992 017		
3	135	7	MOD1	MCW	0000	XR3		1414	M 000 099		
3	140	7		A	CONJ3	TBL		1421	A 182 992		
3	145	7		MCW	TBL	LOOP +003		1428	M 992 038		
3	150	7	LOCP	C	0000	XR3		1435	C 000 099		
3	155	5		B	KWD		S	1442	B 097 S		
3	160	7		C	0000	0000	3	1447	C 0+0 0+0		
3	165	5		B	TESE		S	1454	B 070 S		
3	170	7		A	CHAR	XR3		1459	A 189 099		
3	175	4		B	LOCP			1466	B 035		
4	010	8	TESE	BWZ	ENDS	SWE	1	1470	V 091 198 1		
4	012	4	NEXT	CS	0799			1478	/ 799		
4	020	4		SW	0751			1482	, 751		
4	030	7		MCW	ZOS	CHAR		1486	M 803 189		
4	040	4		B	NEWB			1493	B +51		
4	050	7	KWD	A	CONJ5	LHLF		1497	A 806 818		
4	060	7		MCW	LHLF	XR3		1504	M 818 099		
4	070	7		MCW	0000	0176	3	1511	M 0+0 176		
4	080	4		SBR	XR2			1518	H 094		
4	082	7		C	XR2	CON140		1522	C 094 399		
4	084	5		B	CK		S	1529	B 042 S		
4	086	7		MCW	0000	0176	3	1534	M 0+0 176		
4	088	1		MCW				1541	M		
4	090	8	OK	BWZ	AH	SWF	1	1542	V 058 199 1		
4	092	4		SW	SWF			1550	, 199		
4	094	4		B	CH			1554	B 072		

PG	LIN	CT	LABEL	OP	A CPERANC	B OPERAND	D	LCC	INSTRUCTION	COMMENTS	KWIC2
4	096	7	AH	MCW	FHLF	XR3		1558	M	814 099	
4	098	7		MCW	COC0	0139		1565	M	0+0 139	
4	100	7	OH	MCW	0406	0115		1572	M	406 115	
4	110	1		P				1579	4		
4	120	8		BWZ	ST4	SWC	1	1580	V	W30 186 1	
4	130	7		A	CCN1	PCNT		1588	A	195 899	
4	140	8		B	GOES	PCNT	-002	1595	B	W51 897 9	
4	150	8	NP1	BWZ	ENDS	SWC	1	1603	V	W81 198 1	
4	155	4		CS	0180			1611	/	180	
4	160	7		SW	0109	0117		1615	,	109 117	
4	170	4		SW	0141			1622	,	141	
4	190	4		B	NEXT			1626	B	U78	
5	080	7	ST4	A	CCN1	PCNT		1630	A	195 899	
5	090	8		B	NP2	0897	9	1637	B	W66 897 9	
5	100	2		SS			4	1645	K	4	
5	110	4		B	NP1			1647	B	W03	
5	130	4	GOES	SW	SWC			1651	,	186	
5	135	7		MCW	ZCS	PCNT		1655	M	803 899	
5	140	4		B	ST4			1662	B	W30	
5	150	4	NP2	CM	SWC			1666	J	186	
5	160	7		MCW	ZCS	PCNT		1670	M	803 899	
5	170	4		B	NP1			1677	B	W03	
5	180	4	ENDS	CM	SWC			1681	J	198	
5	182	4		CS	0799			1685	/	799	
5	184	1		CS				1689	/		
5	186	1		CS				1690	/		
5	188	1		CS				1691	/		
5	190	4		CS	0180			1692	/	180	
5	192	4		B	START			1696	B	+00	
6	010	3	F05	DCW	0083		405	0083			
6	020	3	S50	DCW	0086		750	0086			
6	030	3	XR1	DCW	0089		407	0089			
6	040	3	XR2	DCW	0094		750	0094			
6	050	3	XR3	DCW	0099		000	0099			
6	060	3	WRD	DCW	0185		000	0185			
6	070	3	CHAR	DCW	0189		000	0189			
6	080	2	CON10	DCW	0192		10	0192			
6	090	2	CON2C	DCW	0194		20	0194			
