PB80-225899

AN ANALYSIS OF THE JUSTICE RETRIEVAL AND INQUIRY SYSTEM (JURIS)

Coopers & Lybrand

U. S. Department of Justice
Washington, D. C.

November 1979

U.S. DEPARTMENT OF COMMERCE
National Technical Information Service
NTIS

NOVEMBER 13, 1979

AN ANALYSIS OF THE JUSTICE RETRIEVAL AND INQUIRY SYSTEM (JURIS)

FINAL REPORT

CONTRACT NO. JAOMF-79-C-0072

50272-101

REPORT DOCUMENTATION PAGE	1. REPORT NO.	2.	3. Recipient's Accession No. PB80-225899

4. Title and Subtitle

An Analysis of the Justice Retrieval and Inquiry System (JURIS)

5. Report Date 11/13/79 Date of Issue

6.

7. Author(s) Coopers & Lybrand

8. Performing Organization Rept. No. JAOMF-79-C-0072

9. Performing Organization Name and Address

U.S. Department of Justice
Justice Management Division
10th & Constitution Avenues, N.W.
Washington, D.C. 20530

10. Project/Task/Work Unit No.

11. Contract(C) or Grant(G) No.

(C) JAOMF-79-C-0072

(G)

12. Sponsoring Organization Name and Address

U.S. Department of Justice
Justice Management Division
10th & Constitution Avenues, N.W.
Washington, D.C. 20530

13. Type of Report & Period Covered

Final Report

14.

15. Supplementary Notes

This document supercedes previously issued report #PB 80-112295. The only difference between this document and the superceded PB 80-112295 is that this document includes five letters added by the Dept. of Justice at the end of the report.

16. Abstract (Limit: 200 words)

This document details the results of Coopers & Lybrand's analysis and comparison of the computer-assisted legal research (CALR) capabilities and costs of three systems: the Justice Retrieval and Inquiry System (JURIS), LEXIS, a service of Mead Data Central, Inc., and WESTLAW, offered by the West Publishing Company. The study, performed for the U.S. Department of Justice, Office of Management and Finance, had several basic objectives Thet were:

- To identify and evaluate the ability of various computer-assisted legal research systems to meet the legal research needs of current JURIS users, both within the Department of Justice and within other government entities.

- To develop an accurate statement of current, recurring operating costs and projected costs of JURIS.

- To develop cost projections for the other systems identified; and

- To identify the residual costs to DOJ should the CALR component of JURIS be provided externally; while other JURIS functions, such as private files, are continued in-house

17. Document Analysis a. Descriptors

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

18. Availability Statement	19. Security Class (This Report)	21. No. of Pages
Release unlimited	Unclassified	
	20. Security Class (This Page) Unclassified	22. Price

U.S. DEPARTMENT OF JUSTICE
JUSTICE MANAGEMENT DIVISION

AN ANALYSIS OF THE JUSTICE RETRIEVAL AND INQUIRY SYSTEM (JURIS)

EXECUTIVE SUMMARY

CONTRACT NO. JAOMF-79-C-0072

COOPERS & LYBRAND

EXECUTIVE SUMMARY

1. INTRODUCTION

This document details the results of Coopers & Lybrand's analysis and comparison of the computer-assisted legal research (CALR) capabilities and costs of three systems: the Justice Retrieval and Inquiry System (JURIS), LEXIS, a service of Mead Data Central, Inc., and WESTLAW, offered by West Publishing Company. The study, performed for the U.S. Department of Justice, Office of Management and Finance, had several basic objectives. They were:

- To identify and evaluate the ability of various computer assisted legal research systems to meet the legal research needs of current JURIS users, both within the Department of Justice and within other government entities,
- To develop an accurate statement of current, recurring operating costs and projected costs of JURIS,
- To develop cost projections for the other systems identified; and
- To identify the residual costs to DOJ should the CALR component of JURIS be provided externally; while other JURIS functions, such as private files, are continued in-house.

2. SUMMARY OF MAJOR FINDINGS

- From an operational standpoint (specifically, search and retrieval capability), both JURIS and LEXIS satisfy most of the users' current and projected CALR requirements. WESTLAW, as presently constituted, does not easily satisfy the requirements of current JURIS users because its search logic and commands are difficult to comprehend and retain, the keyboard arrangement and mode of operation is not as "user friendly" as the other systems, and its data base is not as complete as those of JURIS or LEXIS.
- LEXIS contains more data base files and has better overall library coverage in the areas of need most expressed by DOJ users.

- JURIS is a responsive system for searching, which contradicts a widely-held perception that it is slow to respond. In addition, JURIS appears to be the more desirable system because of its "set creation" approach to searching (a feature preferred by users) and the overall ease of preparation prior to use.

- We calculate the annual recurring operating costs to DOJ for JURIS automated legal research activity to be between $2.081 million and $2.157 million for FY1978. This amount is net of reimbursements from non-DOJ users and includes an estimated depreciation expense of approximately $109,000. Of this amount, between $1.928 million and $1.988 million relates to the DOJ usage of JURIS CALR.

- A comparison of the estimated costs of JURIS and LEXIS for the period FY1978 through FY1983 is shown in the following table:

Fiscal Year	Estimated LEXIS Cost	Estimated JURIS Cost	% of LEXIS Cost to JURIS Cost
Assuming initial subscription in FY1978			
1978	$1,090,700	$1,958,350	56%
1979	1,058,300	2,181,850	49%
Assuming initial subscription in FY1980			
1980	1,550,300	1,978,500	78%
1981	1,827,100	2,131,600	86%
1982	2,060,900	2,299,400	90%
1983	2,296,100	2,426,150	95%

- This comparison assumes that DOJ maintains special files on LEXIS for their use only. This comparison, however, does not reflect several important points:

  - The LEXIS cost does not include the cost of providing West headnotes. Contractual agreements between DOJ and West Publishing Company, and West copyright claims preclude making a reasonable cost estimate for providing West headnote material in LEXIS for the purposes of this projection. Based upon Mead's quoted special file cost rates, the cost for simply loading and storing West headnote material would be approximately $1.6 million over the projection period.

- Some of the JURIS CALR costs are fixed and would not be eliminated, in the short run, by switching to LEXIS. These fixed costs include: Systems Design and Development Staff (SDDS) and Justice Data Management Service (JDMS) indirect costs; JDMS usage costs, and possibly the SDDS personnel cost that is directly attributable to JURIS (depending upon management decisions concerning disposition of this cost). If LEXIS were to replace JURIS, the indirect costs now attributed to JURIS would be redistributed elsewhere and the personnel costs would be eliminated, reassigned or absorbed as indirect costs of other activities. DOJ believes that if JURIS were replaced, JDMS would have excess capacity and therefore the JDMS usage cost would have to be absorbed by other JDMS users as overhead. The fixed costs of JURIS total approximately $1 million per year (see Exhibit 2 page 5 of the Comparative Cost Analysis Report).

  The $1 million referred to above is included as part of the JURIS operating cost. As such, should DOJ elect to switch to LEXIS, the fixed cost of $1 million per year would continue to be incurred by DOJ in the short term.

- For FY1978 and FY1979, the costs are significantly different. In FY1978 and FY1979, the LEXIS cost is approximately half of the JURIS CALR cost. Two major factors cause this discontinuity between the earlier and the later period cost comparisons and the narrowing of the cost gap:

  - The added cost for maintaining special DOJ files on LEXIS during the period FY1980 through FY1983.

  - The use of less expensive equipment to support JURIS CALR beginning in FY1980.

- The impact of private files on the projected LEXIS cost is significant. Some of these costs could be avoided if the Department agreed to make the files available to all LEXIS subscribers.

- West Publishing Company declined to respond to our request for a price quotation. Hence, no costs for Westlaw were developed.

- We were unable to project the cost of LEXIS service to non-DOJ users of JURIS because of difficulties in readily obtaining data such as the number of existing terminals and hours of use. To obtain this information would have required a detailed survey of non-DOJ CALR use that was beyond the scope of our effort.

- Many of the data used in the projections are based upon assumptions that may or may not remain valid over the projection period. In addition, some of the JURIS cost data had to be estimated due to the unavailability of reliable records. All LEXIS costs are based upon an informal cost quotation, which according to Mead was based upon standard rates, that may vary significantly from a formal solicitation request. However, the cost projections, while they should not be considered as precise, are appropriate for this relative cost comparison.

3. POINTS FOR CONSIDERATION

In evaluating both systems DOJ must examine a number of questions. First DOJ must determine the importance of the materials currently in the JURIS data base that are not contained in LEXIS and, concurrently, assess which, if any files would be loaded onto LEXIS. Should the decision be made to place these files on LEXIS, the next question to answer is: Can all or part of this material be made available to other LEXIS subscribers or just to DOJ and its designees? This is important because MDC would assume all of the data conversion and storage costs if the material was made available to other LEXIS subscribers.

Another factor is the cost of adding specialized Tax, Securities, and Trade Regulation libraries to JURIS. Presently these materials are available only on LEXIS. For the material to be made available on JURIS, the DOJ would either incur conversion, loading, and storage expenses or would have to subscribe to LEXIS as an adjunct to JURIS. For purposes of this study, the special library cost has been excluded from both the LEXIS and JURIS projections.

A third data base-related issue concerns the provision of West Publishing Co. headnotes and digests to JURIS. Because of copyright problems, MDC may be precluded from providing these materials; however, user survey results indicate they are an often-used feature. Therefore, DOJ must also consider the importance of this feature and alternate methods (and their costs) of furnishing this feature to current users should LEXIS be selected for automated legal research.

There are several additional points that could not be quantified but that should be considered in assessing the relative cost-related merits of JURIS and LEXIS. They include:

- The effect of Executive Order No. 12146 (issued July 18, 1979) calling for DOJ in cooperation with other agencies, to provide for computer-assisted legal research throughout the Federal government. DOJ should examine the requirements of all users before estimating the total cost impact of either system.
- Possible use of a mass storage system for large JURIS data bases. This has been studied by the Department and can provide incrementally lower data storage costs with acceptable response time for low-use materials.
- The effects of the one-time conversion to LEXIS including the need for retraining DOJ and other government users. While LEXIS will provide training without charge, the Department needs to consider the labor costs involved in a large retraining effort.

4. REPORTS CONTENTS

In the performance of this engagement, four major reports were produced, each detailing a particular aspect of the study. The reports have been included herein to provide a comprehensive discussion of the study's scope, methodology, findings and conclusions. In addition to this Executive Summary (Section I), the four reports are:

Section II - JURIS Users' Requirements Analysis

Section III - Comparative Systems Analysis

Section IV - The Recurring Operating Costs of JURIS Automated Legal Research

Section V - Comparative Cost Analysis of JURIS and LEXIS

Each of these reports described, in detail, the methodology used in performing the associated tasks as well as findings and conclusions of the prject team on the particular matter. The reader is urged to read each report in its entirety in order to obtain a complete view of the project's outcome.

Department of Justice Addendum to the Coopers & Lybrand Final Report

An Analysis of the Justice Retrieval and Inquiry System (JURIS)

Contract No. JAOMF-79-C-0072

Copies of the following five letters appear starting at NTIS page number 347 of this document.

1. May 22, 1980 letter from Coopers & Lybrand to Kevin D. Rooney, Assistant Attorney General for Administration, United States Department of Justice

2. June 12, 1980 letter from Jerome S. Rubin, President, Mead Data Central to Kevin D. Rooney, Assistant Attorney General for Administration, United States Department of Justice

3. July 3, 1980 letter from Coopers & Lybrand to Kevin D. Rooney, Assistant Attorney General for Administration, United States Department of Justice

4. July 30, 1980 letter from Rhoda R. Mancher, Deputy Assistant Attorney General for Administration, Office of Litigation and Management Systems, Justice Management Division to Jerome S. Rubin, President, Mead Data Central

5. July 30, 1980 letter from Rhoda R. Mancher, Deputy Assistant Attorney General for Administration, Office of Litigation and Management Systems, Justice Management Division to Joseph G. Kehoe, Coopers & Lybrand

U.S. DEPARTMENT OF JUSTICE
JUSTICE MANAGEMENT DIVISION

JURIS USERS REQUIREMENT'S ANALYSIS

CONTRACT NO. JAOMF-79-C-0072

C&L

COOPERS & LYBRAND

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List of Exhibits and Appendices

I. INTRODUCTION

1.1 Purpose of the Report

This report examines a number of key points concerning the analysis of JURIS, LEXIS and WESTLAW. Much of the material will serve as the basis for the later comparative systems analysis and will provide guidance for judging the ability of each system (JURIS, WESTLAW and LEXIS) to satisfy the CALR needs of the current JURIS user community. Broadly stated, the purposes of this report are to:

- Define the current and future CALR needs of present JURIS users;
- Present the results of interviews with current JURIS users, which describe their attitudes toward, perception of, and desire to use CALR in general and JURIS in particular;
- Detail the methodology to be used in completing a comparative evaluation of the existing systems; and
- Discuss in detailed profiles the specific data requirements, system features, and system reliability needs of JURIS users, as defined by the interview results.

1.2 Methodology Used

Our approach included over 25 interviews with current JURIS users; a review of previous comparative and evaluative studies of CALR; a review of various documents that describe the operation, features and data base contents of each system; and a review of current literature on CALR. The steps of the process are explained in the paragraphs below.

1.2.1. Selection of Users to be Interviewed

Since one objective of the project is to define the current and future CALR needs of JURIS users, we chose the people to be interviewed based on their use of the system. Starting with statistical reports compiled by the Systems Design and Development Staff (SDDS), we first looked for organizational units which displayed high, medium and low usage of JURIS. This process involved examining three months' data (October and November 1978 and February 1979) and listing each organizational unit's total number of search sessions. Next, the raw data were broken down by groups of 25, e.g., 1-25 search sessions, 26-50 etc., to determine what the range of low, medium, and high usage might be. For example, in November, 1978, 81 groups had fewer than 25 search sessions, 33 recorded between 26 and 50 sessions; 11 between 51 and 75, etc. We then went back to the November 1978 and February 1979 JURIS usage reports and culled out those units which recorded between 1 and 7 search sessions, and 40 to 50 sessions per month to be used as sources for candidates in our interview groups.

Next, we determined individual user search frequency and then selected two or three names per unit as possible interview candidates. Each unit was checked to ensure adequate coverage of the major legal divisions within the department as well as non-DOJ users of JURIS. A total of 40 names of interview candidates were submitted to DOJ. Because of scheduling conflicts, over-representation of some divisions in the interview group, and normal staff turnover, some names were deleted and a total of 27 persons were interviewed.

The selection process was kept random to determine if para-legals may be over-represented in the JURIS user statistics. Actual results show that out of the twenty-seven interviews, only six were para-legals or law clerks.

1.2.2. Preparation of Interview Guidelines

Interview guidelines permitted interviewers to address prepared questions in any sequence, and interview subjects were encouraged to give discussive answers. The only rigid requirement in the interview process was that each subject responded to all of the questions in the interview guide. To ensure candor, all interviews were confidential and anonymous.

The seven areas covered by the interview guide were as follows:

- Types of legal problems researched.
- Types of information required for research.
- Types of legal problems best researched on a CALR system.
- Types of problems best researched manually.
- System usage patterns.
- System capabilities required.
- Level of satisfaction with current system.

Exhibit 1, pages 4-9 shows 21 of the 22 questions contained in the interview guide, grouped by each major topic area. Question number 1, which addresed the interviewee's prior usage of CALR, is not included in any of the specific topic areas.

Exhibit 1

Interview Questions Groups

Types of Legal Problems Researched

Question Number	Question
2.	In using JURIS or the other systems, what are the benefits to you as a legal researcher? What are the drawbacks?
5.	What types of problems do you feel are most effectively handled by a computer-assisted legal research system? What types are not?
15.	Can you describe the types of legal problems you generally research. Do you require case law statutes, regulations, executive orders? Other?
16.	Can you give us some detail on your usage patterns. For example: • At what time(s) of the day do you use JURIS? • During a search, do you form broad search queries, e.g., one term, and then narrow your search? Or vice versa? • Do you make use of the connectors? Which ones? Why? • How many search terms do you combine into a single query? • Do you supplement JURIS searches with manual legal research? Why?
18.	Are you generally pleased with the result of your research? Have you ever compared the results of a computer-assisted search with a manual search?

Types of Information Required For Research

Question Number	Question
2.	In using JURIS or the other systems, what are the benefits to you as a legal researcher? What are the drawbacks?
3.	What are the features you like most about CALR in general, and in particular for JURIS, LEXIS and WESTLAW?
4.	What are the features you dislike the most in JURIS, LEXIS and WESTLAW?
5.	What types of problems do you feel are most effectively handled by a computer-assisted legal research system? What types are not?
7.	Are there people you work with who do not use CALR or don't believe in it? What are their reasons?
14.	If JURIS was being re-designed or improved, what feature would you most like to see incorporated? For example: . More libraries . Other libraries . Easier searching procedures . More terminals
15.	Can you describe the types of legal problems you generally research. Do you require case law, statutes, regulations, executive orders? Others?

Types of Legal Problems Best Researched on CALR

Question Number	Question
5.	What types of problems do you feel are most effectively handled by a computer-assisted legal research system? What types are not?
15.	Can you describe the types of legal problems you generally research? Do you require case law, statutes, regulations, executive orders? Other?

Types of Problems Best Researched Manually

Question Number	Question
2.	In using JURIS or the other systems, what are the benefits to you as a legal researcher? What are the drawbacks?
5.	What types of problems do you feel are most effectively handled by a computer-assisted legal research system? What types are not?
7.	Are there people you work with who do not use CALR or don't believe in it? What are their reasons?
15.	Can you describe the types of legal problems you generally research. Do you require case law, statutes, regulations, executive orders? Other?

Usage Patterns

Question Number	Question
8.	Are you a regular user of JURIS? How often, within a given month, do you use JURIS? Is your time spent primarily on legal research? Litigation support? Other? How much time do you physically spend at the terminal during an average session?
9.	Over the past year has your use of JURIS increased or decreased? Why? How long have you been using JURIS? Has your time on the terminal increased or decreased?
10.	Do you have several research problems to solve when you log on to JURIS, or do you take each problem one at a time?
11.	What is the typical time interval between working sessions with JURIS? How much time do you have to spend refreshing your memory before you feel confident enough to use the system?
12.	Do you usually have to wait for an available terminal or are there available terminals close by? Are the terminals you use conveniently located? How many are at your disposal?

16. Can you give us some detail on your usage patterns? For example:

- At what time(s) of the day do you use JURIS?
- During a search, do you form broad search queries, e.g., one term, and then narrow your search? or vice versa?
- Do you make use of the connectors? Which ones? Why?
- How many search terms do you combine into a single query?
- Do you supplement JURIS searches with manual legal research? Why?

17. When retrieving information, which format do you more often use? KWIC, CITE, FULL? Do you make use of browsing keys?

21. Do you perform searches for anyone else in your office? Why don't they use JURIS? What instructions do they give you?

22. Were there any special features of JURIS you learned through application rather than the formal training?

Capabilities Required

Question Number	Question
3.	What are the features you like most about CALR in general, and in particular for JURIS, LEXIS, and WESTLAW?
4.	What are the features you dislike the most in JURIS, LEXIS and WESTLAW?
6.	Which of the following features would you find useful as part of searching on CALR systems?:

- Automatic plurals (e.g., lawyer also retrieves lawyers)

- Automatic synonyms (e.g., lawyer also retrieves attorney)
- Automatic verb forms (e.g., sue also retrieves suing)
- Other (specify)

14. If JURIS was being re-designed or improved, what feature would you most like to see incorporated? For example:

- More libraries
- Other libraries
- Easier searching procedures
- More terminals

15. Can you describe the types of legal problems you generally research. Do you require case law, statutes, regulations, executive orders? Other?

Level of Satisfaction

Question Number	Question
3.	What are the features you like most about CALR in general, and in particular about JURIS, LEXIS, and WESTLAW?
4.	What are the features you dislike the most in JURIS, LEXIS, and WESTLAW?
13.	How would you rate JURIS in terms of system availability? Should it be available earlier/later? Response time? Could it be faster? Reliability? Is it "down" for short periods of time? Considerable periods of time?
18.	Are you generally pleased with the result of your search? Have you ever compared the results of a computer-assisted search with a manual search?
19.	When were you trained on JURIS (or any other systems)? How useful did you find the training? What specifically did you like/dislike, e.g., how to use the machine, search logic, etc. Did you find the printed/audio materials helpful?

20. Should periodic refresher courses in searching procedures, terminal operation, etc., be given? Would you find it helpful? Are you informed of changes made to JURIS? How? Memos, announcements etc.?

22. Were there any special features of JURIS you learned through application rather than the formal training?

1.2.3. Conduct of the Interviews

We had two interview teams, each composed of one attorney and one system analyst. Most interviews took one to one and one-half hours to complete and were conducted informally. Three interview times, 10:30 a.m., 1:30 p.m., and 3:00 p.m. were scheduled and, with one exception, three or four interviews were conducted in a day. Interviewers were randomly assigned to ensure that no one or two personalities would dominate and possibly bias the interview reporting process.

Subjects were first given a brief description of the project's scope and objectives and background on Coopers & Lybrand and the interview team. They were then asked to describe their educational background, work history within and outside of DOJ, and their title and organization unit. Next, the interview team asked them to describe briefly what types of cases, legal problems, and research their position required. Then on to the seven principal areas of inquiry. Each team member reported independently, thus enabling us to view the responses from the perspective of an attorney and a systems analyst.

1.2.4. Analysis of Results

We listed the responses to each question and grouped them according the topic areas discussed in 1.2.2 above. We have not censored the user comments detailed in Section 3, below; however, for purposes of summarizing, the responses to each question were qualitatively compiled for the purpose of comparison against the other data, specifically documentation from other sources.

1.2.5. Literature Review Methodology

In addition to the interviews, we also reviewed literature on CALR in general and on JURIS, LEXIS or WESTLAW in particular. We gave special attention to two comparative studies of LEXIS and WESTLAW performed by Project SEARCH and the Federal

Judicial Center, as well as the JURIS Task Force Report and subsequent rebuttal. We reviewed all available documentation for JURIS, LEXIS and WESTLAW, noting the features, mode of operation, and data base contents of each.

We secured copies of the following public documents for reference. This list includes two books:

- Bing, Jon, and Harvold, Trygve, Legal Decisions and Information Systems, Norwegian University Press, Oslo, Norway (1977).
- Sprowl, James A., A Manual for Computer-Assisted Legal Research, published by the American Bar Foundation, Chicago, Illinois (1976).

two government-financed studies:

- "Automated Legal Research: A Study for Criminal Justice Agencies", technical report no. 19, Search Group, Inc., 1620 35th Avenue, Sacramento, California (February 1978).
- "An Evaluation of Computer-Assisted Legal Research Systems for Federal Court Applications", FJC-R-77-2, Federal Judicial Center, Dolley Madison House, 1520 H Street, NW, Washington, DC (September 1977).

and nine articles published in legal journals:

- McGonigal, Richard M., "Implementation and Cost Effectiveness of Computerized Legal Research--LEXIS and WESTLAW Compared", Computer/Law Journal, vol. 1, no. 2, pg. 359 (Fall 1978).
- McGonigal, Richard M., "Computerized Legal Research: One Firm's Experience", Law Office Economics and Management, vol. 15, pg. 213 (1974).
- Sprowl, James A., "Computer-Assisted Legal Research--An Analysis of Full Text Document Retrieval Systems, Particularly the LEXIS System", American Bar Foundation Research Journal, 1976, pg. 175.

- Sprowl, James A., "The WESTLAW System--A Different Approach to Computer-Assisted Legal Research", Jurimetrics Journal, vol. 16, no. 3, pg. 142 (1976).

- Bing, Jon, "Legal Information Retrieval Systems: The Need for and the Design of Extremely Simple Retrieval Strategies", Computer/Law Journal, vol. 1, no. 2, pg. 379 (Fall 1978).

- Slayton, Phillip, "Electronic Legal Retrieval--The Impact of computers on a Profession", Jurimetrics Journal, vol. 14, no. 1, pg. 29 (Fall 1973).

- Mackaay, Ejan, Book review of Electronic Legal Retrieval, by Philip Slayton, in Jurimetrics Journal, vol, 15, no. 2, pg. 108 (Winter 1975).

- Rubin, Jerome, "Fear and Trembling in the Groves of Academe', Jurimetrics Journal, vol 15, no. 2, pg. 112 (Winter 1975).

- Slayton, Philip, "A Short Reply to Mackaay and Rubin", Jurimetrics Journal, vol. 15, no. 2, pg. 115 (Winter 1975).

Additionally, we obtained a draft of "Computer-Assisted Legal Research: Present Status and Future", to be presented at the 1979 National Computer Conference by Mr. Fred M. Greguras, an associate of Kutak, Rock and Huie, Omaha, Nebraska.

These references can be divided into two groups - comparisons between specific systems (usually LEXIS versus WESTLAW), and commentaries on the role of CALR systems in the legal research process.

II. RESULTS OF INTERVIEWS

This section of the report discusses the information collected from various JURIS users in interviews conducted during the weeks of April 2nd and 9th. The overall impressions of JURIS users are first summarized, while the detailed responses to specific categories of questions conclude this section.

We interviewed 27 JURIS users to determine their attitudes toward CALR; their perception of the need for and future of CALR; their attitudes toward JURIS and similar systems, details on how they used JURIS, their satisfaction/dissatisfaction with it, and, most importantly, their preferences for system capabilities. Our findings are presented in narrative instead of tabular format. All of the observations come from persons interviewed and represent their responses to questions as well as unsolicited comments.

2.1. Overall Impressions

Almost uniformly, the respondents saw CALR as one of many tools to use in conducting legal research. Only two of the subjects indicated they perform the bulk of their legal research on JURIS. CALR was viewed as an excellent supplement to manual research, and there was an even split between people who use CALR before using printed materials and those who use it after starting their research with printed materials.

The biggest benefit mentioned is the speed with which cases or terms can be extracted from the system, even if the researcher only knows half of the case name or only one or two key words such as "exigent circumstances".

Another benefit mentioned by several users is that CALR is current and complete on recent cases. Many users felt the search logic frees them from reliance on headnote writers and indexers

who may not view a problem from the same perspective. In effect, they preferred to outguess the system rather than the indexers because they were free to look for concepts first and then match cases to those concepts. Several felt that CALR is superior to manual research in allowing the attorney to use both words and concepts in developing several alternative strategies or lines of investigation. This is particularly useful in the formative stages of an investigation.

A number of drawbacks to CALR were cited during the interviews. Many respondents indicated they are wary of "the computer" because the same search logic that gives them greater flexibility, also increases the possibility of some important case or document being overlooked. Because each system retrieves documents that contain only the exact words in the search expression, there exists the real possibility that the user will not employ every relevant word in the search and therefore will not retrieve all relevant cases. For example, in a case involving the search of an automobile, all possible plural variants and synonyms (motor vehicles, vans, trucks, Pintos, etc) would have to be used to be sure of locating all of the relevant cases. Several users were worried that a term might be misspelled in the CALR data base, unless they use the same misspelling, any documents containing that word would be overlooked in a search.

Many doubted that CALR is a time saver for broad concepts. Often the example of "search and seizure" was used to illustrate this point. Using "search" to retrieve a CALR system's case law files would produce a large number of documents which contain that term. Using printed materials, the researcher could use a legal encyclopedia or a digest to narrow the possibilities. Other drawbacks cited were specific complaints about existing systems' features such as data base contents, response time and search logic. These will be detailed in subsection 2.3. below.

Since each person interviewed was identified as a user of CALR, it was not surprising that each expressed a need for CALR and a desire to have it improved and expanded. Several persons, still unsure of CALR, said they use it because it is "the coming thing" or it is inevitable that more computerized research will be performed; so they want to keep pace with the technology. One DOJ attorney did raise a caution for the government: increased use of CALR by courts and defense attorneys will require DOJ to maintain CALR capability.

2.2. Attitudes Toward JURIS

The project team attempted to make the interviewee selection process as random as possible (with the only constant being that each interviewee had used JURIS to varying degrees) and encountered some interviewees who had used systems other than JURIS. This provided us with a unique opportunity to determine user attitudes towards the JURIS system.

User satisfaction with JURIS is mixed. We talked with several attorneys, paralegals and law clerks who thought very highly of the system and used it regularly, found few problems with it and wished to see it expanded. Some interviewees felt the system suffered from incomplete caselaw files, poor response time, inadequate training and indifferent management. A third group was critical of some JURIS features such as search response time, yet expressed a desire to see JURIS improved rather than replaced. Specific benefits and drawbacks of JURIS will be discussed in more detail below; however, it is appropriate to note that most users rate JURIS very positively on its search logic (specifically the ability to create sets); the current status of the caselaw file; hours of availability and system reliability (low down-time); and its keyword in context (KWIC) features.

The primary point of dissatisfaction was the slow search response time of the system, which, according to a significant number of interviewees, often took several minutes. Only a relative handful of interviewees had used LEXIS and only one had any experience with WESTLAW. Generally, those who had compared both JURIS and LEXIS found them to be compatible, although they preferred LEXIS' search response speed and state caselaw data base. One specific criticism of LEXIS was its search logic, which, according to three respondents, forced them into a certain search strategy and was not as flexible as JURIS. The one interviewee familiar with WESTLAW compared its search logic, reliability and response time as favorable to LEXIS, but felt its data base content to be too incomplete at this point to be of use to DOJ.

Basically, the users felt CALR to be an effective legal research tool when used to supplement manual research. The users with experience on other systems attributed some specific benefits and drawbacks to each of the major CALR systems, finding no major differences that would lead them to prefer one system over another.

2.3. Responses to Major Categories of Questions

In developing the informal interview guidelines, we formulated questions designed to elicit responses in several major categories:

- Types of legal problems researched.
- Types of information required for research.
- Types of legal problems best researched on CALR.
- Usage patterns, e.g., time, query structure, features used.
- Capabilities required by an effective CALR system.
- Level of satisfaction with CALR in general, and JURIS in particular.

The discussion that follows addresses each of these major categories in the order presented above.

2.3.1. Types of Problems Researched on CALR

The responses to our questions on the types of problems researched on CALR clearly indicate that the problems most suitable for CALR are those that lend themselves to quick retrieval. One example of this is to search for cases based on unique terms such as "exigent circumstances" and "flashlight search", "expungement of arrest records", a case name, parts of the case name, or case citation, or statute name or citation. Another example of the types of research that require quick retrieval are verifying cases or keywords obtained during manual research; or searching for cases from a particular circuit or judge.

When asked what problems are best handled by CALR, the comments included:

> "Problems which are well-defined or contain reference points or obvious points of law."
>
> "When a unique keyword or words or a narrow legal concept is present."
>
> "Complex issues not adequately covered in the indexes or digests, concepts which can be taken apart and rearranged depending on the line of cases you retrieve."
>
> "Problems which involve traditionally poorly-indexed materials such as state statutes or federal regulations."

Many respondents indicated they will use JURIS to find a case quickly, to respond to a request from a judge during a proceeding or for a colleague who may call in with a quick-response problem. Also, CALR is seen as a useful way of researching problems not encountered in the traditional, printed material.

2.3.2. Types of Information Required for Research

For purposes of this study, DOJ can be viewed as several specialty law firms operating under on umbrella organization, each with unique legal research needs. This is reflected in the responses to those questions dealing with the sources of information used for legal research. By sources we mean case law (federal and state); administrative decisions, federal statutes, regulations, executive orders, state statutes, indexes, digests, periodicals and other legal research material.

The majority of the interviewees indicated need for federal case law including Supreme Court and Court of Appeals (circuit court) opinions, U.S. District Court opinions (to a lesser degree); and some state case law (primarily, by those in the torts and land and natural resources areas plus the other federal users.) Next, users require federal statutes (U.S. Code) and legislative history, federal regulations (Code of Federal Regulations) and state statutory information with almost as much frequency as case law materials. Finally, there is a third tier of materials such as Index to Legal Periodicals and law review articles; specialized reporting services for civil rights, tax, environment, etc.; law digests and encyclopedias, rules of procedure; and some nonlegal information. The only source of information cited by every DOJ respondent as a necessary part of their legal research was the Shepard's Citations.

The problems for which legal research is performed include criminal and civil litigation, appellate brief writing, motion writing and review, policy formulation and response. Substantive areas of the law include torts, contracts, creditors' rights, criminal law, civil rights, land rights, mineral rights, taxation, copyright protection, patents, etc. Many of these areas require manual research because broad concepts are involved; or because the data base coverage does not include enough historical material; or because the necessary materials are not available through a CALR system.

2.3.3. JURIS Usage Patterns

To aid the project team in its compilations of CALR user requirements, we collected considerable information on how JURIS is currently being utilized. We looked at such items as:

- Degree of use -- is it regular, periodic, not at all? Is use daily, weekly, monthly? How much time was spent at the terminal? Why? Has usage shown an increase or decrease and why?
- How do you use JURIS? Take it one problem at a time or batch problems? What features are useful? Why? What formats do you use after documents are retrieved? Why?
- System availability, reliability and response time, terminal location and availability. What time of day do you use JURIS?
- Search logic and procedures. Do you start out with a broad search and narrow down? To what degree do you plan a search before you use the system? How many search terms do you include in a single query? Why and what results?

In all, nine of the twenty-five questions concerned use patterns. Because we attempted to identify a cross-section of users, responses varied on the question of regular use. The extremes in responses ranged from two daily users to one person who used JURIS once in six months. Responses to the question about time at the terminal were somewhat spotty and no meaningful observations could be made except to say it appears to vary with the individual user and the problem being researched.

A majority of the users indicated their usage of JURIS has remained steady over the past six to twelve months and that most users quickly reached this level after an initial orientation period with the system. Almost all of the interviewees indicated that they research only one problem at a time, usually in the course of their research process.

2.3.4. JURIS Reliability

Three specific items drawing special attention were: the user's perception of JURIS' reliability, system availability (hours of operation) and search response time. These factors were criticized in previous studies. The majority of users found terminals conveniently located, generally on the same floor or nearby. Some interviewees said they would often use the JURIS training facility since they were aware that terminals were available there. Several complaints were voiced about some terminals lacking printers thereby causing the user either to find one with a printer or to copy citations and look up the case or statute manually. No one indicated they had to wait long to use a terminal; however, users in outlying buildings were disinclined to walk to the main building to use JURIS.

JURIS hours of operation (system availability) were considered more than adequate. Several people, unaware that JURIS was available until 11:00 p.m. on week nights, said that even 9:00 p.m. was adequate. No need for Sunday availability was expressed.

The area where the most negative comments were made was search response time. Without exception, every user said the response time was very slow, especially during the mid-day hours of 10:00 a.m. to 2:00 p.m. Many of the more experienced users would choose late afternoon or early morning to use JURIS. Several users told of waiting as much as fifteen minutes to get the results of a search which retrieved small numbers of documents. Those users who are familiar with LEXIS or other non-legal document retrieval systems were especially critical of JURIS response time.

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*Since the conclusion of the survey, JURIS has been modified to improve overall response time. This will be measured in the comparative systems analysis and the results contained in the report on the analysis.

Some of the infrequent users cited the slow response time as a major reason they do not use JURIS more often. Two frequent users indicated they felt that poor response time was indicative of poorly-formulated search queries. Overall, system response time was rated as poor.

The reliability of JURIS has improved over the past nine months or so according to most users. There have been very few problems with the system being unavailable or "crashing" during a search. Some concern was voiced, by three or four of the more sophisticated users, about not being able to save their searches overnight and over weekends.**

2.3.5. Searching Capabilities

To determine how users performed searches, they were asked to describe a recent completed search in terms of how they framed their search expression, use of search features such as sets and connectors, formats in which retrieved documents are reviewed, and the degree to which their searches are supplemented by manual research. The basic pattern for searching is somewhat affected by the slow response time. Most users will limit the number of terms per query, preferring to start with one or two broad terms and then utilize sets and connectors to narrow their focus.

**It should be noted that a JURIS feature enables the user to save searches overnight. Hardware or software failure can negate this feature however. JURIS does not save searches over a week-end because documents which are retrieved from a "hot" (current) file one week may be moved to another file following weekly file maintenance.

By selecting fewer terms per search, and generally avoiding features such as the root expanders (*, !), most users achieve faster response time. One very experienced user did, however, favor long, complex queries often combining as many as 17 terms in one search, then narrowing down the retrieved documents to about 100. When formulating queries, most users attempted to ascertain likely plurals and synonyms for their search terms but several indicated they were often uncertain that all possibilities had been correctly anticipated.

Every interviewee supplemented his or her automated search with a manual search. Some preferred to use JURIS to identify a few relevant cases or statutes and complete their research using printed materials, while others reversed the procedure, going to the books for keywords or phrases and then using JURIS to complete their research.

Once documents were retrieved, the KWIC (keyword in context) format was perferred for browsing through the cases or statutes to determine their relevance. Should the documents be relevant, the person will use the CITE format to print out the citation list, and go to the library to review manually the text of the cases. Very few users sit at the terminal and read the full text of the document from the screen because they consider it too slow and there is no scrolling or speed reading feature. One major criticism of the KWIC format was its failure to display the original reporter page or full citation information, i.e., circuit number and date are missing. Also, some users noted that the CITE feature appears arbitrarily to reduce the number of retrieved documents to a maximum of 200 and lists them in random order. For example, law clerks in the U.S. Attorney's Office for the District of Columbia performed a search that netted 600 documents, yet when they went to the CITE format, only 200 cases were ultimately listed.

2.3.6. Desired CALR Capabilities

This category of questions elicited responses that were useful in developing the Statement of User Requirements contained in Section 3. There was some intentional overlap with the other categories which served to reinforce a number of observations made by the users. We asked the interviewees to distinguish between the data base requirements needed to perform their work on JURIS and what material would be desirable in a data base. Within this area the project team was sensitive to the needs of various DOJ user groups like the Tax and Anti-Trust Divisions, whose CALR requirements are not currently being met by JURIS.

Overall, most users indicated JURIS supplied them with the minimum information they "needed" to perform CALR. However, this result must be viewed in light of the way in which CALR is used by DOJ personnel, e.g., as a supplement to manual research. The materials that users would like to have on a data base included the following (these are listed in approximate order of importance based upon user responses):

- Shepards Citation's as an automated feature was the most requested addition. Most users do not utilize the citation feature of JURIS because it does not give them as complete a history of the cited case as the Shepard's.
- Up-to-date U.S. Code and Code of Federal Regulations that reflect the most current (within one or two months) statutes and federal regulations as well as the U.S. Code Annotated and legislative history.
- More historical coverage for all Federal cases; e.g., Supreme Court back to 1 U.S.; Federal Reporter, 2nd Series to at least 1937, and Federal Supplement to at least 1932, plus the full text of all opinions in the Federal Reporters, including concurrences and dissents.

- Automated Index to Legal Periodicals, plus special libraries for environmental law (Environmental Law Reporter, Environmental Reporter), tax law (CCH and Prentice-Hall materials); civil rights, anti-trust, etc.

- State statutes and selected state's case law were requested by a small number of users.

- Files of all DOJ appellate briefs, jury instructions, voire dire questions and other work product to avoid "reinventing the wheel."

- Other miscellaneous materials such as all Comptroller-General opinions, published and unpublished; all Executive Orders for a ten-year period; Congressional Record; American Law Reports, Annotated; Corpus Juris Secundum; and Court of Claims Orders.

- Tax Division needs include: Treasury Regulations, Regulation Rulings, American Federal Tax Reporter, Tax Court Cases, Tax Court Memorandum Divisions, Privacy Act, Bankruptcy Act, U.S. Reports, and Committee Reports on Tax and Creditor legislation.

The interviewees mentioned a number of additional features or system improvements that would aid their research and increase their CALR usage. Among the improvements suggested were the addition of a judge segment to enable searching on a particular judge's name; a scrolling feature to enable users to "speed read" the displayed text; addition of the original reporter page numbers and footnotes to the opinion segment; addition of full citation information and original reporter page to the KWIC segment; and a "quick stop" on a search. Users also would like a "menu" of plurals and synonyms in the data base that would be displayed whereby they could enter only the necessary terms for searching; and the ability to "check in" on a search in progress to review what, if any, documents had been retrieved.

More flexibility in searching across files and file groups was another frequent request. For example, some users indicated that they had to re-enter the search terms every time

they changed a file group and that this was very inconvenient. Other improvements cited by one or more users included an ability to log on and immediately access a file,* thereby skipping the listings of file groups and specific files; and inclusion of search hints in the data base for on-line tutorial activity.

2.3.7. Level of User Satisfaction

The project team attempted to measure each user's satisfaction/dissatisfaction with CALR in general and JURIS in particular. We found that each interviewee was generally favorably disposed to CALR but not uniformly so disposed towards JURIS. The advantages and drawbacks of CALR were presented earlier in this section. Here we will detail the attitudes of users toward JURIS.

As for features such as search logic, ease of use, system sophistication, currentness of documents, terminal availability and system reliability, the majority of the users are happy with JURIS. Most feel confident with the results of their JURIS searches. Those users experienced with other CALR systems prefer the JURIS search logic's ability to create sets.

Most JURIS users were not satisfied with the poor search response time of the system and complained that it reduces the effectiveness of JURIS. In fact, it is one major reason why many DOJ attorneys and paralegals prefer manual research to CALR. Another area where user dissatisfaction was evident was the audio tape training course. Many felt it was excellent during the first half, and was hurried and confusing in part two, which explained how to perform searches. Some felt that training follow-up was not effective. It is important to note, however,

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*This feature is currently available but not included in the training program.

that those users who received individual instruction from the JURIS staff had much more positive reactions for the training and rated it very highly. A number of users said the simplicity of operating JURIS enabled them to "play" with the machine and discover some features or capabilities not covered in the training session or reference material. Several users indicated they read the JURIS reference manual and taught themselves how to use the system.

In summary, most of the users we interviewed saw many benefits in JURIS, benefits that make the system attractive despite the perceived problem of poor response time. However, it is this problem that keeps many potential users from taking advantage of JURIS.

III. STATEMENT OF USER REQUIREMENTS

In this section, we detail the requirements for CALR as defined by the current JURIS user community. The requirements are grouped under "necessary features" (the minimum needed to perform their legal research) and "desired features" (what users would like to have available). We conclude with a user profile that provides a range of requirements for:

- Data researched/research tools.
- Questions researched.
- Search frequency.
- Search approach.
- System access, reliability and response time.
- System friendliness.
- Training, documentation and user assistance.

We begin with a definition of computer-assisted legal research, as distilled from the literature.

3.1. Definition of CALR

Computer-assisted legal research (CALR) cannot really be defined without first describing the process of legal research itself. A lawyer who is preparing a legal matter must always answer two questions:

- What are the facts of the matter?
- What are the relevant authorities?

Generally, we think of this in terms of a trial lawyer preparing a case for ajudication, but in the context of the Department of Justice this process may also include replying to routine motions, drafting policy statements, appellate actions, and other

activities not directly related to litigation. However, one thing is constant - the issue of what are the relevant authorities.

To answer that question, a lawyer must have access to sources of legal information, including the statutes which apply to the matter at hand and the opinions in cases where similar legal matters were at issue. Legal research consists of locating and accessing these legal sources, selecting those sources which appear to be relevant, retrieving the selected sources, and interpreting them in light of the matter at hand and the known facts.

The operative word in "computer-assisted legal research" is "assisted". It is beyond the capacity of a computer to grasp legal concepts, to understand the material in its data base or to interpret that material in light of some collection of issues and/or facts. There must inevitably be a human being properly trained in the law as the guiding presence in legal research with or without CALR. Among the things a computer can do, and do well, is store large volumes of material, retrieve and display elements of the data base in fractions of a second, and compare two characters (letters, digits, punctuation marks, and blanks) for equality in even smaller fractions of a second. These are the attributes of a computer that CALR exploits.

Briefly, a CALR system acts like a legal library in that it stores a large number of legal sources - statutes, case law, etc. - in machine-readable form in its data base. However, a CALR system then goes beyond an ordinary library by maintaining extensive internal indices to let the user "come at" the material in a number of different ways. In JURIS, LEXIS, and WESTLAW, this index is a word concordance, and a user selects documents to be retrieved based on the occurrence or co-occurrence of specified words or phrases.

In summary, computer-assisted legal research meshes human and machine. A human being trained in the law provides knowledge, understanding, and creativity while the CALR system provides fingertip access to copious amounts of legal material without requiring the person to read every document or forcing the person to work through a pre-set index of uncertain relevance.

3.2. User Profile

This section presents a profile of the CALR requirements of current JURIS users. Because of the great number of special research needs enumerated by each major legal division, e.g., tax, antitrust, etc., a range of requirements is presented, and not a definitive statement with universal application. We have, where appropriate, distinguished between the needs of DOJ and non-DOJ users and present ranges of requirements for both groups.

The profile covers seven classes of needs: data sources and research tools; types of questions researched on CALR; frequency of CALR searches; search approach utilized; system access, reliability and response time; system friendliness; and user assistance. Each area is discussed below.

3.2.1. Data Sources and Research Tools

There are many sources in legal research and many research tools. The data sources include the following:

- Case Law
  - Federal

    Supreme Court
    Courts of Appeals, including the District of Columbia
    District Courts
    Courts of Claims
    Tax Court of the United States
    Regulatory Rulings (SEC, ICC etc)

- State

  Supreme Courts
  Courts of Appeal
  Some lower level courts

- Statutory

  - Federal

    Constitution
    Public Laws
    United States Code and U.S.C. Annotated
    Code of Federal Regulations
    Congressional Committee Reports and
    Legislative History
    Internal Revenue Code

  - State

    Constitutions
    Statutes

- Workproduct

  Briefs
  Memoranda
  Motions
  Forms

- Other

  Executive Orders
  Comptroller - General Opinions
  Perodicals and Law Review Articles
  Rules of Court Procedure

To access these many sources, both manual and automated research tools are available. These include: treatises, enyclopedias, restatements, law reviews, official case reports, "unofficial" reports, topical reporters, digests, annotated reports, case "citators", statutory compilations, indexes, and computer-assisted legal research systems which combine much of the materials previously described. A more detailed list of research tools with examples is contained in Exhibit 2, page 31.

Exhibit 2

List of Legal Research Tools*

A. Secondary Sources

1. Treatises - written by legal scholars and focusing on a particular area of the law, e.g., Prosser on Torts.

2. Encyclopedias - textual analysis of numerous legal topics with footnote citations to cases, e.g., Corpus Juris and Corpus Juris Secundum, American Jurispurdence and American Jurispurdence 2d.

3. Restatements - a series of books, in the form of a single rule for each question of law within a given area, e.g., Restatement of Contracts. A second series includes comments and citations to leading cases.

4. Law Reviews - collections of articles and notes which involve an intensive analysis of a particular legal problem or narrow area of the law.

5. Index to Legal Periodicals - an index to articles and notes contained in law reviews.

B. Reports of Cases

1. Official Reports - published by the highest courts for a state or for the Supreme Court.

2. Unofficial Reporters - published by private or non-official groups and include federal and state material. Includes topical reporters such as CCH Tax Cases, U.S. Law Week, etc.

3. American Digest System - contains short abstracts of all reported American Cases since 1658. Cases are organized under the "key number" topics as the unofficial West Reporters.

4. Annotated Reports - report only the most significant decisions of high state and federal courts, e.g., American Law Reports, Annotated (1st, 2nd & 3rd series).

5. Shepard's Citations - special publications indexing the subsequent history of all reported American cases, with a separate set of "citators" for each different and unofficial reporter series.

C. Statutes

1. Federal Materials - United States Revised Statutes of 1875, and United Statutes at Large, United States Code, Annotated, Code of Federal Regulations, United States Code Congressional and Administrative News.

2. State Materials - official and unofficial compilations of each state's laws.

*Part of the above material is adapted from Introduction to Advocacy, prepared by the Board of Student Advisors, Harvard Law School, Foundation Press, 1970.

The paragraphs above broadly describe the legal research sources and tools of JURIS users. Although not a complete description, it is, however, adequate for purposes of our discussion. Should all of these diverse items be part of a CALR system? To answer that question, we must keep in mind that CALR is only one of the many research aids, even though it is often the preferred research tool because of its speed, flexibility, completeness and currency of data.

Therefore, we can limit the list of data sources for a CALR system to several major categories without compromising legal research. Based upon our interviews and a limited analysis of individual search histories, it appears that the following data sources are most used:

- Federal Caselaw

  Supreme Court
  Courts of Appeals
  Districts Courts
  Court of Claims
  Tax Courts of the United States
  Regulatory Rulings

- Federal Statutory

  Public Laws
  U. S. Code
  Code of Federal Regulations
  Treasury Regulations
  Internal Revenue Regulations on C Rulings
  Committee Reports/Legislative History.

- Work Product

  Briefs
  Forms
  Memoranda

- Other

  Periodicals and articles

The most used and most important tools are: Index to Legal Periodicals; Shepard's Citations, and topical reporters. To satisfy the research needs of current users, a CALR system should provide, at a minimum, the data sources outlined above.

3.2.2. Types of Questions Researched

Users cited a number of different questions or problems they felt were best researched on a CALR system. We have grouped them into six broad categories:

1. Unique word(s) or phrase(s) appear in the problem.
2. Problem involves a broad area of the law and there is a need to review all the cases or authorities to formulate DOJ policy or review trends, etc.
3. Citation checking or verification is required for a specific case(s).
4. Quick response is required to a query.
5. The problem involves a new area of the law or an unfamiliar point of law.
6. The traditional sources of data available to answer the question are poorly indexed or the materials are not reliably indexed.

Despite overlaps among these categories, they present a reasonable picture of why users elect CALR. We found that these six categories apply to all three groups of users: Attorneys, Para-Legals/Law Clerks, and Researchers/Librarians.

In addressing these problems, the users would adopt one of three methods: use CALR first, and then go to manual research; start with manual research and then use CALR; or rely on CALR only. The table below shows how the three approaches were applied to the various categories of problems.

CALR to Manual	Manual to CALR	CALR Only
Categories 1,2,3,5, & 6	1, 2, 3	2, 4, 6

Notice that the second category of problem is represented in all three approaches and that the first approach is used to address almost every category of problem. This relationship further verifies user preference for CALR as a research aid as well as the attraction of manual research as a strong alternative to CALR.

3.2.3. Search Frequency

The degree to which CALR is used has strong bearing on the user profile. Frequency of use directly effects system capacity, reliability and availability. For example, if the system has a high number of users who search on a daily basis between the hours of 10:00 a.m. and 2:00 p.m., system designers must take this peak load into account to ensure the system's response time and availability will not be seriously degraded.

We asked the people interviewed to characterize their usage frequency within three categories: frequent, moderate, and infrequent. We found that, in general, the frequent users were appellate attorneys, para-legals and law clerks and some of the researchers and librarians. The infrequent users included all three major user groups who were either involved in handling routine matters, who worked in areas where legal research needs were infrequent, or who were not adequately served by the current JURIS data base, i.e., Tax Division, Antitrust Division. We next asked them to identify key factors affecting their frequency of use, to relate why each factor was important, and to characterize the factors as negative or positive influences. Six key factors were defined as influencing search frequency:

1. Workload.

2. User background and experience.

3. Availability of needed data within system.

4. Availability of system equipment (terminal, printer).

5. Problem to be researched and immediacy of solution.

6. Understanding of system operation and capabilities.

No single factor led to the decisions to use or not use CALR. For example, some users were, because of experience (factor 2) in law school or previous employment, predisposed towards it, used it when the problem at issue was amenable to CALR (factor 5) and there was a terminal available (factor 4). On the other hand, some of the infrequent users indicated that because the data they required were not in the data base (factor 3) and they really did not understand how the system worked (factor 6), they did not use CALR.

