

Received w/Ltr Dated 4/29/90

**AN EVALUATION OF TECHNICAL COMPUTING REQUIREMENTS  
IN GEOSCIENCES AND SYSTEMS PERFORMANCE,  
FOR THE U. S. NRC (DHLWM & WMB, RES) AND  
CENTER FOR NUCLEAR WASTE REGULATORY ANALYSES**

Prepared for

U. S. Nuclear Regulatory Commission  
Contract NRC-02-88-005

Letter Report Number 3702-002-462

Prepared by  
Stephen R. Young

Center for Nuclear Waste Regulatory Analyses  
Southwest Research Institute

June 29, 1990

426.1

9007200119 900629  
PDR WASTE PDC  
WM-11

Job# 7025  
Box 19

**TABLE OF CONTENTS**

	<b>PAGE</b>
<b>1. INTRODUCTION</b> . . . . .	<b>1</b>
1.1 Purpose and Scope of the Report . . . . .	<b>1</b>
1.2 Purpose and Scope of the Survey . . . . .	<b>1</b>
<b>2. SUMMARY OF RESULTS</b> . . . . .	<b>2</b>
2.1 Technical Computing Requirements of NRC Geoscience Staff . . . . .	<b>3</b>
2.2 Technical Computing Requirements of CNWRA Geoscience Staff . . . . .	<b>3</b>
2.3 Technical Computing Requirements of Combined Geoscience Staff . . . . .	<b>3</b>
<b>3. RANKING OF TECHNICAL COMPUTING REQUIREMENTS</b> . . . . .	<b>4</b>
3.1 NRC Survey Results . . . . .	<b>4</b>
3.2 CNWRA . . . . .	<b>6</b>
3.3 Combined Ranking . . . . .	<b>7</b>
<b>4. TABULATION OF SURVEY RESULTS</b> . . . . .	<b>8</b>
4.1 NRC . . . . .	<b>9</b>
4.1.1 Participants . . . . .	<b>9</b>
4.1.2 Results Listing . . . . .	<b>9</b>
4.2 CNWRA . . . . .	<b>12</b>
4.2.1 Participants . . . . .	<b>12</b>
4.2.2 Results Listing . . . . .	<b>13</b>
4.3 Combined Results Listing . . . . .	<b>16</b>
<b>APPENDIX A: TECHNICAL COMPUTING REQUIREMENTS SURVEY FORM</b> . . . . .	<b>19</b>
<b>APPENDIX B: TECHNICAL COMPUTING REQUIREMENTS SURVEY</b> . . . . .	<b>20</b>
<b>APPENDIX C: SUMMARY OF PERSONAL INTERVIEWS</b> . . . . .	<b>21</b>

**AN EVALUATION OF TECHNICAL COMPUTING REQUIREMENTS  
IN GEOSCIENCES & SYSTEMS PERFORMANCE,  
FOR THE U.S. NRC (DHLWM & WMB, RES) AND  
CENTER FOR NUCLEAR WASTE REGULATORY ANALYSES**

**1. INTRODUCTION**

Effective evaluation of Department of Energy (DOE) scientific, engineering, and technical investigations associated with site characterization, performance assessment and associated engineering/design activities in the high-level nuclear waste (HLW) geologic repository program requires that NRC staff and CNWRA staff develop in house and/or have access to advanced technical computing capabilities. This is especially true given the disparity in resources between DOE and NRC, which can be applied to the program. Application of computing technology can significantly narrow the gap in effective operational resources that can be brought to bear on the project and is likely to substantially enhance the technical rigor of reviews and evaluations. Effective application of computing technology will also decrease the time involved in providing technical evaluations associated with development of prelicensing guidance and with the License Application review.

The CNWRA FY90-91 Operations Plans for the Division of High Level Waste Management directs the Center to determine the technical computing requirements of geoscience staff in NRC and the Center.

**1.1 PURPOSE AND SCOPE OF THE REPORT**

The purpose of this report is to document the results of personal interviews and a survey (Appendix A) of NRC and CNWRA geoscience technical personnel (see lists in Sections 4.1.1. and 4.2.1 ) on the subject of TECHNICAL COMPUTING REQUIREMENTS (specifically defined by geoscience and system performance oriented staff). Results of the survey are tabulated and desired capabilities and work products are ranked. The total Automatic Data Processing (ADP) requirements for the CNWRA are included in the CNWRA ADP Plan for FY90-91 and the NRC HLW ADP requirements are presently being prepared. Additionally, a user survey specifically for Program Architecture was completed in May 1989.

This report is intended to satisfy the requirements of TASK 2 (Regulatory and Technical Guidance Development); SUBTASK 2.4 (Analytical Support for Regulatory and Technical Guidance Development); COMPONENT 1 (Determine USNRC and CNWRA Technical Requirements) of the Geologic Setting Program Element section of the CNWRA FY90-91 Operations Plans for the Division of High Level Waste Management. This report is identified as Major Milestone 3702-002-462.

**1.2 PURPOSE AND SCOPE OF THE SURVEY**

The technical approach to Component 1, established in the Operations Plan, is to determine technical computing capabilities and work products required by geologists, geophysicist, geochemists, and hydrologists at the NRC and the Center to conduct reviews and evaluations necessary to support the development of technical and regulatory guidance. This was initially to be accomplished by polling the technical

staff supporting the Geologic Setting (GS) Program Element activity at the Center and the NRC staff in the Geology-Geophysics Section and the Hydrologic Transport Section of the Geosciences and Systems Performance Branch (HLPG) of the Division of High Level Waste Management (DHLWM). It was subsequently determined that considerable added value would come from including pertinent individuals from Systems Performance (HLPG), the Waste Management Branch of the Office of Nuclear Regulatory Research (RES) and other Elements within the Center. This determination was based on the large proportion of geosciences work contained in the NRC's performance assessment and research programs associated with the HLW geologic repository program.

The focus of the survey is on the determination of desired functional capabilities. Accordingly, categories of technical and scientific computing are not generally defined by specific applications programs or data bases. Rather, the survey is composed of a list of general technical computing activities that a scientist or technical staff member may be required to do to accomplish a certain technical task.

Although evaluation and recommendation of specific application software and source code is not within the scope of Component 1, space was made available on the survey form for applications currently used in certain functional areas. This was done because individual choice or use of an application program gives some indication of the level and type of functionality that a person may require or prefer. It also serves as a point of common reference from which to draw examples of how a software system may accommodate a certain functional requirement. Subsequent to the determination of desired functional capabilities in Component 1, the Center will prepare a report for Component 2 documenting computer hardware and software which may be used to accomplish the desired technical computing functional activities.

## 2. SUMMARY OF RESULTS

The results of this survey must be viewed in a subjective manner. No attempt is made to accomplish rigorous statistical analysis of the responses. This is a small sampling of scientists with common overall objectives but disparate individual responsibilities, interests, and goals. The intent here is to show the extent of common need, rather than to indicate relative scientific importance or significance. Therefore, computer applications basic technical computing functions are mixed in the list of technical computing activities surveyed. In general, the priority functions have been listed below in the context of all the major applications. The objective is to show those general areas of technical computing which seem to be most in demand at this time. Participants were asked to anticipate near-to- intermediate-term future needs. The emphasis is on gaining a user-community perspective. The approach is very much from a user's or application point of view. Evaluation of a technical computing activity outside of its application to a specific scientific problem is difficult. A certain computing tool may be required by only one person on a single job or task. However, the value of that tool is tied directly to the value of the task at hand. Valuation of computing tools is not simply a matter of the number of people requiring that tool at some point in time. But rather, the value depends heavily on the intended application. So, the overall rank of a given computing activity includes some consideration of how it will be used.

This evaluation is based on needs as determined by pertinent staff. It is not based on an independent systematic functional analysis of overall NRC and CNWRA operations. We depend here on staff perception of functional needs and associated technical computing requirements.

## 2.1 TECHNICAL COMPUTING REQUIREMENTS OF NRC GEOSCIENCE STAFF

The highest priority computing requirements of NRC staff are in:

- \* GENERAL COMPUTING TOOLS & UTILITIES
- \* COMMUNICATION
- \* NETWORK OPERATIONS
- \* DATA BASE ACCESS AND MANAGEMENT
- \* MODELLING SOFTWARE ON APPROPRIATE WORKSTATION SYSTEM
- \* PC GRAPHICS FOR REPORTS
- \* 3D INTERACTIVE GRAPHICS & GEOMETRIC MODELING SOFTWARE
- \* DATA DISPLAY AND ANALYSIS SOFTWARE
- \* MAPPING SOFTWARE
- \* GEOGRAPHIC INFORMATION SYSTEM SOFTWARE ON APPROPRIATE WORKSTATION
- \* LAN PLOTTING, PRINTING, HARDCOPY

## 2.2 TECHNICAL COMPUTING REQUIREMENTS OF CNWRA GEOSCIENCE STAFF

The highest priority computing requirements of CNWRA Staff are in:

- \* COMMUNICATION
- \* NETWORK OPERATIONS
- \* LAN PLOTTING, PRINTING, HARDCOPY
- \* DISTRIBUTED COMPUTING FACILITIES
- \* MODELLING, STATISTICS, DATA ANALYSIS SOFTWARE
- \* 3D INTERACTIVE GRAPHICS AND VISUALIZATION SOFTWARE AND GRAPHICS WORKSTATION SYSTEM
- \* PC GRAPHICS FOR REPORTS
- \* DATA BASE ACCESS AND MANAGEMENT SOFTWARE
- \* MAPPING SOFTWARE

## 2.3 TECHNICAL COMPUTING REQUIREMENTS OF COMBINED GEOSCIENCE STAFF

High priority computing requirements common to both groups are:

- \* COMMUNICATION & NETWORK OPERATIONS
- \* LAN PLOTTING, PRINTING, HARDCOPY
- \* PC GRAPHICS FOR REPORTS
- \* MODELLING SOFTWARE ON APPROPRIATE WORKSTATION
- \* 3D INTERACTIVE GRAPHICS AND VISUALIZATION SOFTWARE ON APPROPRIATE WORKSTATION
- \* DATA BASE ACCESS AND MANAGEMENT SOFTWARE
- \* MAPPING
- \* STATISTICS, DATA DISPLAY AND ANALYSIS SOFTWARE

### 3. RANKING OF TECHNICAL COMPUTING REQUIREMENTS

The need for specific categories of technical computing capabilities is determined on the basis of 1) the results of the Survey of Technical Computing Requirements (Appendix A and Appendix B), and 2) results of interviews with individual scientists during the survey process. Ranking is based first on the survey results (tabulated in section 3) and then modified following suggestions and impressions gained during the interviews.

Some technical computing activities are listed under scientific disciplinary headings. These are automated display and analysis methods associated with this discipline area, and the ranking does not refer to the relative importance of the discipline. For example, under GEOCHEMISTRY, the ranking refers to the need for certain computing capabilities, shown on the survey form (Appendix A), not to the science of geochemistry. These types of headings were included because geochemistry, hydrology, etc., are dominant work areas.

#### 3.1 NRC SURVEY RESULTS

Technical computing activities are ranked by frequency of current and anticipated future use. The ranking is determined by adding the number of OCCASIONAL (OC) and OFTEN (OF) responses under the survey heading FREQUENCY OF USE. Activities with the same total of OC + OF are then ranked by the number of (OF) responses. Impressions gained from individual interviews are used to adjust activities with close scores.

The following are based on responses from NRC participants only.

<u>ACTIVITY</u>	<u>SCORE</u>			<u>RANK</u>
	(OC)	(OF)	(TOT)	
WORD PROCESSING	0	8	8	1
BUSINESS REPORTS/ GRAPHICS	2	5	7	2
MODELLING	2	5	7	3
COMMUNICATION/ TERMINAL EMULATION	3	4	7	4
PLOTTING/HARD COPY	2	4	6	5
DISTRIBUTED COMPUTING/ NETWORK OPERATIONS	3	3	6	6
DATA BASE ACCESS AND MANAGEMENT	4	2	6	7

STATISTICS/DATA ANALYSIS	4	2	6	8
MAPPING/CARTOGRAPHY	1	4	5	9
HYDROLOGY	2	3	5	10
DIGITIZATION	2	3	5	11
VISUALIZATION	3	2	5	12
GEOLOGIC CROSS SECTIONS	3	2	5	13
PROGRAM ARCH. * SUPPORT SYSTEM	3	1	4	14
SPREADSHEETS	0	3	3	15
GEOGRAPHIC INFORMATION SYSTEMS	1	2	3	16
DIGITAL IMAGE PROCESSING & ANALYSIS	1	2	3	17
GEOPHYSICAL LOG INTERPRETATION	2	1	3	18
PROJECT MANAGEMENT	2	1	3	19
GEOCHEMISTRY	1	1	2	20
GRAVITY/MAGNETIC INTERPRETATION	1	1	2	21
REFLECTION/REFRACTION SEISMIC INTERP.	0	1	1	22
COMPUTER AIDED DRAFTING & DESIGN	1	0	1	23
APPLICATION DEVELOPMENT	1	0	1	24

\* Sampled 1 of 3 possible PASS user groups.

3.2 CNWRA SURVEY RESULTS

The following rankings are based on responses from CNWRA participants only.

<u>ACTIVITY</u>	<u>SCORE</u>			<u>RANK</u>
	(OC)	(OF)	(TOT)	
WORD PROCESSING	0	8	8	1
COMMUNICATION/ TERMINAL EMULATION	1	7	8	2
DISTRIBUTED COMPUTING/ NETWORK OPERATIONS	0	7	7	3
PLOTTING/HARD COPY	0	7	7	4
BUSINESS REPORTS/ GRAPHICS	2	5	7	5
STATISTICS/DATA ANALYSIS	5	2	7	6
VISUALIZATION	2	4	6	7
DATA BASE ASSESS AND MANAGEMENT	3	3	6	8
MODELLING	0	5	5	9
SPREADSHEETS	2	3	5	10
MAPPING/CARTOGRAPHY	3	2	5	11
GEOCHEMISTRY	0	4	4	12
HYDROLOGY	1	2	3	13
PROGRAM ARCH. SUPPORT SYSTEM *	2	1	3	14
PROJECT MANAGEMENT	2	1	3	15
GEOLOGIC CROSS SECTIONS	3	0	3	16
DIGITIZATION	1	1	2	17

DIGITAL IMAGE PROCESSING & ANALYSIS	2	0	2	18
COMPUTER AIDED DRAFTING & DESIGN	2	0	2	19
GEOGRAPHIC INFORMATION SYSTEM	0	1	1	20
APPLICATION DEVELOPMENT	0	1	1	21
GEOPHYSICAL LOG INTERPRETATION	1	0	1	22
GRAVITY/MAGNETIC INTERPRETATION	1	0	1	23
REFLECTION/REFRACTION SEISMIC	0	0	0	24

\* Sampled 2 of 8 possible PASS user groups.

### 3.3 COMBINED RANKING

The following are based on the combined responses of NRC and CNWRA participants.

<u>ACTIVITY</u>	<u>SCORE</u>			<u>RANK</u>
	(OC)	(OF)	(TOT)	
WORD PROCESSING	0	16	16	1
COMMUNICATION/ TERMINAL EMULATION	4	11	15	2
BUSINESS REPORTS/ GRAPHICS	4	10	14	3
PLOTTING/HARD COPY	2	11	13	4
DISTRIBUTED COMPUTING/ NETWORK OPERATIONS	3	10	13	5
STATISTICS/DATA ANALYSIS	9	4	13	6
MODELLING	2	10	12	7

DATA BASE ACCESS AND MANAGEMENT	7	5	12	8
VISUALIZATION	5	6	11	9
MAPPING/CARTOGRAPHY	4	6	10	10
SPREADSHEETS	2	6	8	11
HYDROLOGY	3	5	8	12
GEOLOGIC CROSS SECTIONS	5	3	8	13
DIGITIZATION	3	4	7	14
PROGRAM ARCH. SUPPORT SYSTEM	5	2	7	15
GEOCHEMISTRY	1	5	6	16
PROJECT MANAGEMENT	4	2	6	17
DIGITAL IMAGE PROCESSING & ANALYSIS	3	2	5	18
GEOGRAPHIC INFO. SYSTEMS	1	3	4	19
GEOPHYSICAL LOG INTERPRETATION	3	1	4	20
GRAVITY/MAGNETIC INTERPRETATION	2	1	3	21
COMPUTER AIDED DRAFTING & DESIGN	3	0	3	22
APPLICATION DEVELOPMENT	1	1	2	23
REFLECTION/REFRACTION SEISMIC	0	1	1	24

#### 4. TABULATION OF SURVEY RESULTS

Survey results are tabulated on the basis of computing activity. These are computing activities that are determined to be required now or in the near future (3-5 years). Responses were requested for (1) computing tier, (2) application software currently in use or desired for use, (3) frequency of use. Computing-tier and frequency-of-use are the most important parameters for the Component 1 study.

The objective here is to determine relative interest in rather broad categories of computing and peripheral activities. Specific application software or programs currently in use are not listed here but can be found on the original survey forms in Appendix B.

Participant responses are tabulated by showing the number of responses per choice in the general categories. Some categories offer more than one opportunity for response. In these cases, an individual participant may be counted more than once. For example, if a person desires to have data base management capability on both PC and mainframe, then a response is entered in both the PC and mainframe choices under Computing Tier.

#### 4.1 NRC SURVEY

##### 4.1.1 PARTICIPANTS

Participants from the Geosciences & Systems Performance Branch (HLGP) were:

Mike Blackford	Seismologist/Geophysicist
Tom Cardon	Geologist
Don Chery	Hydrologist
Dick Codell	Performance Assessment
Neil Coleman	Hydrologist
Norm Eisenberg	Performance Assessment
Dan Fehringer	Health Physicist
Bill Ford	Hydrologist
Harold Lefevre	Geologist
Kieth McConnell	Geologist
Jim Park	Performance Assessment
Jeff Pohle	Hydrogeologist
John Trapp	Geologist

Participants from the Waste Management Branch (RES) were:

George Birchard	Geochemist
Ralph Cady	Hydrogeologist
Tom Nicholson	Hydrogeologist

Eight of the participants returned the written survey forms, the others were interviewed. Responses from interviews are included in the survey listings where possible and discussed in Section 2. SUMMARY OF RESULTS. Interviews are summarized in Appendix C.