6	100	1	CCN1	DCW	0195		1	0195			
6	105	1	CCN3	DCW	0182		3	0182			
6	110	1	CON9	DCW	0196		9	0196			
6	120	1	CNTR5	DCW	0197		0	0197			
6	130	1	SWC	OC	0198		E	0198			
6	140	1	SWF	OC	0199		F	0199			
6	150	3	ZDS	DCW	0803		000	0803			
6	160	3	CCN35	DCW	0806		035	0806			
6	170	3	RESET	DCW	0810		000	0810			
6	180	3	FHLF	DCW	0814		000	0814			
6	190	3	LHLF	DCW	0818		000	0818			
6	200	25		DCW	0844			0844			
7	010	32		DCW	0876			0876			
7	020	20		DCW	0896			0896			
7	030	3	PCNT	DCW	0899		000	0899			
7	035	1	SWC	DC	0186		C	0186			

GREETINGS FROM LES TURNER
 PHASE 2 IS COMPLETE-YOU DID WELL
 NOW, ON WITH THE SCRT

PG	LEN	CT	LABEL	OP	A OPERAND	B OPERAND	D	LOC	INSTRUCTION COMMENTS	KWIC2
7	040	2		DCW	1804			WE	1804	
7	050	2		DCW	1806			OF	1806	
7	060	2		DCW	1808			ME	1808	
7	070	2		DCW	1810			BE	1810	
7	080	2		DCW	1812			HE	1812	
7	090	2		DCW	1814			IF	1814	
7	100	2		DCW	1816			II	1816	
7	110	2		DCW	1818			UP	1818	
7	120	2		DCW	1820			TO	1820	
7	130	2		DCW	1822			SO	1822	
7	140	2		DCW	1824			NO	1824	
7	150	2		DCW	1826			OR	1826	
7	160	2		DCW	1828			ON	1828	
7	170	2		DCW	1830			AN	1830	
7	180	2		DCW	1832			DO	1832	
7	190	2		DCW	1834			IN	1834	
7	200	2		DCW	1836			US	1836	
8	000	2		DCW	1838			MY	1838	
8	010	2		DCW	1840			AS	1840	
8	020	2		DCW	1842			AT	1842	
8	030	2		DCW	1844			BY	1844	
8	040	2		DCW	1846			IS	1846	
8	050	2		DCW	1848			IT	1848	
8	060	1		DCW	1850			+	1850	
8	070	3		DCW	1853			THE	1853	
8	080	3		DCW	1856			SEE	1856	
8	090	3		DCW	1859			ONE	1859	
8	100	3		DCW	1862			OFF	1862	
8	110	3		DCW	1865			AND	1865	
8	120	3		DCW	1868			ARE	1868	
8	130	3		DCW	1871			DID	1871	
8	140	3		DCW	1874			DUE	1874	
8	150	3		DCW	1877			HAD	1877	
8	160	3		DCW	1880			III	1880	
8	170	3		DCW	1883			WHO	1883	
8	180	3		DCW	1886			TWO	1886	
8	190	3		DCW	1889			PER	1889	
9	000	3		DCW	1892			OWN	1892	
9	010	3		DCW	1895			OUR	1895	
9	020	3		DCW	1898			AGO	1898	
9	030	3		DCW	1901			ALL	1901	
9	040	3		DCW	1904			CAN	1904	
9	050	3		DCW	1907			FAR	1907	
9	060	3		DCW	1910			FOR	1910	
9	070	3		DCW	1913			HER	1913	
9	080	3		DCW	1916			HIM	1916	
9	090	3		DCW	1919			YET	1919	
9	100	3		DCW	1922			WHY	1922	
9	110	3		DCW	1925			WAY	1925	
9	120	3		DCW	1928			WAS	1928	
9	130	3		DCW	1931			NOW	1931	
9	140	3		DCW	1934			NOT	1934	
9	150	3		DCW	1937			NEW	1937	
9	160	3		DCW	1940			CUT	1940	

PG	LIN	ET	LABEL	OP	A OPERAND	B OPERAND	D	LOC	INSTRUCTION COMMENTS	KWIC2