Factor 2 seemed to be common across the range of users. Anyone with a predisposition to automated data processing used the system and those who were not comfortable with computers were less eager to try CALR. However, an attempt to weigh or rank the factors in order of importance was considered too difficult since the impact of each factor was directly related to each individual's perception of CALR.

3.2.4 Search Approaches

Once users decide that a problem is suitable for CALR, they then must decide how to utilize the system to retrieve relevant information. These paragraphs discuss how users formulate search queries, what features they use in restricting or expanding their searches, and how they view the information retrieved.

We identified four basic approaches to search formulation:

1. Simple, one-word or single-phrase queries.
2. Complex, multi-word or multi-phrase searches.
3. Successive refinements of initial search query.
4. Use of single-word search sets and successive refinement of the sets.

The approaches generally did not correlate to user sophistication. It appeared that the approach was a function of preference. There seemed to be a decided number of users who favored the first approach, one that JURIS training encourages.

The features used most often in the search process include the proximity features "OR", "AND", "W/SEN", "W/", and "P/" ("BUT NOT" was hardly used); root expanders ("*", and to a lesser degree "!"), and the set/key to combine search sets into a new query. Most users indicated a preference for the set combination feature because it allowed them greater flexibility in searching verbs, synonyms and possessives. Some users have a problem because they are often unsure they have thought of all applicable terms. Therefore, they prefer to have a thesaurus or index as some sort of an aid.

Reference fields that correspond to the components of a reported case, e.g., citation, judge, date of decision, court, etc., were used heavily, and many respondents stated a desire to see a complete set of these reference fields (sometimes called segments) on a CALR system. All users desired the ability to move within file groups or libraries, and individual files within those groups or libraries, without the need to re-key their search terms.

3.2.5. System Access, Reliability and Response Time

This category covers such items as terminal locations, system availability in terms of down time and ease of logging on, and the response time for searching and information display. As we noted earlier, CALR is a supplement to manual research and is the preferred method only when it satisfies the requirements of speed, completeness or currency. For the system to be useful, it must be easy to use and not involve long periods of waiting.

According to our user profile, it is apparent that any CALR serving both DOJ and non-DOJ users, must:

- Have convenient terminal locations and each terminal must have a rapid local print capability.
- Be rapid in its search response and information displays, or the research advantage of CALR is lost.
- Be free of service interruptions (long periods of down time) or system unavailability due to overloaded capacity.
- Be available during normal working hours at a minimum and at least one hour before the work day starts and six hours after closing; also be available between 7:00 a.m and 6:00 p.m. on Saturdays.
- Use reliable equipment to avoid failure of keyboards, view screens and printers.

3.2.6. System Friendliness

The user interviews indicated that many existing as well as potential users will not (or do not) use CALR because they do not understand it or they feel it will not be easy to learn. To overcome this attitude, the system must be simple enough to permit easy use, yet sophisticated enough to be a useful research tool. Most literature and practitioners call this characteristic

"system friendliness." The need for system friendliness is crucial for the DOJ and non-DOJ users alike. Their requirements include: an easy sign-on procedure and an ability to by-pass system "tutorials" such as file group or library contents; special keyboard caps with English language commands (mnemonics) such as "AND", "OR", "BUT NOT", "CHANGE", etc. as part of a simple keyboard layout; a properly indexed, problem-oriented desk book or users manual and the ability to save search results for long periods, especially over weekends. The users also require a number of "help" prompts or use aids such as:

- Detailed explanations of error messages and how to correct errors.
- A "search-is-proceeding" flasher to let them know the system is still searching.
- A search progress update on how many documents have been retrieved to that point, thus permitting users to stop or proceed with search.
- An interrupt key to stop the search and facilitate machine loop recovery.
- On-line search hints.

3.2.7. System Training, Documentation and User Assistance

A system that is not fully understood by potential users will always be underutilized. Training and user assistance are the keystones to increased user satisfaction and reliance upon CALR. Current JURIS users expressed a number of suggestions in this area, some of which they felt new employees would benefit from, others of which they felt would be of value to themselves. The first requirement is that training should allow users to advance at their own pace and should adapt to their busy schedules, which often call for out-of-town travel or other conflicting time commitments. The training should also stress how CALR operates in such areas as searching procedures, etc. One-on-one training should be available for those who request it (and

many users indicated they would do so for both initial system orientation and refresher courses). Advanced searching techniques should be offered to the more experienced users, with examples of actual searches, and be generally more problem-solving-oriented as opposed to system-operation-oriented.

A user hot-line, staffed by experienced system personnel, should be available during hours of operation to assist users. All system enhancements should be announced on-line as well as through full distribution of hard copy announcements to keep users current. Finally, a strong outreach program designed to make new employees aware of CALR should be in place.

3.2.8. Conclusion

We have discussed the minimum requirements that a CALR system should satisfy if it is to benefit the current JURIS user community. As we stated in the beginning of this section, these requirements define a range of needs and do not constitute a definitive statement for all users in all situations. In the following exhibit we have distilled the major points into a simple chart. WE CAUTION THE READER THAT THE CHART, STANDING ALONE, DOES NOT PRESENT A SUFFICIENT PICTURE OF USER NEED. IT SHOULD BE CONSIDERED ONLY IN CONJUNCTION WITH THE NARRATIVE PRECEDING IT.

Exhibit 3

Summary of User Profile

A. Data Sources and Research Tools

1. Most Federal Caselaw, including administrative decisions.
2. Most Federal Statutory Material, including committee reports and legislative history.
3. Work product, including briefs, motions, memoranda, instructions, forms, etc.
4. Research Aids including, Shepard's Citations, Index to Legal Periodicals, topical reporters such as Commerce Clearing House, Prentice-Hall, Bureau of Natural Affairs, and Pike and Fischer, and digests.

B. Types of Questions Researched

1. Unique word(s) or phrase(s).
2. Broad area of law and a need to review all cases or authorities on point.
3. Citation verification and "shepardizing".
4. Quick response queries.
5. New area of law or strange point of law.
6. Traditional sources available to answer questions are poorly indexed or editorially unreliable.

C. Search Frequency - No Conclusion

1. Dependent upon:
   - Workload
   - User background and experience
   - Availability of needed data within system
   - Availability of system equipment
   - Problem to be researched and immediacy of resolution
   - Understanding of system operation and capabilities

2. No one factor is predominant, generally the decision to use CALR or manual research involves two or more factors.

3. If one or more factors are given either a positive or negative weight, each additional factor in the decision-making process will amplify that characterization.

D. Search Approaches

1. Four basic approaches:

   - Simple, one-word or single-phrase expressions.
   - Complex, multi-word or phrase search (no iterations).
   - Successive refinement of initial search expression.
   - Use of single-word or phrase search expressions and successive refinement using set combination.

2. Approach is a function of user preference and may vary with problem being researched.

3. Boolean and proximity connectors are generally used, root expanders are used infrequently.

4. Users prefer "set" combination because of greater flexibility.

5. Reference fields that correspond to the major parts of a case or other documents were heavily researched.

6. Users wish to have the capability to move within file groups or libraries, and within individual files without re-keying search terms.

E. System Access, Reliability and Response Time

1. Users require terminal locations convenient to their work stations, and each terminal must have a local print capability.

2. System must be rapid in its search response and information displays.

3. System must not be susceptible to service interruptions or availability due to overloaded capacity.

4. System must be available during normal working hours and should be available one hour prior to and six hours after normal working hours. Saturday availability should run between 7:00 am and 6:00 pm.

5. System equipment should be reliable.

F. System Friendliness

1. The system must be easy to learn and understand, yet sophisticated enough to ensure adequate research results.

2. Sign-on procedures should be simple, and users should be able to access a desired file immediately.

3. Keyboard layout should be simple, and contain keyboard caps with simple English language commands.

4. A properly-indexed, problem-oriented reference book should be at each terminal.

5. The system should flash a "search proceeding" message every ten seconds to let user know machine is operational.

6. Users should be able to get a search progress report on how may documents have been retrieved so they can decide whether to continue or terminate search.

7. The system should have easily understood error messages and connection procedures, as well as a panic button to stop a search.

G. System Training and Documentation

1. Training should proceed at user's pace and be adaptable to the user's schedule.

2. Training should cover the operation of the computer, e.g., how it searches, how the data is utilized, etc.

3. One-on-one training should be an available option.

4. Advanced search technique training should be available.

5. A "hot-line" staffed by experienced system personnel should be available during hours of operation.

6. Current awareness material should be put on-line as well as distributed in hard copy.

Exhibit 4

Summary of Necessary and Desired User Requirements

Areas of Needs	Necessary or Desirable
A. Data Sources and Research Tools	
• Federal Caselaw	
- Supreme Court	Necessary
- Courts of Appeal	Necessary
- District Courts	Necessary
- Court of Claims	Desirable
- Tax Courts	Necessary
- Administrative Decisions	Necessary
• Federal Statutory Material	
- Public Laws	Necessary
- U.S. Code	Necessary
- Code of Federal Regulations	Necessary
- Treasury Regulations, Internal Revenue Rulings	Necessary
- Committee Reports/Legislative Rulings	Desirable
• Work Product	
- Briefs	Necessary
- Motions	Necessary
- Memoranda	Desirable
- Forms	Desirable

• Research Tools	
- Index to Legal Periodicals	Desirable
- Topical Reporters	Desirable
- Shepard's Citations	Necessary
B. Search Features	
• Connectors; AND/OR/NOT	Necessary
• Proximity connectors	Necessary
• Thesaurus or index of plurals, synonyms	Desirable
• Reference fields for judge, citation, date court, dissent or concurrence	Necessary
• Ability to move between major file groups and between files without re-keying search	Necessary
• Ability to merge search expressions	Necessary
C. System Access, Reliability and Response Time	
• Adequate numbers of terminals	Necessary
• Conveniently located terminals	Necessary
• Local printers with each terminals	Necessary
• Rapid display of retrieved documents	Necessary
• High reliability (95%-99%)	Necessary
• Hours of availability 7:00 am to 11:00 pm weekdays, 7:00 am to 6:00 pm Saturdays	Necessary
D. System Friendliness	
• Easy sign-on and identification protocol	Necessary
• Ability to access desired file immediately after sign-on	Necessary
• Mnemonic keyboard characters	Desirable
• Problem-oriented reference manual at terminal	Desirable

• "Search is proceeding" flasher	Necessary
• Search progress update	Desirable
• "Panic button" to stop search	Desirable
• On-line search hints	Desirable
• Detailed explanation of error messages and steps to correct errors	Necessary

E. System Training Documentation and User Assistance

• Training course designed to allow user to train at own pace and within their schedules	Necessary
• Follow-up one-on-one training	Necessary
• Hot-line to system experts to assist in searching	Necessary
• On-line and hard copy awareness material	Desirable

IV. METODOLOGY FOR PERFORMING COMPARATIVE SYSTEMS ANALYSIS

One of the major results of the user interviews was to define areas of user need which will be examined in the comparative systems analysis. Each of the three systems, JURIS, LEXIS and WESTLAW will be analyzed to see how well they match user requirements. This will provide a clearer picture of each system, measured in the context of preferred features, data base contents and ease of operation.

The approach will not be as quantitatively oriented as the previous comparisons made by the Federal Judicial Center or Project SEARCH because of time limitations and the project's scope. However, this will be the first comparison of each system since JURIS became fully operational and WESTLAW instituted full text retrieval; therefore, we will attempt to compare the data base contents in terms of their coverage and utility to the user community. Other elements we compare, such as response time, system reliability and availability, search process, system friendliness, training and user assistance will be analyzed in terms of their ability to reasonably satisfy current user requirements.

In the remainder of this section, we present the basic questions or issues to be examined during the comparative systems analysis. The questions will serve to introduce our proposed methodology, which is described in section 4.2.

4.1. Basic Questions to be Examined

Before beginning the methodology design, we formulated a series of questions which the methodology should examine. We declined to use the term "hypothesis" because our examination will not be as statistically rigorous as previous tests. Also, our basic purposes are to validate the observations made of each system based on their documentation, and to establish whether

each system satisfies the user requirements as outlined in Section 3. To facilitate analysis and clarity of presentation, our basic questions were developed around the areas discussed in the profile (we have combined search frequency and search approach):

- Data sources and research tools.
- Questions researched on CALR.
- Search frequency and approach.
- System access reliability and response time.
- System friendliness.
- Training and documentation.

It is within this framework that we will conduct the comparative analysis and present our findings in the final report.

Below, we have grouped the basic questions to be asked for each area of user needs:

- Data Sources and Research Tools
  - What are the data base contents and structure of each system?
  - What are the constraints each data base's contents and structure place upon the user?
  - What are the consequences of this to the user?
  - What "tools" are available in each system, e.g., "citator" headnotes or digest material, non-legal indexes, etc.?
  - What is the "currency" of the data base, e.g., lag between issuance of opinion or statute and its entry into the data base?
- Questions Researched on CALR
  - How does each system handle simple legal problems, complex problems, broad legal concepts, unique terms, etc?
- Search Frequency and Approach
  - What impact do various search features have on formulation of search expressions?

- Connectors: "and", "or", "but not", "and not".
- Proximity operators: "w/seg", "w/n", "pre/n", "+s", "+p", "/s", "/p", "w/", "p/", "set/".
- Search logic: set creation, levels, etc.
- Segment searching.
- Phrase searching.
- Citation/statute searching.
- Dates.
- Root expanders, e.g., "*", "!".

- How do these features aid or complicate searching?

- Can the system offer automatic selection of plural variants, possessive case variants, verb form variants?

- Can the user modify previous search expressions? Edit misstated searches?

- Does the system have the ability to:

  - Retain research after changing files?
  - Retain research after changing groups/libraries?
  - Retain research after entering a new search expression?
  - Merge or intersect research?

- How are retrieved documents displayed?

  - KWIC
  - Citation Listings
  - Sorting
  - Ranking

- Is there off-line printing capability?

- Does the system feature scrolling or browsing features? What are the hours of operation?

- Does the system experience "downtime" during test periods?

- What is the average time to display retrieved documents?

- How are they displayed, e.g., full screen, line-by line?

- What is the average time to page within a document; change files or groups (libraries), change formats or print documents?
- When is the system difficult to access (log-on), if at all?
- Are the terminals multi-purpose?

• System Friendliness

- Are search histories retained? For how long?
- Are messages explained? In what detail?
- Does the system "communicate" with the user during a search?
  - "Search is proceeding" reminder
  - Search results progress report
- Does the keyboard feature mnemonics (English language command keys)? Is the keyboard layout simple and easy to use?
- Are there on-line tutorials for the new user?
- Is there an interrupt key to stop searches or facilitate machine loop recovery?
- Is there a "hot line" for assistance available during hours of system operation?
- What are the "help" commands generated by the system? Are they useful?
- What is the log-on and user identification protocol? Is it easy to follow?
- How does each system display numbers of documents retrieved and the word frequencies?
- How are Libraries/File Groups/Data Base content displayed? What is the process for their selection?

• Training and Documentation

- Are training materials clearly presented and understandable?
- How is training conducted?

- Are training courses clear, understandable and well-presented?
- Is follow-up training available? What topics are taught?
- Is there a reference/desk book available? Is it useful, understandable?

4.2. Methodology

For the majority of the issues to be examined, the approach will be to simply use each system as recommended in the training sessions and materials. A large number of questions lend themselves to yes/no answers and we will note these answers on a standard worksheet, which is contained as Appendix B.

However, the questions dealing with issues such as data base constraints, search logic approaches and features, response time, hours of availability/downtime, and assessment of system friendliness and training require a more structured approach.

The most difficult part of the analysis is the key element to be assessed: namely, the formulation of a search expression. It will be a major determinant in each system's response time, which is dependent upon the data base searched, the number and type of search terms, features utilized, etc. To avoid any undue bias, we have decided to use a uniform set of problems that cover several types of typical legal questions researched by current users. The problems will be taken from two sources: The Federal Judicial Center's evaluation of CALR, which utilized a total of 46 problems; and problems suggested by various users.

Since it is not our intention to assess the quality of research of each system (assuming that they are roughly the same and recognizing that quality was not a large issue to the users), we are less concerned that we develop a set of problems that will retrieve one or two cases. By rerunning the Judicial Center's

problems, we will be able to use their findings as a base and be able to re-evaluate both WESTLAW (now with limited full-text) and JURIS (which was not included in the test) and update the Center's findings. Also, by using problems suggested by various users, we can understand how each system responds to "live" problems.

This large number is necessary because we propose to measure system response time by type of search expression, time of day, and day of the week. The two research attorneys on the project staff, working with the systems personnel, will formulate search expressions for each problem to be run. At a minimum, we will create several types of expressions, including:

- Simple, one- or two-word expressions of broad application, e.g., search and seizure.
- More focused one- or two-word expressions, e.g., expungement and criminal records.
- Complex, multi-word expressions.
- Expressions using a variety of proximity operators and connector combinations.
- Expressions searching for citations (both case law and statutes), dates, judges etc.
- Expressions that use root expanders.

Each group of expressions will be run during weekdays, which will be divided into six segments: 8:00 a.m. - 10:00 a.m., 10:00 a.m. - 12:00 noon, 12:00 noon - 2:00 p.m., 2:00 p.m. - 4:00 p.m., 4:00 p.m. - 6:00 p.m., and 6:00 p.m. - signoff. As each search expression is run, the response time will be recorded on a matrix, a copy of which is contained as Appendix C. A separate matrix for each system will be prepared first, followed by a combined chart displaying the response times for all three systems. By running various problems during randomly assigned time periods, we will also be able to note each system's general availability.

To assess system friendliness, training, and documentation, we have had various members of our staff trained in the operation of each system. The staff mix includes two administrative-level staff with experience in operating computer terminals but not document retrieval systems, two members of C&L's tax staff who have had experience with CALR; C&L's librarian who has also had experience with CALR; two A.D.P. systems analysts/designers, and two attorney/consultants. They will note their attitudes towards each system's features and ease of operation, as well as the training they have received. All of the searches to be performed will be done by this group. The systems evaluation will run for 20 calendar days, commencing May 7, 1979. Upon completion, the results will be reported and submitted to the COTR for his review.

APPENDICES

- Appendix A - Interview Guide
- Appendix B - CALR System Features Analysis Worksheet
- Appendix C - Search Response Time Test Matrix
- Appendix D - Glossary of Terms and Phrases

JURIS ANALYSIS USER INTERVIEW GUIDELINES

Person Interviewed: _____

Title: _____

Organizational Unit: _____

_____

Phone: _____

Room No. and Bldg. _____

Interview Team: _____

Date: _____

Summary (to be completed after interview):

JURIS STUDY OBJECTIVES

Coopers & Lybrand is under contract with the Office of Management & Finance to perform an objective, independent analysis and comparison of the automated legal research functions of JURIS and other similar-purpose on-line legal information retrieval systems. The systems are to be analyzed in terms of meeting the computer-assisted legal research needs of current JURIS systems users and providing the flexibility to meet future needs at a reasonable cost.

As part of the study, we are attempting to ascertain the automated legal research requirements of Department of Justice personnel. Based upon a review of statistics on JURIS usage, we have selected you as an interviewee, and in the next hour or so, would like to discuss the concept of computer-assisted legal research in general, and your use of JURIS in particular. We would like to emphasize that the interview is informal and the results will be used only to develop a profile of user requirements. You will not be specifically identified. We are not promising that your suggestions will eventually be implemented; however, we hope you would share any recommendations, observations or concerns with us.

GENERAL

1. Have you ever used any other computer-assisted legal research (CALR) system? If yes, which one(s)?

2. In using JURIS or the other systems, what are the benefits to you as a legal researcher? What are the drawbacks?

3. What are the features you like most about CALR in general, and in particular?

   a) JURIS

   b) LEXIS

   C) WESTLAW

4. What are the features you dislike the most in?

   a) JURIS

   b) LEXIS

   C) WESTLAW

5. What types of problems do you feel are most effectively handled by a computer-assisted legal research system? What types are not?

6. Which of the following features would you find useful as part of searching on CALR systems?:

- automatic plurals (e.g., lawyer also retrieves lawyers)
- automatic synonyms (e.g., lawyer also retrieves attorney)
- automatic verb forms (e.g., sue also retrieves suing)
- other (specify)

7. Are there people you work with who do not use CALR or don't believe in it? What are their reasons?

JURIS

8. Are you a regular user of JURIS? How often, within a given month, do you use JURIS? Is you time spent primarily on legal research? litigation support? other? How much time do you physically spend at the terminal during an average session?

9. Over the past year has your use of JURIS increased/ decreased? Why? How long have you been using JURIS? Has your time on the terminal increased or decreased?

10. Do you have several research problems to solve when you log on to JURIS, or do you take each problem one at a time?

11. What is the typical time interval between working sessions with JURIS? How much time do you have to spend refreshing your memory before you feel confident enough to use the system?

12. Do you usually have to wait for an available terminal or are there available terminals close by? Are the terminals you use conveniently located? How many are at your disposal?

13. How would you rate JURIS in terms of: system availability? should it be available earlier/later? response time? could it be faster? reliability? is it "down" for short periods of time? considerable periods of time?

14. If JURIS was being re-designed or improved, what feature would you most like to see incorporated? For example:

- more libraries
- other libraries
- easier searching procedures
- more terminals

SEARCHING

15. Can you describe the types of legal problems you generally research. Do you require case law statutes, regulations, executive orders? other?

16. Can you give us some detail on your usage patterns. For example:

- At what time(s) of the day do you use JURIS?
- During a search, do you form broad search queries, e.g., one term, and then narrow your search? or vice versa?
- Do you make use of the connectors? Which ones? Why?
- How many search terms do you combine into a single query?
- Do you supplement JURIS searches with manual legal research? Why?

17. When retrieving information, which format do you more often use? KWIC, CITE, FULL? Do you make use of browsing keys?

18. Are you generally pleased with the result of your search? Have you ever compared the results of a computer-assisted search with a manual search?

19. When were you trained on JURIS (or any other systems)? How useful did you find the training? What specifically did you like/dislike, e.g., how to use the machine, search logic, etc. Did you find the printed/audio materials helpful?

20. Should periodic refresher courses in searching procedures, terminal operation, etc., be given? Would you find it helpful? Are you informed of changes made to JURIS? How? Memos, announcements etc.?

21. Do you perform searches for anyone else in your office? Why don't they use JURIS? What instructions do they give you?

22. Were there any special features of JURIS you learned through application rather than the formal training?

23. How would you feel if an outside firm was supplying DOJ's CALR needs? What advantages would you see? What reservation would you have, such as prosecuting a minor technical violation of law by that firm, or its parent firm?

24. Would you feel that tne government could suffer a compromise of legal strategizing if opposing lawyers knew what the content of your searches were and the documents were retrieved?

Appendix B

CALR System Features Analysis Worksheet

System: _____

Feature	Availability Yes	Availability No	Comments
• Query Formation			
(1) Boolean connectors			
(2) Proximity connectors			
(3) * and ! operators (or equivalent) for search based on root			
(4) Thesaurus capabilities			
(5) Tools for spelling variants			
(6) Efficient handling of common legal phrases			
(7) Ability to preprogram and recall searches (i.e., macros)			
(8) Automatic selection of plural variants			
(9) Automatic selection of possessive case variants			
(10) Automatic selection of verb form variants (e.g., gerunds)			
(11) Search history retained			
(12) Ability tc modify previous queries			
• Search Restrictions			
(1) Ability to retain research after changing file groups (libraries)			
(2) Ability to retain research after changing files			
(3) Ability to retain research after entering new search query			
(4) Ability to save research at end of session			
(5) Ability to merge or intersect research files			

	Availability Yes	Availability No	Comments
• Output Features			
(1) Context displays			
(2) Citation listings			
(3) Sorting			
(4) Ranking			
(5) Off-line printing			
(6) Electronic mail			
• Training Evaluation			
(1) User manuals			
(2) Self instruction manuals			
(3) Formal training			
(4) Primers			
• User Assistance			
(1) Error messages			
(2) Assistance for naive user from system			
(3) Assistance for naive user from available staff			
(4) Presence of a "hot line" for assistance			
(5) Presence of a "panic button"			

Appendix C

Search Response Time Test Matrix

System: JURIS

Day & Time Period	Search Problems by Type/Response Time in Seconds								
	1	2	3	4	5	6	7	8	Comments/dates of test
Monday									
8-10	5.7								
10-12									
12-2				3.8					
2-4					75.5				
4-6									
6-off									
Tuesday									
8-10									
10-12									
12-2									
2-4									
4-6									
6-off		6.0							
Wednesday									
8-10									
10-12									
12-2						335.0			5/14 misspelled search te
2-4									
4-6									
6-off									
Thursday									
8-10									
10-12									
12-2									
2-4								4.9	
4-6									
6-off									
Friday									
8-10									
10-12									
12-2									
2-4									
4-6									
6-off									

Glossary of Terms and Phrases

Boolean Logic - a method of connecting search terms using "AND", "OR" and "NOT" to include or exclude documents in the selection process.

Browsing - The art of reviewing selected documents. In CALR this is usually done by the "CITE", "FULL", or "KWIC" method.

CITE - A request for citations for all selected documents.

FULL - A request to review an entire selected document.

KWIC - Acronym for Key Word In Context which refers to a method of reviewing a selected document whereby the only portion of the document to be displayed is a few words on either side of the search terms.

CALR - Acronym for Computer Assisted Legal Research

Proximity Connector - Command used to cause the search to select documents that have the search terms positioned in a certain relation to one another.

P/n or Pre/n - The term must be within "n" words of one another in the same sentence, in order.

/P - The term must appear in the same paragraph.

+P - The terms must appear, in order, in the same paragraph.

s/n - The term must appear within "n" sentences of one another.

/s - The terms must appear in the same sentence.

+s - The terms must appear, in order, in the same sentence.

w/n - The terms must appear within the same sentence within "n" words of one another.

w/seg - The terms must appear within the same segment of a document.

U.S. DEPARTMENT OF JUSTICE
JUSTICE MANAGEMENT DIVISION

COMPARATIVE SYSTEMS ANALYSIS
OF JURIS, LEXIS and WESTLAW

CONTRACT NO. JAOMF-79-C-0072

C&L

COOPERS & LYBRAND

Table of Contents

List of Tables, Figures and Exhibits

I. INTRODUCTION

1.1. Project Background and Objectives

The Department of Justice (DOJ) selected Coopers & Lybrand to conduct an objective, independent analysis of the computer-assisted legal research (CALR) requirements of DOJ and to assess the abilities of currently available CALR systems to meet those requirements.

In the first phase of our technical analysis we determined the legal research requirements (both manual and computer-assisted) of current DOJ and non-DOJ JURIS users and developed a detailed profile of the user requirements. The results of this activity were documented in an earlier report and are summarized briefly in Section IV of this document. Once these requirements were determined, we undertook a second phase of activity that involved a detailed, point-by-point comparison of the user requirements and the capabilities of JURIS and two commercially available systems: LEXIS and WESTLAW. The results of this analysis are presented here.

1.2. Systems Selected For Comparison

The charter of the project team was to examine JURIS and other similiar-purpose systems. A recent table of current and historical CALR systems[1], lists a total of seven current or previously-existing systems in the public (federal government) sector and twenty-two such systems developed by the commerical

[1] Computer/Law Journal, vol. 1, no. 2, pp. 442-440. (Fall 1978).

sector within the United States.[2] The results of the JURIS user requirements study showed that at a minimum any system which would replace JURIS must have a substantial, up-to-date, on-line federal case law data base. Only two of the commercial systems- LEXIS offered by Mead Data Central, Inc., and WESTLAW, a service of the West Publishing Company - passed this screening.

The rejected systems included the U.S. Air Force Federal Legal Information Through Electionics (FLITE) system, because it was clear that, despite having one of the more extensive legal data bases encountered during our research, its batch mode orientation for searching precluded it from replacing the on-line JURIS system. The remaining CALR systems were determined to be:

- No longer operating.
- Never more than experimental systems.
- Dedicated to a narrow body of law, e.g., law in a particular state.
- A combination of the above.

1.3. Methodology for Analysis

Our approach was to ascertain the ability of each system to satisfy user needs. Since many of the needs are qualitative and subjective, our analysis had to reflect this fact. Much of the methodology was suggested by the results of our interviews with twenty-seven JURIS users, as well as from input gathered during a broad literature search.

The literature search indicated that previous comparative analyses of CALR systems focused upon the issues of "recall" and "precision". Simply stated, these issues are: what fraction of

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[2] Although there were separate lines for systems that evolved into differently-named systems, e.g., OBAR into LEXIS, LITE to FLITE, these numbers do not reflect a double-counting of such systems.

the total relevant documents in its data base are retrieved by a system in response to a given problem (recall), and what number of these retrieved documents are relevant to the problem being researched (precision)? After consideration of a number of factors, we chose not to focus our analysis on these two issues for the following reasons:

- "Relevance" in the context of legal research is subjective and researcher-dependent.
- The three systems have similiar query language based on Boolean algebra and augmented by proximity connectors. Therefore, gross discrepancies in "recall" and "precision" are more likely to be a function of data base coverage or user familiarity and facility in formulating a search rather than system limitations.
- The concept of whether CALR or manual research is better was not at issue in this study, because the users indicated they rely on both methods.

We did choose to focus our attention on a technical analysis of the features of each system which affect user acceptance. These features were selected on the basis of the JURIS user interviews performed in the first phase of our technical analysis, issues raised in two previous studies of CALR systems by the Federal Judicial Center and the Law Enforcement Assistance Administration, and staff knowledge of the state-of-the-art for the broader category of general bibliographic data retrieval systems. The latter factor was primarily useful in the area of human factors or "user friendliness".

Three types of analyses were performed, depending upon the specific feature being evaluated. The first was a simple side-by-side matching of features present or not present within each system. The comparison of data bases was performed in this manner for example.

Because the users identified system response time as the most important non-data base feature, the second type of analysis was a comparison of system response times to specific user problems. We installed terminals for each system in the Washington D.C. office of Coopers & Lybrand, and project staff members were trained to operate each system by authorized training personnel. Our first step was to determine the time periods in which searches would be made. The day was divided into six two-hour segments:

- 8:00 a.m. - 10:00 a.m.
- 10:00 a.m. - 12:00 noon*
- 12:00 noon - 2:00 p.m.*
- 2:00 p.m. - 4:00 p.m.*
- 4:00 p.m. - 6:00 p.m.
- 6:00 p.m. - System Sign Off

Next, we determined which of those periods experienced higher and lower usage, based upon the user requirements profile. The time periods marked with an * displayed higher usage preference, and a check of JURIS statistics confirmed the interview results. The 4:00 p.m. - 6:00 p.m. slot showed heavier usage than the 8:00 a.m. - 10:00 a.m. and 6:00 p.m. - Sign Off periods, however it was not as heavy as the three peak usage periods. An assignment system was developed to ensure that sample searches were run in all periods but that the number of searches was heaviest in the three peak time slots.

The attorney-consultant members of our project team then developed a series of eight problems to be used in the search response time analysis. Each problem was reviewed by one of our team's computer systems personnel to ensure it was properly framed, e.g., proper use of connectors, root expanders, etc., and that it would measure one or more of the features in each system. Problems were assigned to the various time slots and were run over a period from May 25 through June 8, 1979. Full details on the procedures followed in performing each search response time analysis is discussed in Section III, and samples of recording

forms and other exhibits on analysis results are included in exhibits 2 through 6. The third type of analysis was used for those features which did not readily adapt to objective measurement, particularly human factors and search expression formulation. In an effort to minimize bias or opinions, these features were evaluated by attorney members of the project with prior CALR experience, attorney members of the project without CALR experience prior to this engagement, as well as data processing personnel with varying levels of information system/document retrieval expertise but no prior legal research experience. The values assigned to each feature by these staff members (and detailed in Section II) represent an informed consensus based upon actual operating experience with all three systems.

1.4. Summary of Findings and Conclusions

Our basic conclusion is presented as the answer to this question: which system can meet the CALR needs of current JURIS users and provide flexibility to meet future CALR needs? The project team feels that both the JURIS and LEXIS systems can satisfy current and future user needs. WESTLAW, as presently constituted, is not sufficient to meet these requirements; however, this should not be construed as a comment on its viability as a CALR system, since the JURIS user requirments are somewhat unique.

Our conclusion is based upon a comprehensive review of all three systems, the results of tests to measure system response time to search and browse commands, and an assessment of the ease with which searching can be carried out on each. Summarizing the system comparison is difficult because we identified a large number of features for comparison, and because of the similarity of the systems. Also, there are differences between systems in the way each feature operates. For example, all of the systems arrange their data bases somewhat differently from each other, yet all cover the basic case law required by the user community.

Also, we preferred WESTLAW's training approach over JURIS and LEXIS yet found the latter two easier to operate. The reader is urged to review the summary tables contained in Section II.

The results of the response time tests and assessment of search query formulation are more readily summarized. Based on some 140 separate searches, JURIS responded faster to search commands then either LEXIS or WESTLAW; however, response time for these two systems was not considered outside the range of user needs. WESTLAW'S ranking approach, in which the system responds to a search by displaying the case containing the most number of search terms, was a drawback because most users desire to know the number of cases retrieved in order to decide whether to browse those results, or to expand or narrow their search. Both LEXIS and WESTLAW were faster in responding to browse commands than JURIS, often by a factor of 2-3 times; however, some of the difference is attributable to the methodology used to conduct the test. This is detailed in Section III.

In terms of search query formulation, we concluded that JURIS, with its set searching logic was the preferred approach because of the greater flexibility it provides the user. LEXIS, which employs a query modification approach requiring use of connectors, was viewed as less flexible but adequate for user needs. WESTLAW's full-text logic was confusing to most of our staff, despite a formal orientation and follow-up training. For more "statistical" searches on headnotes, the system is very good; however, it does not meet the users needs for full text searching.

When the three systems are compared against the requirements articulated by the users and contained in the user profile (see Section IV), both JURIS and LEXIS more closely satisfy these needs in each of the six categories. WESTLAW was a more difficult system to learn and to operate, did not provide as comprehensive a data base, and was not as "user friendly" as the other

two systems. In examining JURIS and LEXIS more closely, the project team felt JURIS to be the preferred system because it is easier to learn and to operate, it is currently in place and would not require massive re-orientation of users. If certain improvements such as better CPU hardware, more data base coverage, and improved training are made, it will be more than flexible enough to satisfy future CALR needs.

II. DISCUSSION OF SYSTEM FEATURES

2.1. Overview

Our comparative technical analysis focused on those features of the systems which affect user acceptance of a CALR system as a tool for performing legal research. The primary areas examined were:

- Data Base
- Search Logic
- Browsing
- Human Factors
- Training

Each feature can be grouped according to the ease with which it can be altered to conform to perceived user needs as follows:

- Inherent features which are deeply embedded in the design and software of a given system and cannot be easily changed - query formulation, browsing functions, and "user friendliness" (human factors).
- Extrinsic features, which are totally under human control - training.
- Features which fall into neither of these groups, that is, features which are changable but not entirely under human control - data base, response time, and system reliability.

While it is possible to make comparative judgements for any single feature (e.g., data base) it is dangerous to form any overall conclusions without understanding which of the above three catagories the feature is in.

2.2. Data Base

The three aspects of the data base which can affect user acceptance of a CALR system are:

- Coverage, including not only what is covered (which courts? which statutes? which regulatory rulings?) but also when it is covered (how current? how far back?) and in what form (full text, headnote, etc.).
- Data base organization - how are the documents grouped into files and how are the files grouped?
- Document organization - how does the user view a document in the system and what parts of the document are available?

Data base coverage affects the user's decision of whether or not to use the CALR systems to help solve a problem. Data base and document organization affect the user's decision on how to use the CALR system to best achieve the desired result.

These three aspects - coverage, document organization and data base organization - are discussed in detail in the following sections.

2.2.1. Data Base Coverage

Table 1, located at the end of Section II, describes in detail the coverage provided by the three systems, as of Friday, June 8, 1979. Collectively the three systems cover the following universe of data bases:

Supreme Court
Circuit Court of Appeals
Federal District Courts
Court of Claims
Court of Customs
Court of Customs and Patent Appeals
Tax Court
Board of Tax Appeals
Military
Public Laws
U.S. Code
IRS Code
D.C. Superior Court
State Law

Within the universe, each system provides different types of coverage, even for the same data base. These differences include the following:

- JURIS and WESTLAW coverage are based on the West Publishing National Reporter System, whereas LEXIS coverage is on a court by court basis.
- JURIS augments case law from the WEST reporters with older volumes of U.S. Reports, Court Martial Reports, Court of Claims and D.C. Superior Court, whereas WESTLAW does not.
- All three systems provide coverage of the Federal Courts, except that only LEXIS currently provides coverage for the Tax Court and Board of Tax Appeals.
- JURIS does not provide full text coverage of state case law.
- LEXIS does not have West headnotes.
- WESTLAW does not have statutes.
- In general LEXIS is more historic in its coverage for each of the files.

Table 1, below, compares data base currency for the the Supreme Court, U.S. Circuit Courts of Appeal, and U.S. District Courts data bases for each system as of June 8, 1979. The level of currency shown for these three data bases is representative of all data bases for the three systems.

Table 1: Most Recent Cases by System and Federal Court

	JURIS	WESTLAW	LEXIS
Supreme Court	April 24, 1979	June 1, 1979	May 29, 1979
Circuit Court	April 20, 1979	June 4, 1979	May 22, 1979
District Court	May 3, 1979	June 4, 1979	May 21, 1979

WESTLAW includes the date of the most recent decisions in its file descriptions. Thus a user has a rough guide to know how far back to review slip opinions. In order to obtain the same information on JURIS and LEXIS, the user must formulate a search expression to retrieve the date of the most recent case in any file.

2.2.2. Data Base Organization

WESTLAW's organization of its data base perfectly mirrors the West reporters, i.e., each reporter covered in WESTLAW is contained strictly within its own file. The exception is Federal Rules Decisions, which has been placed in the same file as the Federal Supplement. This organization has the advantage of simplicity, but its inflexibility presents some nuisances to the user. Citation-checking ("Shepardizing") is the most seriously affected, since the user must run the search in three different - and large - files.

Each federal court covered by the LEXIS data base has its own data file, and there is a file devoted to the U.S. Code and Public Laws P.L. 93-1 through 95-600. However, LEXIS also presents the user with a variety of cross-court files, so that a single search can be run against more than one court simultaneously (e.g., the "SUPCIR" file combines the entire Supreme Court file, "SUP", with the Circuit Court of Appeals file, "CIR"). The payoff to the user is flexibility: a user who intends to research more than one level of court has the option to work with a single file, instead of rerunning the same search in multiple files and merging the results by hand.

An important feature of LEXIS is its library structure. In addition to its "General Federal" library, described above, LEXIS has a number of specialized libraries containing federal case law and statutes devoted to specific areas of the law. These libraries cover federal tax law, federal securities

regulations, federal trade regulations, and patents. For corporate lawyers there is also a library devoted to Delaware corporate law. These specialized federal libraries contain legal sources (e.g., Tax Court decisions and memoranda, Board of Tax Appeals decisions, and IRS private rulings) that are in the LEXIS tax law data base and nowhere else and are supplemented by selected decisions from the Supreme Court, Circuit Courts, District Courts, and Court of Claims. Like the General Federal library, each legal source has its own file, certain of which are also combined into cross-source files. Lawyers working in a specialized area of law covered by a LEXIS library gain the following advantages:

- Increased chronological coverage for Supreme Court decisions - since only those Supreme Court rulings relevant to the given area of the law are included.
- Increased precision for queries - fewer totally irrelevant cases will be retrieved as the result of a query.
- Faster searches (as compared to the same file in the General Federal library) because the file and the concordance are smaller.

Beyond the specialized federal libraries, LEXIS has one library for each of 21 states, including the District of Columbia, covered by the system and what might be considered a "library of libraries" for all states in the data base. LEXIS also has two libraries devoted to the ABA and AICPA, respectively. Each state library is organized on a source by source basis, with some cross-court combination files (District of Columbia Court of Appeals is split into two files, one before and one after the court's reorganization). Superficially there is no advantage to this over the WESTLAW organization based on the West reporters, since a user can always append "STATE (name-of-state)" to any WESTLAW query. However, the smaller files and consequently smaller concordances should result in faster searches for LEXIS as opposed to queries run against a regional reporter file in WESTLAW.

The most flexible file organization belongs to JURIS. Like WESTLAW, there is one file for all Supreme Court decisions in the data base, one file for all Federal Reporter 2nd Series (F2d) decisions, and one file for the Federal Supplement (F Supp.). Like LEXIS, there is one file for Court of Claims cases outside the F2d. However, unlike LEXIS and WESTLAW, these files are combined files based on "hot", "recent", "old" (Supreme Court only) and "slips" (F2d. and F Supp. only) variations for each source. Moreover, these smaller files are combined horizontally, i.e., there is a single "SLIPS" file which encompasses "F2DSLIP" and "FSUPSLIP" while the hot versions of each Federal Court decision are combined into a single file. The advantages here are flexibility and search efficiency since the basic files are smaller and have smaller concordances. Figure 1, following this page, illustrates the federal case law file structure for JURIS.

Where LEXIS has libraries, JURIS has file groups. However, the JURIS file groups are organized by type of legal source rather than area of law (with the exception of the USADC file group, which is set up to accomodate the special needs of the Office of the U.S. Attorney for the District of Columbia). There is one file group for case law, another for statutes, a third for headnotes, a fourth for regulations, and a fifth for Department of Justice work product. There is no obvious advantage to the user of such an arrangement, and there are some obvious problems that it can present, particulary since queries cannot be reused after changing file groups. One way around this problem is to use the FLITE group, which covers everything covered by the case law, statutory, and headnote file groups, plus the Comptroller General's Opinions file from the regulatory file group. However, the FLITE group lacks the flexible menu of files of the case law and statutory file groups. The situation is not helped by the description of the FLITE group provided by the system, which seems to imply that the data in that file group has been selected because of a special pertinence to military justice.

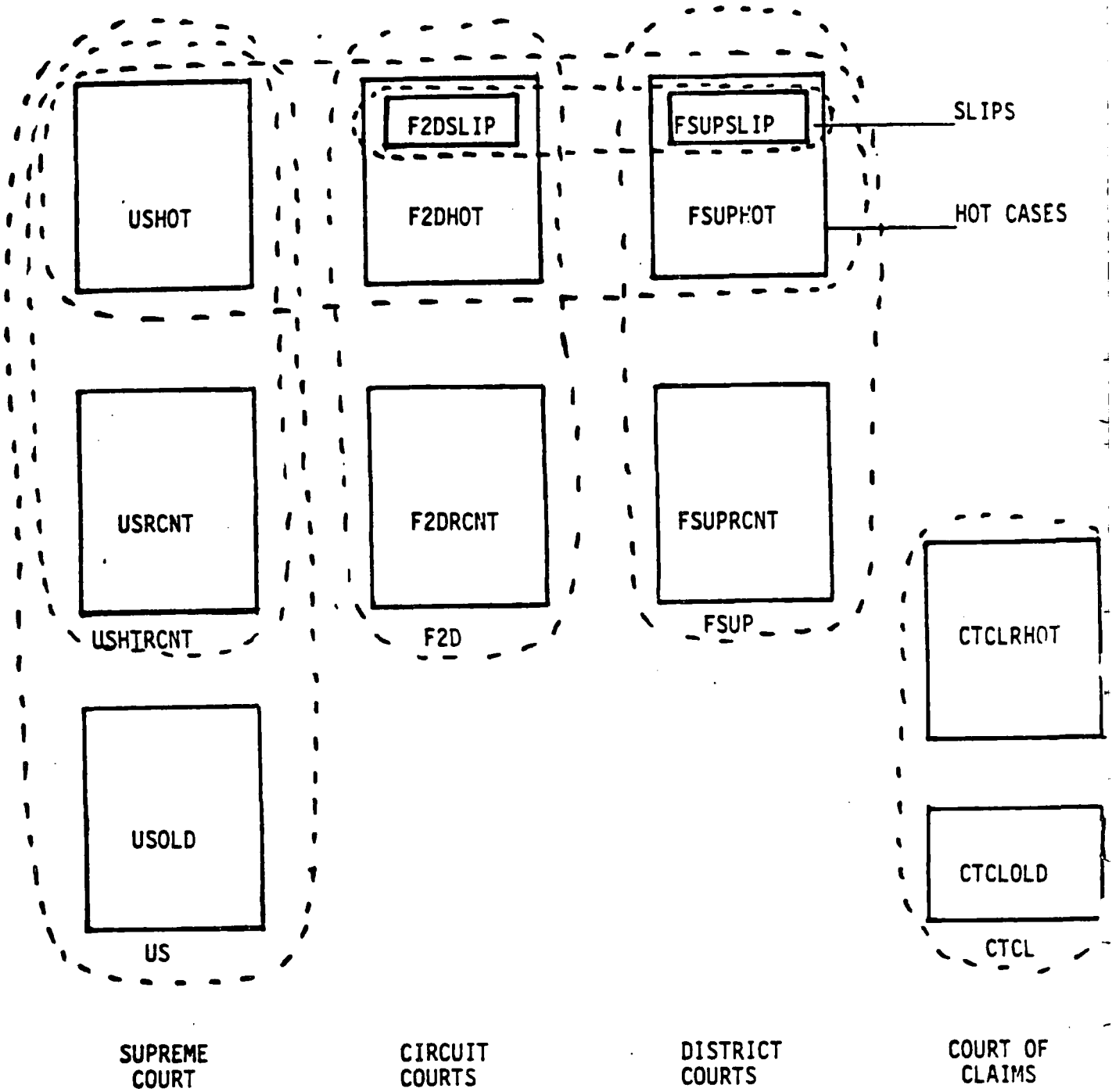

Figure 1: File Combinations in JURIS CASELAW File Group

2.2.3. Document Organization

Documents in each system are organized into searchable segments (though WESTLAW does not use that term) and it is possible to restrict a query to a named segment or to embed such a restricted query inside a more complex query. Table 3, following this page, compares the searchable segments for the three systems. Note that these are specifiable segments only, such that a query can be based on the segment.

The advantage of segment searching is that it permits the user to make a search more selective than by increasing the percentage of "on-point" cases from a specific search. LEXIS has a decided advantage in the number of searchable segments available to users.

2.3. Search Logic and Query Formulation

A CALR system needs more than an extensive data base to be productive; it also needs a mechanism through which a user can easily and accurately extract relevant documents from the data base. All three systems take basically the same approach to document retrieval: selection of documents is based on the co-occurence of words and/or phrases somewhere in the body of the case or statute. A user formulates a query by thinking of words or phrases likely to be present in any relevant legal document and then combining these words (called "search terms") into a "search expression" using Boolean algebra. The commonalities go even further, as each of the three systems augment the Boolean algebra with "proximity connectors", which are specialized forms of the Boolean "and" which require not only that the two search terms be present but also that they satisfy specified location constraints. Each of the three systems also provides the ability to augment the set of search terms with "root expansion" operators that permit variations on a word stem to be automatically generated and searched for by the system. Finally, all three

TABLE 2 - Searchable Segments

	JURIS	WESTLAW	LEXIS
Date	X	X[1]	X[2]
Case Name	X	X	X
Case Citation	X	X	X
Judge (Majority Opinion Author)	X	X	X
Court	X	X	X
Counsel			X
Majority Opinion	X	X	X
Dissenting Opinion(s)			X
Dissenting Opinion Author(s)			X
Concurring Opinion(s)			X
Concurring Opinion Author(s)			X
Vote			X
Disposition			X
Headnotes	X	X	X[3]
Catchlines			X
Synopsis			X
State (where applicable)	X	X	N/A
Statute Text	X	N/A	X
Statute Section		N/A	X
Statute Subsection		N/A	X
Statute Annotation		N/A	X
Statute History	X	N/A	X

[1] Year only
[2] Can specify argued date and decided date
[3] State library only - presumably these are catchlines.

systems provide the ability to restrict document selection by date using the mathematical comparative operators, equal, less than, and greater than; the ability to restrict a search expression to certain segments of a document; and the ability to embed such a restricted search within a larger search expression.

Despite this common framework, however, the three systems have peculiarities that set their query mechanisms apart from each other. Since differences in searchable segments have been explored in the comparative analysis of the respective data bases, the analysis of query formulation will concentrate on the areas of:

- Boolean algebra
- Proximity connectors
- Root expansion

2.3.1. Boolean Algebra

Boolean algebra uses the operations "AND" and "OR" and "NOT" to combine terms having the value "true" or "false" according to the following rules:

- X AND Y are true only if both X and Y are true.
- X OR Y is true if either X or Y (or both) are true.
- NOT X is true only if X is false, and vice versa.

All three systems offer these three basic Boolean operations.

LEXIS has two variations of NOT; "AND NOT" which means not within the same document, and "BUT NOT" which means not within the same segment. These two variations can be confusing to the casual user. However, it appears that few users in the JURIS user community use the NOT operation, so this is a minor problem.

The WESTLAW version of NOT (%) might be more heavily used because of the TOPIC field associated with each case in the WESTLAW data base. For example, a user who wished to exclude criminal cases from a search can do so within WESTLAW by appending "% TOPIC(CRIMINAL)" to the query.

Remembering the correct precedence of the operations is a problem for casual users. For example it is important to know whether the search expression "MINISTER OR RABBI OR PRIEST AND TAX" means to retrieve documents with:

Figure 2a

"MINISTER AND TAX"
or
"RABBI AND TAX"
or
"PRIEST AND TAX

or

Figure 2b

"MINISTER"
or
"RABBI"
or
"PRIEST AND TAX"

All three systems use the association shown in Figure 2a. (i.e. OR has precedence over AND). A more complex, yet very typical, example of the problems of operand precedence is the search expression: "DOCTOR AND PATIENT OR LAWYER AND CLIENT." Since OR precedes AND, this search expression will select only those documents which contain the words DOCTOR, CLIENT, and either PATIENT or else LAWYER. In JURIS and LEXIS a user can override the precedence hierarchy by the use of parentheses: (DOCTOR AND PATIENT) OR (LAWYER AND CLIENT). WESTLAW does not permit parenthesized search expressions and this makes it more awkward to formulate a query in WESTLAW. When we gave attorneys and data processing staff, trained in all three CALR systems, the task of

formulating queries for each system using legal problems culled from the Federal Judicial Center study of CALR systems[1], we found that query formulation was more awkward on WESTLAW than on the other two systems.

2.3.2. Proximity Connectors

Proximity connectors are essentially specialized AND's which require the search terms be within a specified distance from each other (distance is measured in numbers of words), and that the search terms be co-occurring. For example: find all cases where "search" is within five words of "seizure".

The JURIS proximity connectors are: "within same sentence", "within same sentence and also within N words", and "within same sentence and preceding by at most N words". The WESTLAW set of proximity connectors reflect the natural sentence and paragraph structure of the English language: "within same paragraph", "within same sentence", "within same paragraph and preceding", and "within same sentence and preceding". In practice, the WESTLAW connectors were found to be less useful than those of JURIS or LEXIS.

LEXIS connectors reflect the segment structure of documents and the system ignores sentence and paragraph boundaries. The LEXIS connectors are "within same segment", "not within same segment", "within N words",and "preceding by N words". The "within segment" connector almost totally replaced AND in query formulation for the sample problems and was useful in this regard.

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[1]Sager, Alan M., "An Evaluation of Computer-Assisted Legal Research Systems for Federal Court Applications," technical report FJC-R-77-2, Federal Judicial Center, 1520 H. Street, N.W., Washington, D. C. 20005

LEXIS training urged the use of the connector "within N words" using a larger value for N as a substitute for the "within sentence" connector. There are theoretical disadvantages to this but in practice there was only one instance of a false hit due to crossing sentence boundaries and no instances of missed cases due to too small a value being chosen for N.