4.1.2 RESULTS LISTING

<u>ACTIVITY</u>	<u>NUMBER OF RESPONSES</u>	
<u>WORD PROCESSING</u>	<u>COMPUTING TIER</u> 8 - PC - WORKSTATION (WS) - MAINFRAME (MF) - SUPER (SC)	<u>FREQUENCY OF USE</u> - NU (NOT USED) - OC (OCCASIONAL) 8 - OF (OFTEN)
<u>DATA BASE ACCESS AND MANAGEMENT</u>	<u>COMPUTING TIER</u> 6 - PC - WS 4 - MF - SC	<u>FREQUENCY OF USE</u> 2 - NU 4 - OC 2 - OF
<u>PROJECT MANAGEMENT</u>	<u>COMPUTING TIER</u> 3 - PC - WS - MF - SC	<u>FREQUENCY OF USE</u> 5 - NU 2 - OC 1 - OF
<u>PROGRAM ARCH. SUPPORT SYSTEM</u>	<u>COMPUTING TIER</u> 4 - PC - WS 1 - MF - SC	<u>FREQUENCY OF USE</u> 4 - NU 3 - OC 1 - OF
<u>SPREADSHEETS</u>	<u>COMPUTING TIER</u> 3 - PC - WS - MF - SC	<u>FREQUENCY OF USE</u> 5 - NU - OC 3 - OF
<u>BUSINESS REPORTS/ GRAPHICS</u>	<u>COMPUTING TIER</u> 6 - PC 1 - WS - MF - SC	<u>FREQUENCY OF USE</u> 1 - NU 2 - OC 5 - OF
<u>COMMUNICATION/ TERMINAL EMULATION</u>	<u>COMPUTING TIER</u> 5 - PC 1 - WS 1 - MF - SC	<u>FREQUENCY OF USE</u> 1 - NU 3 - OC 4 - OF
<u>DISTRIBUTED COMPUTING/ NETWORK OPERATIONS</u>	<u>COMPUTING TIER</u> 4 - PC - WS 1 - MF 1 - SC	<u>FREQUENCY OF USE</u> 2 - NU 3 - OC 3 - OF

PLOTTING/HARD COPY

COMPUTING TIER

4 - PC  
1 - WS  
- MF  
- SC

FREQUENCY OF USE

2 - NU  
2 - OC  
4 - OF

DIGITIZATION

COMPUTING TIER

2 - PC  
1 - WS  
- MF  
- SC

FREQUENCY OF USE

3 - NU  
2 - OC  
3 - OF

STATISTICS/DATA  
ANALYSIS

COMPUTING TIER

4 - PC  
1 - WS  
1 - MF  
- SC

FREQUENCY OF USE

2 - NU  
4 - OC  
2 - OF

MAPPING/CARTOGRAPHY

COMPUTING TIER

3 - PC  
1 - WS  
2 - MF  
- SC

FREQUENCY OF USE

3 - NU  
1 - OC  
4 - OF

GEOLOGIC CROSS  
SECTIONS

COMPUTING TIER

3 - PC  
1 - WS  
2 - MF  
- SC

FREQUENCY OF USE

3 - NU  
3 - OC  
2 - OF

GEOGRAPHIC INFO.  
SYSTEMS

COMPUTING TIER

1 - PC  
1 - WS  
- MF  
- SC

FREQUENCY OF USE

5 - NU  
1 - OC  
2 - OF

COMPUTER AIDED  
DRAFTING & DESIGN

COMPUTING TIER

1 - PC  
1 - WS  
- MF  
- SC

FREQUENCY OF USE

7 - NU  
1 - OC  
- OF

DIGITAL IMAGE  
PROCESSING & ANALYSIS

COMPUTING TIER

2 - PC  
1 - WS  
1 - MF  
- SC

FREQUENCY OF USE

5 - NU  
1 - OC  
2 - OF

REFLECTION/REFRACTION  
SEISMIC

COMPUTING TIER

- PC  
- WS  
- MF  
- SC

FREQUENCY OF USE

7 - NU  
- OC  
1 - OF

<u>GEOPHYSICAL LOG INTERPRETATION</u>	<u>COMPUTING TIER</u>	<u>FREQUENCY OF USE</u>
	2 - PC	5 - NU
	1 - WS	2 - OC
	- MF	1 - OF
	- SC	

<u>GRAVITY/MAGNETIC INTERPRETATION</u>	<u>COMPUTING TIER</u>	<u>FREQUENCY OF USE</u>
	1 - PC	6 - NU
	- WS	1 - OC
	- MF	1 - OF
	- SC	

<u>HYDROLOGY</u>	<u>COMPUTING TIER</u>	<u>FREQUENCY OF USE</u>
	3 - PC	3 - NU
	1 - WS	2 - OC
	- MF	3 - OF
	- SC	

<u>GEOCHEMISTRY</u>	<u>COMPUTING TIER</u>	<u>FREQUENCY OF USE</u>
	2 - PC	6 - NU
	1 - WS	1 - OC
	- MF	1 - OF
	- SC	

<u>VISUALIZATION</u>	<u>COMPUTING TIER</u>	<u>FREQUENCY OF USE</u>
	3 - PC	3 - NU
	2 - WS	3 - OC
	1 - MF	2 - OF
	- SC	

<u>MODELLING</u>	<u>COMPUTING TIER</u>	<u>FREQUENCY OF USE</u>
	4 - PC	1 - NU
	2 - WS	2 - OC
	1 - MF	5 - OF
	2 - SC	

<u>APPLICATION DEVELOPMENT</u>	<u>COMPUTING TIER</u>	<u>FREQUENCY OF USE</u>
	- PC	7 - NU
	- WS	1 - OC
	- MF	- OF
	- SC	

4.2 CNWRA SURVEY

4.2.1 PARTICIPANTS

The following Center employees participated in the survey:

Rachid Ababou	Hydrogeologist/Fluid Mechanics
Ron Green	Geologist/Hydrogeologist/Geophysicist
Ron Martin	Physics/Numerical Analysis/Technical Computing
Bill Murphy	Geologist/Geochemist
Bobby Pabalan	Geochemist

Wes Patrick  
English Pearcy  
Narasi Sridhar

Mining Engineering/Rock Mechanics/Management  
Geologist/Geochemist  
Corrosion/Metallurgy/Electrochemistry

#### 4.2.2 RESULTS LISTING

##### ACTIVITY

##### NUMBER OR RESPONSES

##### WORD PROCESSING

##### COMPUTING TIER

##### FREQUENCY OF USE

8 - PC  
1 - WORKSTATION (WS)  
- MAINFRAME (MF)  
- SUPER (SC)

- NU (NOT USED)  
- OC (OCCASIONAL)  
8 - OF (OFTEN)

##### DATA BASE ACCESS AND MANAGEMENT

##### COMPUTING TIER

##### FREQUENCY OF USE

5 - PC  
1 - WS  
2 - MF  
- WC

2 - NU  
3 - OC  
3 - OF

##### PROJECT MANAGEMENT

##### COMPUTING TIER

##### FREQUENCY OF USE

2 - PC  
1 - WS  
1 - MF  
- SC

5 - NU  
2 - OC  
1 - OF

##### PROGRAM ARCH. SUPPORT SYSTEM

##### COMPUTING TIER

##### FREQUENCY OF USE

3 - PC  
- WS  
1 - MF  
- SC

5 - NU  
2 - OC  
1 - OF

##### SPREADSHEETS

##### COMPUTING TIER

##### FREQUENCY OF USE

6 - PC  
- WS  
- MF  
- SC

3 - NU  
2 - OC  
3 - OF

##### BUSINESS REPORTS/ GRAPHICS

##### COMPUTING TIER

##### FREQUENCY OF USE

6 - PC  
- WS  
1 - MF  
- SC

1 - NU  
2 - OC  
5 - OF

##### COMMUNICATION/ TERMINAL EMULATION

##### COMPUTING TIER

##### FREQUENCY OF USE

6 - PC  
- WS  
2 - MF  
- SC

- NU  
1 - OC  
7 - OF

DISTRIBUTED COMPUTING/  
NETWORK OPERATIONS

COMPUTING TIER

5 - PC  
- WS  
2 - MF  
1 - SC

FREQUENCY OF USE

1 - NU  
- OC  
7 - OF

PLOTTING/HARD COPY

COMPUTING TIER

7 - PC  
- WS  
1 - MF  
1 - SC

FREQUENCY OF USE

1 - NU  
- OC  
7 - OF

DIGITIZATION

COMPUTING TIER

2 - PC  
- WS  
- MF  
- SC

FREQUENCY OF USE

6 - NU  
1 - OC  
1 - OF

STATISTICS/DATA  
ANALYSIS

COMPUTING TIER

5 - PC  
1 - WS  
3 - MF  
1 - SC

FREQUENCY OF USE

1 - NU  
5 - OC  
2 - OF

MAPPING/CARTOGRAPHY

COMPUTING TIER

3 - PC  
1 - WS  
4 - MF  
- SC

FREQUENCY OF USE

3 - NU  
3 - OC  
2 - OF

GEOLOGIC CROSS  
SECTIONS

COMPUTING TIER

- PC  
1 - WS  
1 - MF  
- SC

FREQUENCY OF USE

5 - NU  
3 - OC  
- OF

GEOGRAPHIC INFO.  
SYSTEMS

COMPUTING TIER

- PC  
- WS  
- MF  
- SC

FREQUENCY OF USE

7 - NU  
- OC  
1 - OF

COMPUTER AIDED  
DRAFTING & DESIGN

COMPUTING TIER

1 - PC  
- WS  
- MF  
- SC

FREQUENCY OF USE

6 - NU  
2 - OC  
- OF

DIGITAL IMAGE  
PROCESSING & ANALYSIS

COMPUTING TIER

1 - PC  
1 - WS  
- MF  
- SC

FREQUENCY OF USE

6 - NU  
2 - OC  
- OF

<u>REFLECTION/REFRACTION SEISMIC</u>	<u>COMPUTING TIER</u> - PC - WS - MF - SC	<u>FREQUENCY OF USE</u> 8 - NU - OC - OF
<u>GEOPHYSICAL LOG INTERPRETATION</u>	<u>COMPUTING TIER</u> 1 - PC 1 - WS - MF - SC	<u>FREQUENCY OF USE</u> 7 - NU 1 - OC - OF
<u>GRAVITY/MAGNETIC INTERPRETATION</u>	<u>COMPUTING TIER</u> 1 - PC 1 - WS - MF - SC	<u>FREQUENCY OF USE</u> 7 - NU 1 - OC - OF
<u>HYDROLOGY</u>	<u>COMPUTING TIER</u> 3 - PC 1 - WS 2 - MF - SC	<u>FREQUENCY OF USE</u> 5 - NU 1 - OC 2 - OF
<u>GEOCHEMISTRY</u>	<u>COMPUTING TIER</u> 4 - PC - WS 2 - MF - SC	<u>FREQUENCY OF USE</u> 4 - NU - OC 4 - OF
<u>VISUALIZATION</u>	<u>COMPUTING TIER</u> 1 - PC 2 - WS 1 - MF - SC	<u>FREQUENCY OF USE</u> 2 - NU 2 - OC 4 - OF
<u>MODELLING</u>	<u>COMPUTING TIER</u> 2 - PC 1 - WS 4 - MF 3 - SC	<u>FREQUENCY OF USE</u> 3 - NU - OC 5 - OF
<u>APPLICATION DEVELOPMENT</u>	<u>COMPUTING TIER</u> - PC - WS 1 - MF 1 - SC	<u>FREQUENCY OF USE</u> 7 - NU - OC 1 - OF

### 4.3 COMBINED RESULTS LISTING

The results from Sections 4.1 and 4.2 are combined and summarized here.

<u>ACTIVITY</u>	<u>NUMBER OR RESPONSES</u>	
<u>WORD PROCESSING</u>	<u>COMPUTING TIER</u> 16- PC 1 - WORKSTATION (WS) - MAINFRAME (MF) - SUPER (SC)	<u>FREQUENCY OF USE</u> - NU (NOT USED) - OC (OCCASIONAL) 16- OF (OFTEN)
<u>DATA BASE ACCESS AND MANAGEMENT</u>	<u>COMPUTING TIER</u> 11- PC 1 - WS 6 - MF - WC	<u>FREQUENCY OF USE</u> 4 - NU 7 - OC 5 - OF
<u>PROJECT MANAGEMENT</u>	<u>COMPUTING TIER</u> 5 - PC 1 - WS 1 - MF - SC	<u>FREQUENCY OF USE</u> 10- NU 4 - OC 2 - OF
<u>PROGRAM ARCH. SUPPORT SYSTEM</u>	<u>COMPUTING TIER</u> 7 - PC - WS 2 - MF - SC	<u>FREQUENCY OF USE</u> 9 - NU 5 - OC 2 - OF
<u>SPREADSHEETS</u>	<u>COMPUTING TIER</u> 9 - PC - WS - MF - SC	<u>FREQUENCY OF USE</u> 8 - NU 2 - OC 6 - OF
<u>BUSINESS REPORTS/ GRAPHICS</u>	<u>COMPUTING TIER</u> 12- PC 1 - WS 1 - MF - SC	<u>FREQUENCY OF USE</u> 2 - NU 4 - OC 10- OF
<u>COMMUNICATION/ TERMINAL EMULATION</u>	<u>COMPUTING TIER</u> 11- PC 1 - WS 3 - MF - SC	<u>FREQUENCY OF USE</u> 1 - NU 4 - OC 11- OF

<u>DISTRIBUTED COMPUTING/ NETWORK OPERATIONS</u>	<u>COMPUTING TIER</u> 9 - PC - WS 3 - MF 2 - SC	<u>FREQUENCY OF USE</u> 3 - NU 3 - OC 10 - OF
<u>PLOTTING/HARD COPY</u>	<u>COMPUTING TIER</u> 11 - PC 1 - WS 1 - MF 1 - SC	<u>FREQUENCY OF USE</u> 3 - NU 2 - OC 11 - OF
<u>DIGITIZATION</u>	<u>COMPUTING TIER</u> 4 - PC 1 - WS - MF - SC	<u>FREQUENCY OF USE</u> 9 - NU 3 - O 4 - OF
<u>STATISTICS/DATA ANALYSIS</u>	<u>COMPUTING TIER</u> 9 - PC 2 - WS 4 - MF 1 - SC	<u>FREQUENCY OF USE</u> 3 - NU 9 - OC 4 - OF
<u>MAPPING/CARTOGRAPHY</u>	<u>COMPUTING TIER</u> 6 - PC 2 - WS 6 - MF - SC	<u>FREQUENCY OF USE</u> 6 - NU 4 - OC 6 - OF
<u>GEOLOGIC CROSS SECTIONS</u>	<u>COMPUTING TIER</u> 6 - PC 1 - WS 3 - MF - SC	<u>FREQUENCY OF USE</u> 8 - NU 5 - OC 3 - OF
<u>GEOGRAPHIC INFO. SYSTEMS</u>	<u>COMPUTING TIER</u> 1 - PC 1 - WS - MF - SC	<u>FREQUENCY OF USE</u> 12 - NU 1 - OC 3 - OF
<u>COMPUTER AIDED DRAFTING &amp; DESIGN</u>	<u>COMPUTING TIER</u> 2 - PC 1 - WS - MF - SC	<u>FREQUENCY OF USE</u> 13 - NU 3 - OC - OF
<u>DIGITAL IMAGE PROCESSING &amp; ANALYSIS</u>	<u>COMPUTING TIER</u> 3 - PC 2 - WS 1 - MF - SC	<u>FREQUENCY OF USE</u> 11 - NU 3 - OC 2 - OF

<u>REFLECTION/REFRACTION SEISMIC</u>	<u>COMPUTING TIER</u> - PC - WS - MF - SC	<u>FREQUENCY OF USE</u> 15- NU - OC 1 - OF
<u>GEOPHYSICAL LOG INTERPRETATION</u>	<u>COMPUTING TIER</u> 3 - PC 2 - WS - MF - SC	<u>FREQUENCY OF USE</u> 12- NU 3 - OC 1 - OF
<u>GRAVITY/MAGNETIC INTERPRETATION</u>	<u>COMPUTING TIER</u> 2 - PC 1 - WS - MF - SC	<u>FREQUENCY OF USE</u> 13- NU 2 - OC 1 - OF
<u>HYDROLOGY</u>	<u>COMPUTING TIER</u> 6 - PC 2 - WS 2 - MF - SC	<u>FREQUENCY OF USE</u> 8 - NU 3 - OC 5 - OF
<u>GEOCHEMISTRY</u>	<u>COMPUTING TIER</u> 6 - PC 1 - WS 2 - MF - SC	<u>FREQUENCY OF USE</u> 10- NU 1 - OC 5 - OF
<u>VISUALIZATION</u>	<u>COMPUTING TIER</u> 4 - PC 4 - WS 2 - MF - SC	<u>FREQUENCY OF USE</u> 5 - NU 5 - OC 6 - OF
<u>MODELLING</u>	<u>COMPUTING TIER</u> 6 - PC 3 - WS 5 - MF 5 - SC	<u>FREQUENCY OF USE</u> 4 - NU 2 - OC 10- OF
<u>APPLICATION DEVELOPMENT</u>	<u>COMPUTING TIER</u> - PC - WS 1 - MF 1 - SC	<u>FREQUENCY OF USE</u> 14- NU 1 - OC 1 - OF

**APPENDIX A: TECHNICAL COMPUTING REQUIREMENTS SURVEY FORM**

MEMORANDUM

May 30, 1990

TO: CNWRA GS STAFF

GEOSCIENCE STAFF: USNRC DIVISION OF HIGH-LEVEL WASTE MANAGEMENT-  
GEOSCIENCES AND SYSTEMS PERFORMANCE BRANCH

USNRC OFFICE OF NUCLEAR REGULATORY RESEARCH-WASTE  
MANAGEMENT BRANCH

FROM: John L. Russell

SUBJECT: GEOLOGIC SETTING PROGRAM ELEMENT: SURVEY OF TECHNICAL COMPUTING  
REQUIREMENTS

TASK 2 ----- Regulatory and Technical Guidance Development  
SUBTASK 2.4 -- Analytical Support for Regulatory and Technical  
Guidance Development  
COMPONENT 1 -- Determine USNRC and CNWRA Technical Requirements

The purpose of this survey is to determine the technical computing requirements of the Geologic Setting Program Element (GSPE) of CNWRA and NRC. This survey is intended to satisfy the requirements of Component 1, Subtask 2.4; "to determine NRC and Center technical requirements by establishing desired capabilities and work products ... required by geologists, geophysicists, geochemists and hydrologists at the NRC and the Center to conduct reviews and evaluations necessary to support the development of technical and regulatory guidance."

Tasks for FY 90 requiring computing are generally documented in the FY 90 and 91 CNWRA Operations Plans. However, we need to plan now for the work we will be required to accomplish during the next five years. So, as you're answering questions about computational needs, think ahead.

The questionnaire is in two parts. Part one is intended to determine current and near future requirements. Part two is a current inventory of PCs, peripheral devices, configurations and available software.

/y

Enclosure

DISTRIBUTION LIST

CNWRA GS STAFF

Ababou, A.  
Green, R.  
Martin, R.  
Miklas, M.  
Murphy, W.  
Pabalan, R.  
Pearcy, E.  
Russell, J.  
Stirewalt, G.  
Young, S.

USNRC STAFF

Ballard, R.  
Birchard, G.  
Blackford, M.  
Bradbury, J.  
Brooks, D.  
Brooks, P.  
Cardone, T.  
Chery, D.  
Codell, R.  
Coleman, N.  
Coplan, S.  
Eisenberg, N.  
Ford, W.  
Haisfield, M.  
Ibrahim, A.  
Justus, P.  
Kovach, L.  
Kornasiewicz, R.  
Lambert, J.  
Lefevre, H.  
Margulies, T.  
McCartin, T.  
McConnell, K.  
Nicholson, T.  
O'Donnell, E.  
Ott, W.  
Park, J.  
Philip, J.  
Pohle, J.  
Prichard, C.  
Randall, J.  
Silberberg, M.  
Stablein, N.  
Wescott, R.