9	180	3		DCW	1943		MAY	1943		
9	190	3		DCW	1946		LOW	1946		
9	200	3		DCW	1949		ANY	1949		
10	010	3		DCW	1952		BUT	1952		
10	020	3		DCW	1955		FEW	1955		
10	030	3		DCW	1958		GET	1958		
10	040	3		DCW	1961		HAS	1961		
10	050	3		DCW	1964		HIS	1964		
10	060	3		DCW	1967		HOW	1967		
10	070	3		DCW	1970		ITS	1970		
10	080	1		DCW	1973		*	1973		
10	090	4		DCW	1977		WITH	1977		
10	090	4		DCW	1977		WITH	1977		
10	100	4		DCW	1981		WERE	1981		
10	110	4		DCW	1985		USED	1985		
10	120	4		DCW	1989		TAKE	1989		
10	130	4		DCW	1993		SUCH	1993		
10	140	4		DCW	1997		SOME	1997		
10	150	4		DCW	2001		SAME	2001		
10	160	4		DCW	2005		SAID	2005		
10	170	4		DCW	2009		NOTE	2009		
10	180	4		DCW	2013		NONE	2013		
10	190	4		DCW	2017		NEED	2017		
10	200	4		DCW	2021		ONCE	2021		
11	010	4		DCW	2025		MUCH	2025		
11	020	4		DCW	2029		MORE	2029		
11	030	4		DCW	2033		MAKE	2033		
11	040	4		DCW	2037		MADE	2037		
11	050	4		DCW	2041		LONG	2041		
11	060	4		DCW	2045		LIKE	2045		
11	070	4		DCW	2049		ABLE	2049		
11	080	4		DCW	2053		BOTH	2053		
11	090	4		DCW	2057		CAME	2057		
11	100	4		DCW	2061		COME	2061		
11	110	4		DCW	2065		DATA	2065		
11	120	4		DCW	2069		EACH	2069		
11	130	4		DCW	2073		GAVE	2073		
11	140	4		DCW	2077		GIVE	2077		
11	150	4		DCW	2081		HAVE	2081		
11	160	4		DCW	2085		HERE	2085		
11	170	4		DCW	2089		HIGH	2089		
11	180	4		DCW	2093		WILL	2093		
11	190	4		DCW	2097		WHOM	2097		
11	200	4		DCW	2101		WHEN	2101		
12	010	4		DCW	2105		WELL	2105		
12	020	4		DCW	2109		UPON	2109		
12	030	4		DCW	2113		TOOK	2113		
12	040	4		DCW	2117		THEN	2117		
12	050	4		DCW	2121		THEM	2121		
12	060	4		DCW	2125		THAN	2125		
12	070	4		DCW	2129		SEEN	2129		
12	080	4		DCW	2133		SEEM	2133		
12	090	4		DCW	2137		OVER	2137		
12	100	4		DCW	2141		ALSO	2141		

26 LIN	CT	LABEL	OP	A OPERAND	B OPERAND	D	LOC	INSTRUCTION COMMENTS	KWIC2
12 110	4		DCW	2145		BACK	2145		
12 120	4		DCW	2149		BEEN	2149		
12 130	4		DCW	2153		DOWN	2153		
12 140	4		DCW	2157		EVEN	2157		
12 150	4		DCW	2161		FROM	2161		
12 160	4		DCW	2165		INTO	2165		
12 170	4		DCW	2169		WHAT	2169		
12 180	4		DCW	2173		WENT	2173		
12 190	4		DCW	2177		WAYS	2177		
12 200	4		DCW	2181		VERY	2181		
13 010	4		DCW	2185		THUS	2185		
13 020	4		DCW	2189		THIS	2189		
13 030	4		DCW	2193		THEY	2193		
13 040	4		DCW	2197		THAT	2197		
13 050	4		DCW	2201		SLOW	2201		
13 060	4		DCW	2205		SHOW	2205		