2.3.3. Root Expansion

All three systems offer an unrestricted root expansion operator - LEXIS and JURIS use an exclamation mark and WESTLAW uses an asterisk. One of these used after a given word stem will cause the system to generate all words beginning with the stem, e.g., car! causes the generation of car itself, plus card, carded, carnation, cardinal, carry, carried, carrying, etc. Because of the large number of search terms which can be generated by an unrestricted root expansion operator both LEXIS and JURIS offer restricted operators; in both cases an asterisk is used. A string of asterisks following a word stem causes all possible word endings no longer than that string to be generated, e.g., car** causes generation of car itself, plus card, care, carol, carom, cars, cart, and all other four and five letter words beginning with car. The absence of such a feature caused problems in working with WESTLAW, because users had to choose between generating irrelevant search terms with the unrestricted root expansion operator or keying in all variants of the search term themselves.

LEXIS goes one step further in using the asterisk as a "universal character" to match any letter within a word stem. Thus "wom*n" generates woman and women. Such a feature is very useful for generating the plurals of irregular nouns. Another advantage provided by LEXIS is that it automatically causes the generation of plurals for regular nouns and possessive cases of all nouns. JURIS users get around the lack of this feature by one of two means: using the restricted root expansion operator

or else using only the singular form of the noun and trusting that the plural and/or possessive form of a word is not used exclusively in any case on point. Both approaches have obvious drawbacks. It should be noted that WESTLAW highlights possessives and presumably selects both the given noun and the possessive of that noun.

2.3.4. Summary

Table 3, following this page, compares the features of the three systems which affect query formation. JURIS has a definite edge over LEXIS in its proximity connectors. LEXIS has a definite edge over JURIS in root expansion. WESTLAW is substantially behind both sytems in all three areas.

2.4. Browsing

A crucial function of any on-line data retrieval system is to provide users with the ability to examine and evaluate retrieved data rapidly and efficiently. CALR systems are no exception. The three CALR systems provide basically the same capabilities for "browsing" through retrieved legal documents:

- Listing by citation - the entire set of documents retrieved is listed by name and citation.
- Keyword in context (KWIC) - search terms are highlighted and displayed in the context in which they appear.
- Full text display.

LEXIS and WESTLAW go beyond this by permitting the user to restrict displays to selected fields/segments of the documents, and LEXIS and JURIS provide a capability to change the size of the KWIC window. The full text display mode is self explanatory, but the other two topics are dealt with in greater detail below.

TABLE 3: Comparison of Search Features

Boolean Algebra	JURIS	LEXIS	WESTLAW
- AND	X	X	X
- OR	X	X	X
- some form of NOT	X	X	X
- ability to use parentheses	X	X	
Proximity Connectors			
- within same segment		X	
- not within same segment		X	
- within same paragraph			X
- preceding in same paragraph			X
- within same sentence	X		X
- preceding in same sentence			X
- within n words	X[1]	X	
- preceding by at most n words	X[1]	X	
- sequential (phrases)	X	X	X
Root Expansion			
- automatic regular plurals		X	
- automatic possessives		X	X
- unrestricted root expansion	X	X	X
- restricted root expansion	X	X	
- universal matching character		X	

[1]Further restricted to be within same sentence.

2.4.1. Citation Listings

Citation listings are simply a list of cases retrieved from a case law file in response to a query. While this is a straight-forward matter, there are some differences between the systems. First, each of the systems list the citation differently. Examples of each are shown below:

JURIS: Battista v. Lebanon Trotting Assn. 538 F.2d 111

LEXIS: Peter L. Battista, Jr., Plaintiff-Appelle, v. Lebanon Trotting Association, Defendant, and John J. Carlo, Defendant-Appellant. No. 75- 2129. Peter L. Battista, Jr., Plaintiff-Appellant v. Lebanon Trotting Association, Defendant-Appelle, and John J. Carlo, Defendant. No. 75-2130, Nos. 75-2129, 75-2130, United States Court of Appeals for the Sixth Circuit, 538 F.2d. 111, June 24, 1976.

WESTLAW: Battista v. Lebanon Trotting Assn, 538 F2.d. 111.

JURIS takes advantage of its large CRT screen to display as many as 20 document citations per "page", while LEXIS, because of the full caption it provides, may display as little as 2 or 3 per page. Both JURIS and WESTLAW cite West reporters, while LEXIS cites West reporters for courts other than the Supreme Court (these cases are cited using the U.S. Reports Citation) and cites other case reporters as well.

2.4.2. KWIC Displays

Each system has its own criterion for establishing the size of KWIC "window," i.e., the amount of context to be used to frame a highlighted research term (or "key word"). WESTLAW shows the entire page on which any search term appears. This has a number of drawbacks from a user's point of view since the search term may be anywhere on the page. If by chance it should happen

to be too near the top or bottom of the page then valuable context may be missed.

JURIS and LEXIS attempt to center the KWIC window about the highlighted search terms. JURIS shows the sentence in which the search term(s) appear plus one sentence on either side. As many opinions contain extremely long sentences, this practice occasionally results in the window being too large to fit on the screen in one display. LEXIS supplies twenty words on either side of the search term(s) and its window is consequently more fixed in size. In cases where a user finds this inadequate, both JURIS and LEXIS provide the ability to alter the size of the window. JURIS permits only enlargement of the window, since the context must be an integral number of sentences. LEXIS permits the window to be expanded or contracted, although the default is to double the amount of context, if the user simply hits the "EXP KWIC" key without specifying the new context size.

In terms of fulfilling its basic function, i.e., showing the user the context in which the word or connected set of words satisfying the input search expression appears, the KWIC feature of all three systems seems adequate for most tasks.

2.4.3. Segment Listing

JURIS, LEXIS and WESTLAW share the ability to let the user select segments and fields for display instead of a KWIC display or full text.* This is a very useful feature in the case where one wishes to have more information displayed then is given in a citation listing, yet doesn't wish to go through a full text listing. LEXIS has the more comprehensive menu of selectable segments, while WESTLAW has the advantage of selectable segments which are based on West's headnote and key numbering system.

*JURIS has a command by which users can name the segments and the order in which they will appear; however, it is rarely used.

2.4.4. Ease of Browsing

For ease of browsing, there is a considerable gap between WESTLAW on the one hand and JURIS and LEXIS on the other. Part of users' difficulties with WESTLAW start even before browsing begins, because the first thing users need to know before browsing is whether the set of documents retrieved by the system in response to a query is small enough to browse. WESTLAW doesn't say; it returns from a query by presenting the first page of the highest ranked document. To determine the number of documents retrieved as a result of a query, users must enter a separate command ("z"). However, if the search expression contains phrases and/or proximity connectors, then the number of documents retrieved by the system will be greater (often far greater) than the actual number of documents satisfying the search expression. Provided the value displayed in response to the z command is not too great (the threshold is highly subjective), the normal action suggested by WESTLAW's instructors is for users to command "r =" and the value WESTLAW shows in response to the z command. This requests the system to display the final document in the retrieved set, but a side effect of the command is that it goes through the list document by document, pruning out those which do not satisfy the phrase and proximity requirements of the search expression. This is generally a slow and laborious operation. By way of contrast, JURIS and LEXIS signify completion of a query by displaying the number of documents retrieved immediately, and every document retrieved by JURIS or LEXIS in response to a query satisfies the given search expression.

WESTLAW also has problems with browsing commands themselves. Documents are displayed in KWIC mode unless otherwise specified, and paging forward is handled by hitting the "ENTER" (transmit) key. However, switching to full text mode and moving to a selected page in the text - two different actions - are accomplished with basically the same command. Also the command for moving from document to document works differently from the

command to move from page to page, a point of potential confusion for inexperienced users.

2.5. Human Factors - System Friendliness

Certain systems are easier to use than others, and the "friendliness" displayed by a system towards its users plays a large role in determining the size and enthusiasm of that community. Our first step in comparing the three CALR systems for system friendliness was to determine the state of the art in human factors for general bibliographic data retrieval systems. In particular a recent paper by Friedrich Gebhardt and Imant Stellmacher[1] suggested many of the criteria used in this portion of the comparative analysis.

2.5.1. Log-on

All three systems are reasonably easy to log onto. Connection for a terminal to the system is identical in each case: the user dials into the computer on a special dataphone, powers up the terminal, and presses the red "data" button when a high-pitched beep is heard. The system prompts for a password, and once this is keyed in, the user is ready to go. WESTLAW does not print the password on the screen, a minor nuisance in case of a typographical error.

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[1]Opinion Paper: "Design Criteria for Documentatin Retrieval Languages," in Journal of the American Society for Information Science, vol. 29, no. 4, p. 191 (July 1978).

2.5.2. Inputting Commands

There are four things a system should provide a user inputting commands:

- The system should prompt a user of the expected next input.
- The system should inform a user what command was entered ("echoing"), so that the user can catch a mistake promptly.
- The commands should be highly mnemonic (i.e., the name of the command should suggest its function and not another operation), or else be input via a special key.
- The user should receive an acoustic signal after each transmission (both input and output) .

LEXIS is better than JURIS for informing the user of needed or expected input. Usually, when a computer provides as much information as LEXIS, it is obtrusive, but LEXIS does an outstanding job of keeping the casual and infrequent user prompted while not slowing down an experienced user.

All three systems echo the important commands, which can be a useful benefit in case they are miskeyed (e.g., queries).

Both LEXIS and JURIS make heavy use of named function keys for their commands. JURIS even has the Boolean operators and proximity connectors as special function keys (it accepts the operators keyed in letter by letter as well), but the names assigned to the operators have excellent mnemonic value. WESTLAW uses a conventional, unmodified keyboard with no special function keys.

The commands handled by function keys in LEXIS and JURIS are handled by one-letter, not very mnemonic, commands with WESTLAW. For example, the command to "display old query" is "Q";

nothing in the description of the command suggests the letter and vice versa. This defect extends to query formation, where special characters replace the mnemonics used by LEXIS and JURIS. The use of an ampersand for the Boolean AND is not unreasonable, but a percent sign for NOT is certainly hard to remember. Our experience with WESTLAW confirmed findings in previous studies showing that formulating queries with special characters and mathematical notations was harder to learn and harder to work with than queries with English keywords.[2] Only JURIS and LEXIS provide acoustic signals.

2.5.3. While the System is Working

Between the time a command is entered and the time the system responds with output, the system should provide the user:

- The ability to interrupt and cancel a command.
- A periodic message to the effect that the system is working on the user's command (and thus has not crashed).
- A warning that the search command is unusually laborious.

All three provide the ability to abort a working command, but only WESTLAW warns the user when a search is exceptionally difficult. In the other two systems, a user must always wonder whether cancellation would terminate a long-running search moments before its successful conclusion. It is easy to underestimate the value of a "system working" message flashed on the screen periodically while the system performs a task, but studies

[2] Reisner, P., Boyce, R.F. and Chamberlin, D.D., "Human Factors Evaluation of Two Database Query Languages: SQUARE and SEQUEL", Proceedings of the 1975 National Computer Conference, AFIPS Press, Montvale, N.J., pp. 447-452.

have shown that even experienced and sophisticated users tend to over-estimate the amount of time that has elapsed since the command was given and to become concerned when there is no quick response from the system.

Only LEXIS notifies the user if the system has stopped working.* This can be important: one JURIS user admitted to sitting at a terminal nearly an hour unaware that the system had gone down.

2.5.4. Output

The output (in this case the documents selected) can be either easy or difficult to work with. To be easy to work with output should satisfy the following criteria:

- The system response should be short, but understandable, with compromises always decided in favor of understandability.
- The results of queries should be clearly arranged.
- The system's output should always be differentiated from the user's input.

All systems arrange results well and there is little difference between them.

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*Both JURIS and WESTLAW rely on lights to notify users. JURIS does this through the "busy" light. If a user suspects the system is down, the user can push the "Transmit" key. This will cause the "busy" light to go out; however, if the system is operating, it will turn the light back on. WESTLAW has two keys, "Local" and "Enter" with red lights, when both keys are unlit, the system is down.

In general, user input is differentiated from system output on all three systems by differences in font. WESTLAW goes even further by highlighting the user's input on the screen.

In overall understandability of the system responses, our subjective evaluation gives LEXIS an edge over JURIS, and JURIS an edge over WESTLAW. However, each system provides more than adequate output.

2.5.5. Error Handling

Features which have been found to be useful for error handling are:

- Short, clear, understandable error messages.
- A "help" function for more detailed explanations of what went wrong and how to correct it.
- "Fail soft" error handling. The system should never abort or move into an interminable loop in response to an input error.
- Automatic detection of spelling errors in queries.

Error handling is probably the weakest point in JURIS. JURIS does provide short and clear error messages, but the messages reflect a common mistake on the part of system designers and programmers: they are easily understood only by a user with an extensive ADP background. Our attorneys frequently had difficult grasping the meaning of rather common error messages. JURIS does provide a HELP button, but it does not always explain the error messages further.

WESTLAW has good error messages and, like the other two systems, it catches user errors in a "fail soft" fashion. WESTLAW's biggest drawback is its lack of a "help" function. A user who does not understand an error message can always get a

tutorial by exiting the data file and entering the "WT" (WESTLAW Training) file with the command "NEW DB WT". However a user may not be aware of this option, or the problem may be in changing data bases to begin with.

LEXIS has the best error messages; it does not respond violently to erroneous user input; it has a help function key which provides an extensive (almost too verbose) explanation of errors and how to correct them; and it tries to catch spelling errors.

JURIS is the only system which does not attempt to catch spelling errors in queries. If a search term in a query is not in the LEXIS OR WESTLAW concordance, then these two systems will immediately advise the user of this fact as it suggests a spelling error. Of course this simple test will not catch all spelling mistakes (e.g., typing "statue" for "statute" will get some hits in the concordance from litigation about public monuments and misspellings of "statute" in the text of documents entered into the data base), but it is a simple feature to implement and quite useful. Since JURIS never advises a user that a given search term is not in the concordance, a user may get the message "no documents retrieved" by that query when in fact there are documents satisfying the search expression intended. The only area where JURIS matches the other two systems is in the ability to cope with erroneous input without shutting down or aborting.

2.5.6. Query Handling

The concept of system friendliness in query handling includes:

- Easy editing of a query at hand.
- Ability to reuse a query after changing files or changing libraries.
- Ability to reuse a former query.

  - After intervening queries
  - During a later terminal session
  - In a present query

- Retention of search history so the user can see what has been done.

All three systems provide easy facilities for editing queries. A set of special keys to shift the CRT's cursor is provided on the terminals of all three systems, and once the cursor is in the appropriate position a user can delete an unwanted character with a special key, or make room for insertion of extra characters, or simply type over the old line. Beyond this feature, the ability of the various systems to edit a query depends upon the design philosophies underlying each separate system.

WESTLAW treats each query totally independently. It does not remember old queries, nor does it remember any results retrieved by former queries. Thus WESTLAW does not retain a search history, queries cannot be recalled after intervening queries or at a later terminal session, and old queries cannot be inserted into new ones (although a new query can be formed by editing the present query). However, it is possible to reuse the present query after changing files.

The LEXIS philosophy is to form new queries by refining previous searches. Generally the initial query serves as a point of departure for subsequent refinements. This "successive refinement" philosophy limits the development of a search history and the ability to reuse former queries; one can never go further back than to the most recent use of the "SEARCH LEVEL 1" key. Subject to that limit, however, LEXIS provides a great deal of flexibility. It is possible to reuse any queries in the current active search history (i.e., linearly descended from the most recent SEARCH LEVEL 1), after changing files, after changing libraries, or during a subsequent terminal session within the same day, provided the user requests that the search results be saved.

The JURIS philosophy is based on the mathematical theory of sets. Conceptually, a given search expression run against a given file defines a set of documents. These sets can be combined using the Boolean operators according to the following rules:

- SET/1 AND SET/2 defines a new set consisting of documents common to both sets.
- SET/1 OR SET/2 defines a new set consisting of all the documents in both sets.
- SET/1 BUT NOT SET/2 defines a new set consisting of documents in the first set, but not in the second.

Mathematically speaking, AND represents set intersection, OR represents set union, and BUT NOT represents set differencing. These operations are complete in the sense that any imaginable combination of two or more sets can be described in terms of these three operations.

In JURIS it is sufficient to define a set implicitly by a search expression and the system makes no distinction between a search expression and a set. Thus it is an easy matter to embed a former query in a new one, e.g., SET/1 AND MIRANDA.

There are some positive and negative consequences of this concept. On the positive side, JURIS is forced to maintain a full search history to make old queries available at any time, even during a later terminal session (if saved). One other positive point: searches structured around sets and combinations of sets are faster and more efficient than the equivalent LEXIS-style query. On the negative side, the fact that sets are defined by a search expression and a given file means that queries cannot be reused after changing files or file groups unless re-keyed.[3]

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[3]We understand that a programming effort is currently underway to modify JURIS to permit reusing a search expression with a new file by inputting its set name.

2.5.7. Retention of Results

A user must have the ability to save and record the results of a query, at least in hard copy if not on-line after logging off. All three systems do provide a hard copy printer with their terminal arrangements, and a paper copy of the contents of the view screen is available at the press of a button. WESTLAW has no provision for saving results on-line, not even from one query to the next. If requested to, LEXIS will save results all day, until the system is shut down at 2:00 a.m., Eastern Standard Time: JURIS will save results until system shutdown and file maintenance on the Saturday following the terminal session, thereby saving results at least overnight and perhaps over several days.

2.5.8. Miscellaneous Features

In systems where the user population is made up largely of infrequent, casual, and/or inexperienced users, the system should provide advice and assistance beyond merely informing users of the expected next input. All three systems make some effort in this direction, WESTLAW with its training file, and LEXIS and JURIS with their HELP keys. The "help" approach is preferred, since the user is not forced to leave the current file to scan the tutorial and then and come back into the file. LEXIS generally urges the user to use the HELP key on every "echo" display (system response after a command is enclosed). JURIS does not put such a message on the screen, even when an error message flashes, because the system designers believed that the users would not utilize the feature very much.

One browsing feature that many of our interviewees desired was the ability to select a specific search term from the query and then to have the system use only that feature for KWIC mode browsing. LEXIS does not provide this capability at all. A JURIS user who is well versed in set theory (or who knows the trick) can accomplish this with some difficulty via a complicated sequence of set operations called the "double but not". WESTLAW handles this with a special "locate" command.

2.5.9. Summary and Conclusions

Table 4, following this page, compares the human-factors system features considered in this section. WESTLAW appears to be a decidedly more unfriendly system than LEXIS and JURIS, which have their respective advantages and disadvantages. It is fair to characterize LEXIS as friendlier to the casual, infrequent, and/or inexperienced user. JURIS provides more flexibility for the experienced user. However, it should be noted that most of the advantages LEXIS enjoys over JURIS are touches that could be added to JURIS with a relatively minimal effort, while the JURIS advantage in query handling is a matter of system design. WESTLAW and LEXIS would require major system redesigns and a major programming efforts to replicate this advantage.

2.6. Training

For this aspect of the comparative analysis, we relied primarily on subjective assessments of our experiences after completing the formal training offered by each system. Although there are quantitative methods of measuring the effectiveness of training, neither the time constraints nor the scope of our study would permit their application. Therefore, we analyzed our impressions of the training and the effects of training upon our staff selected for instruction.

TABLE 4: COMPARISON OF HUMAN FACTORS

FACTOR	WESTLAW	JURIS	LEXIS
Easy Log-on Protocols	Good	Good	Good
Informs User of Expected Input	Fair	Good	Excellent
Echoing Commands	Good	Good	Good
Mnemonic Commands/Function Keys	Poor	Excellent	Good
Acoustic Signal After Transmission	Yes	Yes	Yes
Ability to Cancel a Command	Yes	Yes	Yes
Periodic "System Working" Message	No	No	Yes
Laborious Command Warnings	Yes	No	No
Understandable System Response	Fair	Good	Excellent
Clear Arrangement of Results	Good	Good	Good
Output Differentiated from Input	Good	Good	Good
Understandable Error Messages	Good	Fair	Good
Help Function (Errors Only)	Poor	Fair	Good
"Fail Soft" Error Handling	Yes	Yes	Yes
Detection of Spelling Errors	Yes	No	Yes
Easy Editing of Queries	Good	Good	Good
Retention of Search History	No	Yes	Partial[1]
Ability to Reuse Present Query			
- after changing files	Yes	No	Yes
- after changing libraries	N/A	No	Yes
Ability to Reuse Former Query			
- after intervening queries	No	Yes	Partial[1]
- embedded in new query	No	Yes	Partial[2]
- during a later terminal session	No	Yes[3]	Yes[1]
Ability to Get Hard Copy	Yes	Yes	Yes
Ability to Save Results On-Line			
- all day	No	Yes	Yes
- overnight	No	Yes[4]	No
- over several days	No	Yes[4]	No
- over weekends	No	No	No
Search Tips Provided by System	Fair	Good	Good
User-Selected KWIC Keyword	Yes	Difficult	No

[1]Only as long as linearly descended from same Search Level 1 Query.

[2]New query can derive from former query.

[3]If logged back on to original file.

[4]Except over weekends.

Seven of our staff received formal training for each system, either at designated training facilities (JURIS or LEXIS) or in our office (WESTLAW). Each session was conducted as if we were "customers" for the particular system and comprised the standard curriculum was given to ensure that our staff would experience what a current user might experience.

Following the completion of each training session, we surveyed staff responses to the training. We attempted to answer one basic question; "Was the training you received sufficient to enable you to use the system with some degree of confidence?" Of the staff trained, two were attorneys with previous CALR experience, one an attorney with document retrieval system experience, two were system analysts with no legal research background, and two were para-legal personnel. One of the attorneys was previously trained on LEXIS and did not attend formal LEXIS training for the project; however, he did receive JURIS and WESTLAW training. Each offered comments on the:

- Quality of any audio-visual materials used in training.
- Quality of written materials.
- Quality of material presentation.
- Level of understanding developed by training.
- Orientation of training, e.g., problem-solving, mechanics of the system.
- Length of training session.

Copies of all handout materials, deskbooks, user manuals, reference cards etc. were obtained and reviewed and, where available, on-line tutorial material was accessed and reviewed. Finally, in the case of JURIS and WESTLAW (and for selected staff on LEXIS), advanced training was also received. Below we discuss each system in terms of: written materials, audio-visual materials, formal training, and on-line training.

2.6.1. Written Materials

All of the three systems provide a desk book or user's manual as part of the system documentation. In addition, they may offer reference cards, mimeographed handouts or other written training material to the user. The material studied for each system included:

- JURIS:
  - JURIS Reference Card*
  - JURIS Reference Manual
  - JURIS Reminders * (mimeo)
  - JURIS A Conceptual Overview * (mimeo)
  - JURIS Newsletter
- LEXIS:
  - LEXIS Desk Book
  - LEXIS A Primer*
  - LEXIS The Libraries
  - LEXIS Quick Reference Card*
  - Problem Solving Exercise* (mimeo)
  - Using LEXIS As a Citator* (mimeo)
- WESTLAW:
  - WESTLAW User's Manual*
  - WESTLAW Equipment
  - WESTLAW Data Base

All of the material was reviewed and the items marked "*" were utilized in training sessions. The reference manuals or desk books generally offered a short overview or introduction describing the system and chapters on terminal operation, search logic and data base contents (except for WESTLAW). Both the JURIS and LEXIS desk books were rather lengthy, the former totaling over 40 pages and the latter running 53, minus sections on data base contents and appendices. WESTLAW's user manual totaled 35 pages and was the only document with an index.

We concluded that the LEXIS desk book was very detailed but hard to follow, the JURIS reference manual was easier to understand but contained less detail, and the WESTLAW user's manual, while containing sufficient information, appeared to be out of date and was somewhat confusing in its format. However, WESTLAW personnel did point out, as part of their training, where

information in the manuals should be deleted or modified, and also indicated to the project team that the manual is undergoing revision. On balance, the major reference document for each system was considered useful even though each had some flaws. LEXIS also furnished a condensed version of the desk book, called the Primer, which several project staff found to be very useful.

WESTLAW does not furnish any additonal written training material other than the user's manual; however, both JURIS and LEXIS do. Both have small, folded cardboard cards that provide a quick reference to system operation, data base selection, search technique and browsing. Exhibit 1, following this page, lists the major topics covered on each card. These documents are useful to refresh a user's recollection of a specific systems' function or operation and were found to be helpful. The mimeographed materials contained hints that would prove useful to any user, especially those at the Department of Justice. This material should be incorporated into the manuals or desk books because of its practical value and problem orientation.

2.6.2. Audio-Visual Materials

Only JURIS and LEXIS offered audio-visual material as part of their training (excluding WESTLAW's on-line tutorial courses). JURIS' primary training vehicle is an audio tape for listening while seated at a terminal. It is used in conjunction with graphics and limited text and is geared

Exhibit 1

Contents of Reference Cards

JURIS

Step 1 - How to communicate with JURIS
- Signing on
- Signing off

Step 2 - Where to search

Step 3 - What to search for
- A. Simple words and phases
- B. Multiple words and phases (connectors)
- C. The mechanies of searching

Step 4 - How to look at your results
- A. Selecting a format
- B. Moving with and between documents

Refining JURIS research skills

Printing

Special terminal assistance

LEXIS

- LEXIS hours
- Dialing in
- Search request
  - Search words
  - Search logic
- Search strategy
- Segment searching
- Reviewing your search request
- Modifying a search request by ...
  - Adding more terms
  - Editing existing terms
- Beginning a new search request
  - A new library
  - A new file
  - The same file
- Transferring your last search request to a new file or library
- Choosing a display format
- Browsing through retrieved cases
- To store or end your research
- Printer
- Terminal malfunction

to the text. The first part of the tape describes the operation of the terminal; the second part discusses search techniques. The former is very effective, but the latter was hurried and not well related to the text. LEXIS makes use of video-taped presentations. The tapes were well-produced, making use of graphics and animation to cover areas of computer operation and search logic. Although entertaining and interesting, these aids did not adequately help the user to grasp the concepts being presented.

2.6.3. Formal Training

The training approaches of each system are different: JURIS stresses use of the audio tape and text; LEXIS uses video tape and live trainers in a structured group session; and WESTLAW provides small group training at the user's facility emphasizing trainee operation of the terminal. It is important to note, however, that for the past year or so JURIS has begun to adopt a strategy similiar to WESTLAW and has been conducting on-site group training. A majority of the project team and users who had received this training judged small-group orientations at the user's facility to be the preferred approach because it stressed problem-solving, it involved members of the group in the training, and provided a more informal learning environment. Training on-site was also judged to be a time saver and a convenience.

Initial training for all three systems was considered adequate; and understanding of each system appeared to be a function of the system's complexity of use. Despite our preference for WESTLAW's training approach, our project staff had a more difficult time understanding how the system operates. Search logic and search expression formulation proved to be the hardest concepts to grasp, yet these were topics that all three training courses appeared to explain poorly. Advanced training offered by all three systems did address these topics in more detail, however.

2.6.4. "Hands-On" Training

This concept covers both on-line tutorial courses, such as those offered on WESTLAW, search hints that are part of the "help" function on LEXIS and JURIS, and the use of available documentation and on-line training aids to refresh or assist a user while performing a search. In general, on-line search hints or tutorials were considered helpful and comprehensive for all three systems. Project staff concluded that the provision of examples could be upgraded or made more user-oriented by presenting realistic problems.

Table 5: Data Base Comparison

CASELAW	JURIS	WESTLAW	LEXIS
Supreme Ct			
Headnotes			
1932-1959		X	
1960-pres.	X[1]	X[1]	
Full Text			
1800-1849	U.S.P		
1850-1899	U.S.P		U.S.3
1900-1912	U.S.		U.S.3
1913-1931	U.S.		U.S.3,4
1932-1937	U.S.	S. Ct.	U.S.3,4,5
1938-1974	U.S.	S. Ct.	U.S.3,4.5,6
1975-	U.S.		
	S. Ct.	S. Ct.	U S.3,4.5.6
1976-pres.	S. Ct.[2]	S. Ct.	U.S.3,4,5,6
Ct. of Appeals			
Headnotes			
1957-1959		Xp	
1960-	X	X[p]	
1961-pres.	X[1]	X[1]	
Full Text			
1880-1923	F.p		
1924-1932	F.2d[p]		
1933-1944	F 2dp		Cts. App.5
1945-1960	F.2dP		Cts. App.3,4,5,6
1961-	F.2dp	F 2dP	Cts. App.3,4.5,6
1962-pres.	F.2d[2]	F.2d[2]	Cts. App.3,4,5,6

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Table 5
(Continued)

CASELAW	JURIS	WESTLAW	LEXIS
Dist. Ct.			
Headnotes			
1957-1959		XP	
1960	X	XP	
1961	X[1]	X[1]	
Full Text			
1932	F. Supp.P		
1933-1949	F. Supp.P		Dist. Cts.[5]
1950-1959	F. Supp.P		Dist. Cts.[5,7]
1960	F. Supp.P		Dist Cts.[3,4,5,6,7]
1961-1969	F. Supp.P	F. Supp.	Dist. Cts.[3,4,5,6,7]
1970-pres.	F Supp.[2]	F. Supp.[2]	Dist. Cts.3,4,5,6,7
Ct. of Claims			
Headnotes			
1957-1959		XP	
1960	X	XP	
1961-pres.	X[1]	X[1]	
Full Text			
1867-1941	Ct. Cl.P		
1942-1955	Ct. Cl.P		Ct. Cl.[4]
1956-1961	Ct. Cl.		Ct. Cl.[4]
1962-1975	Ct. Cl. and F. 2d	F. 2d	Ct. Cl.[4]
1976	F. 2d	F. 2d	Ct. Cl.[4]
1977-pres.	F. 2d[2]	F. 2d[2]	Ct. Cl.3,4,6
Full Text			
1961-1976		F.R.D.	
1976-pres.	F.R.D.	F.R.D.	

Table 5
(Continued)

CASELAW	JURIS	WESTLAW	LEXIS
U.S Court of Customs and Patent Appeals			
Headnotes			
1960	X		
1961-pres.	X[1]	X[1]	
Full Text			
1880-1923	F.p		
1924-1951	F. 2d[p]		
1952-1960	F. 2dp		
1961	F. 2dp		C.C.P.A.[3]
1962-pres.	F 2d[2]	F. 2d F 2d[2]	C.C.P.A.[3] C.C.P.A.3
Court of Customs			
Headnotes			
1957-1959		Xp	
1960	X	X[p]	
1961-pres.	X[1]	X[1]	
Full Text			
1932-1960	F. Supp.p		
1961-1969	F. Supp.[p]	F. Supp.	
1970-pres.	F. Supp.2	F. Supp.2	
Tax Court			
1942-1976	U.S. T.C.p		T.C. Memo & Ops.[4]
1977-pres.			T.C. Memo & Ops.[4]
Brd. Tax App			
Full Text			
1924-1925			B.T.A.[4]
1926-1941	B.T.A.p		B.T.A.[4]
1942-pres.			B.T.A.[4]

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Table 5
(Continued)

CASELAW	JURIS	WESTLAW	LEXIS
Military			
Full Text			
1951-1975	C.M.R.		
1975-pres.	MJ. Rptr.	MJ. Rptr.	
Statutes			
Public Law			
Full Text			
93rd-95th Cong.	X10		X
U.S. Code			
1976 Version	X		X
Int. Rev Code			
Full Text			
1954 & updates			X
Legis Hist/Cf. Rpt.			
Full Text			X5
D.C. LAW			
Ct. of App.			
Headnotes			
1957-1966		Xp	
1967-pres.	X1,12	X1	
Full Text			
1965-1970			D.C. Ct. App.
1971-1977	A. 2d8		D.C. Ct. App.
1978-pres.		A. 2d	D.C. Ct. App.

Table 5
(Continued)

CASELAW	JURIS	WESTLAW	LEXIS
D.C. Super. Ct.			
Full Text			
1971-1978	D.C.S.C.8&11		
STATE LAW (50 States)			
Headnotes			
1957-1966		Cal. Rptr.p P. 2d^{p} N.W. 2dp N.Y.S. 2d^{p} N.E. 2dp A. 2d^{p} S.E. 2dp SO. 2d^{p} S.W. 2dp	
1967-pres.	Cal. Rptr.^{1} P. 2d^{1} N.W. 2d^{1} N.Y.S 2d^{1} NE 2d^{1} A. 2d^{1} S.E. 2d^{1} SO . 2d^{1} S.W. 2d^{1}	Cal. Rptr.^{1} P. 2d^{1} N.W. 2d^{1} N.Y S. 2d^{1} NE 2d^{1} A. 2d^{1} S.E. 2d^{1} S., 2d^{1} S.W. 2d^{1}	
Statutory Law			
Full Text - See Appendix			
Caselaw			
Full Text - See Appendix			

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Table 5
(Continued)

CASELAW	JURIS	WESTLAW	LEXIS
Full Text			
California	(P. 2d & Cal. Rptr.)	1967-1977p 1978-pres.	1945-pres.
Alaska	(P. 2d)	1978-pres.	
Arizona	(P. 2d)	1978-pres.	1965-pres.
Colorado	(P. 2d)	1978-pres.	1965-pres.1
Hawaii	(P. 2d)	1978-pres.	
Idaho	(P. 2d)	1978-pres.	
Kansas	(P. 2d)	1978-pres.	1963-pres.9
Montana	(P. 2d)	1978-pres.	
Nevada	(P. 2d)	1978-pres.	
New Mexico	(P. 2d)	1978-pres.	
Oklahoma	(P. 2d)	1978-pres.	1965-pres.p
Oregon	(P. 2d)	1978-pres.	1965-pres.p
Utah	(P. 2d)	1978-pres.	
Washington	(P. 2d)	1965-1977p 1978-pres.	
Wyoming	(P. 2d)	1978-pres.	
Iowa	(N W. 2d)	1978-pres.	1965-pres.p
Michigan	(N.W. 2d)	1978-pres.	1965-pres.
Minnesota	(N.W. 2d)	1945-pres.	1965-pres.
Nebraska	(N.W. 2d)	1978-pres.	
North Dakota	(N W. 2d)	1978-pres.	
South Dakota	(N.W. 2d)	1978-pres.	
Wisconsin	(N W. 2d)	1978-pres.	

Table 5
(Continued)

	JURIS	WESTLAW	LEXIS
New York	(N E. 2d & N.Y.S. 2d)	1967-1977p 1978-pres.	1940-pres.9
Illinois	(N.E. 2d)	1978-pres.	1945-pres.
Indiana	(N.E. 2d)	1978-pres.	
Mass.	(N.E. 2d)	1978-pres.	1950-pres.
Ohio	(N.E. 2d)	1978-pres.	1940-pres.9
Conn.	(A. 2d)	1978-pres.	1965-pres.p
Delaware	(A. 2d)	1978-pres.	
Maine	(A. 2d)	1978-pres.	
Maryland	(A. 2d)	1978-pres.	1965-pres.
New Hampshire	(A. 2d)	1978-pres.	
New Jersey	(A. 2d)	1948-pres.	1948-pres.
Pennsylvania	(A. 2d)	1978-pres.	1955-pres.
Rhode Island	(A. 2d)	1978-pres.	
Vermont	(A. 2d)	1978-pres.	
Georgia	(SE 2d)	1978-pres.	1965-pres.
N. Carolina	(SE 2d)	1978-pres.	1965-pres.p
S. Carolina	(S.E. 2d)	1978-pres.	
Virginia	(S.E. 2d)	1978-pres.	1925-pres.
W. Virginia	(S.E. 2d)	1978-pres.	
Alabama	(SO. 2d)	1978-pres.	
Florida	(SO. 2d)	1978-pres.	1955-pres.
Lousiiana	(SO. 2d)	1957-1977p 1978-pres.	1955-pres.
Mississippi	(SO. 2d)	1978-pres.	

Table 5
(Continued)

Arkansas	(S.W. 2d)	1978-pres.	
Kentucky	(S.W. 2d)	1978-pres.	1955-pres.
Missouri	(S.W. 2d)	1978-pres.	1945-pres.[9]
Tennessee	(S.W. 2d)	1978-pres.	1965-pres.
Texas	(S.W. 2d)	1967-1977P 1978-pres.	1955-pres.

P Planned Files
1 Advance Sheets
2 Slip Opinions
3 In Federal Patent, Trademark, and Copyright Law Library
4 In Federal Tax Library
5 In Securities Law Library
6 In General Federal Library
7 In Trade Regulation Library
8 Criminal Cases Only
9 Statutory Law
10 95th incomplete. Also public laws from 96th Congress as they become available
11 Selected Cases
12 In Digest file group - USADC file group lags behind

III. SPECIFIC TESTS OF RESPONSE TIME AND QUERY FORMULATION

3.1 Overview

From the user interviews there emerged two areas in which we decided that testing would be beneficial and necessary. First was the measurement of the amount of time each system requires to process a search expression, from the time the search is "entered" by the user until a response (other than an error message) is displayed on the terminal view screen. An adjunct to this was to measure the amount of time each system required to respond to "browsing" commands, such as page forward, "KWIC", etc.

Second, the ease or difficulty of formulating a search expression on each system was viewed as having an effect on search response time, overall system usage, and the quality of results. Therefore, we wanted to understand how the particular search logic for each system operated, what was necessary for the user to keep in mind when formulating the search expression, and finally, what effect these factors may have on system usage and the user's research habits. The paragraphs below describe the results of these tests and the findings and conclusions of the project team concerning those results.

3.2. System Response Time

The most consistent complaint of current JURIS users was that system response time for searches was too slow. Although no precise definition of a sufficiently fast response time was offered by the users or found in the literature, we judged that it should be a matter of seconds. However, we were aware of a number of variables that might affect overall response time, and we compiled a list of these factors, which is discussed later in this section.

We first reviewed current JURIS statistics to determine current search command response time, periods of peak and non-peak system usage, and days of the week when usage was heaviest. All data reviewed came from the JURIS Weekly Statistics report compiled by the DOJ Systems Design and Development Staff (SDDS). These reports showed the average response time for all search commands to be 41 seconds, during a period from July 29, 1978 to April 27, 1979. Exhibit 2, following this page, shows the total number of search commands and average search response time for that period. Between 10:00 a.m. and 2:00 p.m. utilization of JURIS was at its heaviest, but data on specific days of the week were inconclusive. Discussions with SDDS personnel confirmed the basic accuracy of the data we examined.

The next step was to compare JURIS, in an operational environment, to LEXIS and WESTLAW in order to assess the search response time of each. Prior to developing the methodology for the test, we compiled a list of variables that could affect search response time. The list included:

- Size of the file being searched.
- Day of the week, time of day - usage varies greatly between peak and slack times.
- Use of "connectors" and root expanders - use of connectors for complex searches and use of certain connectors like BUT NOT will slow response time. This also applies to use of root expanders such as ! and *.
- Words or terms used in search expression - frequently used terms like "housing" or "state court" slow the response; unique words speed the process. Also, legal phrases like "res ipsa loquitur" and "doctrine of last chance" increase response time.

The search expressions developed for the test would, therefore, include examples of all these variables.

Exhibit 2

Juris Search Commands and Average Response Time

Dates	Average Response Total	Time (SECS)
7/29-8/4/78	9,875	57
8/7/-8/11	10.411	52
8/14-8/18	9,633	55
8/21-8/25	9.268	39
8/28-9/1	11,072	38
9/4-9/8	6.786	43
9/11-9/15	8,015	56
9/18-9/22	9.367	45
9/25-9/29	9,517	34
10/2-10/6	9.192	40
10/9-10/13	6,018	38
10/16-10/20	9.782	47
10/23-10/27	10,937	37
10/30-11/3	10.546	35
11/6-11/11	7,795	42
11/13-11/17	8,532	48
11/20-11/24	7,059	45
11/27-12/1	7,432	44
12/4-12/8	8,356	44
12/11-12/15	8,518	37
12/18-12/22	7,642	48
12/25-12/29	6,102	36
1/1-1/5/79	5,938	30
1/9-1/13	9,173	37
1/15-1/19	1,933	51
1/22-1/26	9,645	44
1/29-2/2	10,000	43
2/5-/29	9,703	40
2/12-2/16	8,888	32
2/19-2/23	6.264	32
2/26-3/2	8,296	40
3/5-3/9	9,134	45
3/12-3/16	9,455	32
3/19-3/23	8.939	31
4/2-4/6	10,026	43
4/9-4/13	9.039	44
4/16-4/20	8,204	38
4/23-4/27	9.412	24
	Average response time	41

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3.2.1. Search Expressions Used

The attorney members of our project staff, in conjunction with our systems personnel, developed a series of eight problems which were used to perform the search response time analysis. Our intitial approach was to utilize the problems contained in the Federal Judicial Center's evaluation of CALR systems, because they had not been run on WESTLAW after that system acquired a limited full text capacity and they had never been run on a fully-operational JURIS system. Additionally, the results of each problem search were available for verifying the outcome of our searches and the formulation of our expressions.

However, as we began to work with the various problems we found some of them to be too complex for our purposes and not reflective of the types of legal issues current users research. A review of the user survey results provided us with the basic types of problems users most frequently researched on CALR systems, our search expressions were developed to address each of these problem types. Exhibit 3, following this page, lists the eight problems ultimately developed and utilized in the analysis. Some represent problems from the Federal Judicial Center's evaluation, some were suggested during the user interviews, and others were developed by us.

3.2.2. Response Time Analysis Protocol

To ensure that results were accurately recorded, we established a standard procedure for performing each test session. First, assignment of problems was made by day of the week and time period. Each day was divided into six time periods: 8 a.m.-10 a.m., 10 a.m.-12 noon, , 12 noon-2 p.m., 2 p.m-4 p.m, 4 p.m.-6 p.m. and 6 p.m.-signoff; however, the last time slot was not used in the test because it is an off-peak time

Exhibit 3

Problems Used In Search Response Time Analysis

Problem No.

1. "Shepardize" the follwing three cases:

. WESTLAW		DATA BASE
- Benn	"476 F.2d. 1127"	Each run on
- Delgado	"397 F. Supp. 708"	SCT, FED and FS
- "1965 Buick	"392 F.2d 672"	

. LEXIS

- (Benn pre/3 Hunt) or (476 p/6 1127)	NEWER
- Delgado or (397 pre/6 708)	
- 1965 Buick or (392 pre/6 672)	

. JURIS

- (Benn p/3 Hunt) or (476 p/6 1127)	HOT CASES
- Delgado or (397 p/6 708)	
- 1965 Buick or (392 p/6 672)	

2. Please obtain the case name or citation for:

. WESTLAW

- Citation (541 + S 427)	FED only
- Title (Fortnightly)	SCT only

. LEXIS

- Cite (541 pre/6 427)	
- Name (Fortnightly)	Newer

. JURIS

- Cite (541 p/6 427)	F2D HOT
- Cite (Fortnightly)	USHTRCNT

3. Examining search query modification-Please run the following search:

. WESTLAW - FED File

- warrant /s valid validity invalid
- warrant /s valid validity invalid & unknown "not known"
- warrant /s valid validity invalid & unknown "not known" & informant

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. LEXIS - CIR File

- warrant w/5 valid or validity or invalid (Level 1)
- w/seg (unknown or "not known") (Level 2)
- w/seg informant (Level 3)

. JURIS - F2d. File

- warrant w/valid or validity or invalid (set 1)
- set/1 and unknown or "not known" (set 2)
- set/2 and informant (set 3)

4. Use of root expander - please run the following search:

. WESTLAW -SCT File

- expunge expungement & records
- expunge* expunction & records

. LEXIS - SUP File

- expunge or expungement or expunction and record
- expunge! or expunction and record

. JURIS - USHTRCNT File

- expunge or expungement or expunction and records
- expunge! or expunction and records

5. Plurals - perform the following search:

. WESTLAW - SCT File

- automobile car vehicle & exigent
- automobile* car cars vehicle* & exigent

. LEXIS - SUP File

- automobile or car or vehicle and exigent
  note: no 2nd level

. JURIS - USHTRCNT File

- automobile or car or vehicle and exigent
- automobile* or car* or vehicle* and exigent

6. Perform the following search:

   . WESTLAW - SCT File

   - automobile car vehicle & exigent
   - automobile car vehicle & exigent & glove glovebox

   . LEXIS - SUP File

   - automobile or car or vehicle or exigent (Level 1)
   - and glove or glovebox (Level 2)

   . JURIS - USHTRCNT File

   - automobile or car or vehicle and exigent (Set 1)
   - SET/1 and glove or glovebox (Set 2)

7. Perform the following search:

   . WESTLAW - FED File

   - "declarant unavailable"
   - dead deceased slain +s witness
   - dead deceased slain +s witness & "grand jury"

   . LEXIS - CIR File

   - "Declarant unavailable" (Level 1)
   - and (dead or deceased or slain) pre/3 witness (Level 2)
   - w/seg grand jury (Level 3)

   . JURIS - F2D File

   - Declarant unavailable (Set 1)
   - (dead or deceased or slain) p/3 witness (Set 2)
   - Set/2 and grand jury (Set 3)

8. Perform the following seach: From Sprowl's Book.

   . JURIS - F2DRCNT File

   - (interference w/sen contract or contractual) and (punitive or exemplary) w/sen damages

   . LEXIS - CIR File

   - (interference w/10 contract or contractual) and (punitive or exemplary) w/4 damages

- WESTLAW - FED File

  - interference & contract contractual & punitive exemplary & damages

Exhibit 4

JURIS ANALYSIS

Search Response Time Analysis

LOG SHEET

Operator: _____ Date: _____

Problem No _____ System: _____

1. Log-on Time (clock-time): _____
2. Problems With Log on: _____

   _____

   _____
3. Search Start (clock time): _____
4. Search Stop (clock time): _____
5. Search Response Time: _____
6. Problems With Search: _____

   _____

   _____
7. Sign-Off Time (clock time): _____
8. Comments: _____

   _____

   _____

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and few users indicated any problems with response time after 6 p.m. The bulk of the searches were concentrated in the 10 a.m.-2 p.m. period, during the five week-days.

Prior to beginning a search, the operator was required to obtain a Log Sheet, an example of which is contained in Exhibit 4, following Exhibit 3, and fill out the information at the top. Each operator was handed a list of the problems by time period and entered the problem number on the Log Sheet. At certain defined stages in the test, they were instructed to print out material relevant to the test, e.g. search query used; results of search, error messages etc. Search response time was measured from the time the query was entered until a response appeared on the view-screen or an audible tone was heard, depending upon the operator's preference. A similiar protocol was followed in measuring response time to browsing commands.

3.2.3. Results of Search Response Time Analysis

The eight problems discussed above were run on each system at different time intervals from May 25, 1979 until June 8, 1979. Exhibit 5, following this page, shows the dates and time periods in which each search was performed by system. Because of difficulties in logging onto JURIS or getting the system to "take" the search query due to high usage, some tests were run separately.

Based upon a total of 141 separate searches, we found JURIS, when available for searching, to have the faster overall search response time, with LEXIS second and WESTLAW third.

When the results are examined on a problem-by-problem basis, JURIS still appears to be the fastest system; with searches for LEXIS averaging from 1.5 to 5 times slower, and WESTLAW from 1.6 to 11 times slower. There are exceptions to

Exhibit 5

Dates and Time Periods in Which Search Were Run

Quest 1-4	Quest 5-8
5/25/79	6/4/79
8-10	10-12
10-12	12-2
2-4	2-4
4-6	4-6
5/29/79	6/6/79
10-12	10-12
12-2	12-2
2-4	2-4
5/31-79	4-6
10-12	6/7/79
12-2	2-4 quest. 1-4
6/7/79	4-6 also in this time slot
12-2	6/8/79
2-4	8-10
4-6	10-12

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this general statement. For example, on problem 4 a & c the response times for all systems were practically identical. On problem 7, both LEXIS and WESTLAW out-performed JURIS, but were very close to each other in their response times.

JURIS appears to be very effective in performing short and specific searches like citation checking and "shepardizing"; but it is slowed by a complex expression or use of root expanders. LEXIS also performed the simpler searches, although slower than JURIS. It handled root expansion very well, but was quite slow on problem 3, search query modification, and problem 8, a search expression utilizing parentheses and proximity connectors. WESTLAW is, on the basis of the tests, slower than the other two systems; however, because of the different approach taken by the system in displaying search results, these conclusions may be misleading.

Exhibit 6, on the following page, presents a breakdown of results by problem, time periods and system. These results are for search response time only. Actual search session time could be longer, especially on JURIS because of sporadic system overload. The project team had particular difficulty on May 25 and June 4 both in logging on and getting the system to accept the query, thereby forcing cancellation of some search response tests. Both LEXIS and WESTLAW experienced minor service problems; however, they did not result in cancellation of a test.

Further, we do not represent the results of our limited analysis to be conclusive, because a number of the variables were beyond our control. First, there were differences in the size of data files searched between the three systems. Both LEXIS and WESTLAW have larger files that naturally take more time to search. To obviate this disparity, we would have had to modify the LEXIS and WESTLAW queries to search between specific dates, a factor that reduces search response time. Secondly, the internal file architecture, e.g. concordance, for each system is different

Exhibit 6

Results (In Seconds) of Search Response Time Analysis by Problem, Time of Day and System

Time of Day	Problem/System		
	1a. "Shepardize" Benn v. Hunt 476 F2d. 1127		
	JURIS	LEXIS	WESTLAW
10-12	19	37	96
12-2	30	32	108
4-6	30	51	72
Average	26	40	92
	1b. "Shepardize" Delgado 397 F. Supp. 708		
10-12	19	47	105
12-2	22	46	267
4-6	23	95	72
Average	21	63	148
	1c. "Shepardize" 1965 Buick 392 F2d. 672		
10-12	42	65	58
12-2	52	59	156
4-6	44	65	38
Average	46	63	84
	2a. Find Case Name for 541 F2d 427		
10-12	7	67	18
	7	59	14
	8	67	-
12-2	-	-	16
2-4	27	27	20
4-6	10	28	23
Average	12	50	20
	2c. Find Citation for "Fortnightly"		
10-12	5	28	33
	4	49	179
	5	58	
12-2	-	-	7
2-4	12	20	159
4-6	10	22	110
Average	7	35	78

Exhibit 6
(Continued)

	JURIS	LEXIS	WESTLAW
3. Search Query Modification			
8-10	62	-	192
12-2	138	443	
	-	440	
2-4	-	-	100
4-6	261	513	
Average	154	465	158
4a. Unique Terms: Expunge, expungement			
12-2	15	17	8
	26		21
2-4			27
4-6	10	18	8
Average	17	18	16
4c. Unique Terms and Universal Root Expander			
12-2	13	21	9
	16		22
2-4			19
4-6	23	21	9
Average	17	21	15
5a. Automatic Plurals*			
8-10	-	30	16
12-2	26	54	25
	23	-	-
2-4	30	41	37
	-	46	-
4-6	26	66	23
Average	26	47	25

*On this problem, we only ran one LEXIS search since that system automatically searches for plurals. On JURIS and WESTLAW, ~~you~~ must use the root expanders! or * to search for plurals. The results for 5b (below) reflect the use of root expanders.

Exhibit 6
(Continued)

5b. Use of Root Expanders to Search Plurals

8-10	-	-	10
12-2	219	-	38
	189	-	-
2-4	107	-	49
4-6	103	-	21
Average	155	-	30

6. Simple, Two-Level Search

8-10			21
10-12	47	117	55
	47	144	-
12-2	30	112	44
			24
4-6	37	163	66
Average	40	134	42

7. More Complex, Multi-Level Search

8-10			117
10-12	169	183	150
2-4	203	214	-
4-6	551	193	282
			212
Average	308	197	190

8. Complex One-Level Search with Parentheses and Connectors

8-10	-	-	42
10-12	93	243	38
12-2	82	241	128
2-4	89	242	27
4-6	123	254	24
Average	97	245	52

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and can affect response time either positively or negatively. Finally, as each system's literature points out, searching is a highly individual art rather than a science; therefore, user sophistication can effect response time.