SURVEY OF TECHNICAL COMPUTING REQUIRMENTS  
 GEOLOGIC SETTING PROGRAM ELEMENT  
 CENTER FOR NUCLEAR WASTE REGULATORY ANALYSIS  
 SOUTHWEST RESEARCH INSTITUTE

RESPONDENTS NAME: \_\_\_\_\_

TELEPHONE: \_\_\_\_\_

PROFESSIONAL DISCIPLINE(S): \_\_\_\_\_

-----  
 -----

PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do?  
 Please consider needs for FYs 91-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC		NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - OFTEN
	- SUPERCOMP (SC)		

-----  
 -----

WORD PROCESSING: \_\_\_\_\_

DATA BASE ACCESS AND MANAGEMENT: \_\_\_\_\_

- \* relational DBMS \_\_\_\_\_
- \* access to SEPDB \_\_\_\_\_
- \* DOE/NNWSI RIDB (Reference Info. Data Base) \_\_\_\_\_
- \* USGS (US Geological Survey) \_\_\_\_\_
- \* NOAA (Nat. Oceanic Atm. Admin) \_\_\_\_\_
- \* NIST (Nat. Instit. Std & Tech) \_\_\_\_\_

PROJECT MANAGEMENT: \_\_\_\_\_

- \* AS \_\_\_\_\_

PROGRAM ARCH. SUPPORT SYSTEM: \_\_\_\_\_

- \* Sys. Reg. Analysis \_\_\_\_\_

SPREADSHEETS: \_\_\_\_\_

BUSINESS REPORTS/ GRAPHICS: \_\_\_\_\_

- \* flow charts \_\_\_\_\_
- \* organizational charts \_\_\_\_\_
- \* scheduling \_\_\_\_\_
- \* other charts \_\_\_\_\_
- \* data graphs \_\_\_\_\_

**PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)**  
**Please consider needs for FYs 90-95.**

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC		NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - OFTEN
	- SUPERCOMP (SC)		
-----			
COMMUNICATION/ EMULATION:			
* USNRC E-mail	_____	_____	_____
* CNWRA E-mail			_____
* USNRC-CNWRA E-mail			_____
* national network E-mail			_____
* PC Emulation of mainframe terminal:			_____
- IBM 3270			
- tgraf tektronix (VAX)			
- etc.			
DISTRIBUTED COMPUTING / NETWORK OPS:			
* ethernet	_____	_____	_____
* tcp/ip			_____
* modem			_____
* local area network (lan)			_____
PLOTTING/HARD- COPY:			
* dot-matrix	_____	_____	_____
* color			_____
* thermal			_____
* pen-plotting			_____
* raster			_____
* digital-analog film recording			_____
* video recording			_____
DIGITIZATION:			
* contour maps	_____	_____	_____
- digitizing tablet or table			_____
- contour to grid conversion			_____
- scanning			_____
* photographic imagery			_____
* video imagery			_____

PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)  
 Please consider needs for FYs 91-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC		NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - OFTEN
	- SUPERCOMP (SC)		

-----  
 -----

STATISTICS/  
 DATA ANALYSIS: \_\_\_\_\_

- \* general stat analysis \_\_\_\_\_
- \* time series analysis \_\_\_\_\_
- \* spatial distribution analysis \_\_\_\_\_
- \* orientation data \_\_\_\_\_
  - fractures \_\_\_\_\_
  - faults \_\_\_\_\_
  - stress fields \_\_\_\_\_
  - etc. \_\_\_\_\_

MAPPING/  
 CARTOGRAPHY: \_\_\_\_\_

- \* contouring \_\_\_\_\_
- \* import digital elev. data \_\_\_\_\_
- \* import other digital data \_\_\_\_\_
- \* base maps \_\_\_\_\_
- \* perspective display \_\_\_\_\_
- \* well and core hole locations \_\_\_\_\_
- \* surface facilities \_\_\_\_\_
- \* subsurface structure \_\_\_\_\_

GEOLOGIC CROSS SECTIONS: \_\_\_\_\_

- \* section construction \_\_\_\_\_
- \* section display \_\_\_\_\_
- \* section analysis (balancing, etc.) \_\_\_\_\_

GEOGRAPHIC INFO. SYSTEMS: \_\_\_\_\_

COMPUTER AIDED DRAFTING AND DESIGN: \_\_\_\_\_

**PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)**  
Please consider needs for FYs 91-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC		NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - OFTEN
	- SUPERCOMP (SC)		
-----			
-----			
DIGITAL IMAGE PROCESSING/ ANALYSIS:	_____	_____	_____
* landsat			_____
* digital photo imagery			_____
* petrographic image analysis			_____
* scanned bore hole imagery			_____
- bore hole televiewer			_____
- formation micro-scanner			_____
REFLEC/REFRAC SEISMIC:	_____	_____	_____
* display / analysis			_____
* interpretation			_____
* mapping			_____
* merge with grav/mag			_____
GEOPHYSICAL LOG INTERP:	_____	_____	_____
* display / analysis			_____
* interpretation			_____
* correlation			_____
* mapping			_____
GRAVITY/ MAGNETICS:	_____	_____	_____
* display			_____
* mapping			_____
* overlay on surface geol			_____
* merge with seismic			_____
HYDROLOGY	_____	_____	_____
* data display			_____
* mapping			_____
* merge w/other data sets			_____
GEOCHEMISTRY	_____	_____	_____
* data display			_____
* mapping			_____
* merge w/other data sets			_____

**PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)**  
Please consider needs for FYs 91-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC		NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - OFTEN
	- SUPERCOMP (SC)		

-----  
-----  
**VISUALIZATION:**

* interactive graphics	_____	_____	_____
* three-dimensional graphics	_____	_____	_____
* geometric rendering	_____	_____	_____
* volume rendering	_____	_____	_____
* 3D geometric models	_____	_____	_____
- solid	_____	_____	_____
- wire frame (mesh)	_____	_____	_____

**MODELLING:**

* geohydrologic flow	_____	_____	_____
* transport	_____	_____	_____
- geochemical	_____	_____	_____
- heat	_____	_____	_____
* geological structure	_____	_____	_____
- 2D and 3D geometric	_____	_____	_____
- kinematic	_____	_____	_____
- dynamics / deformation mechanics	_____	_____	_____
* geophysical	_____	_____	_____
- geomagnetic	_____	_____	_____
- gravity	_____	_____	_____
* chemical / molecular	_____	_____	_____
* meteorological	_____	_____	_____
- precipitation	_____	_____	_____
- weather patterns	_____	_____	_____
- global circulation	_____	_____	_____

**APPLICATION**

**DEVELOPMENT:**

* ARTIFICIAL INTELLIGENCE	_____	_____	_____
* EXPERT SYSTEMS	_____	_____	_____

**PART TWO -- INVENTORY**

Please circle the appropriate response or provide the requested information.

1. Do you have a personal computer (PC) in your office? Yes No

2. What type and model? \_\_\_\_\_

3. If the answer to (1.) is 'No', is a PC available for your use at another location? Yes No. If 'Yes', where? \_\_\_\_\_

4. Do you consider this location convenient? Yes No

5. Please answer the following questions about the PC system in your or available for your use:

What size RAM (system memory)? \_\_\_\_\_ Mb.

Does it have a floppy disk (diskette) drive? Yes No. How many? \_\_\_\_\_

What size? 1.0Mb \_\_\_\_\_ 2.0Mb \_\_\_\_\_

Does it have a hard disk drive? Yes No. What size? \_\_\_\_\_ Mb.

Does it have a math (floating point) coprocessor? Yes No.

What type of coprocessor? \_\_\_\_\_

Is it linked to a mainframe? Yes No. What mainframe(s)? \_\_\_\_\_

Is it on a Local Area Network (LAN)? Yes No

Does it have an Ethernet card? Yes No

Can you access the CNWRA Program Architecture Support System (PASS)?  
Yes No

What model of monitor do you have? \_\_\_\_\_

Is the monitor color or monochrome? \_\_\_\_\_

Do you have a printer? Yes No. What model? \_\_\_\_\_

Do you have a modem? Yes No. What model? \_\_\_\_\_

Internal or External? What baud (data trans rate)? \_\_\_\_\_

Do you have a pass word and user identification on either the NRC or a Southwest Research Inst. mainframe? Yes No

6. What applications software is currently installed on your PC?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

PART TWO -- INVENTORY (cont.)

7. Do you have access to a minicomputer workstation with 3-dimensional graphics capability? Yes No. What model? \_\_\_\_\_  
Do you consider the location convenient? Yes No
8. Do you have access to a plotter? Yes No  
What model? \_\_\_\_\_  
Is the location convenient? Yes No
9. Do you have access to a digitizing table? Yes No  
What model? \_\_\_\_\_  
What computer is it attached to \_\_\_\_\_  
What application do you use it with? \_\_\_\_\_

**APPENDIX B: TECHNICAL COMPUTING REQUIREMENTS SURVEY**

SURVEY OF TECHNICAL COMPUTING REQUIREMENTS  
 GEOLOGIC SETTING PROGRAM ELEMENT  
 CENTER FOR NUCLEAR WASTE REGULATORY ANALYSIS  
 SOUTHWEST RESEARCH INSTITUTE

DRAFT

RESPONDENTS NAME: Donald L. Chery  
 TELEPHONE: (301) 652-0259  
 PROFESSIONAL DISCIPLINE(S): Hydrologist

PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do?  
 Please consider needs for FYs 91-95.

ACTIVITY	COMPUTING TIER	APPLICATION SOFTWARE	FREQUENCY OF USE
	- PC		NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - OFTEN
	- SUPERCOMP (SC)		

WORD PROCESSING: PC DWH OF

DATA BASE ACCESS AND MANAGEMENT: PC-MF (XTALK OC

LRC  
data bases

\* relational DBMS } PROFS(3270)  
 \* access to SEFDB  
 \* DOE (NWS) RIDB (Reference Info. Data Base) OC -> often  
 \* USGS (US Geological Survey) Maybe  
 \* NOAA (Nat. Oceanic Atm. Admin) Maybe  
 \* NIST (Nat. Instit. Std & Tech) Maybe

PROJECT MANAGEMENT: \_\_\_\_\_ NU  
 \* AS

PROGRAM ARCH. SUPPORT SYSTEM: PC-MF OC  
 \* Sys. Reg. Analysis

SPREADSHEETS: \_\_\_\_\_

BUSINESS REPORTS/ GRAPHICS: PC  
 \* flow charts  
 \* organizational charts  
 \* scheduling  
 \* other charts Harvard Graphics  
 \* data graphs OC

**PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)**  
 Please consider needs for FYs 90-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC		NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - OFTEN
	- SUPERCOMP (SC)		

**COMMUNICATION/EMULATION:**

- \* USNRC E-mail
- \* CNWRA E-mail
- \* USNRC-CNWRA E-mail
- \* national network E-mail
- \* PC Emulation of mainframe terminal:
  - IBM 3270
  - tgraf tektronix (VAX)
  - etc.

PC      FRDFS(3221)      OC  
~~OC~~  
~~OC~~  
~~OC~~ OC  
~~OC~~  
~~OC~~

**DISTRIBUTED COMPUTING / NETWORK OPS:**

- \* ethernet
- \* tcp/ip
- \* modem
- \* local area network (lan)

(In building but developed)

**PLOTTING/HARD-COPY:**

- \* dot-matrix
- \* color
- \* thermal
- \* pen-plotting
- \* raster
- \* digital-analog film recording
- \* video recording

PC      OC  
OC

**DIGITIZATION:**

- \* contour maps
  - digitizing tablet or table
  - contour to grid conversion
  - scanning
- \* photographic imagery
- \* video imagery

Not used - no capability



**PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)**  
 Please consider needs for FYs 91-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC		NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - OFTEN
	- SUPERCOMP (SC)		

DIGITAL IMAGE  
 PROCESSING/  
 ANALYSIS:

- \* landsat
- \* digital photo imagery
- \* petrographic image analysis
- \* scanned bore hole imagery
  - bore hole televiewer
  - formation micro-scanner

\_\_\_\_\_  
 \_\_\_\_\_  
 NU (now maybe -)  
 NU (now maybe -)  
 \_\_\_\_\_  
 \_\_\_\_\_

REFLEC/REFRAC

SEISMIC:

- \* display / analysis
- \* interpretation
- \* mapping
- \* merge with grav/mag

\_\_\_\_\_  
 \_\_\_\_\_  
 NU  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

GEOPHYSICAL

LOG INTERP:

- \* display / analysis
- \* interpretation
- \* correlation
- \* mapping

\_\_\_\_\_  
 \_\_\_\_\_  
 NU (now maybe)  
 "  
 "  
 "  
 \_\_\_\_\_  
 \_\_\_\_\_

GRAVITY/  
 MAGNETICS:

- \* display
- \* mapping
- \* overlay on surface geol
- \* merge with seismic

\_\_\_\_\_  
 \_\_\_\_\_  
 NU  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

HYDROLOGY

- \* data display
- \* mapping
- \* merge w/other data sets

\_\_\_\_\_  
 \_\_\_\_\_  
 OC  
 "  
 "  
 \_\_\_\_\_  
 \_\_\_\_\_

GEOCHEMISTRY

- \* data display
- \* mapping
- \* merge w/other data sets

\_\_\_\_\_  
 \_\_\_\_\_  
 NU  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)  
Please consider needs for FYs 91-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC		NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - OFTEN
	- SUPERCOMP (SC)		

.....  
.....  
VISUALIZATION: \_\_\_\_\_

- \* interactive graphics
- \* three-dimensional graphics
- \* geometric rendering
- \* volume rendering
- \* 3D geometric models
  - solid
  - wire frame (mesh)

needed badly  
but not available

MODELLING: \_\_\_\_\_

- \* geohydrologic flow
- \* transport
  - geochemical
  - heat
- \* geological structure
  - 2D and 3D geometric
  - kinematic
  - dynamics / deformation mechanics
- \* geophysical
  - geomagnetic
  - gravity
- \* chemical / molecular
- \* meteorological
  - precipitation
  - weather patterns
  - global circulation

OC  
Beginning

APPLICATION

- DEVELOPMENT: \_\_\_\_\_
- \* ARTIFICIAL INTELLIGENCE
  - \* EXPERT SYSTEMS

NO needed down the  
road

PART TWO -- INVENTORY

DRAFT

Please circle the appropriate response or provide the requested information.

Sally  
C. Smith  
11/21/88

1. Do you have a personal computer (PC) in your office?  Yes  No

2. What type and model? Compaq 386 20P

3. If the answer to (1.) is 'No', is a PC available for your use at another location? Yes No. If 'Yes', where? \_\_\_\_\_

4. Do you consider this location convenient? Yes No

5. Please answer the following questions about the PC system in your office or available for your use: ?

What size RAM (system memory)? 1 Mb Mb.  
Does it have a floppy disk (diskette) drive?  Yes  No. How many? 1-5 1/2  
What size? 1.0Mb 2.0Mb  
Does it have a hard disk drive? Yes No. What size? 110Mb Mb.

Does it have a math (floating point) coprocessor?  Yes  No.  
What type of coprocessor? Wright

Is it linked to a mainframe?  Yes  No. What mainframe(s)? IBM 8000  
INEL CYBER & Cray

Is it on a Local Area Network (LAN)? Yes  No

Does it have an Ethernet card? Yes  No

OK

[ Can you access the CNWRA Program Architecture Support System (PASS)?  Yes  No

What model of monitor do you have? Compaq

Is the monitor  color or monochrome? \_\_\_\_\_

Do you have a printer?  Yes  No. What model? HP LaserJet II

Do you have a modem? Yes  No. What model? \_\_\_\_\_  
Internal or External? What baud (data trans rate)? \_\_\_\_\_

OK

[ Do you have a pass word and user identification on either the NRC or a Southwest Research Inst. mainframe?  Yes  No

6. What applications software is currently installed on your PC?

Harvard Graphics  
Quik Basic  
Fast Disk

DW4  
dBase 4  
MSDDS 3  
3270  
Lotus 1-2-3  
N'Tail

Y

7. Do you have access to a minicomputer workstation with 3-dimensional graphics capability? Yes No. What model? \_\_\_\_\_

Do you consider the location convenient? Yes  No

8. Do you have access to a plotter?

What model? IBM/HP Large roller plotters

Is the location convenient? Yes  No

9. Do you have access to a digitizing table?

What model? \_\_\_\_\_ Yes  No

What computer is it attached to \_\_\_\_\_

What application do you use it with? \_\_\_\_\_

OK

SURVEY OF TECHNICAL COMPUTING REQUIRMENTS  
 GEOLOGIC SETTING PROGRAM ELEMENT  
 CENTER FOR NUCLEAR WASTE REGULATORY ANALYSIS  
 SOUTHWEST RESEARCH INSTITUTE

RESPONDENTS NAME: Norm Eisenberg

TELEPHONE: \_\_\_\_\_

PROFESSIONAL DISCIPLINE(S): Performance Assessment

-----  
 -----

PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do?  
 Please consider needs for FYs 91-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC		NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - OFTEN
	- SUPERCOMP (SC)		

-----  
 -----

WORD PROCESSING: PC OW7 OF

DATA BASE ACCESS AND MANAGEMENT: \_\_\_\_\_  
 \* relational DBMS \_\_\_\_\_  
 \* access to SEPDB \_\_\_\_\_  
 \* DOE/NNWSI RIDB (Reference Info. Data Base) \_\_\_\_\_  
 \* USGS (US Geological Survey) \_\_\_\_\_  
 \* NOAA (Nat. Oceanic Atm. Admin) \_\_\_\_\_  
 \* NIST (Nat. Instit. Std & Tech) \_\_\_\_\_

*often may need it.*  
NU

PROJECT MANAGEMENT: \_\_\_\_\_  
 \* AS \_\_\_\_\_

OF

PROGRAM ARCH. SUPPORT SYSTEM: \_\_\_\_\_  
 \* Sys. Reg. Analysis \_\_\_\_\_

OC - depends what happens

SPREADSHEETS: \_\_\_\_\_

BUSINESS REPORTS/ GRAPHICS: \_\_\_\_\_

\* flow charts \_\_\_\_\_  
 \* organizational charts \_\_\_\_\_  
 \* scheduling \_\_\_\_\_  
 \* other charts \_\_\_\_\_  
 \* data graphs \_\_\_\_\_

OC-OFT  
 ↓  
OF  
OF

*\* information flow*  
*\* computer program flow charts*

**PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)**  
 Please consider needs for FYs 90-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC		NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - OFTEN
	- SUPERCOMP (SC)		

**COMMUNICATION/EMULATION:**

- \* USNRC E-mail
- \* CNWRA E-mail
- \* USNRC-CNWRA E-mail
- \* national network E-mail
- \* PC Emulation of mainframe terminal:
  - IBM 3270
  - tgraf tektronix (VAX)
  - etc.

*Great need in this area and great need for distributed mainframe and workstation apps. and data.*

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**DISTRIBUTED COMPUTING / NETWORK OPS:**

- \* ethernet
- \* tcp/ip
- \* modem
- \* local area network (lan)

*Great need for data transfer. Uses Bitnet for data transfer to NSA (IBM 3010)*  
 \* CRY → IBM → VAX data comm.

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 02/0F

**PLOTTING/HARD-COPY:**

- \* dot-matrix
- \* color
- \* thermal
- \* pen-plotting
- \* raster
- \* digital-analog film recording
- \* video recording

*Need to use, but needs to be easy to use.*

02/0F  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**DIGITIZATION:**

- \* contour maps
  - digitizing tablet or table
  - contour to grid conversion
  - scanning
- \* photographic imagery
- \* video imagery

02/0F  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)  
 Please consider needs for FYs 91-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC		NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - OFTEN
	- SUPERCOMP (SC)		

-----  
 -----

STATISTICS/  
 DATA ANALYSIS: \_\_\_\_\_ NU/OC  
 \* general stat analysis \_\_\_\_\_  
 \* time series analysis \_\_\_\_\_  
 \* spatial distribution analysis \_\_\_\_\_  
 \* orientation data \_\_\_\_\_  
 - fractures \_\_\_\_\_  
 - faults \_\_\_\_\_  
 - stress fields \_\_\_\_\_  
 - etc. \_\_\_\_\_

MAPPING/  
 CARTOGRAPHY: \_\_\_\_\_ NU/OC  
 \* contouring \_\_\_\_\_  
 \* import digital elev. data \_\_\_\_\_  
 \* import other digital data \_\_\_\_\_  
 \* base maps \_\_\_\_\_  
 \* perspective display \_\_\_\_\_  
 \* well and core hole locations \_\_\_\_\_  
 \* surface facilities \_\_\_\_\_  
 \* subsurface structure \_\_\_\_\_

GEOLOGIC CROSS  
 SECTIONS: \_\_\_\_\_ NU/OC  
 \* section construction *Transport plumes overlaid* \_\_\_\_\_  
 \* section display *on stratigraphy.* \_\_\_\_\_  
 \* section analysis (balancing, etc.) \_\_\_\_\_

GEOGRAPHIC INFO.  
 SYSTEMS: *Need to combine contaminant plumes on all other data types.* OC/OF

COMPUTER AIDED  
 DRAFTING AND  
 DESIGN: *Combine different data results and models on the same map. Merged model. results. Could solve integration problems.* NU

**PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)**  
Please consider needs for FYs 91-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC		NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - OFTEN
	- SUPERCOMP (SC)		

-----  
-----

DIGITAL IMAGE PROCESSING/ ANALYSIS: *Could use results from this in models.*

* landsat	_____	_____	_____ NU/OC
* digital photo imagery	_____	_____	_____ _____
* petrographic image analysis	_____	_____	_____ _____
* scanned bore hole imagery	_____	_____	_____ _____
- bore hole televiewer	_____	_____	_____
- formation micro-scanner	_____	_____	_____

REFLEC/REFRAC SEISMIC:

* display / analysis	_____	_____	_____ HU
* interpretation	_____	_____	_____ _____
* mapping	_____	_____	_____ _____
* merge with grav/mag	_____	_____	_____ _____

GEOPHYSICAL LOG INTERP:

* display / analysis	_____	_____	_____ HU
* interpretation	_____	_____	_____ _____
* correlation	_____	_____	_____ _____
* mapping	_____	_____	_____ _____

GRAVITY/ MAGNETICS:

* display	_____	_____	_____ NU
* mapping	_____	_____	_____ _____
* overlay on surface geol	_____	_____	_____ _____
* merge with seismic	_____	_____	_____ _____

HYDROLOGY

* data display	_____	_____	_____ HU
* mapping	_____	_____	_____ _____
* merge w/other data sets	_____	_____	_____ _____

GEOCHEMISTRY

* data display	_____	_____	_____ HU
* mapping	_____	_____	_____ _____
* merge w/other data sets	_____	_____	_____ _____



PART TWO -- INVENTORY

Please circle the appropriate response or provide the requested information.

1. Do you have a personal computer (PC) in your office?  Yes  No

2. What type and model? AT

3. If the answer to (1.) is 'No', is a PC available for your use at another location? Yes No. If 'Yes', where? \_\_\_\_\_

4. Do you consider this location convenient?  Yes  No

5. Please answer the following questions about the PC system in your or available for your use:

What size RAM (system memory)? \_\_\_\_\_ Mb.

Does it have a floppy disk (diskette) drive? Yes No. How many? \_\_\_\_\_

What size? 1.0Mb \_\_\_\_\_ 2.0Mb \_\_\_\_\_

Does it have a hard disk drive?  Yes  No. What size? 20 Mb.

Does it have a math (floating point) coprocessor?  Yes  No.