13 070	4		DCW	2209		NEXT	2209		
13 080	4		DCW	2213		MUST	2213		
13 090	4		DCW	2217		ONLY	2217		
13 100	4		DCW	2221		MOST	2221		
13 110	4		DCW	2225		MANY	2225		
13 120	4		DCW	2229		LEFT	2229		
13 130	4		DCW	2233		LAST	2233		
13 140	4		DCW	2237		JUST	2237		
13 150	4		DCW	2241		AWAY	2241		
13 160	4		DCW	2245		BEST	2245		
13 170	4		DCW	2249		CENT	2249		
13 180	4		DCW	2253		DOES	2253		
13 190	4		DCW	2257		EASY	2257		
13 200	4		DCW	2261		GOES	2261		
14 010	1		DCW	2265		#	2265		
14 020	5		DCW	2270		WOULD	2270		
14 030	5		DCW	2275		WHOSE	2275		
14 040	5		DCW	2280		WHOLE	2280		
14 050	5		DCW	2285		WHILE	2285		
14 060	5		DCW	2290		WHICH	2290		
14 070	5		DCW	2295		WHERE	2295		
14 080	5		DCW	2300		THREE	2300		
14 090	5		DCW	2305		THOSE	2305		
14 100	5		DCW	2310		THIRD	2310		
14 110	5		DCW	2315		THESE	2315		
14 120	5		DCW	2320		THERE	2320		
14 130	5		DCW	2325		SINCE	2325		
14 140	5		DCW	2330		LARGE	2330		
14 150	5		DCW	2335		ABOVE	2335		
14 160	5		DCW	2340		ALONG	2340		
14 170	5		DCW	2345		ALONG	2345		
14 180	5		DCW	2350		ARISE	2350		
14 190	5		DCW	2355		QJITE	2355		
14 200	5		DCW	2360		BEING	2360		
15 010	5		DCW	2365		COULD	2365		
15 020	5		DCW	2370		FOUND	2370		
15 030	5		DCW	2375		GOING	2375		
15 040	5		DCW	2380		UNTIL	2380		

PG	LIN	CT	LABEL	CP	A OPERAND	B OPERAND	D	LCC	INSTRUCTION COMMENTS	KWIC2
15	050	5		DCW	2385		UNDER	2385		
15	060	5		DCW	2390		THEIR	2390		
15	070	5		DCW	2395		TAKEN	2395		
15	080	5		DCW	2400		STILL	2400		
15	090	5		DCW	2405		SMALL	2405		
15	100	5		DCW	2410		SHOWN	2410		
15	110	5		DCW	2415		OTHER	2415		
15	120	5		DCW	2420		OFTEN	2420		
15	130	5		DCW	2425		LATER	2425		
15	140	5		DCW	2430		AFTER	2430		
15	150	5		DCW	2435		AGAIN	2435		
15	160	5		DCW	2440		CHAIN	2440		
15	170	5		DCW	2445		GIVEN	2445		
15	180	5		DCW	2450		TIMES	2450		
15	190	5		DCW	2455		STUDY	2455		
15	200	5		DCW	2460		SHOWS	2460		
16	010	5		DCW	2465		SEEMS	2465		
16	020	5		DCW	2470		RULES	2470		
16	030	5		DCW	2475		RIGHT	2475		
16	040	5		DCW	2480		NEEDS	2480		
16	050	5		DCW	2485		MIGHT	2485		
16	060	5		DCW	2490		MEANS	2490		
16	070	5		DCW	2495		MAKES	2495		
16	080	5		DCW	2500		LEAST	2500		
16	090	5		DCW	2505		ABOUT	2505		
16	100	5		DCW	2510		BELOW	2510		
16	110	5		DCW	2515		EARLY	2515		
16	120	5		DCW	2520		EVERY	2520		
16	130	5		DCW	2525		FIRST	2525		
16	140	5		DCW	2530		GIANT	2530		