There are some general conclusions we may draw from this analysis, however. One is that JURIS, despite user complaints, is not a particularly slow system when used as designed, e.g. short, simple search sets. It suffers primarily from hardware-related problems and lack of user understanding of its operation. Secondly, while LEXIS contains a larger data base, its file structure is such that response time is necessarily slower and the user must trade off greater recall capability against greater response time[1]. Finally, WESTLAW is generally slower than the other two systems, and it does not provide the user with the type of response desired.

3.2.4. Results of Browse Command Response Time Analysis

In our follow-up interviews, several JURIS users mentioned their annoyance with slow system response to browse and format commands such as paging forward or backward, KWIC, full text, etc. We decided to measure browse command response time as part of our comparative analysis. The features differ somewhat from system to system, and we identified nine features which have a common function on each of the three systems. They are:

- CITE or LIST, which displays a list of citations to each document retrieved.
- FULL or PAGE, which displays a full page of text from a particular document.

[1]LEXIS will be changing hardware in late Fall or early Winter 1979, that could increase responsiveness.

- KWIC or TERM, which displays the search (key) words and a limited amount of text surrounding the search words.
- Page forward to display the next page in a document.
- Page back to display a previous page.
- Document forward to display the next document or case.
- Document back to display a preceding case or document.
- First document to display the retrieved document (WESTLAW displays this automatically as a search result).
- Change group to begin searching a new collection of data files.

JURIS and LEXIS have two features not found on WESTLAW; change file, which enables the user to move to another file within a group, and expand KWIC, which increases the amount of text displayed on either side of the search words. Features unique to one system were analyzed; however, the results of such tests are not included in the report.

Prior to beginning a test, each operator obtained a log sheet (Exhibit 7, following this page) on which to record results. The operators were instructed to log-on, access the particular file that contained Supreme Court cases, and search for the expression "CATV". When the search was completed, they ran each command in order of its appearance on the log sheet. Browse command response time was measured from the time where the command was entered until an audible tone was heard signalling the system was ready for an additional command (JURIS and LEXIS), or, in the case of WESTLAW, a response appeared on the screen.

The analysis was performed during June 12 and 13, 1979, in each of the five time periods used to test search response time. Only two tests per system per time period were completed

due to time constraints. Since our purpose is to comment on the reasonableness of these features, the results are sufficient.

Generally, LEXIS and WESTLAW were quicker in responding to the nine commands measured, with LEXIS faster in CITE, KWIC, document forward, first document and changing group, and WESTLAW faster in FULL, paging forward and backward, and document back. JURIS ran slower in all categories except for changing the data base. However, it should be noted that because JURIS displays more lines per screen in the full text mode, and has a generally larger KWIC window than LEXIS, the response time would naturally be somewhat longer. It was suggested that we attempt to measure browse command response time from the point of entry until the first character of the response appears on the screen. We decided that in the absence of equipment to perform such measurements, consistency of results would be better served by relying on the audible tone. Because WESTLAW responds with a full screen, visual observation was sufficient. A user can read the document as the screen fills on JURIS and LEXIS; therefore, none of the browse command results should be construed as negative. The results of each test, by command, time of day and system, are contained in Exhibit 8, following this page.

3.3 Ease of Query Formulation

Early in the project, it was apparent that a thorough comprehension of the process required to formulate a search expression or query would be an important part of our analysis. CALR systems, by virtue of their design and method of operation, are alien to persons trained in traditional legal research methods. To use a CALR system requires the user to understand the process of asking the computer to look for and display documents in the data base. However, if the process is too complex or time consuming the user will hesitate to use CALR. Also, should a user lack confidence in the search expressions developed and if

Exhibit 7

JURIS ANALYSIS

BROWSE COMMAND RESPONSE TIME ANALYSIS

LOG SHEET

Operator: _____ Date: _____

System: _____

Search Expression: "CATV"

File: Supreme Court

Browse Commands	Elapsed Time
CITE (WESTLAW = "L")	
FULL (WESTLAW = "R=1", then "P")	
KWIC (WESTLAW = "T")	
PAGE FWD (WESTLAW = "ENTER")	
PAGE BACK (WESTLAW = "P=1")	
DOC FWD (WESTLAW = "R=2") (LEXIS = "CASE FWD")	
DOC BACK (WESTLAW = "R=1") (LEXIS = "CASE BACK")	

Hit KWIC and DOC FWD for LEXIS and JURIS, do R=3 for WESTLAW. Do not record. Then perform tests listed below.

FIRST DOC (WESTLAW = "R=1") (LEXIS = "FIRST CASE")	
LEXIS: Change library to FEDTAX	
WESTLAW: "NEW DB FED"	
JURIS: Change group to STATLAW	

the expression is poorly framed, the results of the search will be less valuable.

3.3.1. Methodology

Our decision to analyze query formulation was easily reached; however, the determination of how best to evaluate it was not as easy. Since a rigorously controlled, quantitative analysis was not possible, we agreed that a subjective analysis, conducted by the two attorney members of the project staff, a C&L attorney skilled in legal research, and a project systems analyst, would be appropriate. Each of the participants had received formal training on all three systems, and had become operationally familiar with all of them prior to the analysis. Five problems from the set of problems used in Federal Judicial Center's study were randomly assigned to each participant with instructions to review the problems and devise an initial search query for each system. Next, the participants were asked to select two problems and run their queries against each system, review the results, and modify the query if necessary. They could make as many as four modifications to their initial search expression to find relevant documents. Each participant reported an analysis of the experience, focusing upon the ease or difficulty of formulating the query, the subsequent modifications made to the query, the results of each search, and an assessment of each system's search logic. From discussions of these analyses came a number of observations concerning formulation of queries.

3.3.2. Findings

The skills and experiences of our participants in some ways mirror those of the user community; however, searching on a CALR system is an art and a matter of individual research approach and expertise. Our search experiences, therefore, may not be typical.

Exhibit 8

Results of Browse Command Response Time Analysis

System/Results (in Seconds)

Command	Time Period	Test 1 JURIS	Test 1 LEXIS	Test 1 WESTLAW	Test 2 JURIS	Test 2 LEXIS	Test 2 WESTLAW
CITE							
	8-10	18.0	12.5	7.6	16.1	13.0	4.7
	10-12	27.2	12.5	4.4	13.1	12.4	5.5
	12-2	10.5	12.3	17.2	12.3	12.5	6.0
	2-4	12.5	12.6	5.5	12.0	12.6	5.5
	4-6	11.9	12.5	32.1	13.6	12.4	29.0
	average	16.0	12.5	13.4	13.4	12.5	10.1
FULL							
	8-10	44.5	10.5	4.0	22.0	11.5	6.0
	10-12	28.6	10.4	5.5	32.8	10.5	7.9
	12-2	20.4	10.6	9.4	25.4	10.5	9.7
	2-4	20.1	11.4	10.1	22.0	10.9	10.5
	4-6	32.0	11.0	7.0	39.5	12.4	7.3
	average	29.1	10.8	7.2	28.3	11.2	8.3
KWIC							
	8-10	20.6	9.9	9.9	19.4	10.6	7.1
	10-12	34.4	10.4	7.5	27.5	10.9	6.5
	12-2	17.6	10.0	17.1	15.9	10.9	16.0
	2-4	18.7	12.0	13.0	17.7	11.4	11.0
	4-6	23.1	11.8	8.8	23.3	11.5	9.1
	average	22.9	10.8	11.3	20.8	11.1	9.9
PAGE FORWARD							
	8-10	17.7	13.1	8.3	14.5	14.8	7.3
	10-12	34.5	9.3	6.5	20.2	7.9	4.9
	12-2	17.4	12.7	12.0	17.5	10.7	11.3
	2-4	17.4	12.6	9.4	17.4	11.1	10.0
	4-6	17.2	13.0	7.6	18.0	12.6	7.0
	average	20.8	12.1	8.8	17.6	11.4	8.1
PAGE BACK							
	8-10	16.6	10.0	7.8	16.7	10.0	4.5
	10-12	27.4	9.9	7.0	16.4	16.4	7.1
	12-2	17.0	9.8	9.3	16.9	9.5	9.0
	2-4	16.4	10.4	10.5	16.9	9.8	9.9
	4-6	17.6	9.5	11.6	17.0	9.5	9.9
	average	19.0	9.9	9.2	16.8	11.0	8.1

000150

Command	Time Period	JURIS	LEXIS	WESTLAW	JURIS	LEXIS	WESTLAW
DOCUMENT FORWARD							
	8-10	9.4	9.5	7.6	19.5	10.4	5.5
	10-12	18.9	9.4	7.3	39.9	9.3	9.7
	12-2	9.5	9.4	12.4	20.5	9.4	12.0
	2-4	9.8	9.4	12.0	17.3	9.3	12.1
	4-6	12.9	9.3	12.5	13.9	9.3	11.7
	average	12.1	9.4	10.4	22.2	9.5	10.2
DOCUMENT BACK							
	8-10	18.7	9.9	5.4	20.5	10.9	5.1
	10-12	22.9	10.0	5.8	26.1	9.5	7.4
	12-2	17.0	9.9	12.5	20.0	9.9	14.2
	2-4	17.9	10.4	14.0	18.0	9.8	13.8
	4-6	18.5	10.0	6.4	17.7	10.1	5.2
	average	19.0	10.0	8.8	20.5	10.0	9.1
FIRST DOCUMENT							
	8-10	17.5	8.5	10.6	19.5	10.1	7.4
	10-12	21.9	10.0	20.7	22.6	10.0	7.0
	12-2	17.5	10.2	13.3	19.1	10.1	11.5
	2-4	18.4	10.5	7.4	19.0	10.3	10.4
	4-6	18.0	10.6	8.7	18.3	10.0	7.6
	average	18.7	10.0	12.1	19.7	10.1	8.8
CHANGE LIBRARY/GROUP/ NEW D.B.							
	8-10	11.4	13.6	7.9	15.5	25.0	5.2
	10-12	13.8	13.6	6.8	25.8	28.1	9.5
	12-2	11.9	11.1	26.0	24.2	13.2	18.7
	2-4	12.3	11.0	15.2	21.1	13.0	16.0
	4-6	14.9	11.2	8.2	15.3	11.9	12.1
	average	12.9	12.1	12.8	20.4	18.2	12.3

Our consensus is that JURIS is the preferred system, primarily because of the flexibility it provides a user in constructing a search. Creation of search sets permits the user to attack a legal problem from several angles and, should one or more prove to be less than successful, does not force the user to restart from the beginning. JURIS encourages the combining of sets to build a search, and its retention of the results of each set promotes efficiency in searching because errors need not be repeated. These features are seen as encouraging the user to apply creative thought in searching and, when combined with the relatively simple use of connectors, enables attention to be given more to the problem at hand than the rules of searching.

LEXIS is considered to work well mechanically; however, it was thought to be more "intimidating" to the user because of its rigid search logic. One of the participants who used LEXIS heavily prior to this study and was somewhat biased toward LEXIS prior to the exercise, came away from the comparison feeling that JURIS was more efficient than LEXIS and that the connector heirarchy of LEXIS made structuring a search more difficult and less efficient.

WESTLAW was rated the most difficult system to understand of the three because of the numerous commands a user must remember, the lack of special function keys, and the need to string sequences of search words together in one query. The ability to modify a search is aided by WESTLAW's acceptance of successive, identical proximity connectors but hampered by an inability to get a response that indicates the number of documents that satisfy proximity connector requests without performing two additional operations. WESTLAW returns from a search with the first document it has "ranked" according to the number of times the search words appear in the document and the date of decision, and not with the number of documents retrieved. To get this number, the user must enter "Z", which provides a total. The system will respond with one of two messages: "N documents contain your

search words" or "N documents contain your search words although some may not satisfy your phrase and/or proximity requests". Should the latter messaage appear, the user may either browse the documents retrieved, or enter R=N (N being equal to the "Total") to have the system sort through each document and respond with the total that does satisfy phrase and/or proximity requests. Since users were generally interested in knowing the number of documents retrieved first, WESTLAW's ranking feature tends to be more of a problem than a help. Several of the participants felt frustrated by full-text searching on WESTLAW, but were pleased by the ease of headnote searching. This suggests that WESTLAW's full text capabilities are not as sophisticated as those of the other two systems.

When the three systems are compared, JURIS is more amenable to simplified query formulation than the other two systems and adapts itself better to the traditional hard copy research approach all attorneys are familiar with. It is an easier system to learn than either LEXIS or WESTLAW and, at least among our analysis group, its principles of operation are easier to retain. LEXIS is similar to JURIS but, because of its limited "levels" for searching, the "successive refinement" approach adopted by the system, and its complex connector heirarchy, requires greater pre-planning and on-line skills. WESTLAW suffers from the decided unfriendliness of its systems design and of a terminal that requires a user to first pre-plan searches in great detail and secondly to remember a number of machine commands.

IV. COMPARISON OF SYSTEMS TC USER PROFILE

Earlier in the project, a profile of the requirements users indicated were necessary and desirable in a CALR system was prepared. As was pointed out in the introduction, the comparative analysis was then designed to ascertain how each system would or would not match up with the profile. This section describes the results of that comparison, beginning with a precis of the user profile for reference, next describing how each system compares with the profile, and concluding with our specific findings, conclusions and recommendations.

4.1. Summary of the User Profile

The attitudes, perceptions and satisfaction level of the current JURIS user community concerning CALR in general, and JURIS in particular, formed the basis for the user profile. A total of 27 DOJ and other federal agency users were interviewed, and pertinent literature read to provide the necessary input. From this, seven broad areas of features were defined as comprising the list of requirements users needed or wanted in a CALR system. These areas were:

- Data sources/research tools
- Problems easily researched with CALR
- Frequency of searching
- Search approach
- System access, reliability and response time
- System "friendliness"
- Training and documentation

Because of the diverse special research needs of the users, e.g. tax law, antitrust law, comptroller-general decisions, etc., we developed a range of requirements, not a definitive statement capable of universal application. The User Requirements Analysis Report, contains a detailed discussion of each area that need not

be repeated here. Two exhibits, 9 and 10 which summarize the user profile and indicate these features deemed necessary or desirable by the users, provide sufficient detail for the reader. These exhibits follow this page.

4.2. Comparative Analysis

The discussion below compares JURIS, LEXIS and WESTLAW to each major category of requirements and describes the degree to which they are able to satisfy these requirements. The items listed in the summary exhibits will each be addressed.

4.2.1. Data Sources and Research Tools

LEXIS, with its larger data base, full text of 21 states' cases, extended historical coverage and special libraries for tax, securities, trade regulations and patents more closely satisfies the requirements of the users. The primary strength of LEXIS lies in the special libraries, which are not available on JURIS and very limited on WESTLAW. These libraries would satisfy the needs of the Tax and Antitrust Division users. Secondary benefits are the full text coverage of 21 states cases and some statutes and the historical coverage in the Federal case law files which goes back further than the other two systems. There are, however, some features LEXIS does not offer that current JURIS users require or have access to now, such as the work product file, West headnotes and the special file for the U.S. Attorney's Office for the District of Columbia. Neither JURIS or LEXIS fully satisfies user needs for up-to-date federal statutory material, including committee reports and legislative history, although LEXIS does have more complete coverage in special libraries. WESTLAW, at present, does not satisfy the data source requirements of the users as well as either JURIS or LEXIS. However, if plans to extend historical coverage are carried out, and full text of current decisions continues to be added to their data base, WESTLAW could close the gap on JURIS in the next few

SUMMARY OF USER PROFILE

A. Data Sources and Research Tools

1. Most Federal Caselaw, including administrative decisions
2. Most Federal Statutory Material, including committee reports and legislative history
3. Work product, including briefs, motions, memoranda, instructions, forms, etc.
4. Research Aids including, Shepard's Citations, Index to Legal Periodicals, topical reporters such as Commerce Clearing House, Prentice-Hall, Bureau of Natural Affairs, and Pike and Fischer, and digests

B. Types of Questions Researched

1. Unique word(s) or phrase(s)
2. Broad area of law and a need to review all cases or authorities on point
3. Citation verification and "shepardizing"
4. Quick response queries
5. New area of law or strange point of law
6. Traditional sources available to answer questions are poorly indexed or editorially unreliable

C. Search Frequency - No Conclusion

1. Dependent upon:
   - workload
   - user background and experience
   - availability of needed data within system
   - availability of system equipment
   - problem to be researched and immediacy of resolution
   - understanding of system operation and capabilities
2. No one factor is predominant, generally the decision to use CALR or manual research involves two or more factors

3. If one or more factors are given either a positive or negative weight, each additional factor in the decision-making process will amplify that characterization

D. Search Approaches

1. Four basic approaches:

   - simple one word or single phrase expressions
   - complex, multi-word or phrase search (no iterations)
   - successive refinement of initial search expression
   - use of single word or phrase search expressions and successive refinement using set combination

2. Approach is a function of user preference and may vary with problem being researched

3. Boolean and proximity connectors are generally used, root expanders are used infrequently

4. Users prefer "set" combination because of greater flexibility

5. Reference fields that correspond to the major parts of a case or other documents were heavily researched

6. Users wish to have the capability to move within file groups or libraries, and within individual files without re-keying search terms.

E. System Access, Reliability and Response Time

1. Users require terminal locations convenient to their work stations, and each terminal must have a local print capability

2. System must be rapid in its search response and information displays

3. System must not be susceptible to service interruptions or availability due to overloaded capacity

4. System must be available during normal working hours and should be available one hour prior to and six hours after normal working hours. Saturday availability should run between 7:00 am and 6:00 pm

5. System equipment should be reliable

F. System Friendliness

1. The system must be easy to learn and understand, yet sophisticated enough to ensure adequate research results

2. Sign-on procedures should be simple, and users should be able to access a desired file immediately

3. Keyboard layout should be simple, and contain keyboard caps with simple English language commands

4. A properly-indexed, problem-oriented reference book should be at each terminal

5. The system should flash a "search proceeding" message every ten seconds to let user know machine is operational

6. Users should be able to get a search progress report on how may documents have been retrieved so they can decide whether to continue or terminate search

7. The system should have easily understood error messages and connection procedures, as well as a panic button to stop a search

G. System Training and Documentation

1. Training should proceed at user's pace and be adaptable to the user's schedule

2. Training should cover the operation of the computer, e.g., how it searches, how the data is utilized, etc.

3. One-on-one training should be an available option.

4. Advanced search technique training should be available

5. A "hot-line" staffed by experienced system personnel should be available during hours of operation.

6. Current awareness material should be put on-line as well as distributed in hard copy.

Exhibit 10

SUMMARY OF NECESSARY AND DESIRED USER REQUIREMENTS

Areas of Needs	Necessary or Desirable
A. Data Sources and Research Tools	
. Federal Caselaw	
- Supreme Court	necessary
- Courts of Appeal	necessary
- District Courts	necessary
- Court of Claims	desirable
- Tax Courts	necessary
- Administrative Decisions	necessary
. Federal Statutory Material	
- Public Laws	necessary
- U.S. Code	necessary
- Code of Federal Regulations	necessary
- Treasury Regulations, Internal Revenue Rulings	necessary
- Committee Reports/Legislative Rulings	desirable
. Work Product	
- Briefs	necessary
- Motions	necessary
- Memoranda	desirable
- Forms	desirable

. Research Tools	
- Index to Legal Periodicals	desirable
- Topical Reporters	desirable
- Shepard's Citations	necessary
B. Search Features	
. Connectors; AND/OR/NOT	necessary
. Proximity connectors	necessary
. Thesaurus or index of plurals, synonyms	desirable
. Reference fields for judge, citation, date court, dissent or concurrence	necessary
. Ability to move between major file groups and between files without re-keying search	necessary
. Ability to merge search expressions	necessary
C. System Access, Reliability and Response Time	
. Adequate numbers of terminals	necessary
. Conveniently located terminals	necessary
. Local printers with each terminals	necessary
. Rapid display of retrieved documents	necessary
. High reliability (95%-99%)	necessary
. Hours of availability 7:00 am to 11:00 pm weekdays, 7:00 am to 6:00 pm Saturdays	necessary
D. System Friendliness	
. Easy sign-on and identification protocol	necessary
. Ability to access desired file immediately after sign-on	necessary
. Mnemonic keyboard characters	desirable
. Problem-oriented reference manual at terminal	desirable

. "Search is proceeding" flasher	necessary
. Search progress update	desirable
. "Panic button" to stop search	desirable
. On-line search hints	desirable
. Detailed explanation of error messages and steps to correct errors	necessary

E. System Training Documentation and User Assistance

. Training course designed to allow user to train at own pace and within their schedules	necessary
. Follow-up one-on-one training	necessary
. Hot-line to system experts to assist in searching	necessary
. On Line and hard copy awareness material	desirable

years. Neither of the three systems address user needs for items such as Shepard's Citations or Index to Legal Periodicals, at present.

4.2.2. Types of Questions Researched

Although discussion of this topic is covered in more detail in the section on search approaches below, we conclude that each system can handle the six general types of questions researched on a CALR system. Each has difficulty with some types of questions, however. For example, WESTLAW's somewhat complicated search logic hampers searching on a broad area of law and on phrases. JURIS does not handle complex searches well, therefore, searching a new area of the law that requires addressing a number of concepts will take some time unless a set search is used. The use of search levels in LEXIS somewhat limits the user's ability to merge or intersect research and may be less useful when searching on broad concepts or new areas of the law.

4.2.3. Search Frequency

As we stated earlier in this report, searching is an individual activity and is influenced by the same factors that affect how often a user may do research on a CALR system. It would be inappropriate to speculate what effect one or the other system may have upon frequency of use. However, based upon the experience gained in the comparative analysis, a most important factor is the user's understanding of how a system operates and what its capabilities are. It appears, for example, that current users have not yet grapsed the concept of set searching on JURIS nor seen the value of this tool in providing flexibility and shorter response time in their searching. Therefore, they continue to use the system incorrectly and achieve poor results, become frustrated and reduce their system usage. There is no guarantee that the same problem would not occur with either LEXIS or WESTLAW, and it would be difficult to ensure that this problem could be avoided.

4.2.4. Search Approach

The user survey clearly indicated satisfaction with the search approach used by JURIS that combines sets of search terms in various ways to retrieve documents. Coupling this with the results of our query formulation analysis, we believe that JURIS offers the preferred search approach. While LEXIS is similar, the variations are significant and would require re-training of current users to familiarize them with its more rigid protocol. Based on our observations, the need to "override" connector hierarchy through the use of parentheses would require current JURIS users to pre-plan searches, something they do not currently do. WESTLAW's search logic does not appear well-suited to user preferences and would require an extensive training effort to be successfully implemented.

In the area of searchable segments of the document, JURIS is not as complete as WESTLAW, and both systems are not as complete as LEXIS, with its flexibility to search and retrieve every part of the case separately. LEXIS segment searching easily and effectively meets the needs of users to determine special items such as dissents by a particular judge, what cases were decided in a particular circuit, etc. WESTLAW is not quite as complete nor efficient as LEXIS; however it does exceed JURIS's ability to provide a user with all segments of a document.

Finally, both LEXIS and WESTLAW provide the user with the ability to move a search into a new file or group without re-entering the query. JURIS currently does not offer this option, instead, it provides the user with a number of file combinations on which to search. This is not an advantage because it can increase search response time.

4.2.5. System Friendliness

Perhaps the second most important group of user needs are those associated with user friendliness. The way a system satisfies these needs will affect overall user confidence in and usage of the system. Below are listed, in order, the basic system friendliness needs and the degree to which each system satisfies those needs.

- System must be easy to learn and understand yet sophisticated enough to retrieve adequate results. JURIS is the easier system to learn and understand, although some current JURIS users do not utilize it correctly due to inadequate training and reference materials. LEXIS requires more exposure to the machine to be used effectively while WESTLAW is the most difficult system to understand. All three systems, if used properly, will retrieve sufficient documents for the user, within their respective data base constraints.

- Sign-on procedures should be simple and users should be able to access a desired file immediately. All three systems' log-on procedures are simple; however, only JURIS and WESTLAW permit access to a file immediately after log-on.

- Keyboard layout should be simple and contain keyboard caps with simple English language commands. Both JURIS and LEXIS have similiar keyboard layouts and special mnemonic command keys. WESTLAW's keyboard layout and use of letter commands is confusing.

- A properly indexed, problem-oriented reference book should be at each terminal. All three systems supply reference books; however, their quality varies. LEXIS is the more detailed, WESTLAW's is better indexed, and JURIS is simpler to read. None of the books is problem-oriented. Each includes long narratives on system features.

- The system should flash a message to let the user know that a search is being run. Currently, only LEXIS offers this feature.

- Users should be able to get a search progress report that indicates the number of documents retrieved. Only WESTLAW, which informs the user of a laborious search but not how many relevant documents have been retrieved, provides any type of feedback.

- The system should have easily understood error messages and correction procedures as well as a stop search button. LEXIS has the better error messages and assistance aids. This makes it easier for the casual or infrequent user to become reacquainted with the system. Both JURIS and, to a greater degree, WESTLAW provide messages that are system designer-oriented rather than user-oriented. Both LEXIS and JURIS provide "red" stop search bottons but WESTLAW requires the user to push x (for cancel) and the enter button.

On balance, JURIS and LEXIS are generally the more "friendly" systems to operate (search logic and query formulation excepted) and more closely satisfy the user's needs. WESTLAW is not a particularly user-oriented machine in terms of what the users desire in a CALR system.

4.2.6. System Access, Reliability and Response Time

These requirements are very important to the users we interviewed because CALR is a supplement to manual research and is used only when it presents a clear advantage in terms of time or research approach. If the user cannot gain access to a terminal, or has access to the terminal but the system is not operational, or is faced with slow search or browse response, CALR has little value. Five requirements were identified: convenient terminal locations and print capability with each terminal, rapid search and browse response, good system reliability (low down-time) and availability (no system overload); extended hours of operation, and reliable system equipment. Each will be discussed in turn.

It was not possible to compare terminal placement, of course; however, we did note some isolated problems with the location and numbers of current JURIS terminals. No matter what system is in place at DOJ, a survey of existing terminals placement should be undertaken. In addition, all JURIS Saunders terminals should be equipped with printers. Both LEXIS and WESTLAW offer rapid printers as part of their standard terminal configuration.

Concerning search and browse response times, the details of how each system performed are detailed in Section III. However, we can state that both JURIS and LEXIS responded quickly to search commands, with WESTLAW being the slowest system; LEXIS and WESTLAW had the faster browse response time with JURIS being slower. None of the systems was very susceptible to downtime, although each did experience isolated problems during the course of our tests. JURIS had considerable problems with overloaded capacity on two occasions, May 24th and June 4th. On both days, the system would repeatedly refuse to accept queries, often flashing the message "system temporarily overloaded, please re-enter request". No similar difficulties were encountered on LEXIS and WESTLAW.

All times of availability were within the user's requirements during week-days; however, WESTLAW is only available between 9:00 a.m. and 3:00 p.m. Eastern Time on Saturdays. Of the three, only LEXIS was available on Sundays. Based on our short experience with the equipment for each system, we found each to be reliable and had no difficulties with any equipment.

4.2.7. System Training and Documentation

This area is the most important area of comparison because of the obvious problems that occur if training and/or documentation are inadequate. As we found with some JURIS users, their lack of knowledge about the system's features had a

negative effect upon the their use of JURIS. The users defined six specific training and documentation needs; training should be individualized and adaptable; training should explain how the computer operates; small group training at the user's location should be available; advanced search techniques should be taught; a "hot-line" should be available for user assistance; and current awareness material should be on-line.

Generally, all three systems do allow the user to proceed individually during training; however, only JURIS, with its audio tape course, has flexibility to meet user's schedules. LEXIS allows the user to work with the system at the end of the formal training session but does not permit the flexibility of JURIS in either proceeding at one's own pace or in scheduling (especially since the course could run up to 4 hours as opposed to 2 hours on JURIS). The third system, WESTLAW, provides a structured group session (discussed below) but also has an on-line tutorial that provides it with greater flexibility than LEXIS. However, since the level of detail for the tutorial is broad, it is not as useful as the JURIS tape.

Only LEXIS includes a section (via video tape) which discusses the operations the system performs in searching. The tape shows what happens from the point a document is placed in the data base and how, when a search is performed, the computer scans the concordance. Members of the team who received LEXIS training found this presentation useful. The other two systems do not include this topic in their training course, although JURIS does have a two-page handout which provides a brief, conceptual overview of system operation.

As we mentioned earlier, WESTLAW's approach to training centers on small-group sessions at the user's facility and involves each attendee in the actual operation of the system during training. WESTLAW also offers a follow-up course that uses the same approach. Over the past several months, JURIS has,

on a limited basis, begun to provide similiar training when requested. LEXIS provides advanced, supervised training for an individual user at a LEXIS training facility. All the systems offer training in advanced search techniques that is more useful and to the point than the initial orientation. On balance, WESTLAW offers the best training in terms of content and approach. JURIS training is more suited to the schedules of users than either LEXIS or WESTLAW. LEXIS' structured approach, given in a training center, does not appear to allow users to learn at their own pace nor does it appear to be flexible enough for the user's schedules. However, in areas where LEXIS does not have a training facility, on-site training is provided.

For the final two categories, a user "hot line", and on-line announcements of current awareness material, each of the systems satisfies the requirements fairly equally and adequately.

4.3. Findings and Conclusions

The preceding sections and sub-sections of this report contain considerable descriptions and comparisons of the three CALR systems we analyzed. Our report has presented the benefits and drawbacks for each system in seven major evaluation categories, and has matched each system's features to those most needed and those most desired by current JURIS users. Both our analysis of the systems and the documentation of the results were as thorough as possible, given our schedule. All of that effort was expended to answer one question: which system can meet the CALR needs of current JURIS users and provide flexibility to meet future needs?

To answer this question appears simple enough: we need only count the plusses and minuses for each system. However, when the results of all our tests and evaluations were reviewed, the project team found few differences between the three systems. Each could, in various ways, meet the minimum user needs

and provide some flexibility to deal with future requirements. All three systems have unique features that make them attractive: e.g., JURIS' set searching; LEXIS' broad data base coverage; and WESTLAW's training approach. Therefore, the project team was forced to look at the intangibles, those factors whose effects are readily felt but whose dimensions are not easily defined or measured. These factors include: the need for re-training of current users should a system other than JURIS be selected and a corollary factor, the limited availability of users for that re-training; the potential for disenchantment with the concept of CALR should users be required to change systems; the potential for making necessary improvements to current JURIS training, hardware, and system operation; and the degree of improvement in CALR quality implementation of another system might bring about.

Technically, JURIS and LEXIS are very similar in overall features, operation, etc. and come closer to satisfying DOJ's needs. WESTLAW, as presently constituted, would not easily satisfy the requirements of current JURIS users.

The primary difficulties with WESTLAW are three: a search logic that is perhaps too difficult to comprehend initially and to retain; a keyboard arrangement and mode of operation that are not as user "friendly" as the other two systems; and an incomplete data base. This judgement should not be read as a categorical dismissal of WESTLAW as a CALR system; rather, it addresses only WESTLAW's ability to satisfy the current CALR needs of the Department of Justice.

We concluded that LEXIS was a more powerful system in terms of data base coverage and document recall; however, we also felt that its structured approach to searching and its training program had the potential for increasing user disenchantment. The LEXIS training course takes about 3-4 hours, depending upon individual progress, and is, for the most part, highly structured. It assumes that current JURIS users would make the

necessary time commitment, yet one of the factors that hampers JURIS is the reluctance of users to spend any amount of time for training. Another factor is the discipline required to perform a LEXIS search, especially in keeping connector precedence in mind when formulating an expression. Because of JURIS's set-creation capability, much of this discipline is imposed internally, by the software. We believe it would be difficult to wean current users away from this approach.

We concluded, from a systems standpoint, that JURIS was the more desirable alternative because it is currently in place and does not require any dislocation of equipment; users are familiar with its operation and no large re-training effort is needed; its search logic and approach are preferred by the users; and it is the more "friendly" system. In addition, JURIS has features the users prefer, such as the "page to keyword" browse command, which enables the user to go forward or backward in a document to the pages on which the keywords appear, and the "keep" set, which enables the user to place specific documents into a file for retrieval later. More importantly, many of the attractive aspects of LEXIS could be programmed into JURIS. However, the desirable set search feature of JURIS is a result of system design and would require a re-design and programming effort to replicate in LEXIS.

JURIS, if retained, will, require improvement in several areas:

- Data base contents must be increased to include more historical coverage of federal cases, statutes and regulations as well as coverage for special areas such as tax law, environmental law, securities, trade regulation, bankruptcy and creditors rights, etc. The need for state case law coverage is low enough that manual research is a satisfactory option.

- Hardware on which the JURIS software is run should be upgraded to expand data base size, system reliability, and overall system capacity. The system

is, at this point, overloaded and, at times, difficult to use.

- Software improvements such as addition of a searchable Judge segment, implementation of the S/connector and ROLL features, automatic searching of plural variants, "search is proceeding" message and automatic detection of spelling errors should be implemented.

- Training and reference materials should be redesigned to be problem-oriented in emphasis, stress the features of the system, e.g., searching headnotes, immediate log-on to a desired file etc., and more follow-up training offered.

U.S. DEPARTMENT OF JUSTICE
JUSTICE MANAGEMENT DIVISION

THE RECURRING OPERATING COST OF JURIS AUTOMATED LEGAL RESEARCH

CONTRACT NO. JAOMF-79-C-0072

COOPERS & LYBRAND

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I. INTRODUCTION

1.1. The Project

Coopers & Lybrand was engaged by the Department of Justice (DOJ) to conduct an independent study of automated legal research in the Department. Specifically, the study included the following tasks:

- Identify the automated legal research needs of the Department's legal activities and general administration organizations.
- Evaluate the ability of three systems to meet the automated legal research needs. The systems are:
  - The DOJ Justice Retrieval and Inquire System (JURIS).
  - The Mead Data Central LEXIS system.
  - The West Publishing Company WESTLAW system.
- Prepare a statement of current recurring operating costs of the JURIS system.
- Develop cost projections for the three systems and compare the current and projected cost.

This report is a detailed description of the methodology and work performed in preparing the statement of current recurring operating costs of the JURIS system.

The DOJ accounting records do not directly identify the cost of JURIS. Rather, the records identify the cost of the organizations which operate and maintain JURIS. The purpose of this task was to apply cost-finding techniques to DOJ records to

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*Terminology in the field varies. In this report we use CALR and automated legal research (ALR) interchangeably to reflect their use within DOJ.

identify the cost of JURIS. This engagement is not an audit of the accounting records in general or those related to JURIS in particular.

1.2. Preliminary Review

The first step in preparing the JURIS cost statement was to review the cost information that was available in DOJ. Interviews were conducted with personnel from the Office of Management and Finance (OMF) to identify the organizations that incur cost related to JURIS, the cost records that are maintained and the JURIS cost accumulation and user billing process. The individuals represented the Financial Management Staff (FMS), the Central Management Services Staff (CMSS), the Justice Data Management Service (JDMS), and the Systems Design and Development Staff (SDDS). Appropriate documents and records were reviewed to gain a comprehensive understanding of their content, origination, and use.

The review identified two organizations that incur costs to make JURIS automated legal research available to users. JDMS, a subsidiary organization within the Central Management Services Staff (CMSS) of OMF, provides data processing support for JURIS. SDDS maintains and updates the JURIS software and the automated legal research data base. SDDS also has user-assistance and system-administration responsibilities, such as user training, terminal and printer placement and support, and user billing. Both organizations are funded through the DOJ Working Capital Fund (WCF).

The DOJ WCF is an intragovernmental revolving fund which finances the operation of six central DOJ administrative service activities. The WCF records obligations of funds, disbursements, and accrued expenditures for delivered goods and services, as well as income or reimbursements actually received. The WCF Section of the FMS administers the WCF.

The documentation of the cost-accumulation and user-billing process identified three separate records that contain JURIS "costs." The records, and the "costs" they contain, are as follows:

- The KOMAND Resource Billing System Report - This report shows JDMS direct and indirect data processing costs by type of service provided.
- The SDDS Project Invoice Report - This report shows costs incurred by SDDS for JURIS and other systems.
- The Working Capital Fund Income and Expense Statement - This report shows the income and delivered orders expense by object class as recorded in the official accounting records of DOJ.

The costs accumulated in the first two reports are really estimates based upon actual resource usage and a fixed cost rate per unit of service (CPU hours, number of terminals, etc.). The costs are identified by system and user organization. The WCF Income and Expense Statement, on the other hand, accumulates cost that represents accrued expenditures as recorded in the DOJ accounting records. The organization that incurred the cost is identified, but the related activity or project is not.

In addition, the review identified two major facts relevant to the task of preparing a JURIS cost statement. The first fact is that SDDS is treated as a user organization by JDMS. The JURIS data processing cost is accumulated by JDMS under SDDS account codes; SDDS pays JDMS for its data processing support. The second fact is that both JDMS and SDDS bill their users in two alternate ways. The billing may be based upon the cost accumulated on the KOMAND Resource Billing System Report or the SDDS Project Invoice Report, as appropriate, or the user may be billed based upon a pre-arranged annual agreement. SDDS, for example, pays JDMS a pre-arranged amount which does not equal the cost accumulated on the KOMAND Report.

Understanding the JURIS cost-accumulation and user-billing process was difficult for two reasons. First, the process is not supported by DOJ documentation. Second, each DOJ person interviewed had knowledge of only a part of the process. A memorandum that documented our understanding of the total cost accumulation and user billing process was prepared. Appropriate DOJ personnel reviewed the memorandum and confirmed our understanding.

The WCF Income and Expense Statement appeared to be the most reliable place to begin our cost review. This assumption was tested through a comparison of the Statement with four documents distributed externally. Through this comparison we were assured that the statement reasonably reflected the information contained in the WCF records, since all documents contained consistent information.

Specifically, the Statement was compared or reconciled to the:

- SF221, Statement of Income and Retained Earnings - The Sales of Services, Total Expenses and Net Income or expense items on the SF221 submitted to Treasury for the period October 1, 1977 through September 30, 1978, were compared to the appropriate items on the Statement. All three items matched.

- SF133, Report on Budget Execution - The figures reported for Obligations Incurred and Reimbursements and Other Income Earned on the SF133 submitted to Treasury and OMB for FY 1978 were traced to the Statement.

- SF1151, Non Expenditure Transfer Authorization - The net income transferred to the General Fund of the Treasury on December 12, 1978 was traced to the net income for FY 1978 shown on the Statement.

- Appendix to DOJ Budget Submission for FY 1980 - The figure for FY 1978 included in the FY 1980 budget submission for Total Operating Cost; Offsetting Collections from Federal Funds, Revenues; and Net Income (Loss) were matched to the Statement.

The remainder of the original task plan for preparing the JURIS cost statement was revised to reflect an approach compatible with the records actually available. Basically, the approach was to review, and adjust as necessary, the SDDS and JDMS organizational costs reported on the WCF Income and Expense Statement. The organization costs would then be applied to JURIS through identification of direct costs and allocations of indirect costs. Specifically, the following approach was established:

1. Adjust the WCF Income and Expense Statement to reflect subsequent events which affect the costs of SDDS and JDMS.

2. Identify direct and indirect costs incurred by SDDS, and allocate the indirect costs to JURIS and other systems.

3. Identify JDMS direct data processing costs and indirect costs, and allocate the indirect costs to JURIS.

4. Identify JURIS automated legal research costs attributable to the Department of Justice offices, boards, and divisions.

Three issues had to be resolved before the JURIS cost statement could be prepared. The first issue is the definition of JURIS. The term "JURIS" is used in many ways within the Department. Actually, JURIS is a software package which provides on-line computer access to a variety of data bases. The original application of JURIS was an automated legal research data base consisting of Federal court decisions, statutes, regulations, policy directives, administrative decisions, legal briefs, and other publicly available compilations of legal material. Subsequently, JURIS has also been applied to a variety of private files for litigation support and other purposes. For purposes of preparing the statement of recurring operating cost, JURIS was defined to include only the proportionate share of JURIS software and the automated legal research data base.

While the costs of developing and maintaining the private files could be identified, we and DOJ agreed that the cost of the private files was not pertinent to the objectives of the study. The cost of the JURIS private file application would continue unchanged if JURIS automated legal research was replaced by LEXIS or WESTLAW, except for certain residual costs of automated legal research which will be accounted for in the cost comparison analysis.

The second issue is the relevant costs to be included in the statement. We decided that the statement of recurring operating costs should include the direct system costs and the directly related overhead costs incurred to make JURIS automated legal research available to users. These costs include the direct data processing costs and the related indirect costs of JDMS and CMSS, and the direct JURIS costs incurred by SDDS and the related SDDS indirect costs. Other overhead costs, such as the Financial Management Staff (which provides accounting services), and the top management of the Department (the Office of the Attorney General, the Office of Assistant Attorney General for Administration, etc.), were not considered because of the negligible amount which would be allocated to JURIS (JURIS is approximately .1% of the total DOJ budget) and because of the impracticality of developing an accurate base for allocating the costs within the time constraints of this contract.

The third issue is the period which the recurring operating cost statement should cover. The objective was to determine the current cost. We chose to use FY 1978 as the study period for three reasons:

- Many of the contractual services related to JURIS are on a fiscal year basis.
- FY 1978 is the most recently completed fiscal year.
- There is an elapsed period of six months during which subsequent events, such as payment of accrued

expenditures, could occur which would affect the period's cost.

The first step was to review the cost balances included on the statement which may have been affected by subsequent events. Since the WCF is a "no year" fund, there is no requirement to adjust prior period results. However, since the JURIS cost statement was to cover a specific period, adjustments resulting from subsequent events which affect accrued expenditures reported for the study period had to be made. Significant adjustments were identified through an extensive review of the accounts payable items included on the statement. These steps are discussed in Section II.

Specific direct and indirect costs incurred by SDDS and JDMS were identified and allocated to the appropriate systems. Different procedures were followed for SDDS and JDMS as discussed in Sections III and IV, respectively.

II. ADJUSTMENT OF THE WORKING CAPITAL FUND INCOME AND EXPENSE STATEMENT

The Working Capital Fund records income earned and expenses incurred by SDDS and JDMS. The expenses reported on the WCF Income and Expense Statement (hereafter called the Statement) are more specifically known as accrued expenditures. Accrued expenditures represent the expense of delivered goods and services. Some accrued expenditures are represented by account payable balances which will be liquidated in the future. These payable balances are subject to change as a result of subsequent events, and therefore may change the amount of expense on the Statement.

Therefore, we reviewed each significant payable, or unliquidated, accrued expenditure item included on the Statement to determine its subsequent disposition. The methodology followed and the results of this review are discussed in this chapter.

2.1. The Working Capital Fund

The Department of Justice Working Capital Fund (WCF) is an intragovernmental revolving fund established by Congress to finance operations in which the costs for goods or services provided are charged to the recipients, while the reimbursements received for these services are available to continue operations and replace capital equipment. The salient advantage of the WCF is that it provides an accounting method that permits consumer financing of services performed centrally, and at the same time, permits the identification of costs of the various service activities to the related organizations benefited. The WCF currently finances six central administrative service activities:

- Telecommunications
- Print Shop
- Data Processing
- Payroll
- Property Management
- Space Management

Results of WCF operations are presented in a monthly Income and Expense Statement (the Statement). This report:

- Details the amount of operating costs incurred by each activity by cost center, and the related income earned.
- Compares the income and operating costs recorded at the close of the respective accounting period with operating plan projections.

For purposes of the WCF, a transaction is not considered a cost until the goods or services generating that cost have been delivered to DOJ. Costs of the WCF correspond to delivered goods or services and consist of both amounts disbursed prior to the date of the Statement and amounts payable as of the date of the Statement.

2.2. Review of Specific Costs on the Income and Expense Statement

2.2.1. Rationale

For purposes of the WCF, transactions do not generate costs until the purchased goods or services have been received to DOJ. That is, costs of the WCF correspond to delivered goods or services. The WCF Income and Expense Statement for FY 1978 (the monthly report dated September 30, 1978) is composed of two types of costs associated with delivered goods or services:

- Costs incurred for goods or services delivered during FY 1978 and for which disbursements were made in FY 1978 (liquidated balance).
- Costs incurred for goods or services delivered during FY 1978 but for which disbursements were not made in FY 1978 (unliquidated or payable balance).

We assumed that the first type of cost had been properly accounted for and appropriately included in the Statement. This assumption was based upon a separate, full scale review of the LAGA accounting system, recently completed by Coopers & Lybrand.

However, the second type of cost can result in upward or downward adjustments to the Statement, since the actual amount paid may not equal the amount of unliquidated expenses included on the Statement. It is common for the payment for goods or services to take place a number of months after the actual delivery of goods or performance of services. In certain instances an invoice for payment may not be promptly received or may be delayed in processing at DOJ.

It is also common for the amount of payment to differ from the amount estimated as payable. These differences arise from a variety of situations, such as blanket purchase agreements, estimates based upon vendor quotations, payment discounts, and variances in the services delivered as compared to the services ordered.

When payments are made in relation to these situations, proper adjustments are made by the WCF. Subsequent payments greater than the corresponding unliquidated balance require an additional obligation of funds ("adjustment") to proceed with payment. Unliquidated balances which are still outstanding, after all necessary payments have been made, require adjustments to "cancel" the remaining unliquidated balance.

As an example, assume that a particular obligation for delivered goods or services has an unliquidated balance for $10,000 as of September 30, 1978. The $10,000 amount has been included in the September 30, 1978 Statement as an accrued expenditure. Subsequent to September 30, 1978 DOJ pays $6,000 towards the liquidation of this balance, reducing the unliquidated (payable) balance to $4,000. If it is assumed that the

remaining $4,000 will not be subsequently paid since the final bill has already been received from the vendor, only $6,000 of actual costs (actual costs relating to the original $10,000 balance) have subsequently been incurred. Although $10,000 has been considered to be an accrued expenditure, and included as an operating cost in the year-end Statement, $4,000 has not materialized as a cost. Accordingly, only $6,000, rather than $10,000, should have appeared on the Statement as an operating cost. The entire process results in the operating costs of the Statement being overstated by $4,000.

An analogous situation can occur if payments made subsequent to the end of the fiscal year in order to reduce a September 30, 1978 unliquidated balance are greater in total than the corresponding unliquidated balance. The adjustment would not have been recorded on the September 30, 1978 Statement. This results in an understatement of operating costs of the Statement.

The WCF appropriately accounts for these differences by making necessary adjustments to the current fiscal year operating costs, since the WCF is considered a "no-year fund." Therefore, adjustments resulting from one fiscal year are carried over and recorded against the subsequent fiscal year. Once a fiscal year has ended no adjustments are made to that year for purposes of the WCF. However, for purposes of this study, the same procedures cannot be followed.

For this study the cost of a specific period, FY 1978, was to be identified. In order to identify the operating costs applicable to SDDS and JDMS for this period, we deviated from the procedure followed by the WCF. Rather than offsetting FY 1978 cancellations and adjustments against FY 1979 operating cost, the FY 1978 operating costs had to be adjusted.

Adjustments to the FY 1978 Statement were identified through a review of unliquidated balances and related subsequent events within each object class of SDDS and JDMS. Of the total unliquidated balance on the September 30, 1978, Statement for SDDS and JDMS, 91% and 96%, respectively, were reviewed.

2.2.2. The Process

The Fiscal Services Section of the Financial Management Staff produces, at the end of each month, adding machine tapes of all undelivered orders and unliquidated balances of delivered orders. The machine tapes detail by cost center and object class the amount of unliquidated delivered orders and undelivered orders outstanding. The tapes are generated by reviewing each obligation source document maintained in manual document files. Undelivered orders and accounts payable are segregated on the tapes. These tapes are the source document for the entry of the unliquidated delivered orders and undelivered order balances into the LAGA accounting system. (Liquidated delivered orders are entered into the system based upon the actual disbursement transaction.)

Since the unliquidated delivered order balance is included on the WCF Income and Expense Statement, the tape provided the basis for the review of each specific unliquidated item. The source document for each material item was identified and reviewed to determine its subsequent disposition.

Each obligation document indicated the unliquidated balance as of September 30, 1978, subsequent payments and adjustments, and the currently outstanding balance. For each document, the payments subsequent to September 30, 1978 were summed. The difference between the account payable balance at September 30, 1978, and the subsequent payments was considered to be either a cancellation (downward adjustment of expenses) or adjustment (upward adjustment of expense).

The amount of adjustment to be made was based on actual disbursements recorded on the obligation document. However, we had to assume that the full amount of unliquidated expenditures should be cancelled. This assumption was based upon the following factors:

- Historically, invoices had been received and paid within a reasonable period after delivery of goods or performance of services.

- The goods and services purchased were not of the nature to require extensively delayed billings.

- There was not an extensive backlog of the Fiscal Services Section.

- There was a very low level of disbursement activity in recent months against FY 1978 obligations.

For SDDS, the unliquidated delivered orders balance at the end of FY 1978 according to the adding machine tapes was $923,654. The review identified that $323,940 of payments were subsequently made against this balance and $512,709 should be cancelled. Therefore, the disposition of $836,649 of the $923,654 accounts payable balance, or 91%, had been determined. Exhibit 1 at the end of this section shows the specific adjustments and cancellations made.

In regard to JDMS, out of a September 30, 1978 unliquidated delivered orders balance of $707,335, $568,465 of subsequent payments were made and $109,689 should be cancelled. Therefore, the disposition of $678,154, or 96%, of the September 30, 1978 JDMS unliquidated delivered orders balance was determined. Exhibit 2 at the end of this section shows the specific adjustments and cancellations which were made for JDMS.

Although this procedure was followed for FY 1978 costs, the same process was not required for FY 1977 costs. In fact, there were no adjustments in the FY 1978 operating cost that related to the FY 1977 cost since SDDS and JDMS were not operating as part of the WCF during FY 1977. In FY 1977 the current SDDS and JDMS organizations operated on an appropriation basis, rather than through the WCF.

The depreciation expense presented on the WCF Statement could not be confirmed. The depreciable assets attributable to each activity within the WCF are used as the basis for determining the amount of depreciation to be expensed. A record of each activity's depreciable assets and the corresponding dollar value is maintained by the Materials Management Section of OMF on the DOJ Accountable Property System (DOJAPS). Each activity obtains the dollar value of its depreciable assets from the Materials Management Section and divides this dollar amount by the expected life of the equipment, in order to determine the applicable depreciation expense. Using this methodology, SDDS and JDMS computed a depreciation expense of $63,367 and $449,256, respectively, for FY 1978.

In order to calculate the SDDS and JDMS depreciation expense, the DOJAPS records pertaining to these two organizations were reviewed. The records were not reorganized into new cost centers when CMSS underwent reorganization in April of 1978. Therefore, JDMS and SDDS property and equipment were both included under the JDMS cost center classification (88) and had to be considered together.

The DOJAPS records pertaining to the 88 cost center were reviewed and all dollar amounts pertaining to depreciable assets were compiled. The total dollar value of depreciable assets within the 88 cost center was $2,129,472. By dividing this amount by the average expected life of the equipment of 7 years

(the method used by DOJ), a yearly depreciation expense of $304,099 was calculated.

The depreciation expense identified from the DOJAPS records is substantially lower than the $512,623 total of JDMS and SDDS depreciation expenses presented in the Income and Expense Statement. However the $304,099 is not a reliable figure for two reasons:

- The DOJAPS records are not up-to-date.
- The estimated life used to calculate the depreciation expense is suspect, as has been recognized by DOJ in calculating depreciation in subsequent years.