What type of coprocessor? \_\_\_\_\_

Is it linked to a mainframe?  Yes  No. What mainframe(s)? MV 9000  
Modem

Is it on a Local Area Network (LAN)?  Yes  No

Does it have an Ethernet card?  Yes  No

Can you access the CNWRA Program Architecture Support System (PASS)?  Yes  No

What model of monitor do you have? IBM

Is the monitor color or monochrome? Monochrome

Do you have a printer?  Yes  No. What model? Epson 286

Do you have a modem?  Yes  No. What model? \_\_\_\_\_

Internal or  External? What baud (data trans rate)? 2400

Do you have a pass word and user identification on either the NRC or a Southwest Research Inst. mainframe?  Yes  No

6. What applications software is currently installed on your PC? Short  
OW4 dBase III+ Sign/Program Master  
d-talk

PART TWO -- INVENTORY (cont.)

7. Do you have access to a minicomputer workstation with 3-dimensional graphics capability? Yes No What model? \_\_\_\_\_  
Do you consider the location convenient? Yes No

8. Do you have access to a plotter? Yes No  
What model? \_\_\_\_\_  
Is the location convenient? Yes No

9. Do you have access to a digitizing table? Yes No  
What model? \_\_\_\_\_  
What computer is it attached to \_\_\_\_\_  
What application do you use it with? \_\_\_\_\_

SURVEY OF TECHNICAL COMPUTING REQUIREMENTS  
 GEOLOGIC SETTING PROGRAM ELEMENT  
 CENTER FOR NUCLEAR WASTE REGULATORY ANALYSIS  
 SOUTHWEST RESEARCH INSTITUTE

DRAFT

RESPONDENTS NAME: MICHAEL BLACKFORD

TELEPHONE: 301/492-0524

PROFESSIONAL DISCIPLINE(S): SEISMOLOGIST/GEOPHYSICIST

PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do?  
 Please consider needs for FYs 91-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u> *	<u>APPLICATION</u> *	<u>FREQUENCY OF USE</u>
	- PC	<u>SOFTWARE</u>	NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - OFTEN
	- SUPERCOMP (SC)		

WORD PROCESSING: PC/LAN WORDPERFECT OF

DATA BASE ACCESS AND MANAGEMENT: PC/LAN/MF

* relational DBMS	<u>OC</u>
* access to SEPDB	<u>OC</u>
* DOE/NNWSI RIDB (Reference Info. Data Base)	<u>OC</u>
* USGS (US Geological Survey)	<u>OC/OF</u>
* NOAA (Nat. Oceanic Atm. Admin)	<u>OC/OF</u>
* NIST (Nat. Instit. Std & Tech)	<u>OC</u>

PROJECT MANAGEMENT: PC/LAN OC

\* AS

PROGRAM ARCH. SUPPORT SYSTEM: PC/LAN OF

\* Sys. Reg. Analysis

SPREADSHEETS: PC/LAN LOTUS OF

BUSINESS REPORTS/ GRAPHICS: PC/LAN

* flow charts	<u>OC</u>
* organizational charts	<u>OC</u>
* scheduling	<u>OC</u>
* other charts	<u>OF</u>
* data graphs	<u>OF</u>

\* After marking these columns on this page, I realized that I don't have any special requirements for particular hardware/software configurations to accomplish the capabilities. Whatever configuration can achieve the capability efficiently and economically is fine with me.

**PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)**  
 Please consider needs for FYs 90-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC		NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - OFTEN
	- SUPERCOMP (SC)		
-----			
-----			
<b>COMMUNICATION/EMULATION:</b>			
* USNRC E-mail	_____	_____	OF
* CNWRA E-mail	_____	_____	OC/OF
* USNRC-CNWRA E-mail	_____	_____	OC/OF
* national network E-mail	_____	_____	OC
* PC Emulation of mainframe terminal:	_____	_____	OF
- IBM 3270			
- tgraf tektronix (VAX)			
- etc.			
<b>DISTRIBUTED COMPUTING / NETWORK OPS:</b>			
* ethernet	_____	_____	OC/OF
* tcp/ip	_____	_____	OC
* modem	_____	_____	OC/OF
* local area network (lan)	_____	_____	OF
<b>PLOTTING/HARD-COPY:</b>			
* dot-matrix	_____	_____	OC
* color	_____	_____	OC
* thermal	_____	_____	NU
* pen-plotting	_____	_____	OC/OF
* raster	_____	_____	OC/OF
* digital-analog film recording	_____	_____	NU
* video recording	_____	_____	NU
<b>DIGITIZATION:</b>			
* contour maps	_____	_____	
- digitizing tablet or table			OC/OF
- contour to grid conversion			OC/OF
- scanning			
* photographic imagery			OC/OF
* video imagery			O:

**PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)**  
**Please consider needs for FYs 91-95.**

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC		NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - OFTEN
	- SUPERCOMP (SC)		

STATISTICS/  
DATA ANALYSIS:

* general stat analysis			OC/OF
* time series analysis			OF
* spatial distribution analysis			OF
* orientation data			OC/OF
- fractures			
- faults			
- stress fields			
- etc.			

MAPPING/  
CARTOGRAPHY:

* contouring			OC/OF
* import digital elev. data			OC/OF
* import other digital data			OC/OF
* base maps			OF
* perspective display			OF
* well and core hole locations			OC
* surface facilities			OC
* subsurface structure			OC/OF

GEOLOGIC CROSS  
SECTIONS:

* section construction			OC
* section display			OC
* section analysis (balancing, etc.)			OC

GEOGRAPHIC INFO.  
SYSTEMS:

			OF
--	--	--	----

COMPUTER AIDED  
DRAFTING AND  
DESIGN:

			OC
--	--	--	----

**PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)**  
**Please consider needs for FYs 91-95.**

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC - WORKSTATION (WS) - MAINFRAME (MF) - SUPERCOMP (SC)		NU - NOT USED OC - OCCASIONAL OF - OFTEN
-----			
DIGITAL IMAGE PROCESSING/ ANALYSIS:			
* landsat	_____	_____	<u>OC/OF</u>
* digital photo imagery	_____	_____	<u>OC/OF</u>
* petrographic image analysis	_____	_____	<u>NU</u>
* scanned bore hole imagery	_____	_____	<u>NU</u>
- bore hole televiewer	_____	_____	
- formation micro-scanner	_____	_____	
REFLEC/REFRAC SEISMIC:			
* display / analysis	_____	_____	<u>OC/OF</u>
* interpretation	_____	_____	<u>OC</u>
* mapping	_____	_____	<u>OC</u>
* merge with grav/mag	_____	_____	<u>OC</u>
GEOPHYSICAL LOG INTERP:			
* display / analysis	_____	_____	<u>OC</u>
* interpretation	_____	_____	<u>OC</u>
* correlation	_____	_____	<u>OC</u>
* mapping	_____	_____	<u>OC/OF</u>
GRAVITY/ MAGNETICS:			
* display	_____	_____	<u>OC</u>
* mapping	_____	_____	<u>OC/OF</u>
* overlay on surface geol	_____	_____	<u>OC/OF</u>
* merge with seismic	_____	_____	<u>OC/OF</u>
HYDROLOGY			
* data display	_____	_____	<u>OC</u>
* mapping	_____	_____	<u>OC</u>
* merge w/other data sets	_____	_____	<u>OC/OF</u>
GEOCHEMISTRY			
* data display	_____	_____	<u><del>OC</del> NU</u>
* mapping	_____	_____	<u>NU</u>
* merge w/other data sets	_____	_____	<u>NU</u>

PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)  
Please consider needs for FYs 91-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC		NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - OFTEN
	- SUPERCOMP (SC)		
.....			
.....			
VISUALIZATION: _____			
* interactive graphics			<u>OF</u>
* three-dimensional graphics			<u>OF</u>
* geometric rendering			<u>OC/OF</u>
* volume rendering			<u>OC</u>
* 3D geometric models			<u>OC/OF</u>
- solid			
- wire frame (mesh)			
MODELLING: _____			
* geohydrologic flow			<u>NU</u>
* transport			<u>NU</u>
- geochemical			
- heat			
* geological structure			<u>OF</u>
- 2D and 3D geometric			
- kinematic			
- dynamics / deformation mechanics			
* geophysical			<u>OC/OF</u>
- geomagnetic			
- gravity			
* chemical / molecular			<u>NU</u>
* meteorological			<u>OC</u>
- precipitation			
- weather patterns			
- global circulation			
APPLICATION DEVELOPMENT: _____			
* ARTIFICIAL INTELLIGENCE			<u>OC</u>
* EXPERT SYSTEMS			<u>OC</u>

PART TWO -- INVENTORY

DRAFT

Please circle the appropriate response or provide the requested information.

1. Do you have a personal computer (PC) in your office?  Yes  No

2. What type and model? IBM PC XT MODEL 286

3. If the answer to (1.) is 'No', is a PC available for your use at another location? Yes No. If 'Yes', where? N/A

4. Do you consider this location convenient? N/A Yes  No

5. Please answer the following questions about the PC system in your office available for your use: ?   
 ?

What size RAM (system memory)? 0.640 Mb.

Does it have a floppy disk (diskette) drive?  Yes  No. How many? 1

What size? 1.0Mb  2.0Mb

Does it have a hard disk drive?  Yes  No. What size? 20 Mb.

Does it have a math (floating point) coprocessor? Yes  No

What type of coprocessor? N/A

Is it linked to a mainframe?  Yes  No. What mainframe(s)? NRC/MV8000 INEL/CRAY

Is it on a Local Area Network (LAN)? Yes  No

Does it have an Ethernet card? Yes  No

OK

[ Can you access the CNWRA Program Architecture Support System (PASS)?  Yes  No

What model of monitor do you have? IBM PC COLOR DISPLAY

Is the monitor color or monochrome? COLOR

Do you have a printer?  Yes  No. What model? EPSON FX286e

Do you have a modem?  Yes  No. What model? AJ 2412-STH

Internal or  External  What baud (data trans rate)? UP TO 2400

OK

[ Do you have a pass word and user identification on either the NRC or a Southwest Research Inst. mainframe?  Yes  No

6. What applications software is currently installed on your PC?

BASIC, DBASE III PLUS, WORDPERFECT, LOTUS, CROSSTALK, SMARTERM, FORTRAN

↓

UKRAFT

PART TWO -- INVENTOR (cont.)

OK

- 7. Do you have access to a minicomputer workstation with 3-dimensional graphics capability?  Yes  No. What model? IBM 3179G  
Do you consider the location convenient?  Yes  No
  
- 8. Do you have access to a plotter?  Yes  No  
What model? IBM 6186  
Is the location convenient?  Yes  No
  
- 9. Do you have access to a digitizing table? Yes  No   
What model? N/A  
What computer is it attached to N/A  
What application do you use it with? N/A

SURVEY OF TECHNICAL COMPUTING REQUIRMENTS  
 GEOLOGIC SETTING PROGRAM ELEMENT  
 CENTER FOR NUCLEAR WASTE REGULATORY ANALYSIS  
 SOUTHWEST RESEARCH INSTITUTE

DRAFT

RESPONDENT'S NAME: FEHRINGER

TELEPHONE: 20426

PROFESSIONAL DISCIPLINE(S): HEALTH PHYSICS

PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do?  
 Please consider needs for FYs 91-95.

ACTIVITY	COMPUTING TIER	APPLICATION SOFTWARE	FREQUENCY OF USE
	- PC		NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - OFTEN
	- SUPERCOMP (SC)		

WORD PROCESSING: PC WORD PERFECT OF

DATA BASE ACCESS AND MANAGEMENT: \_\_\_\_\_

- \* relational DBMS \_\_\_\_\_
- \* access to SEPDB \_\_\_\_\_
- \* DOE/NNWSI RIDB (Reference Info. Data Base) \_\_\_\_\_
- \* USGS (US Geological Survey) \_\_\_\_\_
- \* NOAA (Nat. Oceanic Atm. Admin) \_\_\_\_\_
- \* NIST (Nat. Instit. Std & Tech) \_\_\_\_\_

PROJECT MANAGEMENT: \_\_\_\_\_

- \* AS \_\_\_\_\_

PROGRAM ARCH. SUPPORT SYSTEM: \_\_\_\_\_

- \* Sys. Reg. Analysis \_\_\_\_\_

SPREADSHEETS: \_\_\_\_\_

BUSINESS REPORTS/ GRAPHICS: PC HARVARD GRAPHICS OC

- \* flow charts \_\_\_\_\_
- \* organizational charts \_\_\_\_\_
- \* scheduling \_\_\_\_\_
- \* other charts \_\_\_\_\_
- \* data graphs \_\_\_\_\_

OTHER: PC or MF ? OF

- \* EVENT/FAULT TREE ANALYSIS

**PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)**  
 Please consider needs for FYs 90-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC - WORKSTATION (WS) - MAINFRAME (MF) - SUPERCOMP (SC)		NU - NOT USED OC - OCCASIONAL OF - OFTEN
.....			
.....			
<b>COMMUNICATION/ EMULATION:</b>			
* USNRC E-mail	_____	_____	_____
* CNWRA E-mail	_____	_____	_____
* USNRC-CNWRA E-mail	_____	_____	_____
* national network E-mail	_____	_____	_____
* PC Emulation of mainframe terminal:	_____	_____	_____
- IBM 3270			
- tgraf tektronix (VAX)			
- etc.			
<b>DISTRIBUTED COMPUTING / NETWORK OPS:</b>			
* ethernet	_____	_____	_____
* tcp/ip	_____	_____	_____
* modem	_____	_____	_____
* local area network (lan)	_____	_____	_____
<b>PLOTTING/HARD-COPY:</b>			
* dot-matrix	_____	_____	_____
* color	_____	_____	_____
* thermal	_____	_____	_____
* pen-plotting	_____	_____	_____
* raster	_____	_____	_____
* digital-analog film recording	_____	_____	_____
* video recording	_____	_____	_____
<b>DIGITIZATION:</b>			
* contour maps	_____	_____	_____
- digitizing tablet or table			
- contour to grid conversion			
- scanning			
* photographic imagery	_____	_____	_____
* video imagery	_____	_____	_____

**PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)**  
**Please consider needs for FYs 91-95.**

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC		NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - OFTEN
	- SUPERCOMP (SC)		
.....			
.....			
STATISTICS/ DATA ANALYSIS:	_____	_____	_____
* general stat analysis			_____
* time series analysis			_____
* spatial distribution analysis			_____
* orientation data			_____
- fractures			_____
- faults			
- stress fields			
- etc.			
MAPPING/ CARTOGRAPHY:	_____	_____	_____
* contouring			_____
* import digital elev. data			_____
* import other digital data			_____
* base maps			_____
* perspective display			_____
* well and core hole locations			_____
* surface facilities			_____
* subsurface structure			_____
GEOLOGIC CROSS SECTIONS:	_____	_____	_____
* section construction			_____
* section display			_____
* section analysis (balancing, etc.)			_____
GEOGRAPHIC INFO. SYSTEMS:	_____	_____	_____
COMPUTER AIDED DRAFTING AND DESIGN:	_____	_____	_____

**PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)**  
Please consider needs for FYs 91-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC - WORKSTATION (WS) - MAINFRAME (MF) - SUPERCOMP (SC)		NU - NOT USED OC - OCCASIONAL OF - OFTEN
.....			
.....			
DIGITAL IMAGE PROCESSING/ ANALYSIS:	_____	_____	_____
* landsat			_____
* digital photo imagery			_____
* petrographic image analysis			_____
* scanned bore hole imagery			_____
- bore hole televiewer			_____
- formation micro-scanner			_____
REFLEC/REFRAC SEISMIC:	_____	_____	_____
* display / analysis			_____
* interpretation			_____
* mapping			_____
* merge with grav/mag			_____
GEOPHYSICAL LOG INTERP:	_____	_____	_____
* display / analysis			_____
* interpretation			_____
* correlation			_____
* mapping			_____
GRAVITY/ MAGNETICS:	_____	_____	_____
* display			_____
* mapping			_____
* overlay on surface geol			_____
* merge with seismic			_____
HYDROLOGY	_____	_____	_____
* data display			_____
* mapping			_____
* merge w/other data sets			_____
GEOCHEMISTRY	_____	_____	_____
* data display			_____
* mapping			_____
* merge w/other data sets			_____

PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)  
Please consider needs for FYs 91-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC		NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - OFTEN
	- SUPERCOMP (SC)		

.....  
.....  
VISUALIZATION:

- |                              |       |       |       |
|------------------------------|-------|-------|-------|
| * interactive graphics       | _____ | _____ | _____ |
| * three-dimensional graphics | _____ | _____ | _____ |
| * geometric rendering        | _____ | _____ | _____ |
| * volume rendering           | _____ | _____ | _____ |
| * 3D geometric models        | _____ | _____ | _____ |
| - solid                      | _____ | _____ | _____ |
| - wire frame (mesh)          | _____ | _____ | _____ |

MODELLING:

- |                                    |       |       |       |
|------------------------------------|-------|-------|-------|
| * geohydrologic flow               | _____ | _____ | _____ |
| * transport                        | _____ | _____ | _____ |
| - geochemical                      | _____ | _____ | _____ |
| - heat                             | _____ | _____ | _____ |
| * geological structure             | _____ | _____ | _____ |
| - 2D and 3D geometric              | _____ | _____ | _____ |
| - kinematic                        | _____ | _____ | _____ |
| - dynamics / deformation mechanics | _____ | _____ | _____ |
| * geophysical                      | _____ | _____ | _____ |
| - geomagnetic                      | _____ | _____ | _____ |
| - gravity                          | _____ | _____ | _____ |
| * chemical / molecular             | _____ | _____ | _____ |
| * meteorological                   | _____ | _____ | _____ |
| - precipitation                    | _____ | _____ | _____ |
| - weather patterns                 | _____ | _____ | _____ |
| - global circulation               | _____ | _____ | _____ |

APPLICATION DEVELOPMENT:

- |                           |       |       |       |
|---------------------------|-------|-------|-------|
| * ARTIFICIAL INTELLIGENCE | _____ | _____ | _____ |
| * EXPERT SYSTEMS          | _____ | _____ | _____ |

PART TWO -- INVENTORY

DRAFT

Please circle the appropriate response or provide the requested information.

daily  
(+ weekly)  
inventory

1. Do you have a personal computer (PC) in your office?  Yes  No

2. What type and model? IBM PS 2 Model 30 286

3. If the answer to (1.) is 'No', is a PC available for your use at another location? Yes No. If 'Yes', where? \_\_\_\_\_

4. Do you consider this location convenient?  Yes  No

5. Please answer the following questions about the PC system in your office or available for your use: ? office

What size RAM (system memory)? DAMFINO - PROBABLY 512Kb ~~1Mb~~

Does it have a floppy disk (diskette) drive?  Yes  No. How many? 1

What size? 1.0Mb - 1.44Mb 2.0Mb

Does it have a hard disk drive?  Yes  No. What size? ? Mb.