16	150	5		DCW	2535		GIVES	2535		
16	160	5		DCW	2540		GREAT	2540		
16	170	1		DCW	2545		*	2545		
16	180	6		DCW	2551		TOWARD	2551		
16	190	6		DCW	2557		TAKING	2557		
16	200	6		DCW	2563		SHOULD	2563		
17	010	6		DCW	2569		SECOND	2569		
17	020	6		DCW	2575		SEARCH	2575		
17	030	6		DCW	2581		NEEDED	2581		
17	040	6		DCW	2587		METHOD	2587		
17	050	6		DCW	2593		LITTLE	2593		
17	060	6		DCW	2599		AROUND	2599		
17	070	6		DCW	2605		BECAME	2605		
17	080	6		DCW	2611		BECOME	2611		
17	090	6		DCW	2617		BEFORE	2617		
17	100	6		DCW	2623		CALLED	2623		
17	110	6		DCW	2629		DOUBLE	2629		
17	120	6		DCW	2635		DURING	2635		
17	130	6		DCW	2641		ENOUGH	2641		
17	140	6		DCW	2647		FORMED	2647		
17	150	6		DCW	2653		INDEED	2653		
17	160	6		DCW	2659		ITSELF	2659		
17	170	6		DCW	2665		SYSTEM	2665		
17	180	6		DCW	2671		REMAIN	2671		

PG	LIN	CT	LABEL	OP	A OPERAND	B OPERAND	D	LOC	INSTRUCTION COMMENTS	KWIC2
17	190	6		DCW	2677		RATHER	2677		
17	200	6		DCW	2683		APPEAR	2683		
18	010	6		DCW	2689		BETTER	2689		
18	020	6		DCW	2695		CENTER	2695		
18	030	6		DCW	2701		ELTHER	2701		
18	040	6		DCW	2707		HAPPEN	2707		
18	050	6		DCW	2713		HIGHER	2713		
18	060	6		DCW	2719		THINGS	2719		
18	070	6		DCW	2725		THEORY	2725		
18	080	6		DCW	2731		SERVES	2731		
18	090	6		DCW	2737		REVIEW	2737		
18	100	6		DCW	2743		REPORT	2743		
18	110	6		DCW	2749		REALLY	2749		
18	120	6		DCW	2755		NEARLY	2755		
18	130	6		DCW	2761		NARROW	2761		
18	140	6		DCW	2767		PARTLY	2767		
18	150	6		DCW	2773		OTHERS	2773		
18	160	6		DCW	2779		MOMENT	2779		
18	170	6		DCW	2785		MERELY	2785		
18	180	6		DCW	2791		LIKELY	2791		
18	190	6		DCW	2797		ACROSS	2797		
18	200	6		DCW	2803		ALLOWS	2803		
19	010	6		DCW	2809		ALMOST	2809		
19	020	6		DCW	2815		CANNOT	2815		
19	030	6		DCW	2821		EASILY	2821		
19	040	6		DCW	2827		EFFECT	2827		
19	050	6		DCW	2833		IMPACT	2833		
19	060	1		CCW	2839		*	2839		
19	070	7		DCW	2846		THROUGH	2846		
19	080	7		DCW	2853		BECAUSE	2853		
19	090	7		DCW	2860		EXAMPLE	2860		
19	100	7		DCW	2867		HIMSELF	2867		
19	110	7		DCW	2874		INCLUDE	2874		
19	120	7		DCW	2881		INDUCED	2881		
19	130	7		DCW	2888		INSTEAD	2888		
19	140	7		DCW	2895		SPECIAL	2895		
19	150	7		DCW	2902		SEVERAL	2902		
19	160	7		DCW	2909		SECTION	2909		
19	170	7		DCW	2916		PROBLEM	2916		
19	180	7		DCW	2923		ANGULAR	2923		
19	190	7		DCW	2930		ANOTHER	2930		
19	200	7		DCW	2937		BETWEEN	2937		