DOJ is in the process of completing a physical inventory of all DOJAPS property. However, the inventory effort is not yet to the stage where reliable information is available to develop a more appropriate physical inventory value and related depreciation expense.

In summary, no documentation was found for either the asset base or estimated life of the SDDS and JDMS depreciable property. However, while the depreciation expense shown on the Statement could not be confirmed, a more appropriate figure could not be reliably determined. Therefore, the depreciation expense shown on the Statement was accepted as an appropriate cost within a range of plus or minus 40%. This range reflects the alternative cost figure which we were able to develop.

Based upon the review and adjustments discussed above, an adjusted Statement of Working Capital Fund expenses for SDDS and JDMS was prepared. This statement is shown in Exhibits 3 and 4, for SDDS and JDMS respectively.

Exhibit 1

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Adjustments to September 30, 1978 WCP Accounts Payable

Systems Design and Development Staff

COST CENTER	OBJECT CLASS	DESCRIPTION/PURPOSE (Names of employees related to travel have been withheld to protect their privacy)	PAYABLE BALANCE @ 9-30-78	AMOUNT PAID SUBSEQUENT TO 9-30-78	(CANCEL) OR ADJUST
8101	2100	Travel	$ 500.00	$ 665.21	$ 165.21
	2100	Travel	575.00	295.30	(279.70)
	2100	Travel	382.00	-	(382.00)
	2300	Savin paper copiers	634.30	677.87	43.57
	2360	GSA phones	4,600.00	11,059.22	6,459.22
	2500	Office machine repair	500.00	18.40	(481.60)
	2500	Use of briefing center for JURIS video presentation	1,080.00	-	(1,080.00)
	2500	Keyboarding of daily materials by minority contractor - IMP	62,308.72	3,558.72	(58,750.00)
	2500	Training	275.00	275.00	-
	2560	JDMS	225,728.40	33,247.00	(192,481.40)
8102	2100	Imprest funds	223.96	13.57	(210.39)
	2100	Travel	805.00	805.00	-
	2100	Travel	683.00	683.00	-
	2100	Travel	1,039.00	1,039.00	-
	2100	Travel	1,189.00	910.36	(278.64)
	2100	Travel	942.00	955.42	13.42
	2100	Travel	415.00	546.20	131.20
	2100	Travel	383.00	383.00	-
	2100	Travel	349.07	349.07	-
	2100	Travel	363.00	251.49	(111.51)
	2200	Miscellaneous	312.50	312.50	-
	2300	Switch telephone numbers	200.00	-	(200.00)
	2300	Rental of T-1210 KSR printer	179.50	-	(179.50)
	2300	Lease Lexitron 921	2,134.40	1,184.46	(949.94)
	2460	Silkscreening of binders, ACCSYS caseload manual	1,200.00	2,133.00	933.00
	2460	JURIS reference cards	350.00	616.00	266.00
	2460	Printing - presentation of new matter (civil)	1,100.00	883.00	(217.00)
	2500	Office machine repair	41.67	-	(41.67)
	2500	Maintenance for Lexitron 921	516.90	-	(516.90)
	2600	Pressman implementation book	3.64	-	(3.64)
	2660	GSA store	204.82	97.49	(107.33)

SOURCE: Obligation documents for FY/1978 expenses.

Adjustments to September 30, 1978 WCF Accounts Payable

Systems Design and Development Staff

COST CENTER	OBJECT CLASS	DESCRIPTION/PURPOSE	PAYABLE BALANCE @ 9-30-78	AMOUNT PAID SUBSEQUENT TO 9-30-78	(CANCEL) OR ADJUST
8104	2100	Travel	$ 129.22	$ -	$ (129.22)
	2100	Travel	500.00	-	(500.00)
	2100	Travel	651.00	-	(651.00)
	2100	Travel	370.00	-	(370.00)
	2100	Miscellaneous travel	344.00	-	(344.00)
	2100	Travel	276.00	241.27	(34.73)
	2500	Training course	585.00	-	(585.00)
8105	2200	Transportation of JURIS terminals for maintenance	5,467.67	481.86	(4,985.81)
	2200	Transfer of GTR costs	82.00	-	(82.00)
	2200	Federal Express airfreight shipments	467.90	350.37	(117.53)
	2200	Airfreight Scope printers for maintenance and replacement	2,480.38	284.14	(2,196.24)
	2200	Federal Express airfreight shipments	880.16	-	(880.16)
	2200	Airfreight of new Sanders terminals to USAGO's	681.36	-	(681.36)
	2300	Lease Scope series 200 printers	258.54	-	(258.54)
	2300	Lease Scope series 200 printers	103.41	-	(103.41)
	2300	Rental of T-1200 KSR	179.50	-	(179.50)
	2300	Lease of KSB-1200	183.00	-	(183.00)
	2300	JURIS modem - Baltimore	360.00	83.37	(276.63)
	2300	JURIS modem - Dallas, Ft. Worth, Houston & San Antonio	495.00	445.96	(49.04)
	2300	Lease Hazeltine terminals & printers	362.00	-	(362.00)
	2300	Lease Hazeltine terminals & printers	219.00	196.00	(23.00)
	2300	Lease of thermal printer at LEAA, use related to NCJRS	905.00	-	(905.00)
	2300	Lease one Scope printer, Office of General Counsel, DOD	226.82	-	(226.82)
	2300	Lease Scope printer, Executive Office of President	216.82	103.41	(113.41)
	2300	Lease two 1200 BAUD acoustic couplers	28.00	-	(28.00)
	2300	Add and delete phone numbers	50.00	-	(50.00)
	2300	Lease terminet printer from Alanthus	420.00	105.20	(314.80)
	2300	Lease four Scope Data series R10 printers	453.64	-	(453.64)
	2300	Increase number of Scope printers on maintenance contract	126.00	-	(126.00)
	2300	Lease two Anderson Jacobson acoustic couplers	150.28	-	(150.28)

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Adjustments to September 30, 1978 WCF Accounts Payable

Systems Design and Development Staff

COST CENTER	OBJECT CLASS	DESCRIPTION/PURPOSE	PAYABLE BALANCE @ 9-30-78	AMOUNT PAID SUBSEQUENT TO 9-30-78	(CANCEL) OR ADJUST
8105	2300	Alanthus terminals for Seattle, Phoenix, and Tucson	$ 759.80	$1,080.00	$ 320.20
	2300	Alanthus terminals & printers, Chicago, Los Angeles, Dallas, Washington	3,073.00	2,192.00	(881.00)
	2300	Word processors for Tucson & Phoenix land fraud case	3,692.56	3,677.76	(14.80)
	2300	Lease of U202 & TI200 for LAATR (Corrug. container case)	2,925.00	-	(2,925.00)
	2300	Bunker Ramo terminals, LMSPS, NCJRS, and FLITE	2,068.00	2,008.00	(60.00)
	2300	Lease Scope printers	2,688.66	-	(2,688.66)
	2300	Two TI model 745 portable terminals	2,808.00	1,134.00	(1,674.00)
	2300	Texas Instrument model 745 terminal	1,212.27	-	(1,212.27)
	2300	Lease System 2000 modules	3,723.00	3,729.00	6.00
	2300	Codex equipment to multiplex FLITE inquires from 5 terminals	2,773.00	994.00	(1,779.00)
	2300	Lease 14 Scope printers	1,802.97	1,447.74	(355.23)
	2300	Alanthus terminals for Newark	554.00	522.00	(32.00)
	2300	Lease Scope terminet 1200 printer with keyboard	660.00	105.23	(554.77)
	2300	Scope printers for user assistance, TIG & LEAA	1,435.75	310.23	(1,125.52)
	2300	Lines between Todd and CAB for SDDS RJE and terminal controller	2,736.26	-	(2,736.26)
	2300	JURIS modems, Phoenix and Tucson	550.00	62.52	(487.48)
	2300	Nine ADAC 1200 acoustic couplers from Anderson Jacobsen	1,190.00	1,260.00	70.00
	2300	Lease Hazeltine terminals	2,450.00	192.00	(2,258.00)
	2300	Lease Data 100 remote entry terminal	5,535.00	2,234.02	(3,300.98)
	2300	Memorex controller	2,982.00	284.50	(2,697.50)
	2300	Lease Diablo impact printer	642.00	480.00	(162.00)
	2360	JURIS modem - Miami	650.00	99.30	(550.70)
	2360	JURIS modem - Nashville and Memphis	700.00	1,435.17	735.17
	2360	JURIS modem - San Francisco, Los Angeles, Sacramento, San Diego	1,852.00	137.53	(1,714.47)
	2360	ACCSYS modem - Chicago	4,249.00	55.15	(4,193.85)
	2360	JURIS modem - Seattle and Portland	560.00	86.34	(473.66)
	2360	JURIS modem - Newark and Buffalo	1,044.03	236.59	(807.44)
	2360	JURIS modem - Columbia, South Carolina and Atlanta	1,050.00	46.70	(1,003.30)
	2360	Lease NCR thermal printer	770.00	770.00	-
	2360	JURIS modem - Dallas ART	565.00	-	(565.00)
	2360	JURIS modem - Chicago USAO	1,020.00	-	(1,020.00)
	2360	MRI Systems Corp. - Manuals	120.00	-	(120.00)

Adjustments to September 30, 1978 WCP Accounts Payable

Systems Design and Development Staff

COST CENTER	OBJECT CLASS	DESCRIPTION/PURPOSE	PAYABLE BALANCE @ 9-30-78	AMOUNT PAID SUBSEQUENT TO 9-30-78	(CANCEL) OR ADJUST
8105	2360	JURIS modem - Little Rock and Montgomery	$ 930.00	$ 389.32	$ (540.68)
	2360	JURIS modem - Des Moines and Indianapolis	930.00	194.47	(735.53)
	2360	JURIS modem - Lexington and Louisville	930.00	-	(930.00)
	2360	JURIS modem - Syracuse	595.00	-	(595.00)
	2360	JURIS modem - Burlington, Vt.	570.00	-	(570.00)
	2360	JURIS modem - New Haven	595.00	-	(595.00)
	2360	GSA telephone - Washington	3,928.67	1,872.96	(2,055.71)
	2360	ACCSYS modem - Phoenix and Tucson	1,522.63	52.60	(1,500.03)
	2360	FTS	282,000.00	92,910.40	(189,089.60)
	2360	JURIS modem - Philadelphia and Pittsburgh	945.00	1,229.39	284.39
	2360	ACCSYS modem - Seattle	770.00	127.86	(642.14)
	2360	JURIS modem - Oklahoma City	120.00	72.30	(47.70)
	2360	JURIS modem - Shreveport	360.00	-	(360.00)
	2360	JURIS modem - Savannah	465.00	207.32	(257.68)
	2360	JURIS modem - Topeka	365.00	210.92	(154.08)
	2360	JURIS modem - Ashville, N.C.	465.00	-	(465.00)
	2360	JURIS modem - Charleston, WV	465.00	-	(465.00)
	2360	JURIS modem - Office of General Counsel	389.86	-	(389.86)
	2460	Guide cards	250.00	-	(250.00)
	2500	WESTLAW	37,500.00	56,875.00	19,375.00
	2500	Maintenance of Sanders custom terminals	2,495.84	2,495.84	-
	2500	Maintenance of Sycor-340 master station	840.00	840.00	-
	2500	Maintenance of System 2000 Modules and Technical and Consultation	3,605.00	-	(3,605.00)
	2500	Depot maintenance of 50 printers purchased from Scope	525.00	551.23	26.23
	2500	SBA - Contract for document control, document markup, keyboarding and file maintenance of material for JURIS	11,985.00	2,331.91	(9,653.09)
	2500	West Publishing - Case proof materials, CPI increase and release from $300 non-DOJ terminal access	73,000.00	75,000.00	2,000.00
	2500	Acquire tax court decisions from Informatics	9,300.00	-	(9,300.00)
	2500	Keyboarding - Federal Prisons	14,220.21	748.23	(13,471.98)
	2500	Sycor - 340 master station maintenance	840.00	-	(840.00)
		TOTALS	$836,649.09	$323,940.39	$(512,708.70)

Adjustments to September 30, 1978 WCF Accounts Payable

Justice Data Management Service

COST CENTER	OBJECT CLASS	DESCRIPTION/PURPOSE (Names of employees related to training have been withheld to protect their privacy)	PAYABLE BALANCE @ 9-30-78	AMOUNT PAID SUBSEQUENT TO 9-30-78	(CANCEL) OR ADJUST
8801 01	2300	IBM Copier II	$ 2,553.62	$ 693.45	$ (1,860.17)
	2300	Overtime heating and a/c	80,000.00	80,000.00	-
	2300	IBM memory typewriter	613.00	612.90	(.10)
	2500	Training	165.00	165.00	-
8801 02	2300	STC 3470 tape drives	10,395.00	2,454.00	(7,941.00)
	2500	Reinking - Crystal Industries Inc.	2,040.00	-	(2,040.00)
	2600	Shade Information Systems	41,206.78	41,147.10	(59.68)
8801 03	2500	Training	645.00	645.00	-
	2560	Renovations to 5th and 10th floors of Todd	28,728.00	28,728.00	-
	2600	Information Handling Services	83,045.00	70,172.00	(12,873.00)
	2600	Congressional Information Service	40,170.00	40,170.00	-
8801 04	2300	Bruning duplicator	3,240.80	2,768.73	(472.07)
	2300	IBM 5748	2,025.00	450.00	(1,575.00)
	2300	Control Data Corp. - MTI core	1,250.00	1,250.00	-
	2300	Memorex disk drive, modules	10,602.67	-	(10,602.67)
	2300	Storage Technology Corp.	26,155.50	27,424.00	1,268.50
	2300	IBM	13,399.00	3,493.00	(9,906.00)
	2300	IBM - 370/168	102,608.21	99,396.00	(3,212.21)
	2300	Bunker Ramo lease and maintenance	4,890.00	4,890.00	-
	2300	Kodak	18,952.96	7,685.24	(11,267.72)
	2300	IBM	7,223.50	6,980.00	(243.50)
	2300	COMTEN	9,336.26	10,610.00	1,273.74
	2300	IBM 3333 disk storage and control units	7,947.00	7,947.00	-
	2300	IBM display station and control units	2,258.00	1,998.00	(260.00)
	2300	Memorex disk packs	1,206.00	1,072.00	(134.00)
	2360	GSA telephones	3,316.00	3,400.59	84.59
	2360	Lines and modems	1,036.00	-	(1,036.00)

SOURCE: Obligation documents for FY/1978 expenses.

Adjustments to September 30, 1978 WCF Accounts Payable

Justice Data Management Service

COST CENTER	OBJECT CLASS	DESCRIPTION/PURPOSE	PAYABLE BALANCE @ 9-30-78	AMOUNT PAID SUBSEQUENT TO 9-30-78	(CANCEL) OR ADJUST
8801 04	2500	IBM	$ 5,794.55	$ 3,478.00	$ (2,316.55)
	2500	Culliane Corp.; maintenance	4,500.00	-	(4,500.00)
	2500	IBM 3155-J CPU S/N 10328 and 10191	4,561.71	6,835.05	2,273.34
	2600	Kodak - BPA	1,964.88	4,472.00	2,507.12
	2600	Xidex - BPA	22,756.76	4,290.00	(18,466.76)
	2600	Diazo film, blue polyester	2,675.00	-	(2,675.00)
	2600	SCM Allied Egry Business Systems	9,337.50	9,337.50	-
	2600	GAF Corp. - Diazo microfilm	2,749.98	-	(2,749.98)
	2600	SCM Allied Egry Business Systems - paper	1,720.50	-	(1,720.50)
8801 99	2560	Internal Audit Services	97,341.66	95,062.50	(2,279.16)
	2660	GSA Store	1,972.53	837.73	(1,134.80)
8806 99	2360	GSA telephones	2,592.00	-	(2,592.00)
8807	2300	Lexitron	1,009.70	-	(1,009.70)
8899	2300	Guard Service	10,285.00	-	(10,285.00)
	2300	FTS	2,963.01	-	(2,963.01)
	2300	Penalty mail	920.50	-	(920.50)
		TOTALS	$678,153.58	$568,464.79	$109,688.79

Exhibit 3

Adjusted WCP Expense Statement for FY 1978

Justice Data Management Service

OBJECT CLASS	DESCRIPTION	RECORDED PER 9/30/78 WCP INCOME AND EXPENSE STATEMENT	ADJUSTMENTS INCREASE (ADJUST)	ADJUSTMENTS DECREASE (CANCEL)	ADJUSTED 9/30/78 WCP INCOME AND EXPENSE STATEMENT
	TOTAL PERSONNEL SERVICE EXPENSES	$ 2,123,083			$ 2,123,083
2100	Travel and Transportation of Persons	20,480			20,480
2200	Transportation of Things	108			108
2300	Communications, Rent and Utilities	4,216,585		$ 63,654	4,152,931
2400	Printing and Reproduction	9,562			9,562
2500	Other Contractual Services	861,225		8,862	852,363
2600	Supplies, Materials and Uncapitalized Equipment	433,376		37,173	396,203
	Amortization and Depreciation	449,256			449,256
	TOTAL OTHER EXPENSES	$ 5,990,592		$109,689	$5,880,903
	TOTAL OPERATING EXPENSES	$ 8,113,675		$109,689	$8,003,986

Adjusted WCF Expense Statement for FY 1978

Systems Design and Development Staff

OBJECT CLASS	DESCRIPTION	RECORDED PER 9/30/78 WCF INCOME AND EXPENSE STATEMENT	ADJUSTMENTS INCREASE (ADJUST)	ADJUSTMENTS DECREASE (CANCEL)	ADJUSTED 9/30/78 WCF INCOME AND EXPENSE STATEMENT
	TOTAL PERSONNEL SERVICE EXPENSES	$ 1,862,305			$1,862,305
2100	Travel and Transportation of Persons	54,322		$2,981	51,341
2200	Transportation of Things	25,575		8,943	16,632
2300	Communications, Rent and Utilities	742,897		231,876	511,021
2400	Printing and Reproduction	16,473	$732		17,205
2500	Other Contractual Services	875,880		464,013[1/]	411,867
2600	Supplies, Materials and Uncapitalized Equipment	16,630		110	16,520
	Amortization and Depreciation	63,367			63,367
	TOTAL OTHER EXPENSES	$ 1,795,144	$ 732	$707,923	$1,087,953
	TOTAL OPERATING EXPENSES	$ 3,657,449	$ 732	$707,923	$2,950,258

1/ Includes $194,482 of JDMS costs, which were actually dispersed, but which were adjusted since JDMS costs for JURIS were separately calculated.

III. IDENTIFICATION OF SPECIFIC SDDS COSTS

We reviewed the specific costs incurred by SDDS during FY 1978 to identify those costs that were directly related to JURIS and other systems controlled by SDDS, and those costs that were indirectly related to all or some of the systems. The indirect costs were then allocated over the direct costs incurred to obtain a full cost of SDDS operations related to JURIS.

This cost-identification process was accomplished in two steps. The first step concerned non-personnel expenses; the second concerned personnel costs. Non-personnel costs were identified through a review of specific obligation documents paid before and after September 30, 1978, for FY 1978. Personnel costs were indentified based upon the personnel time spent in each of the following categories:

- JURIS ALR.
- JURIS ALR and private files combined.
- Other systems.
- Indirect activities.

3.1. Non-Personnel Costs

All SDDS obligation documents maintained in the Fiscal Services Section, FMS, manual files were reviewed to identify amounts paid for JURIS, other systems, and indirect activities. In most cases, these costs could be readily identified by the description of services to be performed. In certain instances, attached purchase requisitions, other documentation, or discussions with SDDS personnel were required to identify the nature of the cost.

SDDS identified the following four vendors as suppliers of hardware equipment for JURIS:

- Scope Data Inc.
- Sanders Technology Systems, Inc.
- Bunker-Ramo Corporation.
- Hazeltine Corporation.

Other costs identified specifically as JURIS costs include:

- West Publishing (provision of data base information).
- Telecommunication (modem) costs.
- JURIS-related printing costs (reference and identification cards).
- Central Data Processing, Inc. (keyboarding services).
- Aspen Systems Corp. (keyboarding services).
- NCR thermal printer.
- JURIS-related travel and training costs.

The following vendors and costs were identified as being applicable only to the operation of other systems:

- Costs related to ACCSYS.
- ALANTHUS terminals.
- MRI Modules (System 2000).
- MRI maintenance.
- 3M Word Processor - Linolex.

All depreciation expense was assumed to be indirect SDDS expense. As stated in Section II, a major problem was encountered in identifying depreciation expense. We were unable to

determine that the amount reported on the WCF Income and Expense Statement reasonably reflected the amount of depreciation which should have been reported by SDDS. As a result, we could not specifically identify depreciation expense items which related directly to JURIS or other systems.

Exhibits 5 through 10 show the specific costs identified as JURIS, other systems, and indirect activities costs. Each exhibit presents a different object class, i.e., type of expense. Exhibit 11 is a summary of all SDDS costs by cost category.

Usage statistics provided by SDDS were then used to allocate JURIS costs between JURIS automated legal research and other applications of JURIS. The statistics indicated that 80% of total JURIS usage charged to SDDS resulted from automated legal research applications. Exhibit 12 details the source of the statistics and the automated legal research allocation factor developed.

Not all JURIS costs were subject to this allocation process. Certain items were specifically identifiable as automated legal research or private file costs. These items, and the adjustment of the total JURIS cost, are shown in Exhibit 13. Out of an aggregate direct JURIS cost of $634,481, $303,011 were identified as automated legal research and $69,172 were identified as private file costs. The remaining $262,298 was then allocated to automated legal research according to the 80% factor. The combination of identified and allocated costs resulted in the calculation of $512,849 of JURIS automated legal research costs incurred by SDDS, as detailed on Exhibit 13.

As shown on Exhibit 14, the indirect non-personnel costs of SDDS in FY 1978 were calculated to be $344,514, plus or minus 40% of the stated depreciation expense ($63,367). These costs were then allocated to JURIS and other systems based upon the proportion of the system's personnel costs to the total SDDS personnel

cost. We and SDDS agreed that personnel cost was the most appropriate for cost allocation due to the nature of specific indirect costs. Based upon the relation of JURIS ALR personnel costs (as determined in Section 3.2 of this chapter) to total SDDS personnel costs, the percentage of indirect costs allocable to JURIS ALR was calculated. This percentage, 19%, was then multiplied by the indirect costs of SDDS. Exhibit 14 details this process which results in the allocation of between $60,651 and $70,264 of SDDS indirect costs to JURIS automated legal research.

3.2. Personnel Costs

SDDS personnel costs were reviewed so that those directly related to JURIS and other systems could be specifically identified. However, records from a timekeeping system were not available for identifying either time or cost. There was no system in existence in FY 1978 which identified time spent on JURIS. The current timekeeping system identifies time spent by a user organization, which does not necessarily correlate to a system such as JURIS automated legal research or ACCSYS. The alternative method for identifying the allocation of time between various systems and overhead activities was to interview SDDS staff members to obtain their estimates of time spent by employees on various projects. While this was the only available means for gathering the required information, the resulting data must be qualified since interviewees' perceptions and memories were involved.

The following method was developed for allocating personnel costs to JURIS:

- An SDDS personnel list was obtained.
- Interviews were conducted with SDDS supervisors to determine which people spent time on which activities.

- Direct salaries for the specific individuals were allocated to activities and indirect costs were applied to direct personnel costs.
- Fringe benefits were applied in accordance with OMB Circular A-76, as revised in April 1979.

3.2.1. Obtained Personnel List

We obtained from SDDS a list of their current personnel. This list approximated the staff members and positions during FY 1978. Staff members were identified by group and section within SDDS. Their grade and function were also identified. Based on the personnel list and the total direct salaries paid during FY 1978, a direct salary was calculated for each person.

3.2.2. Determined Time Spent by Staff Members

Determination of how staff members spent their time was made in two steps. The first step was to identify which staff members spent time on JURIS. A senior staff member who was involved with JURIS in FY 1978 identified the specific individuals and/or positions. To protect the privacy of individual employees, their names and salaries will not be identified in this report. The staff members identified as spending at least part of their time directly on JURIS were in the following SDDS organizations:

- Office of the Director.

- Legal Systems Development Group:
  - Legal Systems Software Support Section.
  - Legal Data Base Administration Section.
- Systems Training and Special Projects Group:
  - Legal Research Systems Training Section.

The section chiefs for the organizations whose people work on JURIS were interviewed to identify the percent of time that each employee dedicated to projects. These supervisors were involved with their organizations in FY 1979. Four specific project categories were established and each employee's time was included in one or more of the categories. The catagories were:

- JURIS - Both automated legal research and private file (litigation support) activities.
- JURIS - Automated legal research (ALR).
- Other Projects.
- Indirect Activities.

An estimate was obtained for every employee, detailing the percent of time dedicated to each of the four catagories listed above. According to the definition of JURIS ALR, as used in this project, JURIS private file activities fall into the "Other Projects" catagory. Therefore the pro-rata share of each employee's time applicable to JURIS-Both was reallocated to JURIS ALR and Other Projects. This reallocation was based on the percent of JURIS ALR to total JURIS connect time recorded in the SDDS Project Invoice Report. Using this methodology, 80% of the JURIS-Both category was included in JURIS ALR and the remaining 20% in Other Projects. The resulting statistics for each employee were used to calculate the direct salary cost applicable to each category.

3.2.3. Calculate Direct Salaries and Allocate Indirect Activity Salary Cost

For each SDDS section a total direct salary cost was determined for the JURIS ALR, Other Projects, and Indirect Activities categories. Overhead was then allocated to the JURIS-ALR and Other Project categories within the section, then the group, and finally within SDDS. Exhibit 14 shows this calculation.

3.2.4. Apply Fringe Benefits Cost

OMB Circular A-76 prescribes fringe benefit percentages which are to be applied for cost comparision studies of this nature. These percentages are listed below:

- 20.4% - For Federal Employee Retirement Benefits.
- 3.7% - For Federal Employee Insurance (Life and Health) Benefits.
- 1.9% - For Employee Compensation, Bonuses, Award and Unemployment.

The percentages were applied to the JURIS automated legal research direct salary costs to determine the total burdened cost of SDDS personnel allocable to JURIS. The total JURIS automated legal research personnel cost incurred by SDDS is $347,169, as shown on Exhibit 15.

The sum of these percentages, 26%, differs from the actual fringe benefits paid. The actual fringe benefits paid during FY 1978 were approximately 7% higher than the OMB prescribed rate. However, the difference in JURIS automated legal research cost which results from applying the actual fringe benefit percentage as opposed to the OMB prescribed rate is only approximately $20,000. This difference is negligible when considered in relation to the total SDDS cost.

3.3. Total SDDS Costs

Exhibit 16 details total SDDS costs applicable to the operation of JURIS ALR. The total SDDS cost of between $920,669 and $930,282 attributable to JURIS is derived from four components as follows:

- SDDS personnel costs, $347,169.
- ALR component of shared (automated legal research and private file) direct JURIS costs, $209,838.
- Direct SDDS JURIS ALR costs, $303,011.
- Indirect SDDS costs related to JURIS ALR, $60,651 - $70,264.

Exhibit 5

Identified Costs

Systems Design and Development Staff

Object Class 2100

Travel and Transportation of Persons

	JURIS (ALR & PRIV. FILES)	OTHER SYSTEMS	INDIRECT	TOTAL
Training, site inspection, installation, conversion	$13,376			
Travel to analyze procedures study for Lands and Resources Big Cypress for possible automation	396			
ICSYS training, system review, seminars		$12,342		
System 2000 conference - Austin, Texas[1]		454		
IM/370 CP struc. meeting			$450	
Travel[1] Charlottesville			28	
Seminars			413	
Training			1,609	
AT&T Seminar			214	
Travel[1] to Seattle 12/11 - 12/16/77		1,106		
Telecom inspection - Newark		69		
Imprest funds			115	
Other			20,769	
Total	$13,772	$13,971	$23,598	$51,341

[1] Names have been withheld to protect the privacy of the individuals.

Exhibit 6

Identified Costs

Systems Design and Development Staff

Object Class 2200

Transportation of Things

	JURIS (ALR & PRIV. FILES)	OTHER SYSTEMS	INDIRECT	TOTAL
Transportation of JURIS terminals for maintenance	$6,414			
Airfreight for Scope printers, maintenance and replacement	2,259			
Federal Express air freight shipments			$5,124	
Emery Air Freight			869	
Other			1,966	
Total	$8,673		$7,959	$16,632

Identified Costs

Systems Design and Development Staff

Object Class 2300

Communications, Rent and Utilities

	JURIS (ALR & PRIV. FILES)	OTHER SYSTEMS	INDIRECT	TOTAL
Telephone modems	$30,159			
ease of acoustic couplers for JURIS Lit. Support	3,558			
TCI terminals for program development			4,721	
Codex equipment to multiplex FLITE inquiries	3,670			
ease of Hazeltine equipment	19,970			
Lease of Bunker-Ramo equipment	30,066			
ease of Scope equipment	41,492			
FTS	100,125	17,209		
ord processors for land fraud case	29,440			
Scope teletypewriter - Trans Alaska Case	1,032			
Texas Int. Model 745 terminal	549			
exas Int. Model 745 portable	1,168			
ease of NCR thermal printer	840			
Lease of System 2000 modules		11,187		
ease of two Alanthus terminals for Newark		2,717		
ease KSR-1200 (Alanthus)		292		
ease of IBM Keypunch		4,680		
Lease of Dialdo impact printer		480		
ease of acoustic couplers		313		
Lease of Alanthus terminals and printers for Seattle, Tucson, and Phoenix (ACCSYS)		12,574		

Identified Costs

Systems Design and Development Staff

Object Class 2300

Communications, Rent and Utilities

	JURIS (ALR & PRIV. FILES)	OTHER SYSTEMS	INDIRECT	TOTAL
Alanthus terminals and printers for Chicago, Los Angeles, Dallas, and Washington		$ 8,790		
Telephone modems - ACCSYS		2,920		
Acoustic couplers		227		
Lease Alanthus terminet printer		105		
Lease Memorex controller and eight terminals			$ 284	
Lexitron 921			1,184	
GSA phones			77,684	
Conditioned lines between Todd and CAB for SDDS, RJE and terminal controller	$ 1,068			
SAVIN paper copiers			936	
Data 100 remote job entry			2,234	
Space			76,236	
Other			23,111	
Total	$263,137	$61,494	$186,390	$511,021

Exhibit 8

Identified Costs

Systems Design and Development Staff

Object Class 2400

Printing and Reproduction

	JURIS (ALR & PRIV. FILES)	OTHER SYSTEMS	INDIRECT	TOTAL
eference cards	$ 767			
Identification cards	39			
Guide cards - ACCSYS TABS		$ 264		
Silkscreen ACCSYS collection manual binders		466		
Silkscreen ACCSYS caseload manual binders		2,133		
ACCSYS proposed codes		118		
Miscellaneous ACCSYS forms		2,078		
Other			$11,340	
Total	$ 806	$ 5,059	$ 11,340	$ 17,205

Identified Costs

Systems Design and Development Staff

Object Class 2500

Other Contractual Services

	JURIS (ALR & PRIV. FILES)	OTHER SYSTEMS	INDIRECT	TOTAL
Central Data Processing, data conversion services for Franklin Bank	$ 30,000			
Aspen Systems Corp.	21,534			
Contract for document control, document markup, keyboarding, and file maintenance - SBA	2,332			
WEST	249,375			
Sanders	23,999			
Scope	4,200			
MRI Systems - training Systems 2000		$1,750		
Maintenance System 2000 modules and technical and consultation		5,135		
Maintenance of IBM 548 interpreter and 83 card sorter		1,107		
Keyboarding - Federal Prisons	11,528			
Payroll Services			$ 5,110	
Keyboarding - IMP		12,677		
U.S. Tax Court Reports	1,590			
U.S. Attorney Annual Statistical Report		3,600		
Keyboarding - International Computer Resources	697			
Office machine repair			338	
Printing			66	

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Identified Costs

Systems Design and Development Staff

Object Class 2500

Other Contractual Services

	JURIS (ALR & PRIV. FILES)	OTHER SYSTEMS	INDIRECT	TOTAL
Security Investigations			$ 1,700	
Install dedicated 20 AMP circuit, open one 3" telephone duct			427	
Training			10,158	
Development of management system design and management methodology - Executive Resource Associates, Inc.			14,362	
Leroy Morris Films - Provide film for presentation with Executive Seminar on System Management			9,960	
Remove carpeting Todd 5630			48	
Other			174	
Total	$345,255	$24,269	$42,343	$411,867

Exhibit 10

Identified Costs

Systems Design and Development Staff

Object Class 2600

Supplies, Materials and Uncapitalized Equipment

	JURIS (ALR & PRIV. FILES)	OTHER SYSTEMS	INDIRECT	TOTAL
Scope supplies	$1,386			
Sanders supplies	472			
IBM ribbons		$54		
IBM keypunch ribbon		46		
Diablo printer ribbons		17		
GSA store			$752	
COBOL coding forms		248	248	
Printer paper			506	
Books - digital techniques			404	
Packet data comm. '78 study			225	
Card mailer boxes		200	200	
Wide angle viewer			39	
Cable			78	
Harvard Business Review			21	
Public laws	110		110	
Black's Law Dictionary			48	
Printer paper			1,470	
Subscriptions			90	
Teletype ribbon			67	
Data cable			172	
Publications			117	
Sanyo tapes			45	
Monthly reports			365	
Auto-cite 10/1/77 - 9/30/78		3,600		
U.S. Board of Tax Appeals Report	870			
Other			5,118	
Total	$2,838	$4,165	$9,517	$16,520

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Exhibit 11

Summary of

Identified System Design and Development Staff Costs

OBJECT CLASS	DESCRIPTION	JURIS	OTHER SYSTEMS	INDIRECT	TOTAL	
2100	Travel and Transportation of Persons	$ 13,772	$13,971	$23,598	$51,341	(Exhibit III-1)
2200	Transportation of Things	8,673	-	7,959	16,632	(Exhibit III-2)
2300	Communications, Rent and Utilities	263,137	61,494	186,390	511,021	(Exhibit III-3)
2400	Printing and Reproduction	806	5,059	11,340	17,205	(Exhibit III-4)
2500	Other Contractual Services	345,255	24,269	42,343	411,867	(Exhibit III-5)
2600	Supplies, Materials and Uncapitalized Equipment	2,838	4,165	9,517	16,520	(Exhibit III-6)
	Amortization and Depreciation			63,367[1/]	63,367	
		$634,481	$108,958	$344,514	$1,087,953	

[1/] Assumed to be correct within ± 40% ($25,300), or within the range of $38,000 to $88,500. Refer to text for discussion.

Exhibit 12

JURIS Automated Legal Research and Private File Usage

	CONNECT TIME UNITS	% OF JURIS ALR USAGE [1]	% OF JURIS PRIV FILE USAGE [1]
JURIS-ALR USAGE			
DOJ	1,128,357	80%	64%
Non-DOJ	289,539	20%	16%
Total JURIS-ALR Usage	1,417,896		80% [2]
OTHER JURIS USAGE	358,536		20% [2]
Total JURIS Usage	1,776,432	100%	100%

[1] Percentage based on total connect time units.

[2] Percentages used to allocate total JURIS costs between JURIS-automated legal research and JURIS-litigation support

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ALR vs. Private File Component of

Systems Design and Development Staff Direct JURIS Costs

Total SDDS Direct JURIS Costs		$634,481	(Exhibit III-7)
Less: ALR Component			
. WEST	$249,375		(Exhibit III-5 Page 1 of 2)
. Aspen Systems Corp.	21,534		(Exhibit III-5 Page 1 of 2)
. Training, site inspections, installation, conversion	13,376		(Exhibit III-1)
. Keyboarding - Federal Prisons	11,528		(Exhibit III-5 Page 1 of 2)
. Codex equipment to multiplex FLITE inquiries	3,670		(Exhibit III-3 Page 1 of 2)
. U.S. Tax Court Reports	1,590		(Exhibit III-5 Page 1 of 2)
. Conditioned lines between Todd and CAB for SDDS, JURIS lines to FLITE in Denver	1,068		(Exhibit III-3 Page 2 of 2)
. U.S. Board of Tax Appeals Report	890		(Exhibit III-6)
		(303,011)	
Less: Private File Component			
. Central Data Processing, data conversion for Franklin Bank	$ 30,000		(Exhibit III-5 Page 1 of 2)
. Word Processors for land fraud case	29,440		(Exhibit III-3 Page 1 of 2)
. Lease of acoustic couplers for JURIS lit. support	3,558		(Exhibit III-3 Page 1 of 2)

Private File Component (cont.)			
. Contract for document control, document workup, keyboarding, and file maintenance - SBA	2,332		(Exhibit III-5 Page 1 of 2)
. Texas Int. Model 745 terminal and portable	1,717		(Exhibit III-3 Page 1 of 2)
. Scope teletypewriter - Trans Alaska case	1,032		(Exhibit III-3 Page 1 of 2)
. Keyboarding - International Computer Resources	697		(Exhibit III-5 Page 1 of 2)
. Lands and Resources Big Cypress	398		(Exhibit III-1)
		(69,172)	
SDDS Direct JURIS Costs to be allocated between ALR and private file usage		262,298	
ALR percentage of JURIS usage		x 80%	(Exhibit III-7)
ALR component of shared SDDS direct JURIS costs		209,838	
Plus: ALR component of direct JURIS costs		303,011	
Total Direct SDDS Costs of JURIS ALR		$512,849	

Exhibit 14

Allocation of Systems Design and Development Staff Indirect Costs to JURIS

STEP

1. **Determination of SDDS Indirect Cost Allocation Percentage**

   - $\frac{\text{SDDS JURIS ALR Personnel Costs}}{\text{Total SDDS Personnel Costs}}$ = SDDS Indirect Cost Allocation %

   - $\frac{\$347,169 \text{ (Exhibit III-11)}}{\$1,862,305 \text{ (Exhibit II-3)}}$ = 19%

2. **Calculation of SDDS Indirect Costs Related to JURIS ALR**

   - SDDS Indirect Costs × SDDS Indirect Cost Allocation % = SDDS Indirect Costs Allocable to JURIS ALR

   - 319,214 - 369,814 [1/] × 19% = 60,651 - 70,264 [1/]

[1/] Range reflects the assumption that actual depreciation expense is within ± 40% of the stated amount.

Exhibit 15

Calculation of Direct Salaries and Allocation of Indirect Activity Salary Cost

GROUP/SECTION		JURIS-ALR	OTHER PROJECTS	GROUP INDIRECT COSTS	TOTAL
Legal Systems Development Group					
Office of the Chief		$ -0-	$ -0-	$ 48,639	$ 48,639
Legal Systems Software Support Section -	Direct Costs	47,088	107,270	-0-	154,358
	Indirect Costs	1,099	2,503	-0-	3,602
Case Management Systems Section -	Direct Costs	-0-	180,804	-0-	180,804
	Indirect Costs	-0-	38,833	-0-	38,833
Legal Data Base Administration Section -	Direct Costs	76,672	75,947	-0-	152,619
	Indirect Costs	1,558	1,543	-0-	3,101
Litigation Assistance Systems Section		-0-	38,501	-0-	38,501
Total of Section Direct and Indirect Costs		126,417	445,401	48,639	620,457
Allocation of Group Indirect Costs		10,754	37,885	(48,639)	-0-
Total Group Cost		137,171	483,286	-0-	620,457
Systems Training and Special Projects Group					
Office of the Chief		-0-	-0-	38,680	38,680
Legal Research Systems Training Section (Direct and Indirect Costs)		80,697	28,543	-0-	109,240
Technical Training Section (Direct and Indirect Costs)		-0-	57,532	-0-	57,532
Special Projects Section (Direct and Indirect Costs)		-0-	69,251	-0-	69,251
Total of Section Direct and Indirect Costs		80,697	155,326	38,680	274,703
Group Indirect Cost Allocation		13,225	25,455	(38,680)	-0-
Total Group Cost		93,922	180,781	-0-	274,703
Administrative Systems Development Group[1]		-0-	375,924	-0-	375,924
Total Personnel Cost for All Groups		231,093	1,039,991	-0-	1,271,084
SDDS Overhead Allocation		44,438	122,706	-0-	167,144
Total Direct Salary Cost Including Indirect Activities		275,531	1,162,697	$ -0-	$1,438,228[4]
Fringe Benefits[3]		71,638			
Total SDDS Personnel Costs Attributable to JURIS-ALR		$347,169			

[1] All Administrative Systems Development Group Direct and Indirect Costs were attributable to "Other Projects".

[2] This amount includes $17,172 from the Office of the Director specifically applicable to JURIS-ALR only.

[3] Based on Fringe Benefit Percentages as specified in OMB circular A-76, the actual percentages used were; employee retirement benefits - 20.4%; employee insurance benefits - 3.7%; and employee compensation, bonuses, awards and unemployment - 1.9%.

[4] Total personnel costs used for allocation was $1,438,236; the difference is due to rounding estimates.

Exhibit 16

Systems Design and Development Staff
Costs Applicable to the Operation of JURIS ALR

Personnel Service Costs (Exhibit III-11)	$ 347,169
Shared SDDS Costs Allocated to JURIS ALR (Exhibit III-9)	209,838
Direct SDDS JURIS ALR Costs (Exhibit III-9)	303,011
Indirect SDDS Costs Related to JURIS ALR (Exhibit III-10)	60,651 - 70,264
SDDS JURIS ALR Costs	$920,669 - $930,282

IV. REVIEW OF JDMS DATA PROCESSING COSTS

4.1. Introduction

The Justice Data Management Service (JDMS) provides the data processing support for JURIS, as well as other systems operated by DOJ, independent DOJ bureaus, and some other government agencies. The support includes computer processing services and other services, such as microfilming, which are referred to as peripheral services.

JDMS uses commercial software to generate usage statistics and related system costs. The software consists of two separate packages marketed by PACE Applied Technology, Inc., one of the largest vendors of computer system billing software. The two packages used by DOJ are the KOMAND Data Acquisition System (DAS) and the KOMAND Resource Billing System (RBS).

The Data Acquisition System (DAS) package is a job accounting and resource management system which operates in conjunction with the computer operating system. The software generates a comprehensive accounting data base of usage statistics. This information is then used as an input to produce statistical reports. The DAS employs the unit charge approach and maintains an accurate measurement and calculation of the use of each resource, such as central processor units, selector channels, and telecommunications occupancy, by user accounts.

The KOMAND Resource Billing System is the cost distribution system designed to handle the utilization and costing information for all resources within a data processing system. The RBS produces for each user an invoice which summarizes utilization and cost information for resources and services he consumed during the billing period. This is done in two ways: in a detailed report listing all charges and credits and in a summary report which shows overall account activity. Both reports identify the

utilization and charge for each resource, or service description, so the user can identify the system components his job used.

The KOMAND System operates on a fixed unit cost basis. Actual usage statistics are combined with fixed unit costs to calculate the user charge. User charges are reported on the KOMAND Resource Billing System Report.

The cost of operating JDMS is accumulated in the Working Capital Fund (WCF) by the Financial Management Staff. Organizations within the Financial Management Staff record obligations, pay vouchers, and report the results of operations to CMSS and JDMS managers. The WCF Income and Expense Statement is the report which shows the income received, expenses incurred (delivered orders only) and the net results of operations.

The actual costs incurred by JDMS can be divided into two categories. The first category is direct data processing costs. These costs are directly identifiable to particular services provided. For example, the costs of leasing and maintaining the IBM 370/168 computer, the 3277 display terminals and the COBOL Compiler and Library can be identified with the Central Processing Service.

The second category of costs are indirect costs. These are costs which cannot be directly associated with a particular service. The cost of space rental, personnel, office supplies, and office telephones are examples of indirect costs.

The cost accumulated by the KOMAND system does not necessarily match the cost accumulated by the WCF. The primary reason is that the KOMAND system operates on the fixed unit cost basis while the WCF operates on an actual accrued expenditure basis. In fact, for FY 1978, the WCF accumulated an actual cost for JDMS of approximately $8.7 million while the KOMAND system accumulated approximately $20 million. The KOMAND Report includes reliable

usage statistics, but has unit cost rates that have not been updated for approximately two years. In fact, a current study by FEDSIM includes a review of the unit cost rates associated with various service descriptions.

4.2. Approach to Identifying JDMS Costs of JURIS

The approach to identifying JURIS costs was based upon the need to use both the WCF records and the KOMAND system records. The WCF records identify total organization costs and actual specific direct data processing cost items. The KOMAND system provides statistics of system usage. Our approach involved six basic steps:

1. Identify specific equipment related to each category for which computer system and peripheral equipment usage is accumulated.
2. Identify the cost incurred for each hardware and software item.
3. Review the reasonableness and equity of the KOMAND statistics.
4. Apply the direct data processing costs to the JURIS usage statistics.
5. Determine the amount of indirect JDMS costs which should be allocated to the JURIS direct data processing costs and allocate.
6. Derive the JURIS automated legal research costs from the total JURIS cost.

By first identifying the equipment related to each service category for which JDMS charges users, we could then calculate the cost of providing each service from the WCF records. This is the cost which should have been accumulated by the KOMAND system. The cost accumulated by the KOMAND system could then be adjusted to reflect actual costs incurred.

Allocation of cost to users based upon the KOMAND system statistics assumes that the statistics fairly represent the actual system usage. Although a review of the KOMAND system operations was not required for this study, it was important to survey the process since the actual cost allocation was based upon the KOMAND system usage statistics.

After identifying and allocating the direct data processing cost, the indirect cost could be identified and distributed to JURIS. The final step, then, was to separate the JURIS automated legal research activity cost from the JURIS private file activity cost.

4.3. Identifying JDMS Costs of JURIS

This section is a description of each major step taken to accomplish the tasks mentioned above. Exhibits are included to show the results of each task and to explain specific calculations.

4.3.1. Identify Specific Equipment Related to Each Category for Which Computer System and Peripheral Activities Costs Are Accumulated

The JDMS resources consumed by a user are identified by service descriptions on the KOMAND Resource Billing System Report (hereinafter called the KOMAND Report). To assure that JURIS costs equitably reflect the cost of resources consumed, the analysis was done on a service-by-service basis. The first step, therefore, was to identify the specific equipment related to each service category for which usage statistics are accumulated. Exhibit 17 shows the equipment which relates to each service description in the KOMAND Report.

4.3.2. Identify the Cost Incurred for Each Equipment Item

The cost of each equipment item, except owned equipment, related to direct data processing was identified. Owned equipment results in a depreciation expense charge. As discussed in Section II, the depreciation expense could not be confirmed, and specific owned equipment items could not be identified. Therefore, all depreciation expense was considered to be an indirect cost. It should be noted that in FY 1978, only a small dollar amount of direct data processing equipment was owned. Most JDMS-owned property was office furniture, leasehold improvements, and other items which are truly indirect costs.

Obligation documents for each item were reviewed. The disbursements made against each obligation were identified for all items over $30,000 and for those purchased under a blanket purchase order. The items falling into these categories represent approximately 85% of the funds obligated. Based upon the items reviewed, the average deviation between funds obligated and actually paid was less than 4%, with a maximum deviation on any one item of less than 11%. Therefore the expected error due to unresearched obligations for the entire direct data processing cost of JDMS was estimated to be less than $25,000.

Exhibit 18 presents the amounts obligated or actually dispersed for each hardware and software item. The exhibit also shows the actual direct data processing cost of JDMS by service description and in total.

4.3.3. Review the Reasonableness and Equity of the KOMAND Usage Statistics

A limited review of the Data Acquisition System module and Resource Billing System module of KOMAND System was performed to identify unreasonable or inequitable accumulations of usage statistics. The system documentation at DOJ, PACE Applied

Technology, Inc. product description booklets, and the user-defined tables which drive the allocation algorithms were reviewed.

For other than disk occupancy usage statistics, the statistics accumulated by the KOMAND system appear to reasonably reflect the actual use of the system. No significant biases were identified which would penalize or favor a particular type of system.

However, disk occupancy usage does not reasonably reflect the fact that a group of disk packs, drives, and controllers are dedicated to JURIS. The statistics capture data when the system is in use, but do not reflect the idle time which results when JURIS is not operating. To account for this situation, we allocated disk occupancy cost based upon the number of disk packs, drives, and controllers actually dedicated to JURIS. This calculation is explained further in the next step.

4.3.4. Apply Direct Data Processing Costs to the JURIS Usage Statistics

The JURIS costs accumulated by the KOMAND System were adjusted to reflect the costs incurred for each service description. The methodology to make this adjustment involved first calculating a factor to adjust the total cost accumulated by KOMAND to the actual cost incurred, and then applying this factor to the JURIS cost accumulated by KOMAND.

As an illustration, KOMAND accumulated a cost of $594,557 for TP Occupancy (Exhibit 19). The direct data processing cost identified for this item was $98,990. Therefore, an adjustment factor of .1665 was calculated. If this factor was applied to the KOMAND cost for each system which incurred TP Occupancy charges, the charge to all users would be $98,990. By multiplying the KOMAND cost charged to JURIS for TP Occupancy, $192,270,

by the adjustment factor, the TP Occupancy direct data processing cost allocable to JURIS of $32,013 is calculated.

JURIS usage statistics and related cost are accumulated in several accounts. The major account is the H202 account, JURIS On-Line Production. All usage of JURIS software for both automated legal research and private file activities is accumulated in this account, as well as some usage of ACCSYS. Several other accounts accumulate statistics related to the maintenance of the JURIS software and automated legal research data base. These accounts are:

H203 - JURIS Terminal Requested Printouts
H208 - JURIS Data Base File Maintenance
H209 - JURIS Common Support Processing
H217 - JURIS Bunker-Ramo Terminal Rental
H224 - JURIS Batch Program Development and Maintenance
H230 - JURIS On-line Program Development and Maintenance

The accounts which accumulate statistics related to the development and maintenance of special files were not considered. An exception to this methodology was the calculation of disk occupancy costs.

As stated above, the usage statistics for the disk occupancy cost do not accurately reflect the dedication of certain disk packs, drives, and controllers. The following items were identified by DOJ as being dedicated to JURIS:

48 disk packs (3330)
24 dual density disk modules (3675)
6 string controllers (3673)
6 storage controllers (3672)

In addition, a portion of disk packs or related equipment used for systems overhead and work space should be allocated to JURIS. JDMS and SDDS estimated that the equivalent of one dual density disk pack and the associated modules and controllers

should be allocated to JURIS. Therefore, the disk occupancy cost for JURIS should be based upon the following resources:

49	disk packs (3330)
24.5	dual density disk modules (3675)
6.125	string controllers (3673)
6.125	storage controllers (3672)

The calculations of cost related to these items are shown below:

. Disk Packs (3330)

Packs are leased from Memorex and IBM at unit prices ranging from $87 to $240. Therefore we assumed an average per unit price of $184.42 calculated as follows:

Total lease cost	$ 45,737.00	
Divided by total units leased	248.00	
	184.42	
Times packs allocated to JURIS	49	= $ 9,037

. Dual Density Disk Modules (3675)

Total Lease Cost	597,067	
Divided by total units leased	54	
	11,056	
Times drives allocates to JURIS	24.5	= 270,872

. String Controllers (3673)

Total lease cost =	$ 51,871	
Divided by total units leased	20	
	2,594	
Times controllers allocated to JURIS	6.125	= 15,888

. Storage Controllers (3672)

Total lease cost =	249,508		
Divided by total units leased =	20		
	12,475		
Times controllers allocated to JURIS	6.125	=	76,400
Total Cost			$372,200

Exhibit 19 shows the results of this adjustment process. The exhibit shows the cost incurred, the total cost accumulated by KOMAND, the calculating factor, the JURIS costs accumulated by KOMAND, and the adjusted cost of JURIS by service description.