Does it have a math (floating point) coprocessor?  Yes  No

What type of coprocessor? \_\_\_\_\_

Is it linked to a mainframe?  Yes  No. What mainframe(s)? \_\_\_\_\_

Is it on a Local Area Network (LAN)?  Yes  No

Does it have an Ethernet card?  Yes  No

OK

[ Can you access the CNWRA Program Architecture Support System (PASS)?  Yes  No

What model of monitor do you have? IBM PS2 COLOR DISPLAY

Is the monitor  color or monochrome? \_\_\_\_\_

Do you have a printer?  Yes  No. What model? EPSON FX-1050

Do you have a modem?  Yes  No. What model? \_\_\_\_\_

Internal or External? What baud (data trans rate)? \_\_\_\_\_

OK

[ Do you have a pass word and user identification on either the NRC or a Southwest Research Inst. mainframe?  Yes  No

6. What applications software is currently installed on your PC?

DISPLAY WRITE 4, BASIC, CROSSTALK, DBASE III, IBM 3270 EMULATION, LOTUS 123, FASTBACK

Y

**DRAFT**

**PART TWO -- INVENTORY (cont.)**

- OK [
7. Do you have access to a minicomputer workstation with 3-dimensional graphics capability? Yes  No. What model? \_\_\_\_\_  
Do you consider the location convenient? Yes No
8. Do you have access to a plotter? Yes  No  
What model? \_\_\_\_\_  
Is the location convenient? Yes No
9. Do you have access to a digitizing table? Yes  No  
What model? \_\_\_\_\_  
What computer is it attached to \_\_\_\_\_  
What application do you use it with? \_\_\_\_\_

SURVEY OF TECHNICAL COMPUTING REQUIREMENTS  
 GEOLOGIC SETTING PROGRAM ELEMENT  
 CENTER FOR NUCLEAR WASTE REGULATORY ANALYSIS  
 SOUTHWEST RESEARCH INSTITUTE

DRAFT

RESPONDENTS NAME: William H. Ford  
 TELEPHONE: 492-0506  
 PROFESSIONAL DISCIPLINE(S): Hydrogeologist

**PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do?  
 Please consider needs for FYs 91-95.**

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC		NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - OFTEN
	- SUPERCOMP (SC)		
	- Local Area Network (LAN)		

WORD PROCESSING: PC/LAN Word Perfect OC

DATA BASE ACCESS AND MANAGEMENT: PC/LAN/MF  OC

- \* relational DBMS
- \* access to SEPDB
- \* DOE/NNWSI RIDB (Reference Info. Data Base)
- \* USGS (US Geological Survey) PC - Alpha 4\*
- \* NOAA (Nat. Oceanic Atm. Admin) LAN - (3)
- \* NIST (Nat. Instit. Std & Tech) MF - (3)

PROJECT MANAGEMENT: PC/LAN  OC

\* AS

PROGRAM ARCH. SUPPORT SYSTEM: PC  NU

\* Sys. Reg. Analysis

SPREADSHEETS: PC/LAN Lotus equivalent OF

BUSINESS REPORTS/ GRAPHICS: PC/WS Surfer, Grapher OF

\* flow charts

\* organizational charts

\* scheduling

\* other charts

\* data graphs

\* Alpha 4 - ease of use, DBASE III compatible



**PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)**  
 Please consider needs for FYs 91-95.

ACTIVITY	COMPUTING TIER	APPLICATION SOFTWARE	FREQUENCY OF USE
	- PC - WORKSTATION (WS) - MAINFRAME (MF) - SUPERCOMP (SC)		NU - NOT USED OC - OCCASIONAL OF - OFTEN

**STATISTICS/  
DATA ANALYSIS:**

	<u>PC/WS</u>		<u>OC</u>
* general stat analysis			
* time series analysis		OC	
* spatial distribution analysis		OC	
* orientation data			
* fractures	?		
- faults			
- stress fields			
- etc.			

**MAPPING/  
CARTOGRAPHY:**

	<u>PC/WS</u>		<u>OF</u>
* contouring			
* import digital elev. data		OF	
* import other digital data			
* base maps			
* perspective display			
* well and core hole locations		OC	
* surface facilities			
* subsurface structure		OC	

**GEOLOGIC CROSS  
SECTIONS:**

	<u>PC/WS</u>		<u>OC</u>
* section construction			
* section display			
* section analysis (balancing, etc.)			

**GEOGRAPHIC INFO.  
SYSTEMS:**

	<u>PC/WS</u>	<u>USGS top map of Yucca Mt.</u>	<u>OC</u>

**COMPUTER AIDED  
DRAFTING AND  
DESIGN:**

	<u>PC/WS</u>		<u>?</u>

use to make grids(?)

Two types of graphic software needed.

- (1) PC ~~2D~~ Graphical, contour, & 3D display
- (2) WC sophisticated graphical displays.

This will see more frequent use, because there will be many more small model plots than large plots.

**PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)**  
 Please consider needs for FYs 91-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC - WORKSTATION (WS) - MAINFRAME (MF) - SUPERCOMP (SC)		NU - NOT USED OC - OCCASIONAL OF - OFTEN
.....			
.....			
DIGITAL IMAGE PROCESSING/ ANALYSIS:	<u>PC/WS</u>	_____	<u>NU</u>
* landsat			_____
* digital photo imagery			_____
* petrographic image analysis			_____
* scanned bore hole imagery			_____
- bore hole televiewer			
- formation micro-scanner			
REFLEC/REFRAC SEISMIC:	_____	_____	<del>NU</del> <u>NU</u>
* display / analysis			_____
* interpretation			_____
* mapping			_____
* merge with grav/mag			_____
GEOPHYSICAL LOG INTERP:	<u>PC/WS</u>	<u>(?)</u>	<u>OC</u>
* display / analysis			_____
* interpretation			_____
* correlation			_____
* mapping			_____
GRAVITY/ MAGNETICS:	_____	_____	<u>NU</u>
* display			_____
* mapping			_____
* overlay on surface geol			_____
* merge with seismic			_____
HYDROLOGY	<u>PC/WS</u>	_____	<u>OF</u>
* data display			_____
* mapping			_____
* merge w/other data sets			_____
GEOCHEMISTRY	<u>PC/WS</u>	_____	<u>OC</u>
* data display			_____
* mapping			_____
* merge w/other data sets			_____

PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)  
Please consider needs for FYs 91-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC		NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - OFTEN
	- SUPERCOMP (SC)		
.....			
.....			
VISUALIZATION:	<u>PC/WS</u>	_____	<u>OC</u>
* interactive graphics			_____
* three-dimensional graphics			_____
* geometric rendering			
* volume rendering			
* 3D geometric models			
- solid			
- wire frame (mesh)			
MODELLING:	<u>PC/WS</u>	_____	_____
* geohydrologic flow			<u>OF</u>
* transport			<u>OF</u>
- geochemical			
- heat			
* geological structure			<u>OC</u>
- 2D and 3D geometric			
- kinematic			
- dynamics / deformation mechanics			
* geophysical			<u>NU</u>
- geomagnetic			
- gravity			
* chemical / molecular			<u>OC</u>
* meteorological			<u>NU</u>
- precipitation			
- weather patterns			
- global circulation			
APPLICATION DEVELOPMENT:	_____	_____	<u>NU</u>
* ARTIFICIAL INTELLIGENCE			_____
* EXPERT SYSTEMS			_____

PART TWO -- INVENTORY

DRAFT

Please circle the appropriate response or provide the requested information.

Handwritten note: (to Sally) (small) inventory

1. Do you have a personal computer (PC) in your office?  Yes  No

2. What type and model? Compaq 386

3. If the answer to (1.) is 'No', is a PC available for your use at another location? Yes No. If 'Yes', where? \_\_\_\_\_

4. Do you consider this location convenient?  Yes  No

5. Please answer the following questions about the PC system in your office or available for your use: ?

What size RAM (system memory)? ~~2 megabyte~~ 1 megabyte Mb.

Does it have a floppy disk (diskette) drive?  Yes  No. How many? 1

What size? 1.0Mb \_\_\_\_\_ 2.0Mb \_\_\_\_\_ 1.2 Mb K

Does it have a hard disk drive?  Yes  No. What size? 160 Mb Mb.

Does it have a math (floating point) coprocessor?  Yes  No.

What type of coprocessor? Wyttek

Is it linked to a mainframe?  Yes  No. What mainframe(s)? All NRC

Computers through a modem

Is it on a Local Area Network (LAN)?  Yes  No

Does it have an Ethernet card?  Yes  No

OK

[ Can you access the CNWRA Program Architecture Support System (PASS)?  Yes  No

What model of monitor do you have? EGA, CGA, VGA, Compaq

Is the monitor color or monochrome? color

Do you have a printer?  Yes  No. What model? HP LASER SET Series II

Do you have a modem?  Yes  No. What model? Hayes

Internal or External? What baud (data trans rate)? 2400

OK

[ Do you have a pass word and user identification on either the NRC or a Southwest Research Inst. mainframe?  Yes  No

6. What applications software is currently installed on your PC?

SEE Attachment

Handwritten mark resembling a vertical line with a hook at the bottom.

PART TWO -- INVENTORY (cont.)

2K

- 7. Do you have access to a minicomputer workstation with 3-dimensional graphics capability?  Yes  No. What model? SUN in NRK (rental)  
Do you consider the location convenient?  Yes  No
- 8. Do you have access to a plotter?  Yes  No  
What model? HP Large bed.  
Is the location convenient?  Yes  No
- 9. Do you have access to a digitizing table?  Yes  No  
What model? \_\_\_\_\_  
What computer is it attached to \_\_\_\_\_  
What application do you use it with? \_\_\_\_\_

SURVEY OF TECHNICAL COMPUTING REQUIRMENTS  
 GEOLOGIC SETTING PROGRAM ELEMENT  
 CENTER FOR NUCLEAR WASTE REGULATORY ANALYSIS  
 SOUTHWEST RESEARCH INSTITUTE

DRAFT

RESPONDENTS NAME: JEFFREY POHLE  
 TELEPHONE: 301-492-0545  
 PROFESSIONAL DISCIPLINE(S): HYDROGEOLOGIST

PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do?  
 Please consider needs for FYs 91-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC		NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - OFTEN
	- SUPERCOMP (SC)		

WORD PROCESSING:	<u>PC</u>	<u>WORDPERACT</u>	<u>OF</u>
DATA BASE ACCESS AND MANAGEMENT:	<u>PC/MF</u>		
* relational DBMS			<u>NU</u>
* access to SEPDB			<u>OC</u>
* DOE/NNWSI RIDB (Reference Info. Data Base)			<u>OC</u>
* USGS (US Geological Survey)			<u>NU</u>
* NOAA (Nat. Oceanic Atm. Admin)			<u>NU</u>
* NIST (Nat. Instit. Std & Tech)			<u>NU</u>
PROJECT MANAGEMENT:	<u>PC</u>		<u>NU</u>
* AS			
PROGRAM ARCH. SUPPORT SYSTEM:	<u>PC</u>		<u>OC</u>
* Sys. Reg. Analysis			
SPREADSHEETS:	<u>PC</u>		<u>OF</u>
BUSINESS REPORTS/ GRAPHICS:	<u>PC</u>		<u>OF</u>
* flow charts			<u>OC</u>
* organizational charts			<u>NU</u>
* scheduling			<u>NU</u>
* other charts			<u>OC</u>
* data graphs			<u>OF</u>

**PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)**  
 Please consider needs for FYs 90-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC - WORKSTATION (WS) - MAINFRAME (MF) - SUPERCOMP (SC)		NU - NOT USED OC - OCCASIONAL OF - OFTEN
-----			
-----			
COMMUNICATION/ EMULATION:	<u>PC</u>		<u>OF</u>
* USNRC E-mail			
* CNWRA E-mail			
* USNRC-CNWRA E-mail			<u>OC</u>
* national network E-mail			<u>NU</u>
* PC Emulation of mainframe terminal:			<u>OF</u>
<u>IBM 3270</u>			
- tgraf tektronix (VAX) ✓			
- etc.			
DISTRIBUTED COMPUTING / NETWORK OPS:	<u>PC</u>		<u>OF</u>
* ethernet	} <i>USE WHAT I HAVE</i>		
* tcp/ip			
* modem			
* local area network (lan)			
PLOTTING/HARD- COPY:	<u>PC</u>		<u>OF</u>
* dot-matrix			<u>OF</u>
* color			<u>OC</u>
* thermal (ASe)			<u>OF</u>
* pen-plotting			<u>OC</u>
* raster ?			<u>NU</u>
* digital-analog film recording			<u>NU</u>
* video recording			<u>NU</u>
DIGITIZATION:	<u>PC</u>		<u>OC</u>
* contour maps			
- digitizing tablet or table			<u>OC</u>
- contour to grid conversion			<u>OC</u>
- scanning			
* photographic imagery			<u>NU</u>
* video imagery			<u>NU</u>

**PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)**  
 Please consider needs for FYs 91-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC		NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - OFTEN
	- SUPERCOMP (SC)		

STATISTICS/  
 DATA ANALYSIS: PC \_\_\_\_\_ OC

- \* general stat analysis OC
- \* time series analysis OC
- \* spatial distribution analysis OC
- \* orientation data OC
  - fractures
  - faults
  - stress fields
  - etc.

MAPPING/  
 CARTOGRAPHY: PC/MF/DA \_\_\_\_\_ OF

- \* contouring OF
- \* import digital elev. data OF
- \* import other digital data OF
- \* base maps OC
- \* perspective display OF
- \* well and core hole locations OF
- \* surface facilities NU
- \* subsurface structure OF

GEOLOGIC CROSS SECTIONS: PC/MF/DA \_\_\_\_\_ OF

- \* section construction OF
- \* section display OF
- \* section analysis (balancing, etc.) OC

GEOGRAPHIC INFO. SYSTEMS: ? \_\_\_\_\_ \_\_\_\_\_

COMPUTER AIDED DRAFTING AND DESIGN: \_\_\_\_\_ NU

**PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)**  
 Please consider needs for FYs 91-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC - WORKSTATION (WS) - MAINFRAME (MF) - SUPERCOMP (SC)		NU - NOT USED OC - OCCASIONAL OF - OFTEN
.....			
.....			
DIGITAL IMAGE PROCESSING/ ANALYSIS:	_____	_____	_____ <u>NU</u> _____
* landsat			_____
* digital photo imagery			_____
* petrographic image analysis			_____
* scanned bore hole imagery			_____
- bore hole televiewer			
- formation micro-scanner			
REFLEC/REFRAC SEISMIC:	_____	_____	_____ <u>NU</u> _____
* display / analysis			_____
* interpretation			_____
* mapping			_____
* merge with grav/mag			_____
GEOPHYSICAL LOG INTERP:	_____ <u>PC</u> _____	_____	_____ <del>NU</del> <u>OC</u> _____
* display / analysis			_____ <u>OC</u> _____
* interpretation			_____ <u>OC</u> _____
* correlation			_____ <u>OC</u> _____
* mapping			_____ <u>OC</u> _____
GRAVITY/ MAGNETICS:	_____ <u>PC</u> _____	_____	_____ <del>NU</del> <u>OC</u> _____
* display			_____ <u>OC</u> _____
* mapping			_____ <u>OC</u> _____
* overlay on surface geol			_____ <u>NU</u> _____
* merge with seismic			_____ <u>NU</u> _____
HYDROLOGY	_____ <u>PC</u> _____	_____	_____ <u>OF</u> _____
* data display			_____
* mapping			_____ <u>OF</u> _____
* merge w/other data sets			_____ <u>OF</u> _____
GEOCHEMISTRY	_____ <u>PC</u> _____	_____	_____ <u>OF</u> _____
* data display			_____ <u>OF</u> _____
* mapping			_____ <u>OF</u> _____
* merge w/other data sets			_____ <u>OF</u> _____

PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)  
Please consider needs for FYs 91-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC		NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - OFTEN
	- SUPERCOMP (SC)		

.....

.....

VISUALIZATION: PC/MF \_\_\_\_\_ OC  
 \* interactive graphics OC  
 \* three-dimensional graphics  
 \* geometric rendering  
 \* volume rendering  
 \* 3D geometric models  
 - solid  
 - wire frame (mesh)

MODELLING: PC/SC \_\_\_\_\_ OF  
 \* geohydrologic flow OF  
 \* transport OF  
 - geochemical  
 - heat  
 \* geological structure OC possibly  
 - 2D and 3D geometric  
 - kinematic  
 - dynamics / deformation mechanics  
 \* geophysical NU  
 - geomagnetic  
 - gravity  
 \* chemical / molecular NU  
 \* meteorological OC  
 - precipitation  
 - weather patterns  
 - global circulation

APPLICATION DEVELOPMENT: \_\_\_\_\_ NU  
 \* ARTIFICIAL INTELLIGENCE  
 \* EXPERT SYSTEMS

PART TWO -- INVENTORY

DRAFT

Please circle the appropriate response or provide the requested information.

OK  
(C) 1/11/85  
1/11/85

1. Do you have a personal computer (PC) in your office?  Yes  No

2. What type and model? IBM PS/2 MODEL 30 (286)

3. If the answer to (1.) is 'No', is a PC available for your use at another location? Yes No. If 'Yes', where? \_\_\_\_\_

4. Do you consider this location convenient? Yes No

5. Please answer the following questions about the PC system in your <sup>office</sup> or available for your use: ?

What size RAM (system memory)? 512K Mb.

Does it have a floppy disk (diskette) drive?  Yes  No. How many? ONE

What size? 1.0Mb \_\_\_\_\_ 2.0Mb \_\_\_\_\_ 1.44Mb

Does it have a hard disk drive?  Yes  No. What size? 20 Mb.

Does it have a math (floating point) coprocessor? Yes  No.

What type of coprocessor? \_\_\_\_\_

Is it linked to a mainframe?  Yes  No. What mainframe(s)?

VIA ANS CAN ACCESS INEL (CRAY/CYBER), NIH (IBM) ETC.

Is it on a Local Area Network (LAN)? Yes  No

Does it have an Ethernet card? Yes  No

OK

[ Can you access the CNWRA Program Architecture Support System (PASS)?  Yes  No

What model of monitor do you have? IBM PS/2 COLOR DISPLAY

Is the monitor color or monochrome? COLOR

Do you have a printer?  Yes  No. What model? EPSON FX-1050

Do you have a modem?  Yes  No. What model? ? HARD-WIRED TO NRC COMMUNICATION EQUIPMENT SOMEWHERE IN BUILDING  
Internal or External? What baud (data trans rate)? 9600

OK

[ Do you have a pass word and user identification on either the NRC or a Southwest Research Inst. mainframe? USE INEL CRAY Yes  No

6. What applications software is currently installed on your PC?

NRC → BASIC, dBASE III PLUS, CROSSTALK, DISPLAYWRITE 4, IBM 2370 SIMULATION, LOTUS 1-2-3, LOTUS WOV, FASTBACK

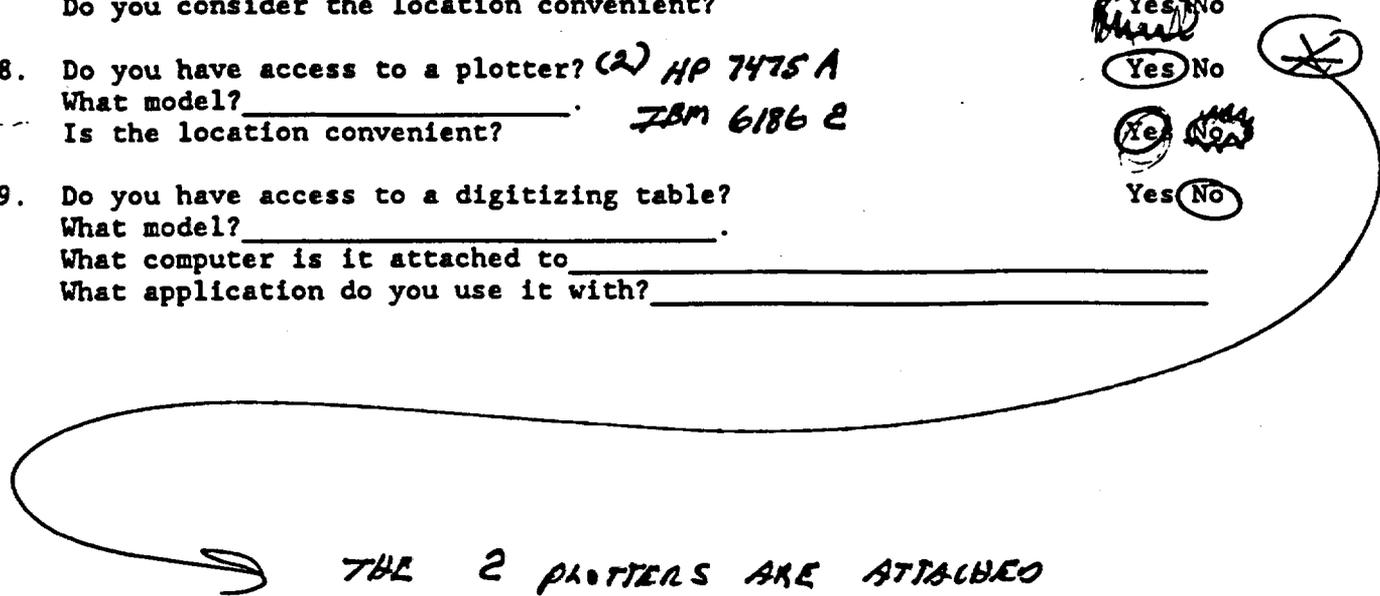
\*// ALSO HAVE KERMIT, SUPPLIED BY INEL AS COMMUNICATION SOFTWARE 6F CHOICE

THE KERMIT ON XTALK IS TO SIMPLIFIED TO CONFIGURE TO INEL'S CONFIGURATION, FILE ERROR-CHECKING WANT FUNCTION SO INEL HAS BEEN SUPPLYING USERS W/ THEIR KERMIT VERSION + CONFIG. FILE.

PART TWO -- INVENTORY (cont.)