20	010	7		DCW	2944		CERTAIN	2944		
20	020	7		DCW	2951		CONTROL	2951		
20	030	7		DCW	2958		EARLIER	2958		
20	040	7		DCW	2965		FURTHER	2965		
20	050	7		DCW	2972		GENERAL	2972		
20	060	7		DCW	2979		GREATER	2979		
20	070	7		DCW	2986		HOWEVER	2986		
20	080	7		DCW	2993		WITHOUT	2993		
20	090	7		DCW	3000		VARIOUS	3000		
20	100	7		DCW	3007		USUALLY	3007		
20	110	7		DCW	3014		THOUGHT	3014		
20	120	7		DCW	3021		SYSTEMS	3021		

PG	LIN	CT	LABEL	OP	A CPERAND	B OPERAND	D	LOC	INSTRUCTION COMMENTS	KWIC2
20	130	7		DCW	3028		STUDIES	3028		
20	140	7		DCW	3035		RESULTS	3035		
20	150	7		DCW	3042		READILY	3042		
20	160	7		DCW	3049		PRESENT	3049		
20	170	7		DCW	3056		PERHAPS	3056		
20	180	7		DCW	3063		LARGELY	3063		
20	190	7		DCW	3070		AGAINST	3070		
20	200	7		DCW	3077		ALREADY	3077		
21	010	7		DCW	3084		BESIDES	3084		
21	020	7		DCW	3091		BROUGHT	3091		
21	030	7		DCW	3098		CENTERS	3098		
21	040	7		DCW	3105		CHANGES	3105		
21	050	7		DCW	3112		CLEARLY	3112		
21	060	7		DCW	3119		EFFECTS	3119		
21	070	7		DCW	3126		FINALLY	3126		
21	080	1		DCW	3133		*	3133		
21	090	8		DCW	3141		THEMSELF	3141		
21	100	8		DCW	3149		SOMETIME	3149		
21	110	8		DCW	3157		RESEARCH	3157		
21	120	8		DCW	3165		PRODUCED	3165		
21	130	8		DCW	3173		POSSIBLE	3173		
21	140	8		DCW	3181		POSITIVE	3181		
21	150	8		DCW	3189		LIFETIME	3189		
21	160	8		DCW	3197		ALTHOUGH	3197		
21	170	8		DCW	3205		APPROACH	3205		
21	180	8		DCW	3213		COMPLETE	3213		
21	190	8		DCW	3221		EVIDENCE	3221		
21	200	8		DCW	3229		TOGETHER	3229		
22	010	8		DCW	3237		SOLUTION	3237		
22	020	8		DCW	3245		MOREOVER	3245		
22	030	8		DCW	3253		BEHAVIOR	3253		
22	040	8		DCW	3261		SECTIONS	3261		
22	050	8		DCW	3269		PROBLEMS	3269		
22	060	8		DCW	3277		APPARENT	3277		
22	070	8		DCW	3285		ELEMENTS	3285		
22	080	1		DCW	3293		*	3293		
22	090	9		DCW	3302		THEREFORE	3302		
22	100	9		DCW	3311		SOMETHING	3311		
22	110	9		DCW	3320		DEPENDING	3320		
22	120	9		DCW	3329		FOLLOWING	3329		
22	130	9		DCW	3338		INFLUENCE	3338		
22	140	9		DCW	3347		PRINCIPAL	3347		
22	150	9		DCW	3356		PRECISION	3356		
22	160	9		DCW	3365		POTENTIAL	3365		
22	170	9		DCW	3374		PROCESSES	3374		
22	180	9		DCW	3383		GENERALLY	3383		
22	190	1		DCW	3392		*	3392		
22	200	10		DCW	3402		ASSOCIATED	3402		
23	010	10		DCW	3412		PRODUCTION	3412		
23	020	10		DCW	3422		EVALUATION	3422		
23	030	10		DCW	3432		VARIATIONS	3432		