As mentioned earlier, the JURIS usage statistics accumulated by JDMS in the H202 account include some ACCSYS usage, automated legal research usage, and private file usage. Therefore, to determine the direct data processing costs attributable to JURIS, we had to allocate the following service costs between JURIS and ACCSYS:

- Central Processor
- TP Occupancy
- Spooled Lines Printed-Local

SDDS provided information which showed that ACCSYS accounted for approximately 18% of the H202 account usage for the above mentioned services. Based upon this percentage, $64,613 of Central Processor costs, $42,072 of TP Occupancy costs, and $282 of Spooled Lines Printed-Local costs were allocated to ACCSYS.

The total direct data processing cost of JURIS is $823,889. However, this figure includes costs which are attributable to both automated legal research and non-automated legal research use of JURIS, as well as some on-line processing related to ACCSYS.

4.3.5. Determine the Indirect JDMS Cost Attributable to JURIS and Allocate

The indirect cost of JDMS was considered to be all non-data processing costs plus the amount of direct data processing costs incurred by JDMS for administrative and other general purposes. All personnel costs were considered to be indirect costs, since they could not be associated with a level of activity below the total data processing operation. All depreciation costs were considered to be indirect costs, as discussed in the introduction to this chapter.

The indirect cost of JDMS also included a pro rata share of CMSS overhead costs. For FY 1978, 80% of the CMSS costs were allocated to JDMS. The other 20% was allocated to Justice Publications Service and Justice Communications Service, two other revenue-producing organizations within CMSS. This allocation of indirect costs was based upon the ability of each organization to bear the cost in their charges to users.

Upon review of the basis for allocating CMSS overhead costs, we determined that the most appropriate basis for allocating overhead was cost incurred. CMSS overhead activity is primarily personnel time which is spent processing obligations, taking personnel actions, and addressing policy decisions. These activities roughly correlate with the level of spending. Therefore, CMSS overhead was recalculated and applied to JDMS for distribution to JURIS based upon the accrued expenditures for all CMSS activities.

Exhibit 20 shows the calculation of JDMS indirect costs and the allocation to JURIS. There are four separate calculations shown on the exhibit:

- Adjustment of JDMS Data Processing Costs for General Administrative and Other Purposes - This calculation is required to adjust the cost

accumulated on the KOMAND Report to the direct data processing cost identified thorugh obligations incurred. The calculation is similar to the calculation of JURIS direct data processing cost.

- Calculation of CMSS Costs Allocable to JDMS - This calculation is required to adjust the CMSS overhead cost allocated to the amount which more properly reflects the JDMS share.

- Calculation of JDMS Costs to be Allocated - This step is the calculation of the JDMS costs to be allocated over the direct data processing cost base. It involves adding the JDMS indirect (non-data processing) costs, the JDMS internal data processing costs, and CMSS overhead.

- Allocation of JDMS Indirect Costs to JURIS - The final step is the actual allocation of JDMS indirect costs to JURIS.

As discussed in earlier sections, we were unable to confirm the depreciation expense stated by DOJ. Based upon our limited testing, we assumed that the stated amount was correct within plus or minus 40% of the stated amount. As a result, the indirect cost is stated as a range.

4.3.6. Derive the JURIS Automated Legal Research Costs from the Total JURIS Cost

As mentioned earlier, the JURIS usage statistics accumulated by JDMS in the H202 account include both automated legal research and other applications of JURIS, as well as some ACCSYS usage. To determine the cost of JURIS, automated legal research, the direct and indirect JDMS cost accumulated in steps 4 and 5 was allocated between the automated legal research and other functions (including ACCSYS) based upon user-specific statistics accumulated by SDDS.

The SDDS statistics, shown on Exhibit 21, indicate that 80% of the JURIS computer usage accumulation related to automated legal research during FY 1978. These statistics are derived from

the actual on-line usage of the JURIS software charged to the H202 account. As shown on Exhibit 21 this statistic was used to derive the JDMS costs related to JURIS automated legal research. All JDMS accounts related to JURIS were allocated between automated legal research and private file applications. They also accumulate common costs, except H208, which accounts for less than 2% of the JURIS data processing activity.

The JDMS costs attributable to JURIS automated legal research activities were calculated to be between $1,489,591 and $1,555,502. This amount consists of $659,111 of direct data processing cost, and between $830,480 and $896,391 of indirect JDMS cost.

KOMAND Resource Billing Systems Service Descriptions and Related Equipment Items

	SERVICE DESCRIPTION/EQUIPMENT ITEM	SYSTEM 1 (IBM 370/155)	SYSTEM 2 (IBM 370/155)	SYSTEMS 3 + 9 (IBM 370/168)
001	Central Processing			
	Central Processing Unit 370-168			X
	Motor Generator Maintenance			X
	3272 CRT Control Unit			X
	3277 Display Stations			X
	3277 Display Terminals			X
	Central Processing Unit 370/155	X	X	
	CPU Maintenance	X	X	
	3215 Console	X	X	
	Software			
	COBOL Compiler and Library	X	X	X
	CICS/OS STD V2	X	X	X
	Optimizing Compiler and Libraries OS	X	X	X
	3550/3330 5799 ARG	X	X	X
	APL 5748 API	X	X	X
	COBOL Optimizer Package	X	X	X
	Sync Sort	X	X	X
	IDMS, GCI and IDMS CULPRTT	X	X	X
	VM Monitor Analysis	X	X	X
	KOMAND DAS and RBS	X	X	X
	VCC Tape Library Management System	X	X	X
	Training System for Computer Console	X	X	X
	EASYTRIEVE, PANVALET CMS, PANVALET	X	X	X
	Intercom Telecommunications Monitor	X	X	X
002	Selector Channel			
	2860-3 Selector Channel			X
003	Multiplexor Channel			
	2880-2 Block Multiplexor			X
	2870 Byte Multiplexor			X
004	Main Core Occupancy	X	X	
006	Tape Occupancy			
	3800 Controller and Maintenance	X	X	X
	3470 Tape Drives	X	X	X
	Tape Cleaner and Evaluator	X	X	X

KOMAND Resource Billing System Service Descriptions and Related Equipment Items

SERVICE DESCRIPTION/EQUIPMENT ITEM	SYSTEM 1 (IBM 370/155)	SYSTEM 2 (IBM 370/155)	SYSTEMS 3 + 9 (IBM 370/168)
009 Disk Occupancy			
3672 Storage Control	X	X	X
3673 String Controllers	X	X	X
3675 Dual Density Drives	X	X	X
3670 Single Density Drives	X	X	X
3830 Disk Control	X	X	X
3330 String Control and Drive	X	X	X
3333 Storage Control and Switch	X	X	X
3330 Disk Packs	X	X	X
010 Unit Record			
012 Spooled Cards Read-Local	Equipment items are common to 010, 012, 014 and 016.		
014 Spooled Lines Printed-Local			
016 Spooled Cards Punched-Local			
2821 Control Unit	X	X	X
2540 Card Punch	X	X	X
2501 Card Reader	X	X	X
1403 Printer and Ribbons	X	X	X
1416 Print Chains	X	X	X
Data Processing Cards	X	X	X
013 Spooled Cards Read-Remote			
015 Spooled Lines Printed-Remote	No associated equipment.		
017 Spooled Cards Punched-Remote			
011 Telecommunications Occupancy			
T-Bar Switches	X	X	X
Rack Panels	X	X	X
Signal Cables	X	X	X
COMTEM	X	X	X
018 Volume Mounts	No associated equipment.		
Peripheral Services			
803 Bunker-Ramo JURIS			
807 Bunker-Ramo Control Unit			
2228 Communication Controllers			
2271 AN Modum			
808 Line Cost	No associated equipment.		

KOMAND Resource Billing System Service
Descriptions and Related Equipment Items

SERVICE DESCRIPTION/EQUIPMENT ITEM	SYSTEM 1 (IBM 370/155)	SYSTEM 2 (IBM 370/155)	SYSTEMS 3 + 9 (IBM 370/168)
309 JURIS Software			
310 KOM Equipment COM Unit and Supplies Bruning Fiche Duplicator and Supplies			
313 Daily Tape Occupancy			
314 P/L 1 Optimizing Compiler	No associated equipment.		

Calculation of JURIS Direct Data Processing Equipment Cost

	PACES DESCRIPTION OF SERVICE EQUIPMENT ITEM		JDMS DATA PROC. EQUIP. COSTS
001	Central Processing		
	Hardware IBM 370/168		
	Central Processing Unit	$1,010,278	
	Motor Generator Maintenance	6,336	
	3272 CRT Control Unit	8,784	
	3277 Display Stations	15,576	
	3277 Display Terminals	10,966	$1,051,940
	Hardware IBM 370/155's		
	Central Processing Unit	439,495	
	CPU Maintenance	57,695	
	3215 Console	5,376	502,566
	Total All Hardware		$1,554,506
	Software		
	COBOL Compiler and Library	2,412	
	CICS/OS STD V2	29,628	
	Optimizing Compiler and Libraries OS	3,396	
	3350/3330 5799 ARG	10,800	
	APL 5748 API	4,800	
	COBOL Optimizer Package	5,082	
	Sync Sort	7,560	
	IDMS, GCI and IDMS CULPRTT	6,000	
	VM Monitor Analysis	1,220	
	KOMAND DAS and RBS	1,690	
	VCC Tape Library Management System	1,236	
	Training System for Computer Console	2,700	
	EASYTRIEVE, PANVALET CMS, PANVALET	2,880	
	Intercom Telecommunications Monitor	20,664	
	Miscellaneous	3,299	103,367 [1]
	Total Central Processing Equipment		$1,657,873
002	Selector Channel (Systems 3 + 9 only) [2]		
	2860-3 Selector Channel		59,820
003	Multiplexor Channel (Systems 3 + 9 only) [2]		
	2880-2 Block Multiplexor		132,456
	2870 Byte Multiplexor		32,460
	Total		$ 164,916
004	Main Core Occupancy (System 1 + 2 only)		244,291
006	Tape Occupancy		
	3800 Controller & Maintenance		15,926
	3470 Tape Drives		121,613
	Tapes (Under Peripheral)		
	Tape Cleaner and Evaluator		9,829
	Total		$ 147,368

[1] $60,525 of software cost allocated to IBM 370/168 to derive system 3 and 9 Central Processing cost of $1,112,465.

[2] Actual cost for systems 1 and 2 is included in the lease cost of the 370/155's.

Calculation of JURIS Direct Data Processing Equipment Cost

PACES DESCRIPTION OF SERVICE EQUIPMENT ITEM	JDMS DATA PROC. EQUIP. OBLIGATIONS
009 Disk Occupancy	
3672 Storage Control	$ 249,508
3673 String Controllers	51,871
3675 Dual Density Drives	597,067
3670 Single Density Drives	112,753
3830 Disk Control	3,780
3330 String Control and Drive	23,952
3333 Storage Control and Switch	95,364
3330 Disk Packs	45,737
Subtotal	$1,180,032
M-Disk	
Reg. 2314 Vol-1PL	JDMS has no associated costs.
Reg. 3330 Vol-1PL	
Reg. 3330-II Vol-1PL	
Total	$1,180,032
010 Unit Record	Equipment items are common to 010, 012, 014 and 016.
012 Spooled Cards Read-Local	
014 Spooled Lines Printed-Local	
016 Spooled Cards Punched-Local	
2821 Control Unit	26,610
2540 Card Punch	1,872
2501 Card Reader	4,308
1403 Printer and Ribbons	28,855
1416 Print Chains	6,060
Data Processing Cards	2,200
Total	$ 69,905
013 Spooled Cards Read-Remote	JDMS has no associated costs.
015 Spooled Lines Printed-Remote	
017 Spooled Cards Punched-Remote	
011 Telecommunications Occupancy	
T-Bar Switches, Rack Panels, and Signal Cables - $3,337 Items Purchased during FY 1978	
COMTEN	$ 98,990
018 Volume Mounts	JDMS has no associated costs.

Calculation of JURIS Direct Data Processing Equipment Cost

PACES DESCRIPTION OF SERVICE EQUIPMENT ITEM	JDMS DATA PROC. EQUIP. OBLIGATIONS
PERIPHERAL SERVICES	
803 Bunker Ramo Equipment JURIS	Equipment cost paid by SDDS.
807 Bunker Ramo Control Unit	
2228 Communication Controllers	40,728
2271AN Modem	18,092
	58,820
808 Line Cost	1,036
809 JURIS Software	JDMS has no associated costs.
810 KOM Equipment	
COM Unit and Supplies	68,679
Bruning Fiche Duplicator and Supplies	26,430
	95,109
813 Daily Tape Occupancy - Magnetic Tapes	92,573
814 P/L 1 Optimizing Compiler	JDMS has no associated costs.
Total All Services	$ 3,870,733

Calculation of JURIS Direct Data Processing Costs

SERVICE DESCRIPTION	ACTUAL COST	KOMAND COST	ADJUSTMENT FACTOR	JURIS COST PER KOMAND	ACTUAL JURIS COST
Central Processor (Systems 3 + 9 only)[1/]	$1,112,465	$1,666,364	.667	$ 424,802	$283,343
Selector Channel (Systems 3 + 9 only)[2/]	59,820	31,498	1.899	16,838	31,977
Multiplexor Channel (Systems 3 + 9 only)[2/]	164,916	2,796	58.982	1,139	67,182
Main Core Occupancy (Systems 1 + 2 only)[2/]	244,291	1,274,958	.191	4,713	903
Tape Occupancy	147,368	598,364	.248	52,818	13,009
3330 Disk Occupancy	1,180,032	9,308,890	-	4,188,946	372,206[6/]
TP Occupancy	98,990	594,557	.166	192,270 [4/]	32,013
UR Occupancy					
Spooled Cards Read-Local Spooled Lines Printed-Local Spooled Cards Punched-Local	69,905	495,023	.141	38,913 [5/]	5,494
Spooled Cards Read-Remote Spooled Lines Printed-Remote Spooled Cards Punched-Remote	-0-	162,221	-0-	6,029	-0-
Volume Mounts	-0-	241,159	-0-	16,338	-0-
3330 M-Disk		1,263,339	-0-	4,177	-0-
Required 2314 Vol. 1 PL	-0-	10,777	-0-	-	-0-
Required 3330 Vol. 1 PL		282,612	-0-	-	-0-
Required 3330 II Vol. 1 PL		1,810,699	-0-	-	-0-
Total	$3,077,787	$17,743,257		$ 4,946,983	$ 806,127

1/ Adjustment factor for only the 370/168 (Systems 3 + 9). This factor was used to calculate actual JURIS cost since JURIS automated legal research operates approximately 98% on Systems 3 + 9).
2/ Actual equipment relates only to these systems. KOMAND cost figures reflect only those accumulated under these systems.
3/ Net of computed ACCSYS cost of $ 64,613.
4/ Net of computed ACCSYS cost of $ 42,072.
5/ Net of computed ACCSYS cost of $ 282.
6/ Disk cost figures according to dedicated equipment. Refer to text for discussion.

Calculation of JURIS Direct Data Processing Cost

SERVICE DESCRIPTION	ACTUAL COST	KOMAND COST	ADJUSTMENT FACTOR	JURIS COST PER KOMAND	ACTUAL JURIS COST
Bunker Ramo-JURIS	-0-	42,000	-0-	42,000	-0-
Bunker Ramo	58,820	42,790	1.374	-0-	-0-
3750 Line Cost	1,036	74,350	.013	-0-	-0-
JURIS Software	-0-	143,960	-0-	-0-	-0-
KOM Equipment	95,109	341,455	.278	-0-	-0-
Daily Tape Occupancy	92,573	108,415	.853	-0-	17,762 7/
PL/1 Optimizing Compiler	-0-	3,240	-0-	-0-	-0-
Total	$247,538	$756,210		$42,000	$17,762
Grand Total	$3,325,325	$18,499,467		$4,988,983	$823,889

7/Cost calculated based upon number of JURIS tapes as a percentage of total JDMS tapes times actual cost incurred.

Calculation of JDMS Indirect Costs and Allocation to JURIS

1. CALCULATION OF JDMS DATA PROCESSING COSTS FOR GENERAL ADMINISTRATIVE AND OTHER PURPOSES

SERVICE DESCRIPTION	TOTAL COST ACCUMULATED BY KOMAND [1]	ADJUSTING FACTOR	ADJUSTED COST
Central Processor	$ 356,909	.49	$177,527
Selector Channel	355 [2]	1.89	674
Multiplexor Channel	42 [2]	58.98	2,477
Main Core Occupancy	47,677 [3]	.19	9,135
Tape Occupancy	57,608	.24	14,188
3330 Disk Occupancy	345,101	.08 [4]	30,699
TP Occupancy	49	.16	8
UR Occupancy	-	-	-
Spooled Cards Read-Local	10,566	.14	1,492
Spooled Line Printed-Local	72,713	.14	10,267
Spooled Cards Punched-Local	1,232	.14	174
Spooled Cards Read-Remote	8,233	0	0
Spooled Lines Printed-Remote	21,015	0	0
Spooled Cards Punched-Remote	7,290	0	0
Volume Mounts	43,882	0	0
3330 M-Disk 3330	1,164,806	0	0
Required 2314 Vol-1PL	98,046	0	0
Required 3330 Vol-1PL	383,465	0	0
Required 3330 II Vol-1PL	10,777	0	0
Total	$2,629,766		$246,641
Bunker Ramo-JURIS	-	-	-
Bunker Ramo	-	-	-
3705 Line Cost	-	-	-
JURIS Software	-	-	-
KOM Equipment	6,144	.278	1,711
Daily Tape Occupancy	23,531	1.0	23,531
PL/1 Optimizing Compiler	-	-	-
Total	$ 29,675		$ 25,242
Grand Total	$ 2,659,441		$271,883

Footnotes on following page.

1/ Represents total cost accumulated by KOMAND system under accounts:

- M45S - Special Selective Service
- M400 - General JDMS Organization Costs
- M401 - JDPC Overhead - Testing
- M404 - Training
- M409 - JDPC Overhead - Production
- M415 - Monthly Resource Billing System
- M428 - Tape Management System
- M435 - Virtual Machines
- M5 - Summary Technical Support Group

2/ Systems 3 + 9 only

3/ Systems 1 + 2 only

4/ Disk occupying adjustment factor calculated based upon actual cost incurred vs. total cost accumulated by the KOMAND System, net of cost related to JURIS.

Calculation of JDMS Indirect Costs and Allocation to JURIS

2. CALCULATION OF CMSS OVERHEAD COSTS ALLOCABLE TO JDMS[5/]

CMSS Overhead Costs:	
Office of the Director	$307,063
Office of Resources and Security Management	376,311
Total Overhead	$683,374

Allocation:

Organization	Cost [6/]	% Share	Overhead
Employee Data Services	$2,234,685	14.19%	$ 96,971
Communications	2,798,707	17.78%	121,504
Publications	2,046,017	12.99%	88,770
JDMS	8,665,498	55.04%	376,129
	$15,744,907	100.00%	$683,374

[5/] All costs represent those shown on the WCF Income and Expense statement. Unliquidated accrued expenditure adjustments have not been applied, since the purpose of this calculation is to derive relative percentages.

[6/] Source of cost information is the FY 1978 WCF Income and Expense Statement.

Calculation of JDMS Indirect Costs and Allocation to JURIS

3. CALCULATION OF INDIRECT COST ALLOCATION FACTOR

Step 1

	Total JDMS Cost Per Adjusted Statement		$8,003,986 [1]
Plus:	CMSS Overhead Costs Allocable to JDMS		376,129 (Exhibit IV-Page 3 of 4
Less:	Total Direct Data Processing Cost		3,870,733 (Exhibit IV-Page 3 of 4
Plus:	Data Processing Costs Related to JDMS Overhead Operations		271,883 (Exhibit IV-Page 1 of 4
Less:	JDMS Costs Paid for Other Organization's Operations		
	. New York Times Information Service	2,500 [2]	
	. Information Handling Service	70,172 [2]	72,672
	Total Indirect Cost to be Allocated		$4,708,593

Step 2

	Total Direct Data Processing Cost	$3,870,733
Less:	JDMS Data Processing Costs	271,883
	Direct Data Processing Cost Base	$3,598,850

Step 3

	Total Indirect Cost to be Allocated	$4,708,593 ± $179,700 [1]
÷	Direct Data Processing Cost Base	3,598,850
	Indirect Cost Factor	1.26-1.36

4. ALLOCATION OF INDIRECT COSTS TO JURIS

Step 1

	JURIS Direct Data Processing Costs	$ 823,889	(Exhibit IV-3
X	Indirect Cost Factor	x1.26-1.36	Page 2 of 2)
	Indirect Cost Allocation	$1,038,100 - 1,120,489	

Step 2

	JURIS Direct Data Processing Cost	$ 823,889
Plus:	Indirect Cost Allocation	$1,038,100 - 1,120,489
	Total Burdened JURIS JDMS Cost	$1,861,989 - 1,944,378

[1] Indirect cost includes $449,256 of depreciation expense, which is assumed to be correct within ± 40%, or $179,700.

[2] Source: obligation documents for FY 1978 expenses.

Calculation of JURIS Automated Legal Research Data Processing Cost

(1) JURIS USAGE STATISTICS

	CONNECT TIME UNITS	% OF JURIS ALR USAGE [1]	% OF JURIS LIT. SUP. USAGE [1]
JURIS-ALR USAGE			
DOJ	1,128,357	80%	64%
Non-DOJ	289,539	20%	16%
Total JURIS-ALR Usage	1,417,896		80% [2]
OTHER JURIS USAGE	358,536		20% [2]
Total JURIS Usage	1,776,432	100%	100%

(2) ALLOCATION OF JURIS COST TO JURIS AUTOMATED LEGAL RESEARCH

	TOTAL JURIS		80% JURIS ALR
Direct JDMS Cost	$ 823,889	(Exhibit IV-4 Page 4 of 4)	$ 659,111
Indirect JDMS Cost	$1,038,100-$1,120,439	(Exhibit IV-4 Page 4 of 4)	$830,480-$896,391
Total	$1,861,989-$1,944,378		$1,489,591-$1,555,502

[1] Percentage based on total connect time units

2/Percentages used to allocate total JURIS costs between JURIS-automated legal research and JURIS-private file activities

V. SUMMARY

5.1. Introduction

The recurring operating cost of JURIS automated legal research activities for FY 1978 was estimated based upon a review of the Working Capital Fund, JDMS, and SDDS records. The cost for goods and services received in FY 1978 by SDDS and JDMS was estimated through a review of the WCF Income and Expense Statement and the supporting WCF records. The direct JURIS costs incurred by SDDS were estimated through a review of the specific items purchased. Indirect SDDS costs were allocated to JURIS based upon its share of the total direct costs incurred.

The JDMS costs of JURIS were developed through two basic steps. First, the direct data processing costs were identified and allocated to JURIS based on the actual system usage. Second, the JDMS indirect costs were identified and allocated.

The cost of JURIS was separated between automated legal research activities and private file activities. Certain specific costs were identified as being directly related to automated legal research or private file activities. Other costs were allocated based upon the percentage of JURIS use by automated legal research and private file activities.

The total annual recurring operating cost of JURIS automated legal research activities was calculated to be between $2.410 million and $2.486 million. This cost includes approximately $109,000 of depreciation expense which could not be confirmed but which is estimated to be within 40% of the amount expensed by DOJ.

This cost represents total cost to the U. S. Government for JURIS automated legal research. The cost to DOJ can be

separately identified. Automated legal research activities are conducted by users in the DOJ offices, boards, and division (legal activities and general administration functions), DOJ independent bureaus, and other government agencies. The incurred cost can be separated between DOJ and non-DOJ users on an average cost basis.

The DOJ-independent bureaus and other government agencies reimburse DOJ for their use of JURIS automated legal research. This reimbursement must also be considered when determining the actual cost to DOJ since the reimbursements do not equal the actual cost incurred as calculated in this study.

5.2. Allocation of Cost to DOJ and Non-DOJ Users

The total operating costs of JURIS automated legal research were allocated between DOJ and non-DOJ users on an average cost basis. In an average cost allocation each user group (DOJ and non-DOJ) incurs a pro rata share of the total cost based on their proportionate share of system use.

The majority of recurring annual operating costs are incurred for the common support of all system users. For this type of cost analysis, allocation of cost on an average basis insures that all system users bear a proportionate share of common costs as well as the variable costs resulting from their use of the system.

As shown in Exhibit 22, DOJ users account for 80% of the automated legal research connect time. Non-DOJ users account for the remaining 20%. Processing time statistics, which roughly equate to search time, show a similar distribution of system use.

Based upon these statistics, 80% of the total cost or between $1.928 million and $1.989 million was identified as the portion of JURIS automated legal research costs applicable to DOJ

users. The remaining 20% of the total costs, or between $482,000 and $497,000, was allocated to non-DOJ users.

5.3 Reimbursements Paid by Non-DOJ Users

The total JURIS cost represents the total cost to DOJ for providing JURIS automated legal research to both DOJ and non-DOJ users. Many of the non-DOJ users reimbursed DOJ for the use of JURIS automated legal research. To determine the net costs to DOJ of providing JURIS automated legal research, these reimbursements must be offset against the costs assigned to non-DOJ users.

The total amount of reimbursements received from independent bureaus and other government agencies during FY 1978 for JURIS automated legal research was $328,730. Thus the net cost to DOJ in FY 1978 of providing DOJ and non-DOJ users with JURIS automated legal research was calculated to be between $2.081 million and $2.157 million, as shown in Exhibit 22.

Cost to DOJ for JURIS

Automated Legal Research[1/]

Data Processing Costs (JDMS)		$1,489,591-$1,555,502 (Exhibit IV-5)
Non-Data Processing Costs (SDDS)		$ 920,669-$ 930,282 (Exhibit III-12)
Total Cost of JURIS ALR		$2,410,260-$2,485,784
DOJ Portion of JURIS ALR - 80%		$1,928,208-$1,988,627
Plus: DOJ Subsidy of Non-DOJ Users		
-Non-DOJ Portion of Cost - 20%	$482,052-$497,157	
-Less: Reimbursements Paid to DOJ	328,730	$153,322-$168,427
Total Net JURIS ALR Cost to DOJ		$2,081,530-$2,157,054

1/ Cost calculated as a range since Coopers & Lybrand had to assume depreciation to be within ± 40% of the DOJ stated amount.

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U.S. DEPARTMENT OF JUSTICE
JUSTICE MANAGEMENT DIVISION

COMPARATIVE COST ANALYSIS

OF JURIS AND LEXIS

CONTRACT NO. JAOMF-79-C-0072

C&L

COOPERS & LYBRAND

Table of Contents

List of Exhibits

List of Exhibits
(Continued)

1. INTRODUCTION

1.1 Scope of Study

This report explains and documents two major efforts undertaken by Coopers & Lybrand: (1) projections of future costs for providing Computer Assisted Legal Research (CALR)* to current JURIS users in the LEXIS system and in the JURIS system; and (2) a comparative analysis of the two costs. We originally planned to project and compare costs for three systems: JURIS, LEXIS and WESTLAW. However, West Publishing Company declined to respond to our request for a price quotation, citing the time and potential expenses involved. (See Exhibit 1, page 5). Therefore, only JURIS and LEXIS costs were included in the comparative analysis.

1.2 Method

Our method for developing comparable costs required first describing the existing and planned JURIS CALR system. We then established the projected cost of the JURIS CALR system by using FY1978 costs, plus all expected future JURIS cost changes (e.g., for new hardware or services). We projected the LEXIS cost based upon an informal quotation provided by Mead Data Central.

We made several assumptions about future CALR requirements and JURIS costs. The bases of major assumptions are identified in this report. All the assumptions appear valid in light of known facts. Assumptions concerning numbers of terminals, hours of system use and data base size were consistently applied to both JURIS CALR and LEXIS cost projections.

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*Terminology in the field varies. In this report we use CALR and automated legal research (ALR) interchangeably.

We tested the sensitivity of cost projections to changes in the number of terminals and the volume of usage. In addition to the baseline projection, we developed three alternative projections for a 10% increase, a 20% increase, and a 10% decrease in system size relative to baseline. We found that the relative costs did not vary significantly with these alternatives.

1.3 Findings

Our cost analyses resulted in the development of two major findings. First, for the projection period FY1980 through FY1983, the LEXIS operating costs, as a percentage of JURIS CALR operating costs, are as follows:

FY1980	78%
FY1981	86%
FY1982	90%
FY1983	95%

This comparison assumes that DOJ maintains special files on LEXIS for their use only. This comparison, however, does not reflect several important points:

- The LEXIS cost does not include the cost of providing West headnotes. Contractual arrangements between DOJ and West Publishing Company and West copyright claims preclude making a reasonable cost estimate for providing West headnote material in LEXIS for the purposes of this projection. Based upon Mead's quoted special file cost rates, the cost for simply loading and storing West headnote material would be approximately $1.6 million over the projection period.

- The JURIS cost does not include the cost of adding segment information. DOJ currently has no specific plans or estimates for adding segment information to JURIS.

- Some of the JURIS CALR costs are fixed and would not be eliminated in the short run by switching to LEXIS. These fixed costs include: Systems Design

and Development Staff (SDDS) and Justice Data Management Services (JDMS) indirect costs; the JDMS usage cost; and possibly the SDDS personnel cost that is directly attributable to JURIS, (depending upon management decisions concerning disposition of this cost). If LEXIS were to replace JURIS, the indirect costs now attributed to JURIS would be redistributed elsewhere; and the personnel costs would be eliminated, reassigned or absorbed as indirect costs of other activities. DOJ believes that if JURIS were replaced, JDMS then would have excess capacity and therefore the JDMS usage cost would have to be absorbed by other JDMS users as overhead. The fixed costs of JURIS total approximately $1 million per year (see Exhibit 2, page 6).

The $1 million referred to above is included as part of the JURIS operating cost as reflected in Exhibit 7, page 30. As such, should DOJ elect to switch to LEXIS, the fixed cost of $1 million per year would continue to be incurred by DOJ in the short run. To illustrate this point, assume DOJ elected to subscribe to LEXIS in FY1980. The net impact on DOJ for FY1980 would be calculated as follows:

FY1980 JURIS Estimated Operating Cost		$1,978,500
Less:	Variable Costs of JURIS ($1,978,500 - $1,000,000)	(978,500)
Plus:	FY1980 LEXIS Estimated Costs	1,550,300
FY1980 Cost to DOJ Assuming LEXIS Subscription		$2,550,300

The second major finding of our analysis was that for FY1978 and FY1979, the costs are significantly different. For FY1978 and FY1979, the LEXIS cost is approximately half of the JURIS CALR cost. Two major factors cause this discontinuity between the earlier and the later period cost comparisons and the narrowing of the cost gap:

- The added cost for maintaining special DOJ files on LEXIS during the period FY1980 through FY1983.
- The use of less expensive equipment to support JURIS CALR beginning in FY1980.

Our readers should be alerted that some of the data used in the projections are based upon assumptions that may not remain valid over the projection period. Moreover, some of the JURIS cost data had to be estimated in the absence of reliable records. Another caution: all LEXIS costs are based upon an informal cost quotation that may differ from a formal bid. Thus, the projection should not be viewed as a precise estimate of the cost of JURIS or LEXIS. On the other hand, the cost projections are appropriate for our comparative cost analysis.

The report contains four major sections: this introduction; the comparative analysis; a description of projected JURIS costs; and a similar section for LEXIS costs.

Exhibit 1

West Publishing Company • 50 W Kellogg Blvd . P O Box 3526, St Paul, MN 55165 Tel 612/228-2500

WILLIAM J. NEWPOWER
Manager Westlaw Sales
EUGENE B HAVENS
Westlaw Sales Coordinator

June 29, 1979

Coopers & Lybrand
MR JOSEPH TRAVAGLINI
1800 M St N W
Washington DC 20036

Dear Mr Travaglini

Thank you for your letter of June 6.

Unfortunately, the information you asked for is not readily at hand. In the absence of a specific request for proposal, we really cannot justify the time and expense needed to gather the information asked for.

Our hesitation should certainly not be construed as any unwillingness to cooperate as we will certainly provide such information upon receipt of a request for a proposal.

Sincerely

W J Newpower
Manager WESTLAW Sales

mb

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EXHIBIT 2

Fixed JURIS Costs
(Based Upon FY1980 Projected Cost)

Cost Items	Variable	Fixed	Non-Cash	Questionable	Total
SDDS Non-Personnel Costs					
o/c 2100 Travel & Trans. of Persons	19,900				479,000
o/c 2200 Transportation of Things	8,300				
o/c 2300 Communications, Rent & Util.					
Modems	28,200				
Terminals			26,500		
Printers			6,000		
FTS	125,800				
o/c 2400 Printing & Reproduction	1,200				
o/c 2500 Other Contractual Services					
West Publishing Co.	182,000				
Terminal Maintenance	43,700				
Printer Maintenance	15,200				
Other	19,200				
o/c 2600 Supplies, Materials and Uncapatilized Equipment	3,000				
SDDS Personnel Costs					327,400 - 332,000
The disposition of this cost is a management decision.				327,400-332,000	
SDDS Indirect Costs		48,000 - 55,700 1/			48,000 - 55,700
JDMS Storage Costs					231,200
Disk	196,800				
Other	34,400				
Usage Cost					148,500
This item represents a share of the JDMS IBM 370/168 equivalent which may be acquired through purchase or lease. DOJ indicated that the capacity of JDMS would not be reduced if JURIS ALR was replaced by LEXIS. Therefore, this becomes a fixed cost item.		148,500			
JDMS Indirect Costs		709,100 - 767,400 1/			709,100 - 767,400
Total Costs	677,700	905,600 - 971,600	32,500	327,400 - 332,000	1,943,200 - 2,013,800

Minimum Fixed Cost	905,600 - 971,600
Questionable Items	327,400 - 332,000
Maximum Fixed Costs	1,233,000 - 1,303,600

Fixed Cost Range: $905,600/$971,600 - $1,233,000/$1,303,600 or $938,600 - $1,268,300

1/ Includes an insignificant amount of depreciation expense which is not a cash expenditure. The specific amount cannot be precisely determined, but would be less than $100,000.

II. COMPARATIVE COST ANALYSIS

Exhibit 3, page 10, shows that the costs of DOJ usage of JURIS and LEXIS for FY1980 through FY1983 begin to converge toward the end of the projection period, while the figures for FY1978 and FY1979 show LEXIS to be approximately half the cost of JURIS assuming the DOJ maintains special files on LEXIS.

There are two reasons why the costs of JURIS and LEXIS converge after FY1979:

- The cost of LEXIS increases with the added cost of loading and storing special files for DOJ.
- The annual JURIS cost from FY1980 through FY1983 is lowered by approximately $250,000 due to DOJ plans to replace current JDMS hardware. DOJ plans to replace the current IBM 370/168 and Model 3330 disk modules with less expensive equipment in FY1980.

This comparison assumes that DOJ maintains special files on LEXIS for their use only. This comparison, however, does not reflect several important points:

- The LEXIS cost does not include the cost of providing West headnotes. Contractual agreements between DOJ and West Publishing Company, as well as West copyright claims preclude making a reasonable cost estimate for providing West headnote material in LEXIS for purposes of this projection. Based upon Mead's quoted special file cost rates, the cost for simply loading and storing West headnote material would be approximately $1.6 million over the projection period.
- The JURIS cost does not include the cost of adding segment information. DOJ currently has no specific plans or estimates for adding segment information to JURIS.

- Some of the JURIS CALR costs are fixed and would not be eliminated, in the short run, by switching to LEXIS. These fixed costs include Systems Design and Development (SDDS) and Justice Data Management Service (JDMS) indirect costs, JDMS usage costs, and possibly the SDDS personnel costs that are directly attributable to JURIS (depending upon management decisions covering disposition of this cost). If LEXIS were to replace JURIS, the indirect costs now attributed to JURIS would be redistributed elsewhere, and the personnel costs would be eliminated, reassigned or absorbed as indirect costs of other activities. DOJ believes that if JURIS were replaced, JDMS would have excess capacity and therefore the JDMS usage cost would have to be absorbed by other JDMS users as overhead. The fixed costs of JURIS total approximately $1 million per year (see Exhibit 2, page 6).

  The $1 million referred to above is included as part of the JURIS operating cost and reflected in Exhibit 7, page 30. As such, should DOJ elect to switch to LEXIS, the fixed cost of $1 million per year would continue to be incurred by DOJ in the short term. To illustrate this point, assume DOJ elected to subscribe to LEXIS in FY1980. The net impact on DOJ would be calculated as follows:

FY1980 JURIS Estimated Operating Costs		$1,978,500
Less:	Variable Costs of JURIS ($1,978,500 - $1,000,000)	(978,500)
Plus:	FY1980 LEXIS Estimated Costs	1,550,300
FY1980 Cost to DOJ for LEXIS Subscription		$2,550,300

There are several additional factors that could not be quantified but that DOJ should consider in assessing the relative cost-related merits of JURIS and LEXIS. They include:

- The effect of the recently-issued Executive Order No. 12146 (July 18, 1979) calling for DOJ, in cooperation with other agencies, to provide for computer-assisted legal research throughout the Federal government. DOJ should examine the requirements of all government users before estimating the total cost impact of either system.

- The possible use of a mass storage system for large JURIS data bases. Already studied by DOJ, this system would provide lower data storage costs with acceptable response time for low-use materials such

as the Code of Federal Regulations. Such materials are now available to DOJ from the Government Printing Office as a byproduct of the publication process. DOJ is planning to procure a mass storage system within the next year.

- The effect of a one-time conversion to LEXIS, including the need for retraining DOJ and other government users. While LEXIS will provide training without charge, DOJ should consider the cost of a large retraining effort.

We believe that without information on the important issues outlined above, it is premature to decide which of the two systems is more cost effective.

The final problem concerns the use of West Publishing Company headnotes and other copyrighted information. LEXIS does not include West headnotes as part of the data base. If LEXIS would maintain the West Digest information in a special file for DOJ use only, the cost would be approximately $1.6 million over the projection period. (See Exhibit 15, page 82.) We have not included the cost of either loading or maintaining the West headnote information in the special file cost of LEXIS shown in Exhibit 15. DOJ stated that West Publishing Company may not allow the use of their headnotes or other information in the LEXIS system, even as a special restricted file. Furthermore, DOJ said that West may terminate their updating service, thereby limiting the quality of the data on the LEXIS system.

While this issue cannot be resolved as part of this study, it certainly must be addressed in any decision between LEXIS and JURIS, especially since some JURIS users prefer the West headnotes and wish to see them retained.

EXHIBIT 3

Comparison of JURIS and LEXIS Costs

Fiscal Year	Estimated LEXIS Cost	Estimated JURIS Cost	% of LEXIS Cost to JURIS Cost
Assuming initial subscription in FY1978			
1978	$1,090,700	$1,928,200 - $1,988,500	56%
1979	1,058,300	2,149,000 - 2,214,700	49%
Assuming initial subscription in FY1980			
1980	1,550,300	1,943,200 - 2,013,800	78%
1981	1,827,100	2,093,300 - 2,169,900	86%
1982	2,060,900	2,257,800 - 2,341,000	90%
1983	2,296,100	2,380,600 - 2,471,700	95%

NOTE: The JURIS cost for FY1980 through FY1983 reflects the DOJ plan to acquire a less expensive computer and more economical disk modules in FY1980.

III. PROJECTED JURIS CALR COSTS

3.1 Overview

The projected costs of JURIS automated legal research for FY1979 through FY1983 are based upon the FY1978 costs and extensive discussions with DOJ personnel. Since DOJ has no forward plan or budget for JURIS, we worked with appropriate staff to develop estimates of the future CALR needs and specific costs likely to be incurred. It was difficult to identify the number of terminals and terminal accesses to the JURIS system, as well as projected needs for these items, because of a lack of basic management information in DOJ.

Our cost projections must be considered tentative, because we had to make many assumptions about future events. Nevertheless, we consider the projections to be reasonable for the purpose of comparing the cost of JURIS to the cost of LEXIS, since the same assumptions apply to both cost estimates.

In preparation for discussing specific cost estimates, we first asked DOJ officials about their plans for the system over the projection period. We particularly wanted information bearing on the three characteristics of the JURIS system which underlie its cost:

- Number of terminal accesses.
- Usage.
- Data base.

DOJ estimates steady growth in the number of terminal accesses used by DOJ for CALR from the average of 74 Sanders, Hazeltine, Bunker-Ramo and portable terminals in FY1978 to 153 Sanders terminals in FY1983. DOJ cannot reasonably estimate the number of non-DOJ terminals, due to uncertainty both in government policy and in the need for automated legal research. DOJ

estimates that the average per terminal usage in FY1978 (22 hours/terminal/month) will apply in subsequent years. The data base is expected to grow steadily by a total of 106% through FY1983.

3.2 Anticipated JURIS System

DOJ has no formal plan for JURIS CALR, but several DOJ officials have informed opinions on such matters as usage growth, terminal placement, data base size and content, development of additional features, and the supporting computer system. We sought their thinking to obtain the necessary background information for projecting JURIS and LEXIS costs.

This section discusses the ideas of the SDDS. These ideas became the underlying assumptions for the JURIS and LEXIS cost projections. They are grouped into three categories: computer support, system usage, and data base.

3.2.1 Computer Support

Two considerations affect computer support: software and hardware. SDDS does not plan a major re-programming of JURIS software. SDDS has a continuing effort to enhance JURIS but foresees no significant change in the current level of effort. Nor does SDDS anticipate redesigning JURIS for the increased activity expected during the projection period.

DOJ has indicated that two changes will be made to JDMS during FY1980 that will affect JURIS CALR costs. DOJ plans to acquire an IBM 370/168 Model 3-equivalent to replace the IBM 370/168 currently used in DJMS. DOJ estimates that the current configuration can be replaced for an estimated purchase cost of $1,523,000, with a monthly maintenance cost of approximately $5,600.

DOJ also plans to replace the IBM Model 3330 disk modules (and related equipment) with IBM Model 3350-type disk modules

(and related equipment). This conversion will allow DOJ to reduce the number of disk modules used for JURIS by approximately 67%, with a corresponding savings of approximately $300,000 per year.

The effect of these changes on the DOJ usage of JURIS CALR is discussed further in section 3.4.

3.2.2 System Usage

We projected system usage based upon an estimate of the number of terminals in use in each year and an average usage level per terminal. The number of terminals in use is defined as the number of terminal units or the number of terminal accesses (terminal IDs) to the computer. SDDS estimates that the following average number of terminals will be used by DOJ for CALR during each fiscal year:

FY1978 (actual)	74
FY1979	87
FY1980	110
FY1981	125
FY1982	138
FY1983	153

SDDS anticipates that no portable or teletype terminals will be needed by DOJ for CALR.

The number of terminals and terminal IDs for non-DOJ users cannot reasonably be estimated because of the uncertain ramifications of the recently-signed Executive Order No. 12146 (July 18, 1979), which gives DOJ responsibility for CALR throughout the federal government.

SDDS estimates that per-terminal usage will remain relatively constant throughout the projection period. We identified a number of unquantified factors that could influence average use, for example: increased efficiency of attorneys in using the system; increased work load of attorneys; increased use of the

system as proficiency increases; high turnover in DOJ user offices; and the backlog of non-users who would begin using the system as more terminals become available. Because of the unpredictability of these factors, and our resulting inability to quantify them, a constant per-terminal usage level was selected.

In determining the DOJ CALR costs for FY1978, the base year, support costs are allocated between DOJ and non-DOJ users in an 80%-20% ratio, based upon actual system usage. SDDS recommends allocating common support costs in this same ratio throughout the projection period. We assume that if JURIS is continued, non-DOJ users will continue to subscribe to the system and, given recent experience, their usage will increase. Therefore, the 80%-20% ratio of usage appears to be reasonable for purposes of the projections.

3.2.3 Data Base

SDDS estimates that the size of the CALR data base will increase approximately 106% over the projection period. This increase does not include the addition of tax or state case law files. The estimated number of disk modules (based upon the current Model 3330 disk modules) required[1] during each year is:

FY1978 (actual)	49
FY1979	53
FY1980	65
FY1981	88
FY1982	99
FY1983	111

DOJ plans to replace the IBM Model 3330 disk modules with IBM Model 3350-type disk modules in FY1980. The JURIS cost projections reflect this anticipated replacement, as discussed in section 3.4.1.

[1]Includes allocation of overhead and system work modules.

3.3 Systems Design and Development Staff Projected Costs

Projected JURIS CALR costs estimates were developed based upon the cost elements in our "Report On The Recurring Operating Cost of JURIS Automated Legal Research." We reviewed with DOJ the costs recorded in each object class to determine which costs will continue; which costs will remain constant, increase, or decrease; and which costs will change during the year of the projection. Costs that could be identified specifically with private file activity (e.g., NCJRS, and special litigation support files) were excluded from this analysis.

This cost development process was accomplished in three steps, one for non-personnel costs, another for personnel costs, and the third for indirect costs.

3.3.1 Non-Personnel Costs

In order to project certain costs, we developed correlations between costs incurred in FY1978 and causal factors, such as the number of DOJ terminals for JURIS. For example, the costs in object class 2100 (travel and transportation of persons) are incurred for training, site inspection, installation, and conversion. All these activities are closely related to the number of JURIS terminals in use during a fiscal year. As more terminals are put into use, the requirements for training, site inspections, and associated costs increase.

Based upon this relationship, we related FY1978 cost data to the number of terminals in use during the same fiscal year. A per-terminal cost was derived and this cost was consistently applied to the corresponding number of terminals expected to be operating during each of the subsequent years.

The recorded FY1978 cost for training, site inspection, installation, and conversion ($13,376) was divided by the average

number of DOJ CALR terminals in use during that year (74). The resulting cost per terminal ($181) was then used as a basis for developing projected costs for future terminals:

Fiscal Year	Number of DOJ Terminals in Use		Cost Per Terminal		Projected Cost
1979	87	x	$181	=	$15,750
1980	110	x	181	=	19,900
1981	125	x	181	=	22,625
1982	138	x	181	=	25,000
1983	153	x	181	=	27,700

We cannot accurately estimate the effect of inflation on these costs. Some costs are covered by long-term contracts; others may decrease with technological progress; and others may vary with the cost of living. Because of these uncertainties, we have not unilaterally applied inflation factors to the projections.

The method for projecting specific costs is presented below. The resulting costs are shown by object class in Exhibit 4, page 27 .

- Travel and Transportation of Persons (Object Class 2100) - This cost was projected based upon a relationship of FY1978 costs to the average number of Sanders, Hazeltine, and Bunker Ramo terminals in use by DOJ for CALR during FY1978. The per-terminal cost was then applied to the estimate of the average number of DOJ terminals in place during each fiscal year.

- Transportation of Things (Object Class 2200) - This cost was projected based upon the number of terminals and printers returned for maintenance and repairs in FY1978. A per-return cost was developed for FY1978 as well as a ratio of returns per year to total terminals and printers in place. This cost factor and ratio were then

applied to the average number of terminals and printers in place during each year.

- Communications, Rent, and Utilities (Object Class 2300) - This object class includes a number of different cost elements.

  - Telephone modems - this cost was based upon the average number of terminals in place during each year and a unit cost based upon FY1978 costs.

  - Codex Equipment to Multiplex FLITE Inquiries and Conditioned Lines - Because of plans to switch to a private communications network, SDDS expects that this cost will be borne by DOD.

  - FTS - SDDS plans to switch to a private telecommunications network. SDDS developed an estimate of connect hours per year per terminal based upon FY1978 data. We then applied this estimate to the number of terminals during each year and the estimated cost per connect hour under FTS (FY1979) and the private telecommunications network (FY1980-FY1983). We also included the cost estimate provided by Sanders to retrofit their existing terminals.

  - Lease and Purchase of Terminal and Printer Equipment - SDDS plans to replace all Hazeltine and Bunker Ramo equipment through purchase of Sanders terminals and Scope printers. In addition, DOJ will need to purchase 79 Sanders terminals and Scope printers to meet increased DOJ CALR needs. The depreciation related to these purchases is included in this object class for consistency with the FY1978 cost item classifications.

- Printing and Reproduction (Object Class 2400) - This cost was projected based upon the number of terminals in place during each year and a unit cost based upon FY1978 costs.

- Other Contractual Services (Object Class 2500) - This object class includes a number of different cost elements:

  - Terminal and Printer Maintenance Cost - The cost was projected based upon the contractual unit costs and the average number of terminal and printer units estimated to be in place during each year.

  - Data Base Costs - The cost of obtaining information from West Publishing Cost and keyboarding other information through the Federal Prison Industries was projected at the same rate as in FY1978.

- Supplies (Object Class 2600) - This cost was projected based upon the number of terminals in place during each year and a unit cost based upon FY1978 costs.

Based upon this method, we prepared a statement of projected direct non-personnel JURIS operating costs incurred by SDDS. This statement (Exhibit 4) shows that direct JURIS operating costs applicable to DOJ CALR usage range from $410,279 in FY1978 to $543,600 in FY1983, before inflation.

3.3.2 Allocation of SDDS Non-Personnel Costs to DOJ CALR Usage

In developing the FY1978 JURIS cost, we identified cost items that had to be allocated between the private file and CALR

applications of JURIS and between DOJ and non-DOJ users of CALR. We also identified costs which related solely to the private file and CALR applications or the DOJ CALR-user community. To derive the FY1978 costs from the available DOJ records, we allocated particular costs items among the relevant JURIS users: DOJ CALR users, non-DOJ CALR users, and private file users. In developing the projected costs for CALR usage, we calculated only the CALR component of joint costs. For example, to calculate the projected West Publishing Company contract cost which should be allocated to CALR users, we allocated the estimated cost, without inflation escalation, between DOJ and non-DOJ CALR users. This allocation was then included in the costs shown on Exhibit 4. Therefore, no additional allocation of the costs in Exhibit 4 is required.

3.3.3 SDDS Personnel Costs

SDDS management anticipates only one slight change in staffing throughout the projected period, the addition of one GS-13 in FY1980. Two cost escalation factors have been applied to SDDS personnel costs: annual comparability increases and annual quality or step/grade increases. These factors are reasonably predictable and for purposes of this estimation are treated as constant from year-to-year.

According to the Office of Personnel Management (OPM) the comparability increase has recently (1974 to the present) averaged 5.5%. We used this percentage for the projection beyond FY1980.

In addition some federal employees within each agency receive annual quality and step/grade increases. Although no specific, agency-by-agency figures are published, OPM says that a cost increase of 1.00% to 1.75% is a reasonable approximation. Based upon a 5.5% comparability increase, a 1.00% to 1.75% step/grade increase, and the addition of a GS-13 employee, SDDS personnel costs are estimated to be:

Fiscal Year	Total Projected CALR Cost	DOJ CALR Allocation (80% of Total)
1979	$369,000 - $372,700	$295,200 - $298,200
1980	409,200 - 415,000	327,400 - 332,000
1981	451,500 - 460,900	361,200 - 368,700
1982	480,500 - 494,000	384,400 - 395,200
1983	511,900 - 529,800	409,500 - 423,800

These figures include indirect or overhead personnel costs.

3.3.4 Allocation of Indirect Costs

The indirect non-personnel costs of SDDS were allocated to JURIS and other systems. SDDS expects that the indirect costs will remain fixed during the projected years, except for three items:

- Memorex Controller
- Data 100
- Executive Seminar

Adjustments for these specific indirect costs, resulted in total indirect costs ranging from $319,214 to $369,814 in 1978 to:

Fiscal Year	Projected Costs
1979	$360,700 - $411,300
1980	315,800 - 366,400
1981	315,800 - 366,400
1982	315,800 - 366,400
1983	315,800 - 366,400

As in the case of direct non-personnel costs, we did not apply inflation factors to indirect non-personnel costs.