- 7. Do you have access to a minicomputer workstation with 3-dimensional graphics capability? Yes  No  What model? \_\_\_\_\_  
Do you consider the location convenient?  Yes  No
- 8. Do you have access to a plotter? (2) HP 7475 A  Yes  No  
What model? \_\_\_\_\_ ZBM 6186 E  Yes  No  
Is the location convenient?  Yes  No
- 9. Do you have access to a digitizing table?  Yes  No  
What model? \_\_\_\_\_  
What computer is it attached to \_\_\_\_\_  
What application do you use it with? \_\_\_\_\_

JK



THE 2 PLOTTERS ARE ATTACHED  
TO "COMMON" AREA PC'S.  
GRAPHIC'S SOFTWARE ON THESE  
"COMMON" MACHINES IS LIMITED  
TO NON-EXISTANT.

SURVEY OF TECHNICAL COMPUTING REQUIRMENTS  
 GEOLOGIC SETTING PROGRAM ELEMENT  
 CENTER FOR NUCLEAR WASTE REGULATORY ANALYSIS  
 SOUTHWEST RESEARCH INSTITUTE

DRAFT

RESPONDENTS NAME: Tom Cardone  
 TELEPHONE: 20528  
 PROFESSIONAL DISCIPLINE(S): Geology

PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do?  
 Please consider needs for FYs 91-95.

ACTIVITY	COMPUTING TIER	APPLICATION SOFTWARE	FREQUENCY OF USE
	- PC		NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - OFTEN
	- SUPERCOMP (SC)		

WORD PROCESSING:      PC                      WP                      OF

DATA BASE ACCESS AND MANAGEMENT:

- \* relational DBMS
- \* access to SEPDB
- \* DOE/NNWSI RIDB (Reference Info. Data Base)
- \* USGS (US Geological Survey)
- \* NOAA (Nat. Oceanic Atm. Admin)
- \* NIST (Nat. Instit. Std & Tech)

OF  
OC

PROJECT MANAGEMENT:

- \* AS

PROGRAM ARCH. SUPPORT SYSTEM:

- \* Sys. Reg. Analysis

SPREADSHEETS:

BUSINESS REPORTS/ GRAPHICS:

- \* flow charts
- \* organizational charts
- \* scheduling
- \* other charts
- \* data graphs

**PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)**  
 Please consider needs for FYs 90-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC - WORKSTATION (WS) - MAINFRAME (MF) - SUPERCOMP (SC)		NU - NOT USED OC - OCCASIONAL OF - OFTEN
-----			
COMMUNICATION/EMULATION:			
* USNRC E-mail	<u>PC</u>	_____	_____
* CNWRA E-mail			<u>OC</u>
* USNRC-CNWRA E-mail			<u>OC</u>
* national network E-mail			_____
* PC Emulation of mainframe terminal:			_____
- IBM 3270			
- tgraf tektronix (VAX)			
- etc.			
DISTRIBUTED COMPUTING / NETWORK OPS:			
* ethernet	_____	_____	_____
* tcp/ip			_____
* modem			_____
* local area network (lan)			_____
PLOTTING/HARD-COPY:			
* dot-matrix	_____	_____	_____
* color			_____
* thermal			_____
* pen-plotting			_____
* raster			_____
* digital-analog film recording			_____
* video recording			_____
DIGITIZATION:			
* contour maps	_____	_____	_____
- digitizing tablet or table			<u>OF</u>
- contour to grid conversion			_____
- scanning			_____
* photographic imagery			_____
* video imagery			_____

**PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)**  
 Please consider needs for FYs 91-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC		NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - OFTEN
	- SUPERCOMP (SC)		
-----			
-----			
STATISTICS/ DATA ANALYSIS:	<u>PC-MF</u>	_____	_____
* general stat analysis		_____	_____
* time series analysis		_____	_____
* spatial distribution analysis		_____	_____
* orientation data		_____	<u>OF</u>
- fractures		_____	_____
- faults		_____	_____
- stress fields		_____	_____
- etc.		_____	_____
MAPPING/ CARTOGRAPHY:	<u>PC-MF</u>	_____	<u>OF</u>
* contouring		_____	<u>OF</u>
* import digital elev. data		_____	_____
* import other digital data		_____	_____
* base maps		_____	<u>OC</u>
* perspective display		_____	_____
* well and core hole locations		_____	<u>OF</u>
* surface facilities		_____	_____
* subsurface structure		_____	<u>OF</u>
GEOLOGIC CROSS SECTIONS:	<u>PC-MF</u>	_____	<u>OF</u>
* section construction		_____	<u>OF</u>
* section display		_____	<u>OF</u>
* section analysis (balancing, etc.)		_____	<u>OF</u>
GEOGRAPHIC INFO. SYSTEMS:	_____	_____	_____
COMPUTER AIDED DRAFTING AND DESIGN:	_____	_____	_____

**PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)**  
 Please consider needs for FYs 91-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC - WORKSTATION (WS) - MAINFRAME (MF) - SUPERCOMP (SC)		NU - NOT USED OC - OCCASIONAL OF - OFTEN
.....			
.....			
DIGITAL IMAGE PROCESSING/ ANALYSIS:	<u>PC-MF</u>	_____	_____
* landsat			_____
* digital photo imagery			_____
* petrographic image analysis			_____
* scanned bore hole imagery			<u>OF</u>
- bore hole televiewer			_____
- formation micro-scanner			_____
REFLEC/REFRAC SEISMIC:	_____	_____	_____
* display / analysis			_____
* interpretation			_____
* mapping			_____
* merge with grav/mag			_____
GEOPHYSICAL LOG INTERP:	_____	_____	_____
* display / analysis			_____
* interpretation			_____
* correlation			_____
* mapping			_____
GRAVITY/ MAGNETICS:	_____	_____	_____
* display			_____
* mapping			_____
* overlay on surface geol			_____
* merge with seismic			_____
HYDROLOGY	_____	_____	_____
* data display			_____
* mapping			_____
* merge w/other data sets			_____
GEOCHEMISTRY	_____	_____	_____
* data display			_____
* mapping			_____
* merge w/other data sets			_____

PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)  
Please consider needs for FYs 91-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC		NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - OFTEN
	- SUPERCOMP (SC)		

VISUALIZATION:

- |                              |       |       |       |
|------------------------------|-------|-------|-------|
| * interactive graphics       | _____ | _____ | _____ |
| * three-dimensional graphics | _____ | _____ | _____ |
| * geometric rendering        | _____ | _____ | _____ |
| * volume rendering           | _____ | _____ | _____ |
| * 3D geometric models        | _____ | _____ | _____ |
| - solid                      | _____ | _____ | _____ |
| - wire frame (mesh)          | _____ | _____ | _____ |

MODELLING:

- |                                    |                 |       |                 |
|------------------------------------|-----------------|-------|-----------------|
| * geohydrologic flow               | <u>PC</u> _____ | _____ | _____           |
| * transport                        | _____           | _____ | _____           |
| - geochemical                      | _____           | _____ | _____           |
| - heat                             | _____           | _____ | _____           |
| * geological structure             | _____           | _____ | <u>OF</u> _____ |
| - 2D and 3D geometric              | _____           | _____ | _____           |
| - kinematic                        | _____           | _____ | _____           |
| - dynamics / deformation mechanics | _____           | _____ | _____           |
| * geophysical                      | _____           | _____ | _____           |
| - geomagnetic                      | _____           | _____ | _____           |
| - gravity                          | _____           | _____ | _____           |
| * chemical / molecular             | _____           | _____ | _____           |
| * meteorological                   | _____           | _____ | _____           |
| - precipitation                    | _____           | _____ | _____           |
| - weather patterns                 | _____           | _____ | _____           |
| - global circulation               | _____           | _____ | _____           |

APPLICATION

DEVELOPMENT:

- |                           |       |       |       |
|---------------------------|-------|-------|-------|
| * ARTIFICIAL INTELLIGENCE | _____ | _____ | _____ |
| * EXPERT SYSTEMS          | _____ | _____ | _____ |

PART TWO -- INVENTORY

DRAFT

Please circle the appropriate response or provide the requested information.

1. Do you have a personal computer (PC) in your office?  Yes  No

2. What type and model? IBM PC XT

3. If the answer to (1.) is 'No', is a PC available for your use at another location? Yes No. If 'Yes', where? \_\_\_\_\_

4. Do you consider this location convenient?  Yes  No

5. Please answer the following questions about the PC system in your office or available for your use:

What size RAM (system memory)? 0.67 Mb.

Does it have a floppy disk (diskette) drive?  Yes  No. How many? 1

What size? 1.0Mb 2.0Mb

Does it have a hard disk drive?  Yes  No. What size? 20 Mb.

Does it have a math (floating point) coprocessor?  Yes  No

What type of coprocessor? \_\_\_\_\_

Is it linked to a mainframe?  Yes  No. What mainframe(s)? \_\_\_\_\_

Is it on a Local Area Network (LAN)? Yes  No

Does it have an Ethernet card? Yes  No

OK

[ Can you access the CNWRA Program Architecture Support System (PASS)?  
Yes No

What model of monitor do you have? PC Display

Is the monitor color or monochrome? Monochrome

Do you have a printer?  Yes  No. What model? \_\_\_\_\_

Do you have a modem?  Yes  No. What model? Use ANS

Internal or External? \_\_\_\_\_ What baud (data trans rate)? \_\_\_\_\_

OK

[ Do you have a pass word and user identification on either the NRC or a Southwest Research Inst. mainframe?  Yes  No

6. What applications software is currently installed on your PC?

Display, XTALK, DBase, 3270, LOTUS

only  
small  
minutes

?

Y

UKAF-1

PART TWO -- INVENTOR (cont.)

OK

- 7. Do you have access to a minicomputer workstation with 3-dimensional graphics capability? Yes  No  What model? \_\_\_\_\_  
Do you consider the location convenient? Yes No
- 8. Do you have access to a plotter?  Yes  No  
What model? \_\_\_\_\_  
Is the location convenient? Yes No
- 9. Do you have access to a digitizing table? Yes  No   
What model? \_\_\_\_\_  
What computer is it attached to \_\_\_\_\_  
What application do you use it with? \_\_\_\_\_



PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)  
Please consider needs for FYs 90-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC		NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - OFTEN
	- SUPERCOMP (SC)		

**DRAFT**

COMMUNICATION/  
EMULATION:

	<u>PC</u>	<u>XTALK</u>	<u>OC</u>
* USNRC E-mail			<u>OC</u>
* CNWRA E-mail			<u>NU</u>
* USNRC-CNWRA E-mail			<u>OC</u>
* national network E-mail			<u>OC</u>
* PC Emulation of mainframe terminal:			<u>OC</u>
- IBM 3270			
- tgraf tektronix (VAX)			
- etc.			

DISTRIBUTED  
COMPUTING /  
NETWORK OPS:

	<u>PC</u>	<u>?</u>	<u>OC</u>
* ethernet			<u>OC</u>
* tcp/ip			<u>OC</u>
* modem			<u>OC</u>
* local area network (lan)			<u>OC</u>

PLOTTING/HARD-  
COPY:

	<u>PC</u>	<u>?</u>	<u>OC</u>
* dot-matrix			<u>OC</u>
* color			<u>OC</u>
* thermal			<u>NU</u>
* pen-plotting			<u>OC</u>
* raster			<u>NU</u>
* digital-analog film recording			<u>OC</u>
* video recording			<u>NU</u>

DIGITIZATION:

	<u>PC</u>	<u>?</u>	<u>NU</u>
* contour maps			<u>NU</u>
- digitizing tablet or table			<u>NU</u>
- contour to grid conversion			<u>NU</u>
- scanning			<u>NU</u>
* photographic imagery			<u>NU</u>
* video imagery			<u>NU</u>

PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)  
Please consider needs for FYs 91-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC		NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - CF TEN
	- SUPERCOMP (SC)		

DRAFT

STATISTICS/  
DATA ANALYSIS:      PC      ?      OC

- \* general stat analysis      OC
- \* time series analysis      NU
- \* spatial distribution analysis      NU
- \* orientation data      NU
  - fractures
  - faults
  - stress fields
  - etc.

MAPPING/  
CARTOGRAPHY:      \_\_\_\_\_      \_\_\_\_\_      NU

- \* contouring      NU
- \* import digital elev. data      NU
- \* import other digital data      NU
- \* base maps      NU
- \* perspective display      NU
- \* well and core hole locations      NU
- \* surface facilities      NU
- \* subsurface structure      NU

GEOLOGIC CROSS SECTIONS:      \_\_\_\_\_      \_\_\_\_\_      NU

- \* section construction      NU
- \* section display      NU
- \* section analysis (balancing, etc.)      NU

GEOGRAPHIC INFO. SYSTEMS:      \_\_\_\_\_      \_\_\_\_\_      NU

COMPUTER AIDED DRAFTING AND DESIGN:      \_\_\_\_\_      \_\_\_\_\_      NU

PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)  
 Please consider needs for FYs 91-95.

**DRAFT**

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC		NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - OFTEN
	- SUPERCOMP (SC)		

DIGITAL IMAGE  
 PROCESSING/  
 ANALYSIS:

* landsat			NA
* digital photo imagery			NA
* petrographic image analysis			NA
* scanned bore hole imagery			NA
- bore hole televiewer			
- formation micro-scanner			

REFLEC/REFRAC  
 SEISMIC:

* display / analysis			NA
* interpretation			NA
* mapping			NA
* merge with grav/mag			NA

GEOPHYSICAL  
 LOG INTERP:

* display / analysis			NA
* interpretation			NA
* correlation			NA
* mapping			NA

GRAVITY/  
 MAGNETICS:

* display			NA
* mapping			NA
* overlay on surface geol			NA
* merge with seismic			NA

HYDROLOGY

* data display	PC	?	OC
* mapping			NA
* merge w/other data sets			NA

GEOCHEMISTRY

* data display			NA
* mapping			NA
* merge w/other data sets			NA

PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)  
 Please consider needs for FYs 91-95.

**DRAFT**

ACTIVITY	COMPUTING TIER	APPLICATION SOFTWARE	FREQUENCY OF USE
	- PC		NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - OFTEN
	- SUPERCOMP (SC)		

.....

.....

VISUALIZATION:	<u>PC/WS</u>	<u>?</u>	<u>OC</u>
* interactive graphics			<u>OC</u>
* three-dimensional graphics			
* geometric rendering			
* volume rendering			
* 3D geometric models			
- solid			
- wire frame (mesh)			

MODELLING:	<u>PC/WS/MF/SC?</u>	<u>?</u>	<u>OC</u>
* geohydrologic flow			<u>OC</u>
* transport			<u>OC</u>
- geochemical			
- heat			
* geological structure			<u>NU</u>
- 2D and 3D geometric			
- kinematic			
- dynamics / deformation mechanics			
* geophysical			<u>NU</u>
- geomagnetic			
- gravity			
* chemical / molecular			<u>NU</u>
* meteorological			<u>NU</u>
- precipitation			
- weather patterns			
- global circulation			

APPLICATION DEVELOPMENT:			<u>NU</u>
* ARTIFICIAL INTELLIGENCE			<u>NU</u>
* EXPERT SYSTEMS			<u>NU</u>

? FORTRAN COMPILER?

PART TWO -- INVENTORY

Please circle the appropriate response or provide the requested information.

**DRAFT**

1. Do you have a personal computer (PC) in your office? Yes  No
2. What type and model? \_\_\_\_\_
3. If the answer to (1.) is 'No', is a PC available for your use at another location?  No. If 'Yes', where? FROM Tom NICHOLSON
4. Do you consider this location convenient? Yes  No
5. Please answer the following questions about the PC system in your or available for your use:

What size RAM (system memory)? 640 Kb. ~~Mb.~~  
Does it have a floppy disk (diskette) drive?  Yes No. How many? 1  
What size? 1.2Mb ~~X~~ 2.0Mb  
Does it have a hard disk drive?  Yes No. What size? 20 Mb.  
Does it have a math (floating point) coprocessor? Yes  No  
What type of coprocessor? \_\_\_\_\_  
Is it linked to a mainframe? Yes  No What mainframe(s)? \_\_\_\_\_

Is it on a Local Area Network (LAN)? Yes  No  
Does it have an Ethernet card? Yes  No  
Can you access the CNWRA Program Architecture Support System (PASS)? Yes  No

What model of monitor do you have? COMPAQ Dual mode Plasma display  
Is the monitor color or monochrome? MONO

Do you have a printer?  Yes No. What model? EPSON LQ510

Do you have a modem?  Yes No. What model? COMPAQ  
 Internal or External? What baud (data trans rate)? 2400

Do you have a pass word and user identification on either the NRG or a Southwest Research Inst. mainframe? Yes  No

6. What applications software is currently installed on your PC?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

PART TWO -- INVENTORY (cont.)

7. Do you have access to a minicomputer workstation with 3-dimensional graphics capability? Yes  No  What model? \_\_\_\_\_  
Do you consider the location convenient? Yes No
8. Do you have access to a plotter?  Yes  No  
What model? HP 7475  
Is the location convenient? Yes No
9. Do you have access to a digitizing table? Yes  No   
What model? \_\_\_\_\_  
What computer is it attached to \_\_\_\_\_  
What application do you use it with? \_\_\_\_\_

**DRAFT**

SURVEY OF TECHNICAL COMPUTING REQUIREMENTS  
 GEOLOGIC SETTING PROGRAM ELEMENT  
 CENTER FOR NUCLEAR WASTE REGULATORY ANALYSIS  
 SOUTHWEST RESEARCH INSTITUTE

STEVES:  
 Detailed  
MEMO'S ATTACHED

RESPONDENTS NAME: Ronald H. Martin

TELEPHONE: 512-522-5541

PROFESSIONAL DISCIPLINE(S): Geoscience Support (Numerical Analyses, Publication Quality Graphics, Software Engineering, UNIX+VMS+MAC)

PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? "System Management"  
 Please consider needs for FYs 91-95.

ACTIVITY	COMPUTING TIER	APPLICATION SOFTWARE	FREQUENCY OF USE
	- PC - WORKSTATION (WS) - MAINFRAME (MF) - SUPERCOMP (SC)		NU - NOT USED OC - OCCASIONAL OF - OFTEN
WORD PROCESSING:	<u>(MAC)</u> <u>PC/MF(VAX)</u>	<u>WORDY/TPU</u>	<u>OF</u>
DATA BASE ACCESS AND MANAGEMENT:	<u>(VAX)</u>	<u>INGRES</u>	<u>OC</u>
* relational DBMS			<u>NU</u> ?
* access to SEPDB			<u>OC</u>
* DOE/MNWSI RIDB (Reference Info. Data Base)			<u>NU</u>
* USGS (US Geological Survey)			<u>NU</u>
* NOAA (Nat. Oceanic Atm. Admin)			<u>NU</u>
* NIST (Nat. Instit. Std & Tech)			<u>NU</u> } yet?
PROJECT MANAGEMENT:			<u>NU</u>
* AS			
PROGRAM ARCH. SUPPORT SYSTEM:	<u>PC(MAC)</u>	<u>CrocketGraph</u>	<u>OC</u>
* Sys. Reg. Analysis			
SPREADSHEETS:	<u>PC(MAC)</u>	<u>CrocketGraph</u>	<u>OC</u>
BUSINESS REPORTS/ GRAPHICS:	<u>VAX</u>	<u>INDEX</u> <u>NCAR</u>	<u>OC</u>
* flow charts			<u>OC</u>
* organizational charts			
* scheduling			
* other charts			
* data graphs			<u>CONTOUR, 3D OF NCAR OF</u>

PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)  
Please consider needs for FYs 90-95.

ACTIVITY	COMPUTING TIER	APPLICATION SOFTWARE	FREQUENCY OF USE
	- PC		NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - OFTEN
	- SUPERCOMP (SC)		

COMMUNICATION/  
EMULATION:

- \* USNRC E-mail
- \* CNWRA E-mail
- \* USNRC-CNWRA E-mail
- \* national network E-mail
- \* PC Emulation of mainframe terminal:
  - IBM 3270
  - tgraf tektronix (VAX)
  - etc.

PC(MAC)

NCSA TELNET/  
Stanford U. IP

OF

NU

NU

NU

OF

OF

vt100/vt102/TEK 4014  
TEK 4105

DISTRIBUTED  
COMPUTING /  
NETWORK OPS:

- \* ethernet
- \* tcp/ip
- \* modem
- \* local area network (lan) - [App/STalk]

PC(MAC)

NCSA TELNET/  
Stanford U. IP

OF

OF

OF

OF

OF

DISPERA  
CAUSE TCP.  
Reason  
Ethernet  
here.