23	040	10		DCW	3442		POTENTIALS	3442		
23	050	10		DCW	3452		CONDITIONS	3452		
23	060	10		DCW	3462		ESPECIALLY	3462		

PG	LIN	CT	LABEL	CP	A OPERAND	B OPERAND	D	LOC	INSTRUCTION COMMENTS	KWIC2
23	070	10		DCN	3472				EVENTUALLY	3472
23	080	10		DCN	3482				EXPERIMENT	3482
23	090	1		DCN	3492				*	3492
23	100	11		DCN	3503				VARIATIONAL	3503
23	110	11		DCN	3514				DEVELOPMENT	3514
23	120	11		DCN	3525				DISCREPANCY	3525
23	130	1		DCN	3536				*	3536
23	140	12		DCN	3548				EXPERIMENTAL	3548
23	150	1		DCN	3560				*	3560
23	160	13		DCN	3573				REEXAMINATION	3573
23	170	13		DCN	3596				DEMONSTRATION	3596
23	180	13		DCN	3609				DETERMINATION	3609
23	190	13		DCN	3612				INVESTIGATION	3612
23	200	1		DCN	3625				*	3625
24	010	14		DCN	3639				CHARACTERISTIC	3639
24	020	14		DCN	3653				INTERPRETATION	3653
24	030	14		DCN	3667				CONFIGURATIONS	3667
24	040	1		DCN	3681				*	3681
24	050	15		DCN	3696				CHARACTERISTICS	3696
24	060	1		DCN	3711				*	3711
24	070	1		DCN	3712				A	3712
24	080	1		DCN	3713				I	3713
24	090	1		DCN	3714				*	3714
26	010	3		DCN	0902				G12	0902
26	020	3		DCN	0905				G14	0905
26	030	3		DCN	0908				Y04	0908
26	040	3		DCN	0911				Y50	0911
26	050	3		DCN	0914				Y53	0914
26	060	3		DCN	0917				Z73	0917
26	070	3		DCN	0920				Z77	0920
26	080	3		DCN	0923				K65	0923
26	090	3		DCN	0926				K70	0926
26	100	3		DCN	0929				N45	0929
26	110	3		DCN	0932				N51	0932
26	120	3		DCN	0935				Q39	0935
26	130	3		DCN	0938				Q46	0938
26	140	3		DCN	0941				A33	0941
26	150	3		DCN	0944				A41	0944
26	160	3		DCN	0947				B93	0947
26	170	3		DCN	0950				C02	0950
26	180	3		DCN	0953				C92	0953
26	190	3		DCN	0956				C02	0956
26	200	3		DCN	0959				C92	0959
27	010	3		DCN	0962				E03	0962
27	020	3		DCN	0965				E36	0965
27	030	3		DCN	0968				E48	0968
27	040	3		DCN	0971				E60	0971
27	050	3		DCN	0974				E73	0974
27	060	3		DCN	0977				F25	0977
27	070	3		DCN	0980				F39	0980
27	080	3		DCN	0983				F81	0983
27	090	3		DCN	0986				F96	0986
27	100	3		DCN	0989				G11	0989
27	110	3	TBL	DCN	0992				000	0992

PG	LIN	CT	LABEL	OP	A OPERAND	B OPERAND	D	LOC	INSTRUCTION COMMENTS	KNIC2
27	120	3	F15	DCW	0995			015 0995		
27	130	3	TADCR	DCW	0998			896 0998		
27	140	3	CONT140	DCW	0399			140 0399		
27	150	3	INCR	DCW	0393			000 0393		
27	160	3	CONST	DCW	0396			040 0396		
27	170	3	LOC	DCW	0390			000 0390		
30	010			END	START				/ *00 080	