Based upon the proportion of JURIS CALR personnel costs to the total SDDS personnel cost, which SDDS assumes to remain constant at 19%, indirect costs were allocated to JURIS CALR. These costs were then allocated between DOJ and non-DOJ users by an

80%-20% ratio as discussed earlier. For FY1978 this process resulted in the allocation of between $48,500 and $56,200 of SDDS indirect costs to DOJ usage of JURIS CALR. For the projection period the costs are:

Fiscal Year	Projected Indirect Costs	Projected JURIS CALR Indirect Costs	DOJ User's Allocation of CALR Indirect Costs
1979	$360,700 - $411,300	$68,500 - $78,100	$54,800 - $62,500
1980	315,800 - 366,400	60,000 - 69,600	48,000 - 55,700
1981	315,800 - 366,400	60,000 - 69,600	48,000 - 55,700
1982	315,800 - 366,400	60,000 - 69,600	48,000 - 55,700
1983	315,800 - 366,400	60,000 - 69,600	48,000 - 55,700

3.3.5 Total SDDS Costs Allocable to DOJ Users of JURIS CALR

Exhibit 5, page 28, shows projected costs applicable to the use of JURIS CALR by DOJ. They range from between $736,500 and $744,200 in FY1978 to between $1,001,000 and $1,023,100 in FY1983.

3.4 Justice Data Management Service Projected Costs

JDMS costs are composed of two basic components - direct and indirect costs. For purposes of this projection, direct costs can be further segregated according to usage and storage components. Although it is a simplification of the JDMS cost structure, this division provides a reasonable approach for cost projection purposes. Certain generalizations are necessary to isolate key cost components and arrive at an approximation of projected JURIS CALR costs.

The projections assume that the services provided by JDMS and the configuration of JDMS will not differ substantially from the status of FY1978. This assumption is based on our talks with DOJ personnel.

The projections include two planned changes to the JDMS hardware. DOJ plans to acquire an IBM 370/168-equivalent computer in FY1980 to replace the existing, leased IBM 370/168 computer. In addition, DOJ plans to replace the current IBM Model 3330 disk modules with IBM Model 3350-type disk modules in FY1980. Both changes will result in cost savings.

The remainder of this section will discuss the basic components of JDMS costs and the method we employed to project those costs.

3.4.1 Projected JDMS Storage Costs

"The Recurring Operating Cost of JURIS" report shows that storage costs are approximately 50% of direct JDMS costs allocable to JURIS. Given the magnitude and importance of these storage costs, we segregated and projected them according to the most readily available and directly identifiable causal factors.

Storage costs are a function of the number of disk modules, dual density disk drives, string controllers, and storage controllers dedicated to JURIS. These items are referred to as disk occupancy costs on the DOJ computer billing/resource allocation reports. We also assumed that the following three components fall into the category of storage-related costs:

- Tape occupancy,
- Spooled lines printed, read and punched - local, and
- Daily tape occupancy.

DOJ estimated the number of disk modules to be dedicated to JURIS in each of the projection years, in terms of IBM Model 3330 disk modules and Model 3350-equivalent disk modules. The projections are:

Fiscal Year	Number of 3330 Disk Modules	Number of 3350-Type Disk Modules
1979	53	will not be used
1980	65	21
1981	88	28
1982	99	31
1983	111	35

Since DOJ plans to convert to the more economical 3350-type disk modules in FY1980, we projected the FY1979 disk storage costs on the basis of the current IBM Model 3330 disk modules, and DOJ projected the FY1980 through FY1983 disk storage cost on the basis of the Memorex Model 3650 and 3653 disk modules and prices quoted to them by vendors. The projected disk storage cost for each projection year is:

Fiscal Year	Projected Cost	DOJ CALR Allocation 80%
1979	$ 402,600	$ 322,100
1980	246,000	196,800
1981	344,400	275,500
1982	385,200	308,200
1983	434,400	347,500

Project costs associated with the remaining storage-related components were calculated by:

- Determining the percentage increase of disk occupancy costs in projected years over FY1978 disk occupancy costs for maintenance of current data files.
- Applying the percentage increases to FY1978 costs for each of the three components.

This process provided additional storage costs of:

Fiscal Year	Projected Cost	DOJ CALR Allocation 80%
1979	$ 39,300	$ 31,400
1980	43,000	34,400
1981	45,900	36,700
1982	48,800	39,000
1983	52,500	42,000

Storage charges related to DOJ CALR usage of JURIS (as indicated on Exhibit 6, page 29) range from $353,500 in FY1979 to $389,500 in FY1983.

3.4.2 Projected JDMS Usage Costs

We projected JDMS usage costs based upon the FY1978 per-terminal usage cost as adjusted for the change to the IBM 370/168-equivalent computer to be acquired in FY1980 and the estimated average number of DOJ CALR terminals that will access the system during each projection year. This method assumes that average per-terminal usage will remain constant throughout the projection period. As discussed in section 3.2.2, this assumption appears reasonable in light of the many factors that could increase or decrease the per-terminal usage. It is also important to note that this same assumption was included in the projection of the LEXIS cost. Therefore, any deviation from this assumption would effect both cost projections proportionately.

For FY1979, we projected the usage cost based upon the FY1978 costs. A per-terminal cost of $3,580 was calculated by dividing the total usage cost by 116 terminals (74 DOJ CALR terminals divided by 64%, the percentage of the total JURIS system represented by DOJ CALR use). The cost was then applied to the projected number of terminals.

For FY1980 through FY1983, we adjusted the FY1978 usage cost to reflect the acquisition of a replacement IBM 370/168-equivalent computer. The FY1978 usage cost for all JURIS applications dropped from $415,418 to $155,800. A per-terminal cost of $1,350 was calculated and applied to the projected number of terminals.

The projected DOJ CALR usage costs are projected as follows:

Fiscal Year	Number of DOJ Terminal IDs		Cost per Terminal ID		Projected Cost
1979	87	x	$3,580	=	$311,500
1980	110	x	1,350	=	148,500
1981	125	x	1,350	=	168,800
1982	138	x	1,350	=	186,300
1983	153	x	1,350	=	206,600

3.4.3 Projected JDMS Indirect Cost

In FY1978, JDMS personnel costs ($2,123,083) account for 45% of total JDMS indirect costs ($4,708,593 ± $179,700) to be allocated to JURIS. Aside from these personnel costs, JDMS indirect costs allocable to JURIS are not expected to increase significantly through FY1983. However, JDMS personnel costs are expected to increase like those associated with SDDS:

- A 5.5% comparability increase each year, and
- A 1.00% - 1.75% step/grade increase each year.

We calculated the total projected JDMS indirect cost by isolating and increasing personnel costs and by increasing the indirect cost pool by each year's personnel increment.

The indirect cost pool was allocated to JURIS according to the FY1978 ratio of JURIS direct JDMS costs ($823,889) to total direct JDMS processing costs ($3,598,850). This method for distributing indirect costs was the most appropriate considering the lack of detailed cost distribution documentation in JDMS. The association of this factor, 23%, with the JDMS indirect cost pool resulted in indirect costs, allocable to JURIS as follows:

Fiscal Year	Allocation Percentage		JDMS Indirect Cost* Adjusted for Increases in Personnel Costs		Projected Indirect Costs		DOJ CALR Allocation 64%	
1979	23%	x	$4,668,300	$5,044,700	=	$1,074,000 - $1,160,000	$687,400	$742,400
1980	23%	x	4,816,300	5,211,700	=	1,108,000 - 1,199,000	709,100	767,400
1981	23%	x	4,974,300	5,391,700	=	1,144,000 - 1,240,000	732,200	793,600
1982	23%	x	5,142,300	5,584,700	=	1,183,000 - 1,284,000	757,100	821,800
1983	23%	x	5,322,300	5,791,700	=	1,224,000 - 1,332,000	783,400	852,500

*Based upon adjustment of each bound of the FY1978 range.

3.4.4 Total JDMS Cost

Exhibit 6, page 29, shows the accumulation of JDMS costs attributable to DOJ usage of JURIS CALR. The exhibit shows the allocation of each cost discussed in this section to derive the DOJ CALR portion of the cost item. The total JDMS costs attributable to DOJ CALR activities on JURIS were calculated to range from between $1,191,700 and $1,244,300 in FY1978 to between $1,379,500 and $1,448,600 in FY1983.

3.5 Total DOJ JURIS CALR Costs

Exhibit 7, page 30, summarizes the SDDS and JDMS costs of providing CALR to DOJ users. We determined the FY1978 cost based upon a detailed review of available DOJ records as discussed in our report entitled "Report on the Recurring Operating Cost of JURIS Automated Legal Research". The projected costs are based upon cost relationships which existed in FY1978, and estimates of future events. Projections are subject to events which may change the underlying assumptions.

EXHIBIT 4

Projected Direct Non-Personnel Juris Operating Costs
Systems Design and Development Staff

Object Class	Description	1978	1979	1980	1981	1982	1983
2100	Travel and Transportation of Persons	$ 13,772	$ 15,750	$ 19,900	$ 22,600	$ 25,000	$ 27,700
2200	Transportation of Things	8,673	6,500	8,300	9,400	10,400	11,500
2300	Communications, Rent and Utilities	263,137	170,000[1/]	186,500[1/]	186,500[1/]	206,700[1/]	213,800[1/]
2400	Printing and Reproduction	806	950	1,200	1,400	1,500	1,700
2500	Other Contractual Services	345,255	250,400	260,100	274,000	288,200	285,900
2600	Supplies, Materials and Uncapitalized Equipment	2,838	3,000	3,000	3,000	3,000	3,000
	TOTAL SDDS DIRECT JURIS COSTS	$634,481					
	Costs Applicable to Non-DOJ ALR and Private File Users	224,202					
	SDDS COSTS APPLICABLE TO DOJ ALR USERS	$410,279	$446,600	$479,000	$496,900	$534,800	$543,600

[1/] Includes depreciation cost resulting from purchase of terminals and printers. For FY1978, depreciation expense could not be separately identified and was included in SDDS indirect costs.

EXHIBIT 5

Projected Costs Applicable to DOJ Automated Legal Research Usage:
Systems Design and Development Staff

	1978	1979	1980	1981	1982	1983
Personnel Service Costs (Page 19)	$277,700	$295,200- $298,200	$327,400- $332,000	$361,200- $368,700	$384,400- $395,200	$ 409,500- $ 423,800
Direct SDDS JURIS ALR Costs (Exhibit 5)	410,300	446,600	479,000	496,900	534,800	543,600
Indirect SDDS Costs Related to JURIS ALR (Page 20)	48,500- 56,200	54,800- 62,500	48,000- 55,700	48,000- 55,700	48,000- 55,700	48,000- 55,700
PROJECTED SDDS JURIS ALR COSTS	$736,500- $744,200	$796,600- $807,300	$854,400- $866,700	$906,100- $921,300	$967,200- $985,700	$1,001,100- $1,023,100

EXHIBIT 6

Projected Costs Applicable to DOJ Automated Legal Research Usage:
Justice Data Management Service

	1978	1979	1980	1981	1982	1983
Storage Cost - Disk	$	$ 322,100	$ 196,800	$ 275,500	$ 308,200	$ 347,500
- Other		31,400	34,400	36,700	39,000	42,000
Usage Cost		311,500	148,500	168,800	186,300	206,600
Indirect Cost		687,400- 742,400	709,100- 767,400	732,200- 793,600	757,100- 821,800	783,400- 852,500
TOTAL	$1,191,700- $1,244,300	$1,352,400- $1,407,400	$1,088,800- $1,147,100	$1,213,200- $1,274,600	$1,290,600- $1,355,300	$1,379,500- $1,448,600

EXHIBIT 7

DOJ Cost for JURIS
Automated Legal Research

Fiscal Year	Data Processing Costs (JDMS)	Non-Data Processing Costs (SDDS)	Total Estimated/Projected DOJ ALR Cost
1978	$1,191,700 - $1,244,300	$ 736,500 - $ 744,200	$1,928,200 - $1,988,500
1979	1,352,400 - 1,407,400	796,600 - 807,300	2,149,000 - 2,214,700
1980	1,088,800 - 1,147,100	854,400 - 866,700	1,943,200 - 2,013,800
1981	1,213,200 - 1,274,600	880,100 - 895,300	2,093,300 - 2,169,900
1982	1,290,600 - 1,355,300	967,200 - 985,700	2,257,800 - 2,341,000
1983	1,379,500 - 1,448,600	1,001,100 - 1,023,100	2,380,600 - 2,471,700

IV. PROJECTED LEXIS COSTS

4.1 LEXIS Cost Projection Method

To determine the projected costs of LEXIS service to DOJ, we requested a cost quotation from Mead Data Central, the vendor (see Exhibit 8, page 41). We stated the number of terminals needed, the number of total connect hours for one year, and the number of people to be trained. Two sets of figures, one for all JURIS users and one only for DOJ's CALR needs were provided. Further, we asked for prices reflecting two alternative assumptions: first, that Mead would supply their custom terminal, and second, that existing DOJ equipment would be modified to access LEXIS. Mead's response is shown as Exhibit 9, page 49.

The figures shown in Schedule B of our request to Mead, "Basis For Price Quote", were obtained from SDDS statistics and discussions with SDDS personnel. However, DOJ subsequently provided a different set of statistics for the number of terminals in use by DOJ users during FY1978 and projected to be in use through FY1983. Because we received these changes in the CALR requirements after Mead was asked for a price quotation, we revised the Mead estimates accordingly.

Using the Mead cost quotation, we developed cost projections for the current and projected JURIS CALR system. We were able to develop cost projections only for the DOJ usage of LEXIS, not for non-DOJ use. The reasons for this limitation are discussed in the next section.

4.1.1 Problems in Estimating Non-DOJ User Costs

Currently, DOJ supplies JURIS to a number of federal executive, judicial, and congressional users outside the Department. These non-DOJ users receive terminal identification numbers that permit access to JURIS from a variety of terminals,

including the customized Sanders terminal, and non-customized Hazeltine, Bunker Ramo and teletype equipment. Each Sanders terminal is assigned one terminal ID; however, there is not necessarily a one-to-one relationship between ID's and the non-customized equipment. For example, an agency may have four IDs assigned to it, yet have 20 to 30 terminals of various types through which they may access JURIS. We had planned to use the number of terminal IDs as a factor for estimating the cost of LEXIS for non-DOJ users, but a number of factors prevented us from doing so.

First, Mead indicated in their response that they would permit access to LEXIS only through their custom terminal or through the Sanders terminal. This meant that non-DOJ users would have to choose one or the other device, decide how may they need, and select a location for each. Second, several of the non-DOJ users already have a LEXIS installation. Should they acquire 10 or more terminals, regardless of location, or add a second terminal in the same location, they would receive discounts on the library access charges. In effect, this means we would have to survey all non-DOJ users to ascertain whether they have LEXIS terminals and if so, how many and where. For users without a LEXIS terminal, we would have to determine how many terminals would be required and at what locations. In discussions with the COTR, it was apparent that such a survey was not within the scope of our study nor would time or budget constraints permit us to conduct it. Therefore, the cost projections described below pertain solely to DOJ and not to other government agencies.

4.1.2 Changes to the Cost Quotation Basis

After receiving our request, Mead representatives indicated that their pricing schedules depend partly upon the locations of terminals. Additional terminals installed in the same office or building are not accessed a monthly library access charge.

Further, when more than 20 terminals are installed, regardless of office location or city, the user receives a discount of 25% for terminals 2 through 19, and 60% for each terminal over 20. These discounts apply to offices in which terminals have not been previously installed.

In response to this information, we began to locate, by city and office, all JURIS terminals. In doing so, we discovered the figures provided by SDDS accounted for terminal IDs and not actual equipment. A revised listing of DOJ terminals, by office, was sent to Mead; their quotation is based upon a total of 110 terminals located in 62 cities. These figures do not incude non-DOJ users' terminals or DOJ portable teletype or special terminals. After Mead responded based upon the revised number of terminals, DOJ provided new statistics that reduced the average number of DOJ CALR terminals during FY1978 to 74. This figure became the basis for our projections.

4.2 Cost Projection Assumptions

In defining the JURIS system and applying the LEXIS prices to it, we made several assumptions about the number and location of terminals and the level of usage. All assumptions were applied consistently to both the JURIS and LEXIS cost projections. The major assumptions are outlined in the following paragraphs. We intended from the start of this project to prepare a set of projected costs for both JURIS and the private vendor systems for the period of FY1978 through FY1983. This period would provide DOJ with historical perspective as well as information concerning future years.

The Mead price schedule includes one cost element, special file data loading, that involves volume discounts over the subscription life. As DOJ adds more information to their private files, the per unit data loading cost decreases. Since the LEXIS

cost is significantly affected by the date DOJ subscribes to LEXIS, we prepared two LEXIS cost projections. The first projection assumes initial subscription in FY1978; the second assumes initial subscription in FY1980. The costs based upon subscription in FY1978 are shown in Exhibit 16 through 20, pages 83-87. The costs based upon FY1980 initial subscription are shown in Exhibits 21 through 24, pages 88-91 and are used for the comparative analysis with projected JURIS costs.

Since DOJ has no fixed plan showing the expected growth of JURIS during the projection period, we tested the sensitivity of the projection to changes in the number of terminals and usage levels, two of the major factors in both cost projections. We tested for 10% and 20% growth and for a 10% decrease in system size and usage from the baseline data for each projection year. We found that the relative costs of LEXIS and JURIS are not affected by these variations.

To project the costs for LEXIS, we used the JURIS baseline figures for terminals and hours of use. We prepared a series of schedules (see Exhibits 10 to 14, pages 77 to 81) to show the projected number of terminals, the projected hours of use per month (both based on the assumptions underlying the projected JURIS cost), the projected number of installations per year, and data base loading and storage. The following paragraphs detail each major component of the cost projection, including the assumptions made in each area.

4.2.1 Library Access Charges

Because of Mead's pricing schedule for LEXIS, and the difficulty in accurately estimating where and when new terminal installations would be made, we assumed that a total of 72 LEXIS terminals should be installed in separate locations and would incur charges during the projection period. While it is likely

that even more locations might be added, the additional cost may not be significant. For example, if as many as 10 more locations received terminals in one year, the total additional library access charge would be only $16,800 (10 terminals x $140 per month charge x 12 months). This cost does not include the volume discounts that may be applicable. Because of the low cost of new terminal locations, and to simplify the projections, we assumed new terminal placements would not exceed 72* (see Exhibit 10, page 77).

4.2.2 Access (Use) Charges

To determine access (use) charges, we applied an estimate of 22 hours of connect time per terminal per month to the average number of terminals in place during the year (see Exhibit 11, page 78). This factor is based upon the average number of JURIS hours during FY1978. We assumed that this figure would remain constant throughout the projection period since a more reliable estimate could not be obtained (Refer to discussion in section 3.2.2, page 13).

4.2.3 Equipment Installation and Monthly Charges

Mead has recently introduced a new desk-top terminal (UBIQ) that consists of a custom LEXIS keybroad, a CRT video display, a built-in modem and automatic dialing device, and a business telephone line. The terminal is linked to a remote high-speed printer. It is an alternative to the standard LEXIS terminal and is offered at a lower monthly charge and a lower installation cost.

*DOJ estimated that as many as 60 new locations could be added over the projection period. Based on the figures used above, the total costs (assuming the installations were made in one year) would increase by approximately $100,800, or about 5% of the total LEXIS cost.

Mead proposed installation of 16 UBIQ terminals, with one high-speed printer to be installed at the Main Justice Building. We did not include UBIQs in the cost projections because: (1) users indicated that they want every terminal to have a printing device attached, not one main printer; and (2) any decision on the use of UBIQs, their numbers, and locations would have to be made by DOJ and would be based in part upon factors not covered by this study. However, to provide DOJ with a basis for comparison, we prepared an estimate to show the costs of a mix of UBIQ and LEXIS installations for the projected years. In assessing the use of UBIQ terminals, the cost of additional printers and the cost of printing could not be estimated. Statistics on current off-line printing for JURIS are not readily available, and no tally of the amount of printing done at the terminal is available.

Exhibit 12, page 79, shows the number of terminals to be installed during each of the projected years. Exhibit 13, page 80, shows an analysis of the difference between standard LEXIS terminals and a standard terminal/UBIQ mix. The cost differential is not significant. The calculations are based on the projected number of terminals shown in Exhibit 10, page 77.

4.2.4 Data Base Conversion Costs

In developing the projected cost and comparative cost analysis, we determined that certain elements of the existing JURIS data base are not replicated on LEXIS.* Therefore, we requested Mead to provide us with their price schedule for special data base loading, storage, and maintenance. We then obtained character counts for the various items from internal DOJ documentation on planned, available and possible data base contents for JURIS.

*A list of these elements can be found in the cost quotation.

This documentation indicates that a large number of files are planned or possible for the JURIS data base. In discussions with SDDS personnel, it was clear that not all of the files will be put up by 1983; however, several files are only awaiting on-line storage capacity, and a similar number require only minimal preparation. We attempted to judge priorities within these two groups to arrive at a reasonable estimate of future growth in the JURIS file. The planned increase in JURIS capacity, which requires adding files to JURIS through the projection period, necessitates this approach.

We did not try for an exact match between planned files and planned increases in capacity; rather, we looked at user preferences for additional files. We obtained the character counts of these proposed additional files and prepared a listing in three groups:

- Files now on JURIS but not on LEXIS and to be entered immediately upon conversion to LEXIS.
- Planned files not on either system and to be entered in FY1980.
- Planned files to be phased in over the years 1981 through 1983.

Exhibit 14, page 81, lists each file by name and the estimated number of characters within each.

Our schedule does not account for any parallel additions Mead may make to the LEXIS data base through FY1983. Since the cost of loading and maintaining special files is a major LEXIS cost, Mead could significantly alter their price with independent additions to the LEXIS data base.

4.2.5 Other Considerations

Mead indicated that some costs, although small, would be incurred in modifying Sanders equipment to access LEXIS. Before deciding whether to retrofit the Sanders equipment, DOJ should consider the LEXIS monthly equipment cost of $175 less the monthly maintenance expense related to the JURIS equipment over the average life of the JURIS terminal, as the outside limit for retrofit costs. Also, DOJ should keep in mind that other than retrofitting the terminal, JURIS modems and printers are compatible with LEXIS. It is possible that customized material may be required to explain how to access LEXIS through the Sanders terminal; however, it appears that the costs involved are low.

The final problem concerns the use of West Publishing Company headnotes and other copyrighted information. LEXIS does not include West headnotes as part of the data base. If LEXIS would maintain the headnote information in a special file for DOJ use only, the cost would be approximately $1.6 million over the projection period. (See Exhibit 15, page 82.) We have not included the cost of either loading or maintaining the West headnote information in the special file cost of LEXIS shown in Exhibit 15. DOJ stated that West Publishing Company may not allow the use of their headnotes or other information in the LEXIS system, even as a special restricted file. Furthermore, DOJ said that West may terminate their updating service, thereby limiting the quality of the data on the LEXIS system.

While this issue cannot be resolved as part of this study, it certainly must be addressed in any decision between LEXIS and JURIS, especially since some JURIS users prefer the WEST headnotes and wish to see them retained.

4.3 Analysis of Projected LEXIS Costs - Initial Subscription in FY1978

The projected costs of the LEXIS service for the period are shown on Exhibit 20, page 87. There are six elements of cost, each briefly discussed below:

- Subscription Cost. Mead charges each organization (DOJ in this case) subscribing to LEXIS a flat charge of $50 per month. Regardless of how many offices, terminals, etc. DOJ may have, this charge amounts to $600 per year.

- Library Access Charge. We assumed that new terminals would be installed in a maximum of 72 locations.

- Access (use) Charges. Mead's packet-pricing schedule for high volume users would permit DOJ to commit to a minimum monthly use figure. Given the large number of estimated connect hours, DOJ could be charged as little as $24 per connect hour for the bulk of its research time. According to their schedule, the first 750 hours are at $28,100 (approximately $37/hour). For each increment of 50 hours above 750, the charge is $1,200 (approximately $24/hour). The hourly rate for use in excess of the minimum commitment is $44/hour. Based on these charges, DOJ costs range from $596,784 per year for 19,536 hours to $1,094,448 for 40,392 hours of use (see Exhibit 16, page 83).

- Equipment Installation. For standard LEXIS terminals the installation charge is $350 for the first and $250 for each additional terminal, as was mentioned in 4.2.3 above. We did not use UBIQ desk top terminals in our projection. However, to provide DOJ with additional information, we prepared Exhibit 13, page 80, which shows the projected installation and monthly equipment charges for a mix of UBIQ and standard LEXIS terminals for the baseline projection. The costs for standard LEXIS terminal installations are shown in Exhibit 17, page 84.

- Monthly Equipment Charges. For use of the LEXIS terminal, Mead charges a flat $175 per month ($2,100 per year) per terminal. These costs are shown in Exhibit 16, page 83 and do not include any UBIQ terminals.

- Data Base Conversion and Storage Costs. Based on the assumption that certain files currently in the JURIS data base or planned for loading would be put up on LEXIS for use only by DOJ and its designees, we calculated the costs of loading and storing the data. We did not attempt to ascertain what, if any, elements of the actual or planned files would be added to LEXIS by Mead as a matter of course. Also, it is important to note that any special DOJ data files added to LEXIS would be loaded and stored without charge if DOJ agreed to make them available to all LEXIS subscribers. With these caveats in mind, we estimate the costs of data base conversion and storage to range form a low of $54,600 in FY1979 to a high of $724,600 in FY1983. Exhibit 19, page 86, shows the costs of data entry and storage for the projection period. The FY1983 cost represents almost 32% of the total LEXIS cost for that year and points up the significance of this cost element.

As shown on Exhibit 20, page 87, the total projected LEXIS cost increases from $1,090,700 in FY1978 to $2,296,100 in FY1983. The two major factors which cause this growth are increased system usage and the increase in special files which would be maintained.

4.4 Analysis of Projected LEXIS Costs - Initial Subscription in FY1980

The projected LEXIS costs, assuming DOJ initially subscribes in FY1980, are shown on Exhibit 24, page 91. The cost for FY1980 is $167,000 higher under this assumption than under the FY1978 initial subscription assumption. The reason for this cost difference is that FY1978 and FY1979 costs for special file data loading and equipment installation are compressed into the FY1980 cost under the FY1980 initial subscription assumption, as shown in Exhibits 21, 22 and 23. The costs for FY1981 through FY1983 are unchanged. The cost projections under this assumption are used for the comparative analysis for FY1980 through FY1983 (Exhibit 3 of this report and in the Executive Summary).

Exhibit 8

COOPERS & LYBRAND

IN PRINCIPAL AREAS
OF THE WORLD

1800 M STREET N W
WASHINGTON, D. C. 20036
(202) 223-1700

June 6, 1979

Coopers & Lybrand has been selected by the Department of Justice to perform a review of their automated legal research requirements and to compare the cost of alternative systems which can be used to meet these requirements. The automated legal research system which your firm offers is one of the alternatives currently being evaluated. In order to complete our review of your services, we are requesting pricing data as described in Schedule A attached to this letter.

The volume, usage, and data base requirements upon which to base your quotation are found in Schedule B attached to this letter.

We are asking for pricing data based on the use of vendor supplied terminals, and based on the use of DOJ supplied terminals. In pricing the DOJ-supplied-terminal option, include any one time costs which may be required to make existing DOJ equipment compatible with your system. All JURIS terminals are TTY compatible, ASCII code, 300-2400 baud devices.

To the extent possible we have framed the cost categories in the same format as publicly available price lists of the commercial companies under evaluation. If a price category is not applicable to your price structure, simply note that it is inapplicable. If a progression of increased usage or higher levels would result in economies of scale, please note the specific formula used to arrive at such figures.

The prices you present should represent those which you would offer to the Department of Justice if a solicitation was circulated for bid. If the quotations provided vary more than 10% from previous price quotations provided to Federal agencies, please explain the reason for such a variance. The prices should address current prices, estimated or guaranteed cost escalation over the next five years, and the period for which you would be willing to contract at the cited prices.

This letter is not a request for proposals which will be binding upon the Department of Justice. However, the pricing data received will be used in preparing the costs of the alternative systems which can be used to meet DOJ's automated legal research requirements. Therefore, we would appreciate your prompt attention to this request for information and will need to receive your response by June 20, 1979.

Should you have any questions about this request, please contact either Mr. Joseph Kehoe or Mr. Joseph Travaglini of Coopers & Lybrand at (202) 223-1700 or Mr. Richard DeHaan, Contracting Officer's Technical Representative, Department of Justice at 633-3914.

Very truly yours,

Coopers & Lybrand

JGK/ss
DAC

Schedule A

Price Quotation

1. Subscription, sign up, or flat rate license fees and charges - Please indicate any one time charges or general recurring charges for use of the system either on a terminal basis or for the Department of Justice as a whole using both:

   a. Vendor supplied terminals
   b. DOJ supplied terminals

2. Access Charges - Please indicate any charges for accessing the system (i.e., connect time, search time, etc.), and state the basis upon which the charges are calculated and any special rates for off peak system usage using both:

   a. Vendor supplied terminals
   b. DOJ supplied terminals

3. Equipment Charges - Please indicate the one time and recurring costs for supplying all equipment necessary to use your service These charges should be itemized, and quoted on a per terminal basis using both:

   a. Vendor supplied terminals
   b. DOJ supplied terminals

4. Telecommunications Charges - Please indicate the charges (if any) for "hook-up" to telecommunications facilities using both:

   a. Vendor supplied terminals
   b. DOJ supplied terminals

5. Documentation - Please indicate the documentation available, the cost per unit and any volume discounts, for systems using both:

   a. Vendor supplied terminals
   b. DOJ supplied terminals

6. Output Charges - Please specify costs for remote printing services, express charges, delivery, etc.

7. Data Base Conversion Costs - Please specify the time and cost of bringing your current data base into conformance with the JURIS data base. This quotation should be expressed in two ways:

   a. JURIS data base is provided to you in machine readable form;
   b. Documents must be identified, coded, keyed, and loaded by your firm.

8. Training - Please indicate the charges for training users of your system on a recurring basis and the time frames required to complete the initial (FY 80) training requirements for both:

   a. Vendor supplied terminals
   b. DOJ supplied terminals

9. Other Costs - Please specify all additional costs, not covered in sections 1-8, that DOJ would incur if they chose to use your service.

Schedule B

Basis for Price Quote

DOJ currently provides service for both DOJ and non DOJ users of the JURIS system. If you supplied DOJ with your service, would the prices offered to DOJ be applicable to each of the users currently serviced by the DOJ JURIS system?

If the DOJ terms would apply to all current JURIS users, the following terminal and usage statistics are to be used.

Number of terminals - 218
System Usage - 23,631 connect hours per year
Training and Documentation - 3700 people

If the DOJ terms would apply only to DOJ users, the following terminal and usage statistics are to be used.

Number of terminals - 138
System Usage - 18,795 connect hours per year
Training and Documentation - 3000 people

Assume three senarios in preparing your price quote.

- No Growth
- 10% Growth
- 20% Growth

CASE LAW

Supreme Court	
- Headnotes	Supreme Court Reporter, vol. 80 (1960) - advance sheets
- Full Text	United States Reports, vols. 176-442 (1900-1975) Supreme Court Reporter, vol. 96 (1975) - slip opinions
- Future[1]	United States Reports, vols. 1-75 (1800-1899)
Circuit Court of Appeals & Court of Customs and Patent Appeals	
- Headnotes	Federal Reporter, 2nd Series, vol. 181 (1960) - advance sheets
- Full Text	Federal Reporter, 2nd Series, vol. 301 (1962) - slip opinions
- Future[1]	Federal Reporter, vols. 1-300 (1880-1923) Federal Reporter, 2nd Series, vols. 1-300 (1924-1961)
District Courts & Court of Customs	
- Headnotes	Federal Supplement, vol. 178 (1960) - advance sheets
- Full Text	Federal Supplement, vol. 332 (1970) - slip opinions
- Future[1,2]	Federal Supplement, vols. 1-200 (1932-1960) Federal Supplement, vols. 201-331 (1961-1970)
Court of Claims	
- Headnotes	Federal Reporter, 2nd Series, vol. 181 (1960) - advance sheets
- Full Text	Court of Claims Reporter, vols. 134-214 (1956-1975) Federal Reporter, 2nd Series, vol. 301 (1962) - slip opinions
- Future[1]	Court of Claims Reporter, vols. 1-133 (1867-1955)

Procedure

- Headnotes — Federal Rules Decisions, vol. 25 (1960) - advance sheets
- Full Text — Federal Rules Decisions, vol. 73 (1976) - advance sheets

Military

- Full Text — Court-Martial Reports, vols. 1 - 50 (1951-1975)
  Military Justice Reporter, vols. 1-6 (1975-1978)

District of Columbia Court of Appeals

- Headnotes — Atlantic Reporter, 2nd Series, vol. 218 (1967) - advance sheets
- Full Text[3] — Atlantic Reporter, 2nd Series, vols. 273-379 (1971-1977)

District of Columbia Superior Court

- Full Text[3,5] — 1971-1978

State Courts (50 States)

- Headnotes — West Regional Reporters (1967) - advance sheets

Tax Law

- Future[1] — U.S. Tax Court Decisions, vols. 1-62 (1942-1976)
  Board of Tax Appeals, vols. 1-47 (1926-1941)

STATUTORY LAW

Public Laws	93rd, 94th, and 95th Congress[4]
United States Code	1976 Edition through Supplement II
S-1437	as passed by the Senate

ADMINISTRATIVE LAW

Comptroller General Decisions vols. 1 - 56 (1921-1977)

Opinions of the Attorney General vols. 1 - 43 (1791-1975)

Nuclear Regulatory Commission Decisions[5] (1972-1978)

000301

[1]In machine-readable form, awaiting on-line storage space

[2]Lower courts in the time frame 1880-1932 are covered by the Federal Reporter and Federal Reporter, 2nd Series

[3]Criminal cases only

[4]Also Public laws of the 96th Congress as they become available

[5]Selected decisions

Exhibit 9

MeadDataCentral

200 Park Avenue
New York, New York 10017

Telephone 212-883-8560

June 26, 1979

Messrs. Coopers & Lybrand
1850 M Street, N.W.
Washington, D.C. 20036

Attention of Mr. Joseph G. Kehoe

Dear Sirs:

In response to your letter of June 6, 1979, I am pleased to submit MDC's price quotation for a subscription to LEXIS by the Department of Justice (Attachment I).

We have listed in Exhibit B of Attachment I those materials in the JURIS data base (as set forth in Schedule B of your request) that are not duplicated in LEXIS. We have not included in Exhibit B those items which, although not available in LEXIS from the same sources used in JURIS, are available in LEXIS from other sources. For example, for the same time period, LEXIS contains Supreme Court opinions from U.S. Reports (the official, government-published reports) and JURIS obtains the same opinions from the Supreme Court Reporter (published by West).

Our price quotation for including the non-duplicated JURIS materials in LEXIS is expressed in terms of charges for each 1,000 source characters. We have taken this approach because certain of these materials represent unspecified selections from larger collections and, since the materials are in machine-readable form, we assume the Department has specific source-character counts.

For your information, we have listed those materials available in LEXIS that are not in JURIS (Attachment II). It seems to us that most of these materials are of equal, if not greater, value to Department lawyers than the materials available only in JURIS. For example, the number of United States District Court cases in the LEXIS General Federal Library for a given year exceeds by at least 20% the total number of District Court cases published in that year by West in all its reporter sets combined. We estimate that in the year 1978, for example, this represents more than 1,000 cases released for publication by the United States District Courts (and therefore in LEXIS) but not published by West (and therefore not in JURIS). Moreover, LEXIS has the full text of state cases, not just headnotes, and in several states has considerably more cases than JURIS; in New York, for example, for any given year, LEXIS has about twice as many cases in full text as JURIS has in headnote form.

MeadDataCentral

Furthermore, MDC soon will make available two additional data bases of significant value to lawyers. The first, scheduled for availability in LEXIS beginning July 9, 1979, is the Auto-Cite data base developed by The Lawyers Cooperative Publishing Company. A description of Auto-Cite and how it complements the LEXIS service is set forth in Attachment III.

The second is the data base of MDC's recently announced News Research Service (NEXIS) which will be offered commercially this Fall. This new service (in which The Washington Post, The Associated Press, Reuters, Newsweek and The Economist have already agreed to make their materials available in full text) was unveiled in April at the annual convention of the American Newspaper Publishers Association. An introduction to and description of NEXIS are set forth in Attachment IV.

Both of these new data bases would be available to the Department under the price quotation provided herewith. The only incremental cost would be charges attributable to use of the data bases that increased the number of connect hours a month.

If you have any questions or require any additional information, please feel free to call Bob Bennett or Mert McGill in our Washington office.

Very truly yours,

Jerome S. Ruben
President

Attachment I

LEXIS PRICE QUOTATION

A government department or agency can subscribe to LEXIS under either of two standard price schedules, both of which incorporate use charges that are more favorable than those available to the private sector. One is MDC's Packet-pricing Schedule for high use. The other is MDC's Step Schedule, designed for agencies with low use. Both are set forth in Exhibit A.

Both price schedules are applied on an agency-by-agency basis. This quotation is based on MDC's Packet-pricing Schedule and applies only to a subscription by the Department for use by Department personnel. Each government agency that currently uses the JURIS system can subscribe to LEXIS under either schedule. Specific price quotations depend on the number of terminals for each agency, their location, and the projected use by the agency. If MDC is given this information, MDC will provide price quotations for other government agencies now using JURIS.

MDC believes that ignoring non-Department LEXIS subscribers in the Federal government is misleading. There are currently six such LEXIS subscribers with 57 terminals that do not subscribe to JURIS, and five subscribers with 14 terminals that also subscribe to JURIS. Many other Federal agencies (some JURIS subscribers, some not) have told MDC they intend to become LEXIS subscribers. The Federal-government LEXIS subscribers that subscribe to JURIS would incur no incremental fixed charges and some would realize a saving if JURIS were discontinued and the non-duplicate materials made available through LEXIS. Similarly, Federal-government LEXIS subscribers that do not today use JURIS would have access to these non-duplicate materials.

The rest of this attachment consists of four sections

A. Price Quotation
B. Growth
C. Summary of Charges
D. Price Guarantees and Term

A. The price quotation below follows the numbering and format of Coopers & Lybrand's "Schedule A, Price Quotation," attached to its letter to MDC of June 6, 1979.

Item 1a. Subscription, sign up, or flat rate license fees and charges -- vendor supplied terminals:

There is a Monthly Subscription Fee of $50

There is a Monthly Library Access Charge which depends upon the total number of terminals installed and their location relative to one another. (Please refer to Exhibit A, LEXIS Price Schedules, for explanation of these charges.) According to information supplied to MDC by Coopers and Lybrand, there are 110 terminals located in 62 cities as follows:

16 terminals in one building;
6 terminals in another building;
4 terminals in another building;
3 terminals in each of five other buildings
2 terminals in each of five other buildings;
1 terminal in each of 59 other buildings.

The Monthly Library Access Charges under the above assumptions are:

Initial terminal	$ 350.00
19 terminals @ 262.50 each	4,987.50
52 terminals @ 140.00 each	7,280.00
38 terminals @ no charge	-0-
Total Charges	$12,617.50

Annual Library Access Charges $151,410

Item 1b. Subscription, sign up, or flat rate license fees and charges -- DOJ supplied terminals:

Charges are the same as in Item 1a, above.

Item 2a. Access Charges -- Vendor supplied terminals:

Access (Use) charges* are based on the Packet-pricing Schedule contained in Exhibit A. Assuming 18,800 connect hours a year (rounded up from 18,795 as set forth in Coopers & Lybrand's "Schedule B, Basis for Price Quote") and assuming that the monthly distribution of these hours is 1550 hours for each of eight months and 1600 hours for each of four months, the use charges would be:

For each of eight months	$ 47,300
For each of four months	48,500

Annual Use Charges $ 572,400

Item 2b. Access Charges -- DOJ supplied terminals:

Charges are the same as in Item 2a, above.

Item 3a. Equipment Charges -- Vendor supplied terminals:

MDC now has available a desktop LEXIS research terminal, the UBIQ, which is intended for installation in individual lawyers' offices. The UBIQ consists of a custom-LEXIS keyboard, a CRT video display, a built-in modem and automatic dialing device, and a business telephone line. The terminal is designed to operate in

*See also Item 7a, Setup Charge for a private library (credited against use charges).

conjunction with one or more high-speed line printers centrally located within the organization's offices. MDC assumes the installation of 16 UBIQ terminals and one printer at the Main Justice Building in Washington, D.C.

MDC assumes the installation of the standard LEXIS Terminal (consisting of a custom-LEXIS keyboard, a CRT display, a printer operating at 112 characters per second, a data set and a business telephone line) at all other locations.

The Installation and Monthly Equipment Charges are as follows:

Installation Charges (One-time)	
16 UBIQ terminals (per Exhibit A)	$ 1,850
One printer (at Main Justice)	200
94 standard LEXIS terminals @ $250 each	23,500
Total Installation Charges	$25,550
Monthly Equipment Charges	
16 UBIQ terminals (per Exhibit A)	$ 1,210
One printer @ $325	325
94 standard LEXIS terminals @ $175 each	16,450
Total Monthly Equipment Charges	$ 17,985
Annual Equipment Charges	$215,82(

Item 3b. Equipment Charges -- DOJ supplied terminals:

If DOJ uses its own custom-JURIS terminal to gain access to LEXIS, there will be no equipment charge by MDC.

Since the custom-JURIS terminal is patterned in large measure after the LEXIS Research Terminal and is of a design very similar to the LEXIS terminal, MDC believes that the cost to make the custom-JURIS terminal (including data set and telephone link) compatible with the LEXIS system would be insignificant. MDC can provide a specific price quotation for such a task only after it has received and reviewed the specifications for the custom-JURIS terminal.

Item 4a. Telecommunications Charges -- Vendor supplied terminals:

There are no separate "hook-up" charges if terminal equipment is provided by MDC.

Item 4b. Telecommunications Charges -- DOJ supplied terminals:

There are no separate "hook-up" charges. (MDC assumes that the custom-JURIS terminal includes a LEXIS-compatible data set and telephone link.)

Item 5a. Documentation -- Vendor-supplied terminals:

All user documentation is provided at no charge. Some materials are provided to each individual who receives instruction from MDC in the use of LEXIS (e.g., LEXIS Primer, Quick Reference Card). Other materials are made available at every terminal location (e.g., terminal operations, library descriptions and other detailed reference material). Much of the written instructional material is now available on line through the LEXIS HELP feature, which recently has been completely redesigned and expanded. For each point at which HELP can be requested, a specific tutorial has been written, offering the user immediate, tailored instruction on any aspect of LEXIS he does not fully understand.

Item 5b. Documentation -- DOJ supplied terminals:

Same as in 5a, above, except that a customized "Terminal Operations" document and "Quick Reference Card" might be needed for use with the custom-JURIS terminal. The charge, if any, for producing such customized materials, if needed, cannot be determined until MDC reviews the specifications for the custom-JURIS terminal.

Item 6. Output Charges

Off-line printing (MAILIT) charges are as follows:

Printing Charge	1¢ per printed line -- First 5,000 lines
	3/4¢ per printed line -- Next 5,000 lines
	1/2¢ per printed line -- Over 10,000 lines

This charge is computed for the aggregate of off-line prints ordered on any one day by any one individual.

There is a single handling charge of $5.00 for all off-line prints ordered on any one day by any one individual for delivery to any one location. This charge is waived if the MAILIT is directed to a high-speed line printer installed in a subscriber's offices for use with UBIQ terminals.

For individual screenfuls of text (i.e., other than MAILIT's) ordered from a UBIQ terminal for printing on the high-speed line printer installed in the subscriber's offices, the charge is 1/2¢ a line, with a maximum charge of 10¢ a printed page.

There is no charge for printing on the printer attached to the standard LEXIS terminal.

Item 7a. Data Base Conversion Costs - JURIS data base provided to MDC in machine-readable form:

If MDC may make available to all LEXIS subscribers the materials set forth in Exhibit B (JURIS data base contents not available in LEXIS), there will be no charge for data base conversion, loading,

storage or maintenance. But, because real-world experience has repeatedly demonstrated that headnotes and indexing schemes add nothing of value to interactive, full-text research, MDC would, in no event, make West's headnotes or key numbers available to subscribers other than the Department and such other government agencies as might request such access and be so authorized by the Department.

For all materials set forth in Exhibit B which MDC makes available only to the Department and its designees, MDC will charge the Department its standard Private Library Charges as follows:

Set-Up Charge (Nonrecurring) (This charge is recoverable as a credit equal to 30% of all use charges paid by the Department for research in the Private Library until the set-up charge is fully recovered.)	$ 4,500.00
Loading and storage on line for one year for each 1,000 source characters: (These charges will be reduced by 20% for any materials in excess of 100,000,000 characters and by 30% for any materials in excess of 300,000,000 characters delivered to MDC for incorporation in the Private Library).	$ 0.65
On-line storage charges for the second and subsequent years for each 1,000 source characters: (These charges will be reduced by 20% for any materials in excess of 100,000,000 characters, by 25% for any materials in excess of 300,000,000 characters, and by 30% for any materials in excess of 1,000,000,000 characters in the Private Library).	$ 0.18

The time required to make these materials available in LEXIS will depend on the volume of source characters, but is not expected to exceed 30 days after receipt by MDC of tapes and tape documentation.

Item 7b. Data Base Conversion Costs - Documents to be identified, coded, keyed and loaded by MDC:

If MDC may make the materials set forth in Exhibit B (other than West's headnotes and key numbers) available to all LEXIS subscribers, the charges for conversion and loading will be $0.885 for each 1,000 source characters (50% of MDC's standard private library charges for conversion and loading) and there will be no charge for on-line storage. This conversion and loading charge

will be reduced by 20% for any materials in excess of 100,000,000 characters and by 30% for any materials in excess of 300,000,000 characters.

For all materials set forth in Exhibit B that MDC makes available only to the Department and its designees, MDC will charge the Department its standard Private Library Charges, as follows:

1.	Set-Up Charge (Nonrecurring) (This charge is recoverable as explained in 7a, above.)	$ 4,500.00
2.	Conversion, loading and storage on line for one year of each 1,000 source characters: (These charges carry the same volume discounts as described in 7a, above)	$ 1.95
3.	On-line storage charges for the second and subsequent years for each 1,000 source characters: (These charges carry the same volume discounts as described in 7a, above)	$ 0.18

The time required to make these materials available in LEXIS will depend on the volume of materials, but is not expected to exceed 120 days after receipt by MDC of printed source materials.

Note: If the private library consists partly of materials in machine-readable form and partly of materials requiring conversion to such form, there is only one set-up charge, and the discounts set forth in 7a and 7b, above, are cumulative (e.g., if 100,000,000 characters are in machine-readable form and an additional 100,000,000 characters are not, the appropriate discount will be applied to all applicable charges for characters received in excess of 100,000,000 characters).

Item 8a. Training - Vendor supplied terminals:

There is no charge for training Department users in the use of LEXIS. Training of 3,000 Department users could be performed over a six-month period.

Item 8b. Training - DOJ supplied terminals:

Same as in Item 8a.

Item 9. Other Costs:

There are no costs other than those identified above.

B. Growth

As noted above, MDC's Library Access Charges depend on the number of terminals installed and their locations relative to one

another. Similarly, Equipment Charges vary depending on the mix of UBIQ and standard LEXIS Research Terminals installed, and on the number of terminals in any one location. Many variations are possible. For example, a total of 100 UBIQ Terminals and two high-speed line printers could be installed at the Main Justice Building for an additional $3,465 a month, or $41,580 a year. Therefore, without some indication from the Department as to where growth will occur (same locations, new locations, etc.), MDC is unable to respond to your request for price quotes based on growth at 10% and 20%. To project growth in use alone, simply add $1,200 for each additional 50 hours ($24 an hour).

C. Summary of Charges

MDC's charges to the Department may be summarized as follows:

MDC - SUPPLIED TERMINALS

One-time Charges (Installation)	$25,550

Recurring Charges

	Monthly	Annual
Fixed Charges		
Subscription Fee	$ 50.00	$ 600
Library Access	12,617.50	151,410
Equipment	17,985.00	215,820
Use Charges (Average Monthly)	47,700.00	572,400
Total Charges	$78,352.50	$940,230

DOJ - SUPPLIED TERMINALS

One-time Charges (Installation)	None

Recurring Charges

	Monthly	Annual
Fixed Charges		
Subscription Fee	$ 50.00	$ 600
Library Access	12,617.50	151,410
Equipment	-0-	-0-
Use Charges (Average Monthly)	$47,700.00	$ 572,400
Total Charges	$60,367.50	$ 724,410

D. Price Guarantees and Term

The prices quoted in Attachment I are guaranteed through the end of Fiscal Year 1982 (September 30, 1982); the prices for FY 83 will not exceed the quoted prices by a percentage greater than the consumer-price-index increase of 1982 over 1981; similarly the prices for FY 84 will not exceed the FY 83 prices by a percentage greater than the consumer-price-index increase of 1983 over 1982. MDC is willing to enter into an agreement with the Department for a minimum period of three months and a maximum period terminating at the end of FY 84.

Exhibit A

LEXIS PRICE SCHEDULES[1] -- GOVERNMENT

Monthly[2] Subscription Charge	$ 50

Monthly[2] Library Access Charges[3]

Initial Terminal, Each City	350
Each Additional Terminal, Same Office	0
Each Additional Terminal, Same City	262.50

Monthly[2] Equipment Charges		Non-recurring Installation Charge	
Each standard LEXIS Terminal[4]	175	Initial Terminal	$350
		Each Additional Terminal	$250

UBIQ Terminal[5]

Number of Terminals[6]	Monthly Equipment Charge For Each Terminal	Installation Charges For Each Terminal	Maximum[7] For Each Group o Five or Fewe Terminals
1) First 5	$95	$200	$750
2) 6th through 10th	75	200	500
3) 11th through 25th	60	200	400
4) 26th through 50th	50	200	300
5) 51st through 100th	40	200	250
6) 101st and all additional	35	200	200

UBIQ Printer[8]

Monthly Equipment Charges

Total Number of UBIQ's Installed in a Subscriber's Offices (without regard to location)	For First Printer	For Second Printer	For Third Printer
1 - 24	$ 325	$ 325	$ 325
25 - 49	175	325	325
50 - 74	-0-	325	325
75 - 99	-0-	175	325
100 -124	-0-	-0-	325
125 -149	-0-	-0-	175
150 plus	-0-	-0-	-0-

There is a non-recurring installation charge of $200 for each printer, except that there will be no installation charge for a printer if it is installed at a time when no monthly equipment charge is imposed for it.

Relocation Charges

Standard LEXIS Terminal	$250
UBIQ Terminal	$100

Off-Line Print Charges

MAILIT Printing Charge[9]	1¢ per Printed Line -- First 5,000 Lines 3/4¢ per Printed Line -- Next 5,000 Lines 1/2¢ per Printed Line -- Over 10,000 Lines
UBIQ Printing Charge[10]	1/2¢ per Printed Line, but maximum of 10¢ per Page
Handling Charge[11]	$5.00

Instruction Charge[12,13,14] $2,250

Use Charges -- Subscriber may elect to pay for use in accordance with either of the two use-charge schedules below. For organizations anticipating fewer than 100 hours a month of connect time, the Step Schedule is appropriate. For organizations anticipating use of more than 100 hours of connect time a month, the Packet-Pricing Schedule is recommended.