PLOTTING/HARD-  
COPY:

- \* dot-matrix
- \* color
- \* thermal
- \* pen-plotting
- \* raster
- \* digital-analog film recording
- \* video recording

PC(MAC)  
(Aniqa)

NCSA TELNET/  
NCAR/Honegroun,

OF

NU

OC

OC

OC

OC

DIGITIZATION:

- \* contour maps
  - digitizing tablet or table
  - contour to grid conversion
  - scanning
- \* photographic imagery
- \* video imagery

PC(Aniqa)

NEWTEK 2.0  
(DogeVIEW)

OC

NU

NU

OC

OC

Dealup  
to VAX  
(at night)

PC(Aniqa)

vt100/TEK4105  
Emulation  
(Public Domain)

OF

PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)  
 Please consider needs for FYs 91-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC - WORKSTATION (WS) - MAINFRAME (MF) - SUPERCOMP (SC)		NU - NOT USED OC - OCCASIONAL OF - OFTEN
-----			
STATISTICS/ DATA ANALYSIS:	<u>PC/WS/MF(VAX)</u>	<u>VARIOUS + Homegrown</u>	<u>OF</u> <u>OC</u> <u>OC</u>
* general stat analysis			<u>OF</u>
* time series analysis			<u>OC</u>
* spatial distribution analysis			<u>OF</u>
* orientation data			<u>OC</u>
- fractures			
- faults			
- stress fields			
- etc.			
MAPPING/ CARTOGRAPHY:	<u>VAX (MF)</u>	<u>NCAR</u>	<u>OF</u> <u>OF</u> <u>NU</u> <u>OC</u> <u>OC</u> <u>OC</u>
* contouring			<u>OC</u>
* import digital elev. data			<u>NU</u>
* import other digital data			<u>OC</u>
* base maps			<u>OC</u>
* perspective display			<u>OC</u>
* well and core hole locations			<u>OC</u>
* surface facilities			<u>NU</u>
* subsurface structure			<u>OC</u>
GEOLOGIC CROSS SECTIONS:	<u>VAX / CRAY MF/SC</u>	<u>VARIOUS + Homegrown NO NCAR</u>	<u>OC</u> <u>OC</u> <u>NU</u> <u>NU</u>
* section construction			<u>OC</u>
* section display			<u>OC</u>
* section analysis (balancing, etc.)			<u>NU</u>
GEOGRAPHIC INFO. SYSTEMS:		<u>- NONE -</u>	<u>NU</u>
COMPUTER AIDED DRAFTING AND DESIGN:		<u>- NONE -</u>	<u>NU</u>

**PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)**  
Please consider needs for FYs 91-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC		NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - OFTEN
	- SUPERCOMP (SC)		

DIGITAL IMAGE

PROCESSING/

ANALYSIS:

- \* landsat
- \* digital photo imagery
- \* petrographic image analysis
- \* scanned bore hole imagery
  - bore hole televiewer
  - formation micro-scanner

REFLEC/REFRAC

SEISMIC:

- \* display / analysis
- \* interpretation
- \* mapping
- \* merge with grav/mag

GEOPHYSICAL

LOG INTERP:

- \* display / analysis
- \* interpretation
- \* correlation
- \* mapping

GRAVITY/

MAGNETICS:

- \* display
- \* mapping
- \* overlay on surface geol
- \* merge with seismic

HYDROLOGY

- \* data display
- \* mapping
- \* merge w/other data sets

GEOCHEMISTRY

- \* data display
- \* mapping
- \* merge w/other data sets

*NOT MY AREA  
of general  
EXPERTISE,  
skipped.*

*VAX/MAC/Amiga  
PostScript*

*VARIOUS*

*OF  
OC*

*VAX/MAC/PostScript*

*VARIOUS*

*OF  
OF  
OC  
OF*

PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)  
Please consider needs for FYs 91-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC		NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - OFTEN
	- SUPERCOMP (SC)		

.....

.....

VISUALIZATION: Mac/VAX/Amiga VARIOUS OF  
 \* interactive graphics GUI/SC/ OF  
 \* three-dimensional graphics PostScript PREPARERS  
 \* geometric rendering  
 \* volume rendering  
 \* 3D geometric models  
 - solid  
 - wire frame (mesh)  
ALL are OF (often)

MODELLING: VAX/SC Bigflo OF  
 \* geohydrologic flow funflo OF  
 \* transport McTuff (TOUGH) OF  
 - geochemical  
 - heat  
 \* geological structure EQ6/3 etc OF  
 - 2D and 3D geometric  
 - kinematic  
 - dynamics / deformation mechanics  
 \* geophysical (Other Public Domain Codes) OF  
 - geomagnetic  
 - gravity  
 \* chemical / molecular OF

\* meteorological  
 - precipitation  
 - weather patterns  
 - global circulation  
Possible, but not familiar with these.

APPLICATION DEVELOPMENT: VAX/SC TIDY, INDEX, REWIND, FLINT/VARIOUS OF  
 \* ARTIFICIAL INTELLIGENCE FPRETTY, STRUCT NO  
 \* EXPERT SYSTEMS NO  
 \* CASE tools (Computer Aided) OF  
Software Engin

PART TWO -- INVENTORY

Please circle the appropriate response or provide the requested information.

1. Do you have a personal computer (PC) in your office? ONE THAT IS NOT MY PREFERENCE  Yes  No

2. What type and model? ONE I DON'T LIKE (MAC-II)

If the answer to (1.) is 'No', is a PC available for your use at another location? Yes  No. If 'Yes', where? \_\_\_\_\_

Do you consider this location convenient? Yes  No

5. Please answer the following questions about the PC system in your or available for your use:

What size RAM (system memory)? 6-8 MEG Mb.

Does it have a floppy disk (diskette) drive?  Yes  No. How many? ONE

What size? 1.0Mb \_\_\_\_\_ 2.0Mb

Does it have a hard disk drive?  Yes  No. What size? 40 MEG Mb.

Does it have a math (floating point) coprocessor?  Yes  No.

What type of coprocessor? 68881

Is it linked to a mainframe?  Yes  No. What mainframe(s)? ALL VIA THE INTERNET.

Is it on a Local Area Network (LAN)? LOCAL?? I CAN JUMP Yes  No  IP

Does it have an Ethernet card? All over the US + Europe Yes  No  Internet

Can you access the CNWRA Program Architecture Support System (PASS)? WHAT IS PASS? Yes  No

What model of monitor do you have? MONO CHROM APPLE SOMETHING

Is the monitor color or monochrome? MONO

Do you have a printer?  Yes  No. What model? SHARED LASER WRITER

Do you have a modem? Yes  No  What model? \_\_\_\_\_  
Internal or External? What baud (data trans rate)? \_\_\_\_\_

Do you have a pass word and user identification on either the NRC or a Southwest Research Inst. mainframe? on VAX Yes  No

6. What applications software is currently installed on your PC?

On the (NCSA-TELNET, WORD4, Stanford Univ, IP, NCSA-ImageTool, MAC-IE) CRICKET-GRAPH, FTP (NCSA), Adobe Illustrator, METAPOST

On the ArcaA { VI (for an editor), EMACS (Alternate Editor/WP), DRAW (Ages. D. PAINT II, Sculpt-3D (polygon modelling), Middlemon II (for VT100/TEK4105 emulation via serial link), and other tools for GENERAL telecommunications.

PART TWO -- INVENTORY (cont.)

7. Do you have access to a minicomputer workstation with 3-dimensional graphics capability?  Yes No. What model? AMIGA 2000 (PERSONAL PROPERTY)  
Do you consider the location convenient?  Yes No
8. Do you have access to a plotter?  Yes No  
What model? HP7574 (OR RENTED) MAYBE  
Is the location convenient? Yes No →?
9. Do you have access to a digitizing table? Yes  No  
What model? \_\_\_\_\_  
What computer is it attached to \_\_\_\_\_  
What application do you use it with? \_\_\_\_\_

↓  
i.e. IS THE THING EVEN AVAILABLE??

MORE

(a) What about USNET ACCESS?  
(also UUNET)

How CAN ONE do YOUR job  
(also UUNET)  
without ACCESS to USNET?

(b) Why can't TOPS/PROF's SEND +  
RECEIVE INTERNET MAIL? What good  
IS AN OFFICE AUTOMATION PACKAGE  
like that? Talk to itself?

Memo

-----  
To: Steve Young, John Russell  
From: Ronald H. Martin *RHM*  
Date: 06-June-90  
Subject: Thoughts for the Five year computer plan.

## Why PostScript for our graphics and print needs in Div #20?

### Short Answer:

Because PostScript is the only laser printer control language that offers output of graphics, half-toned photographs, and a broad range of fonts, ALL IN ONE DEVICE.

### Background:

Quoting from "PostScript, Language Tutorial and Cookbook" by Adobe Systems:

"The PostScript language is a [page description metafile] programming language designed to convey a description of virtually any desired page to a [laser] printer [or film recorder, or raster display]. It possesses a wide range of [text and] graphic operators that may be combined in any manner."

PostScript is DEVICE INDEPENDENT by design, yet specifically addresses the vast majority of concepts encountered in modern graphics and printing. For example a PostScript page description metafile can:

- (1) print a digitized aerial photograph of a survey area.
- (2) print an overlay of an appropriate contour map of the survey area.
- (3) print text and equations for captions or inline discussion of the survey sight.
- (4) print in any of the above in almost any color (given a color output device).

And execute/print/view the example above on:

- (a) a desktop printer costing about \$3000.00, with 300 dots per inch resolution,
- (b) a publications quality Linotronic (the Institute has one I use periodically in publications [\$2.00 per page]) at photographic quality resolutions (1200 and 2500 dots per inch. Output from the Linotronic can go directly to offset press for bulk printing requirements.)
- (c) a 35mm PostScript slide/film recorder (publications also has one of these), or
- (d) a monitor screen for computers that support a PostScript rendering displays (Such as the Silicon Graphics running "4Sight", or Sun's running "NeWS").

The PostScript metafiles are 100% ascii, which means page descriptions, text, plots, and elaborate font-type may be shared in correspondence either by disk or electronic mail. Most wordprocessing programs (that print to PostScript printers) support import of other PostScript page descriptions. Thus one may add a digitized image, graph, or special font-based output to a document from electronic mail or diskette sources (want a demo? I will put one together with your picture).

(more)

### **The Future:**

The trend in computers and computer aided printing has strongly tended toward ever increasing raster resolution. PostScript is an ideal METAFILE language to overcome DEVICE DEPENDENCE we see in wordprocessing and graphics printing. A set of software using PostScript that prints to a 300 dot per inch printer today will be able to print to any future resolution device that may be implemented (including infinite). This is possible, because PostScript concerns itself with an IDEAL page, and leaves the task of rendering the IDEAL page to the print engine.

Further, the trend in computing is toward SHARED PERIPHERALS -- buying the kind of personal computer people are comfortable with (i.e. Bill Murphy and his Mac's), yet sharing expensive laser printers and plotters (example: there are now three machines sharing "Bill Murphy's" LaserWriter).

The process of SHARED PERIPHERALS like printers/plotters has been occurring in Div #15 without their realizing it -- many PC users are offloading their printing/plotting costs to Div #15 overhead by using the printers attached to the VAX (which is maintained thru overhead funds).

### **Recommendations:**

During the next five years, I would strongly encourage the purchase of an EtherNet attached PostScript printer -- a printer that anyone can use to print from their PC, Workstation, VAX, Cray, or main-frame via the EtherNet. Thus text and graphics output will be available to everyone, regardless of the type of Personal Computer, Workstation, or supercomputer they chose to purchase/use.

By accident or design, collection and sharing of devices such as laser printers will occur. There is danger of incurring hidden overhead costs like Div #15 is experiencing with their VAX. It might be wise if the collection and cost sharing process happened with a little design and forethought.

(This document was printed with a PostScript LaserWriter).

Memo

-----  
To: Steve Young, John Russell  
From: Ronald H. Martin *RHM*  
Date: 06-June-90  
Subject: Thoughts for the Five year computer plan.

### **X-Windows Hardware and Software for Div #20.**

What is the "X-Window" system? X-Windows ("X" for short) is a public domain standard developed by MIT (in collaboration with many major hardware vendors) to develop and establish a protocol that allows mini-computers, main-frames, and super-computers to communicate with "super-smart" high resolution terminals and workstations over an EtherNet. X's intended purpose is, in effect, to provide the user a "super-computer on your desk" without the hardware cost of the supercomputer. The user has access to all the graphics and number crunching power of his/her supercomputer, but with a windowing and graphics capability strongly resembling the Mac. The supercomputer may be only hundreds of yards away, or thousands of miles away (I am currently doing work for Rachid on a machine in the San Francisco Bay area -- and our interaction is just like the supercomputer was next door).

#### **Justification:**

Ideally, if adequate X-Windows Hardware and Software existed within Div #20, and sufficient communications access to remote hosts existed, we would not need to purchase further workstations (I am not against the SGI workstation purchase, but I do believe it is important to point out alternatives). The lack of highly interactive graphics hardware and software encourages people to seek out and purchase their own (possibly incompatible) systems (i.e. the SGI to support Rachid's efforts, Bill Murphy and his Macs to support the geochemistry) [here again, I am not against the Mac's, but am attempting to point out a reason for the fragmentation in hardware choices].

#### **Goals:**

Specifically, I would like to see a greater availability of "X" hardware/software for access to supercomputers and other remote hosts. At this time, I have software available for code and graphics development, **THAT I CANNOT USE** on the Cray-2 at NASA Ames. Availability of "X" equipment would greatly aid the code/graphics development and maintenance for Rachid's Stochastic project, the Stochastic related IR project (20-9615), and possibly performance assessment and thermal hydrology -- if we later obtain accounts on the Crays in Idaho.

#### **Recommendations:**

Initially, acquisition of dedicated X terminal or X-terminal emulation software (for the SGI? Comes built in?) could provide a "soft start" -- providing us a platform to test the viability of X-Window connections, bandpass health of the network, and compatibility of client software on the supercomputers and remote hosts.

We have already tested X-window viability in a minimal sort of way. Ed Perez of the CCF brought over a set of X-Windows emulation software for the PS/2, and we were able to maintain minimal connects between the PS/2 and a PC running UNIX/X-Windows in Div #15. We found that the PS/2 software was not serviceable. However, in recent conversations with two of the people I know who maintain X-Windows hardware/software for a living, I understand that some big name companies (HP is one) have given up on software emulation of X-Windows for the PS/2 (due to speed problems), and have gone to a hardware solution.

Memo

-----  
To: Steve Young, John Russell  
From: Ronald H. Martin  
Date: 15-June-90  
Subject: Thoughts for the Five year computer plan.

**CASE Tools for Fortran77 Software MAINTENANCE, installation, and development for Div #20 codes.**

What are CASE tools? CASE stands for "Computer Aided Software Engineering" -- a fancy way of saying "Fortran Software Tools" for your software "tool box".

**Background:**

My activity here at SwRI is basically the same as your local auto mechanic. People drag in their crippled, broken-down old Fortran codes, and I attempt to "patch" them up for "just one more run".

Being the local Fortran Mechanic, I find it terribly debilitating that the institute does not support a basic toolbox of Fortran maintenance and development tools on the CCFVAX. Fully 60% of my activity, since coming to this division, and 100% of my activity in the former division, has been a effort to correct design flaws in the Fortran code generated by well intended, technically competent individuals who lacked a basic understanding of how to assemble Fortran codes in a maintainable fashion. I have "patched" (note that I did not say "fixed") several of these codes. Some of these codes use design and coding constructs that are not only "bad", but down-right pathological. The situation is exacerbated by using the Fortran language which is notorious for letting users get away with constructs that are self carcinogenic (examples? implicit variable declaration, uninitialized variables, multiple entry points, use of statement labels (and in random number order!)... [need I go on?]).

Plus there is an incredible "reinvented here" mentality for every software modelling project--- every scientist drags in their own set of software models and tools. I recognize that many of the models and data reduction situations are novel, and need custom code to be implemented. But there is great room for using a few "off the shelf" software tools.

**Justification:**

The situation with most Fortran codes can best be understood thru an analogy.

Sometime during the dark ages, monks toiling away copying books developed a uniform format for laying out text (introduction, contents, chapters, sections, paragraphs, sentences, glossary, index, ... that sort of thing). Books can be viewed as simple, linear programs that leads the reader thru a set of information. Information in one chapter builds upon information in previous chapters.

Computer software is a sort of "reference book", with knowledge built into the flow structure. Most people code (build) this knowledge structure WITHOUT A UNIFORM FORMAT -- books without chapters, indexes, contents, or paragraphs. The upshot is a situation where every code has a "personality" -- it strongly reflects the person who implemented it. The situation is so bad, that I have been able to identify the author of various code segments simply looking at the style.

While it is almost impossible to "unwind" these codes to correct their design and construction difficulties, it is possible to have CASE tools that alleviate the situation quickly and efficiently.

For example (and in desperation) I handed off the TOUGH code to a former co-worker in Los Alamos so she could process the source thru a utility they have there called TIDY. TIDY renumbers randomly ordered statement labels into sequential order -- thus inducing some gradient information into the spaghetti of gotos (imagine mother nature without force gradients to sort physical processes, then you can imagine what a computer program with a spaghetti's nest of gotos is like).

### **Recommendations:**

Acquisition of dedicated CASE tools for or on the CCFVAX consisting of:

- (1) FLINT - Fortran "lint" utility similar to the industry standard utility "lint" used by people engaged in C software development. The "lint" utility is particularly picky about variable declarations , argument passing, etc.
- (2) Porting and installation of TIDY (mentioned above) to the CCFVAX.
- (3) Casual access to a BSD 4.3 UNIX machine that supports the RATFOR utility "struct" . In concert with FLINT, TIDY, and FPRETTY (already on the CCFVAX), "struct" is very useful for cleaning up the flow control in old codes.

Memo

-----  
To: Steve Young, John Russell  
From: Ronald H. Martin *RHM*  
Date: 06-June-90  
Subject: Thoughts for the Five year computer plan.

**Why should Div #20 consider video animation capability in it's graphics/display efforts?**

**The Threat: NOVA is coming to shoot footage for a show? (Oh, no!)**

What if NOVA does come to town? What if NOVA or FrontLine, or some other documentary series came to collect footage regarding the high-level nuclear waste disposal issues? Will Div #20 be caught flat-footed, and miss a golden opportunity to share it's expertise with a lay audience? And recall, a voting lay audience.

Modern mass media relies heavily on ANIMATED images -- images that change in time. Whether this is real world footage or stop-motion sequences from a large computer model (say propagation of a pollution plume thru soil or rock) -- the source is unimportant -- the animation is important.

Human perception is driven by motion. We experience 3D object in full by moving around them, and/or watching their shape evolve with time. The only adequate way to experience a 3D computer model is to ANIMATE it in time -- show the pollution plume propagation both by moving around it in a 3d projected sequence, and showing its growth in time.

I would like to urge some consideration of video animation of computer models (and other aspects of Div #20 activity I have not thought of?) over the next five years -- and the purchase some hardware to support it.

Video may make just the splash that is needed to drive some important point home, especially if we "just happen to have " the correct footage "ready to roll" in the bottom desk drawer. (Imagine how convenient this is for a producer trying to fill an hour show) Such a set of tapes may prove themselves priceless in illustrating one or more key issues of our activity.

SURVEY OF TECHNICAL COMPUTING REQUIREMENTS  
 GEOLOGIC SETTING PROGRAM ELEMENT  
 CENTER FOR NUCLEAR WASTE REGULATORY ANALYSIS  
 SOUTHWEST RESEARCH INSTITUTE

RESPONDENTS NAME: NARASI SRIDHAR

TELEPHONE: 512-522-5538

PROFESSIONAL DISCIPLINE(S): CORROSION, METALLURGY, ELECTROCHEMISTRY

.....  
 .....

**PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do?**  
 Please consider needs for FYs 91-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC		NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - OFTEN
	- SUPERCOMP (SC)		

.....  
 .....