STEP-SCHEDULE USE CHARGES

HOURLY CONNECT TIME CHARGES[15,18]

Number of hours of peak-time[16] use by all of a subscriber's users during a single month	Legal Research Service, Auto-Cite, and Company Filing Index	Accounting Information Library,[19] Litigation Support and Private Library Services, and HELP Tutorials
First 5 hours (0 - 5)	$72	$63
Next 5 hours (5 - 10)	45	36
Next 5 hours (10 - 15)	42	33
Next 5 hours (15 - 20)	39	30
Next 5 hours (20 - 25)	36	27
Next 5 hours (25 - 30)	33	24
Next 5 hours (30 - 35)	33	24
Next 5 hours (35 - 40)	33	24
Next 5 hours (40 - 45)	33	24
Next 5 hours (45 - 50)	33	24
Next 50 hours (50 - 100)	30	21
Next 100 hours (100 - 200)	27	18
Next 300 hours (200 - 500)	24	15
More than 500 hours	21	12

Off-peak[17] connect time will be charged at the lower of $30 an hour or the charge that would be applicable if all such use were treated as peak-time use and aggregated with all other peak-time use.

SEARCH SURCHARGES[20]

Each Search Unit	45¢

PACKET-PRICING USE CHARGES

CONNECT-TIME CHARGES[21]

Minimum Monthly Commitment for Hours of Use	Minimum Monthly Commitment in Use Charges	Hourly Rate for Use in Excess of Minimum Monthly Commitment
150	$ 9,150	$ 80
200	11,550	75
250	13,850	70
300	15,950	65
350	17,800	60
400	19,450	57
450	20,900	54
500	22,100	51
550	23,300	49
600	24,500	47
650	25,700	45
700	26,900	44
750	28,100	44

For each increment of 50 hours above 750 a month, add $1,200 a month to the Minimum Monthly Commitment in Use Charges; the Hourly Rate for Use in Excess of the Minimum Monthly Commitment is $44.

SEARCH SURCHARGES

There are no search surcharges under the Packet-Pricing Schedule.

NOTES

1. All prices are for research terminals installed anywhere in the 48 contiguous states of the United States or in the District of Columbia.

2. If any invoice to Subscriber covers a period of less than one month, a proportionate share of all monthly charges is allocated to such period.

3. Once Subscriber has installed ten research terminals in its offices (without regard to location), Subscriber may install additional terminals in other offices in which terminals have not been previously installed, whether or not such offices are in cities where Subscriber has previously installed research terminals, and pay a library access charge of $262.50 with respect to each such office. Furthermore, if at the time Subscriber installs its eleventh terminal, Subscriber is paying $350 as a library access charge with respect to any of its offices in which it has installed research terminals (other than the office in which its initial terminal was installed), the library access charge for each such office will be reduced to $262.50 as of the date on which such eleventh terminal is installed. Once Subscriber has installed 20 research terminals in its offices (without regard to location), Subscriber may install additional terminals in other offices in which terminals have not been previously installed, whether or not such other offices are in cities where Subscriber has previously installed research terminals, and pay a library access charge of $140 with respect to each such other office.

4. The standard LEXIS Terminal consists of the custom-LEXIS keyboard, a CRT video display, a printer that operates at 112 characters per second, and a telephone data set.

5. The UBIQ Terminal is a small desktop terminal consisting of the custom-LEXIS keyboard, a CRT video display, a data set, and an automatic dialing device.

6. All UBIQ terminals, no matter where located, are counted when computing discounted equipment charges (in rows 2 through 6).

7. The maximum installation charges apply to groups of terminals ordered for installation in one place at one time.

8. At the subscriber's option, MDC makes available a high-speed (approximately 240 to 300-lines-a-minute) printer, placed at a convenient location in the subscriber's offices, which can print paper copies from all UBIQ terminals installed in the subscriber's offices; this printer is used to print both copies of individual screenfuls of text as well as MAILIT requests. MAILIT requests may also be sent to this printer from standard LEXIS terminals.

9. This charge is computed for the aggregate of off-line prints ordered on any one day by any one individual, whether printing is done at MDC's Dayton facility or is directed to subscriber's printer installed for use with UBIQ terminals.

10. This charge is made for all copies of individual screenfuls of text ordered from a UBIQ for printing on the optional high-speed printer.

11. This charge applies only to MAILIT requests printed at MDC's Dayton facility. A single handling charge applies to all off-line prints ordered on any one day by any one individual for delivery to any one location.

12. This charge applies only to organizations that pay Use Charges under the Step Schedule.

13. This charge covers (a) the basic instruction of all individuals in Subscriber's offices selected by Subscriber to receive instruction in the use of the Service, and (b) at the option of Subscriber, a review seminar one to two months later. In addition, this charge covers, for each individual instructed, a comprehensive set of written instructional and reference materials on all aspects of the use of the Service. Lawyers, accountants, and librarians (other than temporary employees) who complete the basic MDC instruction program within the time limits set forth below are entitled to two free hours of use to perfect their skills. Other individuals (e.g., paraprofessionals and summer associates) are instructed at no charge but are not entitled to any post-instructional free use.

a)	Individuals in agency on date of installation	Within 60 calendar days of installation
b)	Individuals joining agency after date of installation	Within 60 calendar days of joining

One such hour must be used within 14 calendar days of the date on which basic instruction is completed, and it may be used at a single session or on an aggregated basis. The second hour must be used within 60 calendar days of the date on which instruction is completed and at a single session under the supervision of an MDC representative, scheduled at a mutually agreeable time.

Users must signify their use of free time by entering a designated code at the beginning of each such free research session. Credit for such use will be reflected on Subscriber's monthly bill and will be applied against Subscriber's total use charges. In no event, however, will said credit reduce Subscriber's use charges below its minimum monthly commitment, if any, in use charges. Moreover, for purposes of the carry-forward provision of Note 21 of this exhibit, any portion of said credit in excess of the amount required to reduce Subscriber's use charges to its minimum commitment in use charges will not be carried forward to the following month.

14 For the Subscriber with fewer than eighteen lawyers, accountants, or librarians in the agency on the date Subscriber's agreement is effective, MDC will charge $125 for each lawyer, accountant, or librarian in the agency.

15. Connect time is the total time a researcher is in contact with MDC's central computer, from the time he transmits his identification number until communication with the computer is terminated.

16. "Peak hours" are the following:

Monday through Friday

8:00 a.m. - 7:30 p.m.	Eastern, Central, Mountain and Pacific Time

17. "Off-Peak hours" are the following:

Monday through Friday

7:30 p.m. - 2:00 a.m.	Eastern Time
7:00 a.m. - 8:00 a.m. and 7:30 p.m. - 1:00 a.m.	Central Time
6:00 a.m. - 8:00 a.m. and 7:30 p.m. - 12:00 Midnight	Mountain Time
5:00 a.m. - 8:00 a.m. and 7:30 p.m. - 11:00 p.m.	Pacific Time

Saturday and Sunday

10:00 a.m. - 10:00 p.m.	Eastern Time
9:00 a.m. - 9:00 p.m.	Central Time
8:00 a.m. - 8:00 p.m.	Mountain Time
7:00 a.m. - 7:00 p.m.	Pacific Time

18. All peak-time use of the Legal Research Service, the Accounting Information Library, the Litigation Support and Private Library Services, Auto-Cite, the Company Filing Index, and "HELP" tutorials is counted in determining the applicable step at which a subscriber is charged for connect time.

19. Use of the Accounting Information Library is, in addition, subject to any special surcharges imposed under MDC's agreement with the American Institute of Certified Public Accountants; currently, this surcharge is $40 an hour.

20. Search surcharges are based on the total number of occurrences of the words in each search (i.e., the initial request or any subsequent search level) in the file in which research is being performed. Each 25,000 occurrences (or fraction thereof) is a "search unit." Statistics indicate that one-half of all search s will not exceed a single search unit (i.e., only 45¢), that three-quarters will not exceed six search units (i.e., only $2.70), and that 95% will not exceed 50 search units (i.e., only $22.50). A LEXIS user will be told when a search he has entered would exceed 50 search units (i.e., would cost more than $22.50) and will be given the option of running the search or reformulating it. If a user does not run the search, he will be charged three search units. If a user voluntarily interrupts a search already being processed, he will be charged the greater of (a) three search units, or (b) the number of search units accumulated up to the time of the interruption. A faulty search request that leads to interruption of the processing of the request will cost one search unit.

21. At the beginning of any calendar quarter, Subscriber may commit to a monthly minimum use level from the Use Charges Schedule (or extensions thereof) other than the monthly minimum use level under which it is until then receiving the LEXIS service; provided, however, that Subscriber gives MDC written notice of its new monthly minimum commitment at least thirty (30) days before the beginning of the calendar quarter in which such new monthly commitment shall apply, and provided further that in no event may the Minimum Monthly Commitment for Hours of Use be decreased below 150 hours.

The amount payable in any month for Use Charges will be determined as follows:

a. For each of the first and second months of the calendar quarter, Subscriber will pay the Minimum Monthly Commitment in Use Charges for the Hours of Use to which it has committed;

b. For the third month of the calendar quarter, Subscriber will pay whichever of the following is greater:

i. the Minimum Monthly Commitment in Use Charges if total hours used during the calendar quarter is less than the Minimum Monthly Commitment for Hours of Use multiplied by three; or

ii. the Minimum Monthly Commitment in Use Charges plus an Excess Use Charge calculated by multiplying the number of hours used during the calendar quarter, less the Minimum Monthly Commitment for Hours of Use multiplied by three, times the Hourly Rate for Use in Excess of the Minimum Monthly Commitment at that Commitment level.

Exhibit B

JURIS DATA BASE CONTENTS NOT AVAILABLE IN LEXIS

CASE LAW

Supreme Court[1]

- Full Text	United States Reports (1800-1937)[2]

Circuit Courts of Appeals and Court of Customs and Patent Appeals

- Headnotes	Federal Reporter, 2nd Series (1960) - advance sheets
- Full Text	Federal Reporter, vols. 1-300 (1880-1923) Federal Reporter, 2nd Series[3] (1924-1944)

District Courts and U.S. Customs Court

- Headnotes	Federal Supplement, (1960) - advance sheets
- Full Text (District Courts)	Federal Supplement, (1932-1959)[4]
- Full Text (Customs Court)	Federal Supplement, (1932) - slip opinions

Court of Claims[1]

- Headnotes	Federal Reporter, 2nd Series, (1960-1976)
- Full Text	Court of Claims Reporter, (1867-1975)
- Full Text	Federal Reporter, 2nd Series, (1976)

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[1]Official headnotes included with full-text materials available in LEXIS from Supreme Court and Court of Claims.

[2]Supreme Court Patent, Trademark and Copyright cases from 1850, Tax cases from 1913, Securities cases from 1933, and Trade Regulation cases from 1890 are available in LEXIS.

[3]Circuit Court Securities cases from 1933 are available in LEXIS.

[4]District Court Securities cases from 1933 and Trade Regulation cases from 1950 are available in LEXIS.

Procedure		
	- Headnotes	Federal Rules Decisions, (1960) - advance sheets
Military		
	- Full Text	Court-Martial Reports, (1951-1975)
	- Full Text	Military Justice Reporter, (1975-1978)
District of Columbia Court of Appeals		
	- Headnotes	Atlantic Reporter, 2nd Series, (1967) - advance sheets
District of Columbia Superior Court (Selected criminal decisions)		
	- Full Text	1971-1978
State Courts (38 States)[5]		
	- Headnotes	West Regional Reports, (1967) - advance sheets

[5]Decisions from the following courts contain official headnotes:

Arkansas	- Supreme Court decisions beginning in 1978
Georgia	- Supreme Court and Court of Appeals Decisions beginning in 1965
Michigan	- Supreme Court and Court of Appeals Decisions beginning in 1965
Minnesota	- Supreme Court decisions beginning in 1965
Nebraska	- Supreme Court decisions beginning in 1978
New York	- Court of Appeals decisions beginning in 1940
	- Appellate Division decisions beginning in 1956
	- Miscellaneous decisions beginning in 1956
North Carolina	- Supreme Court decisions beginning in 1965
	- Court of Appeals decisions beginning in 1967
Ohio	- Supreme Court decisions beginning in 1940
	- Appellate Court decisions beginning in 1940
	- Miscellaneous decisions beginning in 1940
Vermont	- Supreme Court decisions beginning in 1978
Virginia	- Supreme Court decisions beginning in 1925
Washington	- Supreme Court decisions beginning in 1965
	- Appellate Court decisions beginning in 1965
West Virginia	- Supreme Court decisions beginning in 1978

Statutory Law

S-1437 as passed by the Senate

Administrative Law

Comptroller General Decisions, (1921-1977)

Opinions of the Attorney General, (1791-1975)

Nuclear Regulatory Commission Decisions, (1972-1978)

Attachment II

LEXIS DATA BASE CONTENTS NOT AVAILABLE IN JURIS

All materials set forth below are available in LEXIS in full text and are current (e.g., usually within one to four weeks of the handing down of the decision).

FEDERAL MATERIALS

Whereas some of the federal case law materials listed below are duplicative of the JURIS Data Base contents, their organization into specialized and separately searchable libraries permits faster and less costly searching.

FEDERAL PATENT, TRADEMARK, AND COPYRIGHT LAW LIBRARY

Contains patent, trademark and copyright cases decided in the:
- Supreme Court beginning in 1850;
- U.S. Court of Customs and Patent Appeals beginning in 1952;
- Courts of Appeals beginning in 1945;
- District Courts beginning in 1960; and
- Court of Claims beginning in 1977.

FEDERAL TAX LIBRARY

Internal Revenue Code

Regulations (Final, temporary, and proposed)

The Cumulative Bulletin beginning in 1954

- Rulings under the 1954 Code;
- Rulings under the 1939 Code;
- Administrative, procedural, and miscellaneous matters; and
- Commissioner's Acquiescences and Non-Acquiescences; Finding List tables; announcements; technical and other releases.

Private Rulings

- All Private Rulings released to the public by the Internal Revenue Service beginning in 1977, and
- Private Rulings released to the public and classified "reference" by the Internal Revenue Service from 1954 to 1977.

Tax Cases decided in the:

Supreme Court beginning in 1913;
Courts of Appeals beginning in 1945;
District Courts beginning in 1960;
Court of Claims beginning in 1942;
Tax Court opinions and memorandum decisions from the beginning; and
Board of Tax Appeals Opinions from the beginning.

Legislative History

Public Laws and House, Senate, and Conference Reports for the 1954 Code and amendments thereto.

SECURITIES LAW LIBRARY

Relevant sections of Title 15 of the U.S. Code

Cases

Securities cases decided in the Supreme Court, the Courts of Appeals, and the District Courts beginning in 1933.

Regulations

Final and proposed Rules and Regulations promulgated under the Securities Acts, and
Final and Proposed Regulations (G, T, U, and X) issued by the Board of Governors of the Federal Reserve System.

Administrative Determinations

No-Action Letters beginning in 1971;
Selected Securities and Exchange Commission Administrative Decisions beginning in 1933; and
Selected Interpretive Releases of the Securities and Exchange Commission beginning in 1933.

Legislative History

House, Senate, and Conference Reports associated with the 1933 and 1934 Acts and amendments thereto.

TRADE REGULATION LIBRARY

Federal Trade Commission Decisions

Commissioner's Opinions beginning in 1950;
Administrative Law Judges' Initial Decisions beginning in 1950;
Administrative Law Judges' Procedural Orders beginning in 1976; and
Consent and Interlocutory Orders beginning in 1970.

Trade Regulation Cases decided in the:

Supreme Court beginning in 1890;
Courts of Appeals beginning in 1945; and
District Courts beginning in 1950.

GENERAL FEDERAL LIBRARY

Decisions construing the Federal Rules of Procedure beginning in 1975. (MDC's compilation contains at least all such decisions reported in Federal Rules Decisions and Federal Rules Service for the period specified. MDC adds the FRD and FRS citation if the case is reported in either of these publications.)

LEXIS contains, for any given year, at least 20% more District Court cases than JURIS.

STATE MATERIALS

ARIZONA LIBRARY

Arizona Supreme Court decisions beginning in 1965, and
Arizona Court of Appeals decisions beginning in 1965.

CONNECTICUT LIBRARY

Connecticut Reports beginning in 1965;
Connecticut Supplement beginning in 1965; and
Connecticut Circuit Court Reports from 1965 to 1974.

CALIFORNIA LIBRARY

California Reports, Second Series, beginning in 1945;
California Reports, Third Series;
California Appellate Reports, Second Series, beginning in 1955; and
California Appellate Reports, Third Series.

DELAWARE CORPORATION LAW LIBRARY

Delaware cases construing the Delaware General Corporation Law:
- Reported decisions beginning in 1898, and
- Unreported decisions beginning in 1970.

Federal cases construing the Delaware General Corporation Law:
- Supreme Court decisions beginning in 1938;
- Courts of Appeals decisions beginning in 1945; and
- District Courts decisions beginning in 1960.

DISTRICT OF COLUMBIA LIBRARY

District of Columbia Court of Appeals decisions beginning in 1965 without regard to whether civil or criminal.

FLORIDA LIBRARY

Florida Supreme Court decisions beginning in 1955, and
Florida District Courts of Appeal decisions beginning in 1957 (excluding memoranda).

GEORGIA LIBRARY

Georgia Supreme Court decisions beginning in 1965, and
Georgia Court of Appeals decisions beginning in 1965.

ILLINOIS LIBRARY

Illinois Reports beginning in 1945;
Illinois Reports, Second Series;
Illinois Appellate Court Reports, Second Series, beginning in 1955; and
Illinois Appellate Court Reports, Third Series.

KANSAS LIBRARY

Constitution of Kansas;
Kansas Statutes;
Kansas Supreme Court decisions beginning in 1963; and
Kansas Court of Appeals decisions beginning in 1977.

KENTUCKY LIBRARY

Kentucky Supreme Court (formerly Court of Appeals) decisions beginning in 1955, and
Kentucky Court of Appeals decisions beginning in 1976.

MASSACHUSETTS LIBRARY

Massachusetts Reports beginning in 1950, and
Massachusetts Appeals Court decisions beginning in 1973.

MICHIGAN LIBRARY

Michigan Reports beginning in 1965, and
Michigan Appeals Reports beginning in 1965.

MINNESOTA LIBRARY

Minnesota Reports beginning in 1965.

MISSOURI LIBRARY

Constitution of Missouri;
Missouri Revised Statutes and Session Laws;
Missouri Supreme Court decisions beginning in 1945; and
Missouri Court of Appeals decisions beginning in 1945.

NEW JERSEY LIBRARY

New Jersey Supreme Court decisions beginning in 1948, and
New Jersey Superior Court decisions beginning in 1965.

NEW YORK LIBRARY

Constitution of New York;
Consolidated Laws of New York;
New York Reports beginning in 1940
(excluding memoranda and motion tables);
New York Reports, Second Series;
Appellate Division Reports, Second Series; and
Miscellaneous Reports, Second Series.

OHIO LIBRARY

Constitution of Ohio;
Ohio Revised Code and Rules of Civil Procedure;
Ohio State Reports beginning in 1940;
Ohio State Reports, Second Series;
Ohio Appellate Reports beginning in 1940;
Ohio Appellate Reports, Second Series; and
Ohio Law Abstract and Ohio Miscellaneous Reports
beginning in 1940.

PENNSYLVANIA LIBRARY

Pennsylvania Supreme Court decisions beginning in 1955;
Pennsylvania Superior Court decisions beginning in 1955; and
Pennsylvania Commonwealth Court decisions beginning in 1970.

TEXAS LIBRARY

Texas Supreme Court decisions beginning in 1955;
Texas Courts of Civil Appeals decisions beginning in
1965 (during 1979, this file will be augmented to
include decisions beginning in 1955); and
Texas Court of Criminal Appeals decisions beginning in 1965.

VIRGINIA LIBRARY

Virginia Supreme Court decisions beginning in 1925.

WASHINGTON LIBRARY

Washington Reports, Second Series, beginning in 1965, and
Washington Appellate Reports beginning in 1969.

WISCONSIN LIBRARY

Wisconsin Reports, Second Series, beginning in 1965.

NEW STATE LIBRARIES

The libraries listed below will become available in 1979.

In addition, by July, 1979, state law libraries consisting of decisions beginning January 1, 1978, will be available for all the remaining states, so that by that date LEXIS research can be conducted in the law of all fifty states and the District of Columbia.

By the end of 1980, there will be state law libraries, consisting of decisions beginning at least as early as 1965, for all fifty states and the District of Columbia.

IOWA LIBRARY

Iowa Supreme Court decisions beginning in 1965, and
Iowa Court of Appeals decisions beginning in 1978.

LOUISIANA LIBRARY

Louisiana Supreme Court decisions beginning in 1965, and
Louisiana Courts of Appeals decisions beginning in 1965.

COLORADO LIBRARY

Colorado Reports beginning in 1965, and
Colorado Appeals Reports beginning in 1965.

INDIANA LIBRARY

Indiana Reports beginning in 1965;
Indiana Court of Appeals Reports beginning in 1972; and
Indiana Appellate Reports from 1965 to 1971.

MARYLAND LIBRARY

Maryland Reports beginning in 1965, and
Maryland Appellate Reports beginning in 1967.

OREGON LIBRARY

Oregon Reports beginning in 1965, and
Oregon Court of Appeals Reports beginning in 1969.

OKLAHOMA LIBRARY

Oklahoma Supreme Court decisions beginning in 1965;
Oklahoma Criminal Court of Appeals decisions beginning in 1965; and
Oklahoma Court of Appeals decisions beginning in 1971.

DELAWARE LIBRARY

Delaware Supreme Court decisions beginning in 1965;
Delaware Court of Chancery decisions beginning in 1965; and
Delaware Superior Court decisions beginning in 1965.

TENNESSEE LIBRARY

Tennessee Supreme Court decisions beginning in 1965;
Tennessee Court of Appeals decisions beginning in 1965; and
Tennessee Court of Criminal Appeals decisions beginning in 1967.

NORTH CAROLINA LIBRARY

North Carolina Reports beginning in 1965, and
North Carolina Court of Appeals Reports beginning in 1967.

OTHER LIBRARIES

ACCOUNTING INFORMATION LIBRARY

The Accounting Information Library contains annual reports, selected by the American Institute of Certified Public Accountants (AICPA), of corporations listed on the New York Stock Exchange and the American Stock Exchange, corporations quoted over-the-counter by the National Association of Securities Dealers Automated Quotations, and Fortuneranked corporations, as well as files of authoritative accounting literature issued by the AICPA, the Securities and Exchange Commission, the Financial Accounting Standards Board, and other organizations.

COMPANY FILING INDEX

The "Company Filing Index," made available in LEXIS under an agreement between MDC and Disclosure, Inc. contains for approximately 12,000 public companies a brief description of the filings each company has made with the Securities and Exchange Commission dating back to 1977 as follows: 10K's, 10Q's, 8K's, 10C's, 7Q's, proxy statements, registration statements, prospectuses, annual reports to shareholders, N1R's and N1Q's. In addition, the CFI file contains a brief description of the listing applications these companies file with the various stock exchanges to document proposed new listings.

EXHIBIT 10

Projected Number of LEXIS Terminals

	1978	1979	1980	1981	1982	1983
Number of Terminals:						
in one building	8	8	13	17	20	22
in a second building	3	3	4	5	6	7
in a third building	3	3	4	5	6	7
in each of 10 buildings	2	2	3	3	4	4
in each of buildings	40	53	59	59[1/]	59[2/]	59[3/]
TOTAL	74	87	110	125	138	153

1. 2 in each of 9 bldgs.
2. 2 in each of 7 bldgs.
3. 2 in each of 18 bldgs.

EXHIBIT 11

Projected Hours of Use

	No. of Terminals	Monthly Hours	Annual Hours
FY 1978	74	1,628	19,536
FY 1979	87	1,914	22,968
FY 1980	110	2,420	29,040
FY 1981	125	2,750	33,000
FY 1982	138	3,036	36,432
FY 1983	153	3,366	40,392

Assumption: A figure of 22 hours of use per terminal per month was used and was assumed to remain constant over the projection period.

EXHIBIT 12

Projected Number of Terminal
Installations Per Year

Fiscal Year	Terminals to be Installed
1978	74
1979	13
1980	23
1981	15
1982	13
1983	15

Note: Based upon the average number of terminals in use during each fiscal year.

EXHIBIT 13

Projected Costs of UBIQ and
Standard LEXIS Terminal Mix

UBIQ	FY 1979	FY 1979	FY 1980	FY 1981	FY 1982	FY 1983
Number of Terminals	15	17	22	25	28	31
Monthly Equipment Charges						
. 1st 5 @ $ 95 per	$ 475	$ 475	$ 475	$ 475	$ 475	$ 475
. 6-10 @ $75 per	375	375	375	375	375	375
. 11-25 @ $60 per	300	420	720	900	900	900
. 26-50 @ $50 per	-0-	-0-	-0-	-0-	150	300
Total Monthly Charges	$ 1,150	$ 1,270	$ 1,570	$ 1,750	$ 1,900	$ 2,050
STANDARD LEXIS TERMINALS						
Number of Terminals	59	70	88	100	110	122
Monthly Equipment Charges @ $175 per	$ 10,325	$ 12,250	$ 15,400	$ 17,500	$ 19,250	$ 21,350
Combined UBIQ and Standard Monthly Charges	11,475	13,520	16,970	19,250	21,150	23,400
Annual Equipment Charges	137,700	162,240	203,640	231,000	253,800	280,800
Annual Cost of 2 Printers @ $3,900 per	7,800	7,800	7,800	7,800	7,800	7,800
Total Annual Cost	145,500	170,040	211,440	238,800	261,600	288,600
Estimated Cost only Standard Terminals	155,400	182,700	231,000	262,500	289,800	321,300
Variance	$ 9,900	$ 12,660	$ 19,560	$ 23,700	$ 28,200	$ 32,700

80

000334

Estimated Number of Characters To Be Loaded and Stored Initial Subscription in FY 1978

Fiscal Year	Number of Characters (in millions)		
	Loaded and Stored	Stored Only	Total
1978	358m		358m
1979		358m	358m
1980	257m	358m	615m
1981	893m	615m	1,508m
1982	893m	1,508m	2,401m
1983	894m	2,401m	3,295m

NOTES:

Files Currently On JURIS But Not On LEXIS

File Name	No. of Characters
U.S. Reports: 1900-1937	100m
S-1437	2m
1 Com. Gen. - 56 Com. Gen.	162m
Nuclear Regulatory Comm. Decisions	10m
Attorney-General Decisions	65m
D.C. Sup. Ct. and U.S.A.D.C.	19m
Total	358m

Files To Be Loaded In FY1980

Files Name	No. of Characters
Unpublished Com. Gen.	120m
203 Ct. Cl. - 214 Ct. Cl.	12m
1 U.S. - 173 U.S.	125m
Total	257m

Files To Be Loaded Over FY1981-1983

Files Name	No. of Characters
1F. - 300F.	975m
1F. Supp. - 200F. Supp.	1,026m
1Ct. C. - 133 Ct. C.	282m
Statutes at Large 1936-1976	92m
Congr. and Adm. News - 1948 to Present	306m
Total	2,681m (note: divide by 3 to get yearly averag

Assumptions:

All materials will be delivered to Mead in machine-readable form. The data files will be available only to DOJ and its' designees.

EXHIBIT 15

Estimated Character Count and Costs of
Loading and Storing West Digest Data on LEXIS
(m=1,000,000)

	1978	1979	1980	1981	1982	1983
Number of Disk Packs x 200m	5.25	5.83	6.41	6.99	7.57	8.15
Number of Characters to be Entered Per Year	1,050m	116m	116m	116m	116m	116m
Number to be Stored	-	1,050m	1,166m	1,282m	1,398m	1,514m
Data Entry Cost 1/						
Number of Characters	1,050m	116m	116m	116m	116m	116m
@ $455/m	$477,800	$52,800	$52,800	$52,800	$52,800	$52,800
Data Storage Cost 2/						
Number of Characters	-	1,050m	1,166m	1,282m	1,398m	1,514m
0-100M @ $180/m						
100-300M @ $144/m						
300-1,000M @ $135/m		86,700	86,700	52,000		
1,000m+ @ $126/m		51,400	66,000	113,000	176,100	190,800
Total Data Storage Cost		$138,100	$152,700	$165,000	$176,100	$190,800
Total Data Entry and Storage Costs	$477,800	$190,900	$205,500	$217,800	$228,900	$243,600

1/ Assumes maximum discount rate for all characters, since material would be part of larger data base.

2/ Assumes material would be in excess of special files shown on Exhibit 20.

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EXHIBIT 16

Projected Cost of Hours of Use

Fiscal Year	Total Hours of Use	Cost of First 750 Hours	Increments of 50 hrs. @ $1,200 per Increment		Each Additional Hour @ $44 per Hour		Total Cost Per Month	Cost Per Year
			No. of Increments	Cost	No. of Hours	Cost		
1978	1,628	$28,100	17	$ 20,400	28	$ 1,232	$ 49,732	$ 596,784
1979	1,914	28,100	23	27,600	14	616	56,316	675,792
1980	2,420	28,100	33	39,600	20	880	68,580	822,960
1981	2,750	28,100	40	48,000	0	0	76,100	913,200
1982	3,036	28,100	45	54,000	36	1,584	83,684	1,004,208
1983	3,366	28,100	52	62,400	16	704	91,204	1,094,448

EXHIBIT 17

Projected Equipment Installation Costs
Initial Subscription in FY 1978

Fiscal Year	No. of Terminals	Cost @ $250 each
1978	74	$18,500
1979	13	3,250
1980	23	5,750
1981	15	3,750
1982	13	3,250
1983	15	3,750

EXHIBIT 18

Projected Equipment Charges

Fiscal Year	No. of Terminals	Cost @ $2100 each
1978	74	$155,400
1979	87	182,700
1980	110	231,000
1981	125	262,500
1982	138	289,800
1983	153	321,300

Projected Costs of LEXIS' Loading and Storing JURIS Data Files

Data Entry Costs

Fiscal Year	No. of Characters	Start-up $[1/]	0-100m $650/m	100m-300m $520/m	300m+ $455/m	Total
1978	358m	$4,500	$65,000	$104,000	$ 26,390	$199,890
1979	0	0	0	0	0	0
1980	257m	0	0	0	116,935	116,935
1981	893m	0	0	0	406,315	406,315
1982	893m	0	0	0	406,315	406,315
1983	894m	0	0	0	406,770	406,770

Data Storage Costs

Fiscal Year	No. of Characters	0-100m $180/m	100m-300m $144/m	300m-1,000m $135/m	1,000m + $126/m	Total
1978	0	$ 0	$ 0	$ 0	$ 0	$ 0
1979	358m	18,000	28,800	7,830	0	54,630
1980	358m	18,000	28,800	7,830	0	54,630
1981	615m	18,000	28,800	42,525	0	89,325
1982	1,508m	18,000	28,800	94,500	64,008	205,308
1983	2,401m	18,000	28,800	94,500	176,526	317,826

1/ This cost is recoverable as a credit equal to 30% of all use charges paid by the Department for research in the Private Library until the set-up charge is fully recovered.

EXHIBIT 20

Projected LEXIS Cost for 1978-1983

	FY1978	FY1979	FY1980	FY1981	FY1982	FY1983
Subscription Cost (page 38)	$ 600	$ 600	$ 600	$ 600	$ 600	$ 600
Library Access Charge (page 38)	119,500	141,300	151,400	151,400	151,400	151,400
Access (Use) Charges (Exhibit 17)	596,800	675,800	823,000	913,200	1,004,200	1,094,400
Equipment Installation (Exhibit 18)	18,500	3,300	5,800	3,800	3,300	3,800
Equipment Charges (Exhibit 19)	155,400	182,700	231,000	262,500	289,800	321,300
Data Base Conver. & Storage (Exhibit 20)	199,900	54,600	171,500	495,600	611,600	724,600
TOTAL PER FISCAL YEAR	$1,090,700	$1,058,300	$1,383,300	$1,827,100	$2,060,900	$2,296,100

Projected Equipment Installation Costs
Initial Subscription in FY 1980

Fiscal Year	No. of Terminals	Cost @ $250 each
1980	110	$27,500
1981	15	3,750
1982	13	3,250
1983	15	3,750

Estimated Number of Characters To Be Loaded and Stored Initial Subscription in FY 1980

Fiscal Year	Number of Characters (in millions)		
	Loaded and Stored	Stored Only	Total
1980	615m		615m
1981	893m	615m	1,508m
1982	893m	1,508m	2,401m
1983	894m	2,401m	3,295m

NOTES:

Files To Be Loaded in FY1980

Files Currently On JURIS But Not On LEXIS

File Name	No. of Characters
U.S. Reports: 1900-1937	100m
S-1437	2m
1 Com. Gen. - 56 Com. Gen.	162m
Nuclear Reguatory Comm. Decisions	10m
Attorney-General Decisions	65m
D.C. Sup. Ct. and U.S.A.D.C.	19m
Total	358m

New Files To Be Loaded in FY1980

File Name	No. of Characters
Unpublished Com. Gen.	120m
203 Ct. Cl. - 214 Ct. Cl.	12m
1 U.S. - 173 U.S.	125m
Total	257m
Total FY1980 Files	615m

Files To Be Loaded Over FY1981-1983

File Name	No. of Characters
1F. - 300F.	975m
1F. Supp. - 200F. Supp.	1,026m
1Ct. C. - 133 Ct. C.	282m
Statutes at Large 1936-1976	92m
Cong. and Adm. News - 1948 to Present	306m
Total	2,681m (note: divide by to get yearly av

Assumptions:

All materials will be delivered to Mead in machine-readable form. The data files will be available only to DOJ and its designees.

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Projected Costs of LEXIS' Loading and Storing JURIS Data Files Initial Subscription in FY 1980

Fiscal Year	No. of Characters	Start-up $[1]	Data Entry Costs 0-100m $650/m	100m-300m $520/m	300m+ $455/m	Total
1980	615	$ 4,500	$65,000	$104,000	$143,325	$316,825
1981	893				406,315	406,315
1982	893				406,315	406,315
1983	894				406,770	406,770

Fiscal Year	No. of Characters	Data Storage Costs 0-100m $180/m	100m-300m $144/m	300m-1,000m $135/m	1,000m+ $126/m	Total
1980	-0-					-0-
1981	615m	$18,000	$28,800	$42,525		$ 89,325
1982	1,508m	18,000	28,800	94,500	$ 64,008	205,308
1983	2,401m	18,000	28,800	94,500	176,526	317,826

[1] This cost is recoverable as a credit equal to 30% of all use charges paid by the Department for research in the Private Library until the set-up charge is fully recovered.

EXHIBIT 24

Projected LEXIS Cost for 1980-1983

	FY 1980	FY 1981	FY 1982	FY 1983
Subscription Cost (page 38)	$ 600	600	600	600
Library Access Charge (page 38)	151,400	151,400	151,400	151,400
Access (Use) Charges (Exhibit 17)	823,000	913,200	1,004,200	1,094,400
Equipment Installation (Exhibit 22)	27,500	3,800	3,300	3,800
Equipment Charges (Exhibit 19)	231,000	262,500	289,800	321,300
Data Base Conver. & Storage (Exhibit 24)	316,800	495,600	611,600	724,600
TOTAL PER FISCAL YEAR	$1,550,300	$1,827,100	$2,060,900	$2,296,100

Department of Justice Addendum to the Coopers & Lybrand Final Report

An Analysis of the Justice Retrieval and Inquiry System (JURIS)

Contract No. JAOMF-79-C-0072

COOPERS & LYBRAND

IN PRINCIPAL AREAS
OF THE WORLD

1800 M STREET N.W.
WASHINGTON, D.C. 20036
(202) 223-1700

May 22, 1980

The Honorable Kevin D. Rooney
Assistant Attorney General
for Administration
United States Department of Justice
Washington, D.C. 20530

Dear Mr. Rooney:

On November 13, 1979, we submitted our final report on An Analysis of the Justice Retrieval and Inquiry System (JURIS). Subsequently, Mead Data Central, Inc. (MDC) submitted comments to you concerning our report. You asked us to review MDC's comments and respond to you. Based primarily on additional/clarifying information provided by MDC, we have made several changes to our report.

This letter transmits our revised report, reflecting two cost adjustments: first, an increase in the projected JURIS storage cost component; and, second, a reduction in the cost of maintaining private files on LEXIS. MDC contested several points in the cost projections:

- The LEXIS cost projection includes approximately $600,000 for converting JURIS terminals for use on LEXIS. MDC has obtained a copy of the JURIS terminal specifications and, by letter of February 25, 1980, indicates that DOJ will incur no conversion cost.

- MDC issued a revised price schedule effective January 1, 1980. MDC calculates that these new prices would reduce the LEXIS cost by $568,000.

- The Department of Justice has subscribed to LEXIS for specialized tax, securities, and other legal libraries. According to MDC, if their usage was projected over the entire projection period, the JURIS cost would increase by $296,000 more than the LEXIS cost due to the different rates at which the usage would be costed.

- Approximately 35% of the DOJ special file material included in the LEXIS cost is not supplied by West, and therefore should not be affected by the West contract and copyright questions. By MDC calculations, DOJ could save approximately $923,000 of LEXIS subscription costs by making this material available to all LEXIS subscribers.

We have not attempted to confirm the MDC cost estimates listed above nor have we modified the report to reflect these points.

If you have any questions concerning this material, please contact Mr. Joseph G. Kehoe at (202) 223-1700.

Very truly yours,

Cooper + Lybrand

JT/sn
Enclosures

Mead Data Central

200 Park Avenue
New York, New York 10017

Telephone 212-383-8560

June 12, 1980

The Honorable Kevin D. Rooney
Assistant Attorney General for Administration
United States Department of Justice
Washington, D.C. 20530

Dear Mr. Rooney:

The revised version of the Coopers & Lybrand Report on JURIS, transmitted to you by Mr. Kehoe's letter of May 22, 1980, makes two indisputable points:

(1) Both LEXIS and JURIS can meet the Department's legal research needs (and LEXIS is, in fact, in many ways superior to JURIS); and

(2) LEXIS would be less expensive to the Department than the continuation of JURIS.

In addition, Coopers & Lybrand acknowledges, in Mr. Kehoe's letter, that there are four items not treated in its report which the Department should assess in comparing the costs of LEXIS and JURIS. These items would account for a further savings to the Department from LEXIS well in excess of two million dollars. In these circumstances, the Department should no longer delay taking the necessary steps to meet its computer-assisted legal research needs from commercial sources, as required by OMB A-76.

Deficiencies in the Revised Report: Substance & Methodology

The body of the revised final report is still shot through with serious errors of fact and interpretation, and is distressingly misleading in its failure to recognize the superiority of LEXIS to JURIS -- in performance, in function and in cost-effectiveness. Although the original version of the "Final Report" was recalled because Coopers & Lybrand acknowledged it to be in error, only a very few of the errors pointed out by MDC (in its comments to you of November 29, 1979), have been corrected. In particular, LEXIS costs are substantially overstated and JURIS costs are substantially understated.

Mead

The executive summary, that portion of the revised final report likely to be perused by most readers to the exclusion of the rest, is particularly biased in favor of JURIS; it does not even represent accurately the body of the report.

We are also concerned because the revised report fails to incorporate many of the changes Coopers & Lybrand led us to believe would be made. We are given to understand that at least some of these changes were excised or modified at the request of Department personnel. The final version of the summary, intended for publication, and the accompanying transmittal letter differ markedly in tone and substance from interim Coopers & Lybrand documents available to us. Other such documents have been withheld, and we suspect they would confirm this pattern of systematic alteration of emphases and conclusions to favor JURIS at the expense of LEXIS. For example, since April 15th we have requested the draft executive summary submitted to the Department on April 14th by Coopers & Lybrand and purportedly reflecting the conclusions of Coopers and Lybrand after its consideration of MDC's written and oral comments. Despite repeated assurances from the Department over the last two months that we would be provided with a copy, we have been unable to obtain one.

The final report, represented by the Department to be an objective analysis of JURIS by an independent consulting firm, is thus, in fact, one heavily influenced by Department Administrative Division employees who have participated in making past decisions to continue JURIS, and who cannot, therefore, be expected to be objective.

Although the revised report concludes that LEXIS will meet the Department's research needs and that it is less expensive than JURIS, Mr. Kehoe's transmittal letter of May 22nd mentions four cost items that were ignored in the Coopers & Lybrand report:

(1) JURIS terminals could be used with LEXIS at no cost to the Department;

(2) LEXIS prices are overstated, because those in effect on November 13, 1979, were used by Coopers & Lybrand in its calculations, although those prices were replaced by a new schedule which went into effect for all LEXIS subscribers on January 1, 1980;

Mead

(3) The Department's costs for use of the LEXIS specialized libraries (to which the Department will continue to subscribe in any event) would be at a lower rate if all of the Department's legal research were done on LEXIS; and

(4) Thirty-five percent of the JURIS material does not come from West publications, is not "infected" by the Department-West agreement, and can, therefore, be made available at no cost to the Department.

Taking the above items into account requires the following adjustments to the Coopers & Lybrand figures (the adjustments are numbered to correspond to the descriptions in the preceding paragraph):

($000)

Fiscal Year	LEXIS Cost from Executive Summary	(1) JURIS Terminals	(2) LEXIS Prices	(3) Specialized Libraries	(4) "Non-Infected" Material	True LEXIS Cost	Percent of JURIS Cost
1978	1091	--	--	--	(200)	891	46%
1979	1058	--	--	--	(55)	1003	46%
1980	1550	(184)	(163)	(74)	(317)	812	41%
1981	1827	(162)	(178)	(74)	(109)	1304	61%
1982	2061	(162)	(190)	(74)	(152)	1483	65%
1983	2296	(161)	(205)	(74)	(166)	1690	70%
Totals	9883	(669)	(736)	(296)	(999)	7183	55%

In addition to the above items, MDC continues to dispute many of the Coopers & Lybrand comments and conclusions with respect to the relative merits and costs of JURIS and LEXIS. We have set forth these errors and omissions in our comments to you of November 29, 1979. Acknowledgement of the validity of even a few of MDC's points would make the case in favor of the replacement of JURIS with LEXIS even more overwhelming.

Mead

The Impropriety of Continuing JURIS

Over the past four years the Department, at the urging of the private sector and of disinterested parties like OMB, has conducted a number of reviews of the relative merits of in-house computer-assisted legal research and of commercial sources. These reviews have demonstrated beyond a reasonable doubt that commercial sources are by far less expensive. OMB A-76 mandates the use of commercial sources in these circumstances. (No one maintains, to our knowledge, that any of the A-76 exceptions are relevant.) And yet the Department, apparently at the urging of those responsible for JURIS within the Department, continues to pay the unnecessary costs of JURIS while "further studying the matter."

The Coopers & Lybrand study is but one more clear statement that the Department has a fully acceptable commercial source to meet its computer-assisted legal research needs. This source is significantly less expensive than (probably less than half the cost of) the Department's in-house service. We hope the Department will at long last move quickly to act in accord with the letter and the spirit of A-76. We stand ready to assist in whatever way we can.

Sincerely yours,

Jerome S. Rubin
President

JSR/jfb
cc: R.M. O'Hara

COOPERS & LYBRAND

IN PRINCIPAL AREAS
OF THE WORLD

1800 M STREET N.W.
WASHINGTON, D.C. 20036
(202) 223-1700

July 3, 1980

The Honorable Kevin D. Rooney
Assistant Attorney General
for Administration
United States Department of Justice
Washington, D.C. 20530

Dear Mr. Rooney:

Mead Data Central, Inc. (MDC) has sent us a copy of its June 12, 1980 letter to you relative to (1) our Report to you on JURIS and (2) our May 22, 1980 letter which transmitted to you a copy of a revised version of the Report.

MDC's June 12 characterizations of both the Report and our May 22, 1980 letter are inaccurate in several significant respects.

1) While the revised Report does conclude that both LEXIS and JURIS can meet the Department of Justice's legal research needs and that LEXIS would probably, on the basis of assumptions set out in detail in the Report, prove moderately less expensive to the Department of Justice than the continuation of JURIS, MDC's June 12 paraphrase of those conclusions is over-simplified and should be considered only in connection with a review of the revised Report itself.

2) Our May 22, 1980 transmittal letter does not "acknowledge" that the "Department should assess" the four items it contains in comparing the costs of LEXIS and JURIS. Rather, our letter merely identifies those four items as being points which MDC raises and which we have made no attempt to confirm. Further, our May 22 letter makes no statements as to any savings which the Department of Justice might realize as a result of these points.

3) Our revised Report reflected the correction of minor errors called to our attention by MDC following its review of our original Report. Our original Report was not recalled. In the revised Report, we corrected anything called to our attention by MDC which we concluded was in fact in error.

4) The four items reflected in our May 22 letter were not matters that had been "ignored" in the original Report. Rather, they were matters brought to our attention and your attention by MDC following submission of our original Report, and reflect for the most part changes made by MDC to their own pricing structure subsequent to the date of our original Report and other matters which MDC brought to our attention only after completion of our original Report. Further, MDC's description of those four points does not reflect our May 22 description of them; rather, it paraphrases and alters our description to make points which MDC apparently wishes to make.

5) We categorically deny that our revised Report fails to incorporate any changes which we led MDC or anyone else to believe would be made. We further categorically deny that the substance of our conclusions was in any way altered or manipulated by Department of Justice personnel in a manner designed systematically to favor JURIS at the expense of LEXIS.

We understand that our revised Report has now been made available by the Department of Justice both to other Federal departments and agencies which have legal research needs, and to the public generally through the National Technical Information Service (NTIS); but that our May 22 transmittal letter has not been made available through NTIS. We further understand that MDC's June 12 letter will be available to the public either through the public's access to the Department of Justice's public files or through NTIS. Finally, we understood when we delivered to you multiple copies of our revised Report together with our May 22 transmittal letter that our revised Report would be used internally by the Department of Justice and other Federal departments and agencies with legal research needs, and accordingly would be read in conjunction with our May 22 transmittal letter.

In this context, where our revised Report is receiving wide distribution and our May 22 letter is being substantially mischaracterized in circumstances where it may not be available for comparison, we believe it most appropriate, and hereby request, that our May 22 letter be made available by the Department of Justice to anyone who receives a copy of our revised Report or MDC's June 12 letter from the Department, whether made available through NTIS or otherwise, so that there will be no misunderstanding by any reader of our revised Report or MDC's June 12 letter of what we said in our May 22 letter. Our May 22 letter is, after all, the best evidence of its contents.

We are providing a copy of this letter to MDC so that they will have a record of our disagreements with their June 12 characterizations of the contents of our Report and May 22 letter.

Sincerely yours,

Cooper + Kybrand

cc: Robert Bennett, Esq.
Mead Data Central, Inc.

U.S. Department of Justice

JUL 30 1980

Mr. Jerome S. Rubin
President
Mead Data Central
200 Park Avenue
New York, New York 10017

Dear Mr. Rubin:

I am responding for Kevin D. Rooney, the Assistant Attorney General for Administration, to your letter of June 12, 1980.

Your allegations of misconduct on the part of Department of Justice (DOJ) employees who supposedly were involved in claimed modifications, excisions, and the "systematic alteration of emphases and conclusions to favor JURIS at the expense of LEXIS" are without foundation. I categorically deny that any such actions were engaged in on the part of Department of Justice employees. Your allegation has no basis in fact and there is not a scintilla of evidence to support it. The DOJ has the right to confer with its contractors on any and all matters regarding work performance and is not obligated to discuss or justify those conferences with any outside party.

The attached letter to Joseph G. Kehoe outlines the approach to be taken regarding any request from any source for copies of the contractor's work papers. The contract study is complete and all work papers are in the possession of Coopers & Lybrand. All requests for work papers, disagreements with the contractor's approach to the study, or disagreements with the contractor's findings should be addressed to Coopers & Lybrand. I am satisfied that the contractor acted professionally and independently in the conduct of the study.

I have directed my staff to have five letters added to the JURIS report in the National Technical Information Service (NTIS) collection. The five letters are: the May 22, 1980 Coopers & Lybrand letter transmitting the final JURIS study report; your June 12, 1980 letter to Kevin D. Rooney objecting to portions of the Coopers & Lybrand JURIS study report; the July 3, 1980 Coopers & Lybrand response to your June 12, 1980 letter; this letter; and the attached copy of my July 1980 letter to Joseph G. Kehoe of Coopers & Lybrand. The distribution of the above letters with each copy of the JURIS study report will minimize the opportunity to mischaracterize the contents of any of the documents.

I believe that the Coopers & Lybrand JURIS study is the basis for a near-term decision on the use of JURIS. Planning for computer assisted legal research (CALR) for the post-FY 1983 time frame is now underway at DOJ. Consideration of OMB Circular No. A-76 and all pertinent government regulations will be included in the decision process. I will be happy to keep you abreast of developments as we proceed. All potential suppliers of such services will be advised of the Department of Justice's intentions upon the completion of the CALR planning phase.

Sincerely,

Rhoda R. Mancher

Rhoda R. Mancher
Deputy Assistant Attorney General
for Administration
Office of Litigation and Management Systems
Justice Management Division

JUL 30 1980

Mr. Joseph G. Kehoe
Coopers & Lybrand
1800 M Street, N.W.
Washington, D.C. 20036

Dear Mr. Kehoe:

I am responding for Kevin D. Rooney, the Assistant Attorney General for Administration, to your letter of July 3, 1980 detailing your observations concerning the June 12, 1980 letter from Jerome S. Rubin, President of Mead Data Central, to Kevin D. Rooney.

In that letter, Mr. Rubin made reference to a Coopers & Lybrand draft executive summary dated April 14, 1980. The Contracting Officer's Technical Representative (COTR) regarded that draft as a Coopers & Lybrand work paper presented to the COTR solely for the purpose of eliciting comments. Subsequently, the COTR returned the draft with his comments. Accordingly, any requests or inquiries the Department of Justice receives regarding those work papers, as well as any and all other contractor work papers associated with the JURIS study (contract no. JAOMF-79-C-0072) will be directed to Coopers & Lybrand, unless the requests involve documents in the official files. I expect that any requests for work papers received by Coopers & Lybrand will be handled in accordance with both Coopers & Lybrand and industry standards regarding such material. The Department of Justice has no objections to the release to third parties of any materials which Coopers & Lybrand deems appropriate to release.

I concur in your suggestion that your letter of May 22, 1980 transmitting the final JURIS study report be delivered along with each copy of the report. I intend to create an addendum to the JURIS study in the National Technical Information Service (NTIS) collection. The addendum will consist of the May 22, 1980 Coopers & Lybrand transmittal letter; the June 12, 1980 objection of Jerome Rubin, President, Mead Data Central to the JURIS study report; the July 3, 1980 Coopers & Lybrand rebuttal to the June 12, 1980 Rubin letter; this letter; and the attached copy of my July 1980 letter to Jerome Rubin, President of Mead Data Central. While the JURIS study was commissioned by the Department of Justice to serve as input to the decision of how best to satisfy the near-term needs of the Department of Justice automated legal research users, it is clear

that since the study represents a recent comparison of JURIS, LEXIS, and WESTLAW, many other current and potential computer assisted legal research (CALR) users are interested in the results. Therefore, it is important that any opportunity to mischaracterize the report's findings, the Mead objections, and the Coopers & Lybrand response be minimized by the public availability of the five letters. I have directed my staff to immediately begin working with NTIS to effect the inclusion of the aforementioned letters in the NTIS collection.

In conclusion, I wish to thank you for your efforts on the completed JURIS study. While I was not employed by the Department of Justice during the course of your contractual services on the JURIS study, I have talked extensively with the members of my staff familiar with your performance. They were complimentary of the thoroughness and independence of your efforts and most importantly of the corporate integrity displayed by the study team.

Sincerely,

Rhoda R. Mancher

Rhoda R. Mancher
Deputy Assistant Attorney General
for Administration
Office of Litigation and Management Systems
Justice Management Division