WORD PROCESSING: PC DW4 Word Perfect OF

DATA BASE ACCESS AND MANAGEMENT: PC, WS dbase IV OF

\* relational DBMS NU

\* access to SEPDB OC

\* DOE/NNWSI RIDB (Reference Info. Data Base) NU

\* USGS (US Geological Survey) NU

\* NOAA (Nat. Oceanic Atm. Admin) NU

\* NIST (Nat. Instit. Std & Tech) OF

PROJECT MANAGEMENT: WS AS OC

\* AS

PROGRAM ARCH. SUPPORT SYSTEM: NU

\* Sys. Reg. Analysis

SPREADSHEETS: ~~PC~~ PC Lotus OF

BUSINESS REPORTS/ GRAPHICS: ~~PC~~ PC Not yet determined

\* flow charts OC

\* organizational charts NU

\* scheduling OC

\* other charts OC

\* data graphs OF

**PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)**  
**Please consider needs for FYs 90-95.**

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC		NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - OFTEN
	- SUPERCOMP (SC)		
.....			
.....			
<b>COMMUNICATION/EMULATION:</b>			
* USNRC E-mail			OF
* CNWRA E-mail			OF
* USNRC-CNWRA E-mail			OF
* national network E-mail			OC
* PC Emulation of mainframe terminal:			OC
- IBM 3270			
- tgraf tektronix (VAX)			
- etc.			
<b>DISTRIBUTED COMPUTING / NETWORK OPS:</b>			
* ethernet			OF
* tcp/ip			NU
* modem			OC
* local area network (lan)			NU
<b>PLOTTING/HARD-COPY:</b>			
	PC, WS		
* dot-matrix			OF
* color			OC
* thermal			NU
* pen-plotting			OF
* raster			NU
* digital-analog film recording			NU
* video recording			NU
<b>DIGITIZATION:</b>			
* contour maps			
- digitizing tablet or table			NU
- contour to grid conversion			NU
- scanning			
* photographic imagery			NU
* video imagery			NU

**PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)**  
Please consider needs for FYs 91-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC		NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - OFTEN
	- SUPERCOMP (SC)		

STATISTICS/  
DATA ANALYSIS:

* general stat analysis			OC
* time series analysis			
* spatial distribution analysis			
* orientation data			
- fractures			
- faults			
- stress fields			
- etc.			

MAPPING/  
CARTOGRAPHY:

* contouring			NU
* import digital elev. data			NU
* import other digital data			NU
* base maps			NU
* perspective display			NU
* well and core hole locations			NU
* surface facilities			NU
* subsurface structure			NU

GEOLOGIC CROSS  
SECTIONS:

* section construction			NU
* section display			NU
* section analysis (balancing, etc.)			NU

GEOGRAPHIC INFO.  
SYSTEMS:

			NU
--	--	--	----

COMPUTER AIDED  
DRAFTING AND  
DESIGN:

			OC
--	--	--	----

**PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)**  
Please consider needs for FYs 91-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC		NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - OFTEN
	- SUPERCOMP (SC)		

-----			
-----			
DIGITAL IMAGE PROCESSING/ ANALYSIS:	_____	_____	_____
* landsat			NU
* digital photo imagery			NU
* petrographic image analysis			NU
* scanned bore hole imagery			NU
- bore hole televiewer			
- formation micro-scanner			
REFLEC/REFRAC			
SEISMIC:			NU
* display / analysis			
* interpretation			
* mapping			
* merge with grav/mag		N/A	
GEOPHYSICAL			
LOG INTERP:			
* display / analysis			
* interpretation			
* correlation			
* mapping			
GRAVITY/ MAGNETICS:			
* display			
* mapping			
* overlay on surface geol			
* merge with seismic			
HYDROLOGY			
* data display			
* mapping			
* merge w/other data sets			
GEOCHEMISTRY			
* data display			
* mapping			
* merge w/other data sets			

**PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)**  
Please consider needs for FYs 91-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC		NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - OFTEN
	- SUPERCOMP (SC)		

.....  
.....  
**VISUALIZATION:**

* interactive graphics	_____	_____	_____
* three-dimensional graphics ✓	_____	_____	OC
* geometric rendering	_____	_____	_____
* volume rendering	_____	_____	_____
* 3D geometric models	_____	_____	_____
- solid	_____	_____	_____
- wire frame (mesh)	_____	_____	_____

**MODELLING:**

* geohydrologic flow	_____	_____	_____
* transport	_____	_____	_____
- geochemical	_____	_____	_____
- heat	_____	_____	_____
* geological structure	_____	_____	_____
- 2D and 3D geometric	_____	_____	_____
- kinematic	_____	_____	_____
- dynamics / deformation mechanics	_____	_____	_____
* geophysical	_____	_____	_____
- geomagnetic	_____	_____	_____
- gravity	_____	_____	_____
* chemical / molecular	_____	_____	_____
* meteorological	_____	_____	_____
- precipitation	_____	_____	_____
- weather patterns	_____	_____	_____
- global circulation	_____	_____	_____

**APPLICATION DEVELOPMENT:**

* ARTIFICIAL INTELLIGENCE	_____	_____	_____
* EXPERT SYSTEMS	_____	_____	_____

Waste Package Degradation Models.

Waste Package Performance Assessment Models.

PART TWO -- INVENTORY

Please circle the appropriate response or provide the requested information.

1. Do you have a personal computer (PC) in your office?  Yes  No

2. What type and model? PS/2 Model 50

3. If the answer to (1.) is 'No', is a PC available for your use at another location? Yes No. If 'Yes', where? \_\_\_\_\_

4. Do you consider this location convenient?  Yes  No

5. Please answer the following questions about the PC system in your or available for your use:

What size RAM (system memory)? 640K + extended Mem: 384K Mb.

Does it have a floppy disk (diskette) drive?  Yes  No How many? 4

What size? 1.0Mb 1.45 Mb 2.0Mb \_\_\_\_\_

Does it have a hard disk drive?  Yes  No. What size? 20 Mb.

Does it have a math (floating point) coprocessor?  Yes  No

What type of coprocessor? \_\_\_\_\_

Is it linked to a mainframe?  Yes  No. What mainframe(s)? IBM, VAX

Is it on a Local Area Network (LAN)?  Yes  No

Does it have an Ethernet card?  Yes  No

Can you access the CNWRA Program Architecture Support System (PASS)?  Yes  No

What model of monitor do you have? IBM PS/2 9105

Is the monitor color or monochrome? color

Do you have a printer? Yes  No  What model? \_\_\_\_\_

Do you have a modem? Yes  No  What model? \_\_\_\_\_

Internal or External? What baud (data trans rate)? \_\_\_\_\_

Do you have a pass word and user identification on either the NRC or a Southwest Research Inst. mainframe?  Yes  No

6. What applications software is currently installed on your PC?

DW4, Dbase IV, Lotus, Pctools

PART TWO -- INVENTORY (cont.)

7. Do you have access to a minicomputer workstation with 3-dimensional graphics capability? Yes No. What model? \_\_\_\_\_  
Do you consider the location convenient? Yes No
8. Do you have access to a plotter? Yes No  
What model? \_\_\_\_\_  
Is the location convenient? Yes No
9. Do you have access to a digitizing table? Yes No  
What model? \_\_\_\_\_  
What computer is it attached to \_\_\_\_\_  
What application do you use it with? \_\_\_\_\_

SURVEY OF TECHNICAL COMPUTING REQUIRMENTS  
 GEOLOGIC SETTING PROGRAM ELEMENT  
 CENTER FOR NUCLEAR WASTE REGULATORY ANALYSIS  
 SOUTHWEST RESEARCH INSTITUTE

RESPONDENTS NAME: RACHIA ABABOU  
 TELEPHONE: (512) 522-2583  
 PROFESSIONAL DISCIPLINE(S): Hydrogeology and Fluid Mechanics.

PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do?  
 Please consider needs for FYs 91-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC		NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - OFTEN
	- SUPERCOMP (SC)		

WORD PROCESSING: PC Wordperfect, T3, etc. OF

DATA BASE ACCESS AND MANAGEMENT: \_\_\_\_\_ NU

- \* relational DBMS \_\_\_\_\_
- \* access to SEPDB \_\_\_\_\_
- \* DOE/NNWSI RIDB (Reference Info. Data Base) \_\_\_\_\_
- \* USGS (US Geological Survey) \_\_\_\_\_
- \* NOAA (Nat. Oceanic Atm. Admin) \_\_\_\_\_
- \* NIST (Nat. Instit. Std & Tech) \_\_\_\_\_

PROJECT MANAGEMENT: \_\_\_\_\_ NU

- \* AS \_\_\_\_\_

PROGRAM ARCH. SUPPORT SYSTEM: \_\_\_\_\_ NU

- \* Sys. Reg. Analysis \_\_\_\_\_

SPREADSHEETS: \_\_\_\_\_ NU

BUSINESS REPORTS/ GRAPHICS: PC Signeplot (datagraphy), Etc ... OC

- \* flow charts \_\_\_\_\_
- \* organizational charts \_\_\_\_\_
- \* scheduling \_\_\_\_\_
- \* other charts \_\_\_\_\_
- \* data graphs \_\_\_\_\_

**PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)**  
Please consider needs for FYs 90-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC		NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - OFTEN
	- SUPERCOMP (SC)		

COMMUNICATION/EMULATION:

- \* USNRC E-mail
- \* CNWRA E-mail
- \* USNRC-CNWRA E-mail
- \* national network E-mail
- \* PC Emulation of mainframe terminal:
  - IBM 3270
  - tgraf tektronix (VAX)
  - etc.

*MF, SC*      *TCP/IP (telnet/ftp)*      *OF*

DISTRIBUTED COMPUTING / NETWORK OPS:

- \* ethernet
- \* tcp/ip
- \* modem
- \* local area network (lan)

*MF, SC*      *Ethernet, TCP/IP*      *OF*

PLOTTING/HARD-COPY:

- \* dot-matrix
- \* color
- \* thermal
- \* pen-plotting
- \* raster
- \* digital-analog film recording
- \* video recording

*laser*      *PC, MF*      *OF (laser)*

*OC*

DIGITIZATION:

- \* contour maps
  - digitizing tablet or table
  - contour to grid conversion
  - scanning
- \* photographic imagery
- \* video imagery

*NU*

**PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)**  
 Please consider needs for FYs 91-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC		NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - OFTEN
	- SUPERCOMP (SC)		

.....

.....

STATISTICS/  
 DATA ANALYSIS: MF, SC Custom-made software + occasional commercial (e.g. IMSL) OF

- \* general stat analysis
- \* time series analysis
- \* spatial distribution analysis
- \* orientation data
  - fractures
  - faults
  - stress fields
  - etc.

MAPPING/  
 CARTOGRAPHY: MF Custom-made and/or NCAR/GKS package OC

- \* contouring
- \* import digital elev. data
- \* import other digital data
- \* base maps
- \* perspective display
- \* well and core hole locations
- \* surface facilities
- \* subsurface structure

GEOLOGIC CROSS SECTIONS: \_\_\_\_\_ NU

- \* section construction
- \* section display
- \* section analysis (balancing, etc.)

GEOGRAPHIC INFO. SYSTEMS: \_\_\_\_\_ (X)

COMPUTER AIDED DRAFTING AND DESIGN: \_\_\_\_\_ NU

**PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)**  
Please consider needs for FYs 91-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC - WORKSTATION (WS) - MAINFRAME (MF) - SUPERCOMP (SC)		NU - NOT USED OC - OCCASIONAL OF - OFTEN
.....			
.....			
DIGITAL IMAGE PROCESSING/ ANALYSIS:			NU
* landsat			
* digital photo imagery			
* petrographic image analysis			
* scanned bore hole imagery			
- bore hole televiewer			
- formation micro-scanner			
REFLEC/REFRAC SEISMIC:			NU
* display / analysis			
* interpretation			
* mapping			
* merge with grav/mag			
GEOPHYSICAL LOG INTERP:			NU
* display / analysis			
* interpretation			
* correlation			
* mapping			
GRAVITY/ MAGNETICS:			NU
* display			
* mapping			
* overlay on surface geol			
* merge with seismic			
HYDROLOGY	MF	Custom-made and/or NCAR/GKS package	OC
* data display			
* mapping			
* merge w/other data sets			
GEOCHEMISTRY			NU
* data display			
* mapping			
* merge w/other data sets			

PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)  
Please consider needs for FYs 91-95.

ACTIVITY	COMPUTING TIER	APPLICATION SOFTWARE	FREQUENCY OF USE
	- PC - WORKSTATION (WS) - MAINFRAME (MF) - SUPERCOMP (SC)		NU - NOT USED OC - OCCASIONAL OF - OFTEN
-----			
VISUALIZATION:			
* interactive graphics * three-dimensional graphics * geometric rendering * volume rendering * 3D geometric models - solid - wire frame (mesh)	<u>WS</u>	<u>Dynamic Graphics,</u> <u>Princeton Toolkit,</u> <u>+ Custom-made using</u> <u>SGI library routines.</u>	<u>OF</u>
MODELLING:			
* geohydrologic flow * transport - geochemical - heat * geological structure - 2D and 3D geometric - kinematic - dynamics / deformation mechanics * geophysical - geomagnetic - gravity * chemical / molecular * meteorological - precipitation - weather patterns - global circulation	<u>MF, SC</u>	<u>Custom-made</u>	<u>OF</u> <u>OF</u> <u>OF</u>  <u>OF</u>
APPLICATION DEVELOPMENT:			
* ARTIFICIAL INTELLIGENCE * EXPERT SYSTEMS			

PART TWO -- INVENTORY

Please circle the appropriate response or provide the requested information.

1. Do you have a personal computer (PC) in your office?  Yes  No

2. What type and model? PS2/70

3. If the answer to (1.) is 'No', is a PC available for your use at another location? Yes No. If 'Yes', where? \_\_\_\_\_

4. Do you consider this location convenient?  Yes  No

5. Please answer the following questions about the PC system in your or available for your use:

What size RAM (system memory)? 5 MB Mb.

Does it have a floppy disk (diskette) drive? Yes No. How many? 4

What size? 1.0Mb \_\_\_\_\_ 2.0Mb

Does it have a hard disk drive? Yes No. What size? 115 MB Mb.

Does it have a math (floating point) coprocessor?  Yes  No

What type of coprocessor? \_\_\_\_\_

Is it linked to a mainframe? Yes No. What mainframe(s)? VAX 8700 IBM 3083

Is it on a Local Area Network (LAN)?  Yes  No

Does it have an Ethernet card?  Yes  No

Can you access the CNWRA Program Architecture Support System (PASS)?  Yes  No

What model of monitor do you have? PS2 (VGA)

Is the monitor color or monochrome? Color, VGA

Do you have a printer? Yes  No  What model? \_\_\_\_\_

Do you have a modem? Yes  No  What model? \_\_\_\_\_  
Internal or External? What baud (data trans rate)? \_\_\_\_\_

Do you have a pass word and user identification on either the NRC or a Southwest Research Inst. mainframe?  Yes  No

6. What applications software is currently installed on your PC?  
Wordprocessor and Grafix software.

PART TWO -- INVENTORY (cont.)

7. Do you have access to a minicomputer workstation with 3-dimensional graphics capability?  Yes  No. What model? Silicone Graphics  
Do you consider the location convenient?  Yes  No
8. Do you have access to a plotter?  Yes  No  
What model? HP Plotter (multipen)  
Is the location convenient? Yes  No
9. Do you have access to a digitizing table? Yes  No  
What model? \_\_\_\_\_  
What computer is it attached to \_\_\_\_\_  
What application do you use it with? \_\_\_\_\_



PART ONE -- REQUIRED COMPUTING CAPABILITIES. What do you need to do? (cont.)  
 Please consider needs for FYs 90-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC - WORKSTATION (WS) - MAINFRAME (MF) - SUPERCOMP (SC)		NU - NOT USED OC - OCCASIONAL OF - OFTEN
-----			
COMMUNICATION/ EMULATION:	<u>MAC</u> PC → MF	<u>?</u> <del>IBM 3270</del>	OF NU OF OC NU OF
* USNRC E-mail			NU
* CNWRA E-mail			OF
* USNRC-CNWRA E-mail			OC
* national network E-mail			NU
* PC Emulation of mainframe terminal:			OF
<u>IBM 3270</u>			
- tgraf tektronix (VAX)			
- etc.			
DISTRIBUTED COMPUTING / NETWORK OPS:	<u>MAC</u> PC → MF	ETHERNET	OF OF OC OF OF
* ethernet			OF
* tcp/ip			OC
* modem			OF
* local area network (lan)			OF
PLOTTING/HARD- COPY:	<u>MAC</u> PC	Cricket graph Adobe Illustrator	OF NU OF NU OC OC
* dot-matrix			OF
* color			NU
* thermal			OF
* pen-plotting			NU
* raster			OC
* digital-analog film recording			OC
* video recording			OF ** NU
DIGITIZATION:	<u>(PC)</u>	?	OC
* contour maps			
- digitizing tablet or table			OC
- contour to grid conversion			OC
- scanning			
* photographic imagery			NU
* video imagery			NU

**PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)**  
 Please consider needs for FYs 91-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC		NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - OFTEN
	- SUPERCOMP (SC)		

-----  
 -----

STATISTICS/ DATA ANALYSIS: * general stat analysis * time series analysis * spatial distribution analysis * orientation data - fractures - faults - stress fields - etc.	(PC)	?	OC OC OC OC OC
---	------	---	----------------------------

MAPPING/ CARTOGRAPHY: * contouring * import digital elev. data * import other digital data * base maps * perspective display * well and core hole locations * surface facilities * subsurface structure	MAC PC	?	<del>OC</del> OC OC OC OC OC OC OC
--	-----------	---	---

GEOLOGIC CROSS SECTIONS: * section construction * section display * section analysis (balancing, etc.)	?	?	OC OC
--	---	---	----------

GEOGRAPHIC INFO. SYSTEMS:	you tell me.		
------------------------------	--------------	--	--

COMPUTER AIDED DRAFTING AND DESIGN:			NA
---	--	--	----

**PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)**  
 Please consider needs for FYs 91-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC - WORKSTATION (WS) - MAINFRAME (MF) - SUPERCOMP (SC)		NU - NOT USED OC - OCCASIONAL OF - OFTEN
-----			
-----			
DIGITAL IMAGE PROCESSING/ ANALYSIS:		?	
* landsat			NU
* digital photo imagery			OC
* petrographic image analysis			OC
* scanned bore hole imagery			NU
- bore hole televiewer			
- formation micro-scanner			
REFLEC/REFRAC SEISMIC:		?	
* display / analysis			NU
* interpretation			NU
* mapping			NU
* merge with grav/mag			NU
GEOPHYSICAL LOG INTERP:		?	
* display / analysis			NU
* interpretation			NU
* correlation			NU
* mapping			NU
GRAVITY/ MAGNETICS:		?	
* display			NU
* mapping			NU
* overlay on surface geol			NU
* merge with seismic			NU
HYDROLOGY		?	
* data display			NU
* mapping			NU
* merge w/other data sets	MAC PC		NU
GEOCHEMISTRY		?	
* data display			OF
* mapping			OF
* merge w/other data sets			OF

PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)  
Please consider needs for FYs 91-95.

ACTIVITY	COMPUTING TIER	APPLICATION SOFTWARE	FREQUENCY OF USE
	- PC		NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - OFTEN
	- SUPERCOMP (SC)		

.....  
.....  
VISUALIZATION:

* interactive graphics	_____	you tell me.	OC
* three-dimensional graphics	_____	_____	OC
* geometric rendering	_____	_____	_____
* volume rendering	_____	_____	_____
* 3D geometric models	_____	_____	_____
- solid	_____	_____	_____
- wire frame (mesh)	_____	_____	_____

MODELLING:

* geohydrologic flow	MF	EQ3/6	OF
* transport	_____	SUPCRT	OF
- geochemical	_____	MAC	OF
- heat	_____	DIAGRAM	_____
* geological structure	_____	_____	_____
- 2D and 3D geometric	_____	_____	_____
- kinematic	_____	_____	_____
- dynamics / deformation mechanics	_____	_____	_____
* geophysical	_____	_____	_____
- geomagnetic	_____	_____	_____
- gravity	_____	_____	_____
* chemical / molecular	_____	_____	_____
* meteorological	_____	_____	_____
- precipitation	_____	_____	_____
- weather patterns	_____	_____	_____
- global circulation	_____	_____	_____

APPLICATION DEVELOPMENT:

* ARTIFICIAL INTELLIGENCE	_____	?	_____
* EXPERT SYSTEMS	_____	_____	_____

PART TWO -- INVENTORY

Please circle the appropriate response or provide the requested information.

1. Do you have a personal computer (PC) in your office?  Yes  No

2. What type and model? Macintosh II ci

3. If the answer to (1.) is 'No', is a PC available for your use at another location? Yes No. If 'Yes', where? \_\_\_\_\_

4. Do you consider this location convenient?  Yes  No

5. Please answer the following questions about the PC system in your or available for your use:

What size RAM (system memory)? 5 Mb.

Does it have a floppy disk (diskette) drive?  Yes  No. How many? 1

What size? 1.0Mb 1.4 Mb 2.0Mb

Does it have a hard disk drive?  Yes  No. What size? 40 Mb.

Does it have a math (floating point) coprocessor?  Yes  No.

What type of coprocessor? \_\_\_\_\_

Is it linked to a mainframe?  Yes  No. What mainframe(s)? SWRI IBM or VAX

Is it on a Local Area Network (LAN)? Mac. LOCAL TALK  Yes  No

Does it have an Ethernet card?  Yes  No

Can you access the CNWRA Program Architecture Support System (PASS)?  Yes  No

What model of monitor do you have? Apple RGB 13"

Is the monitor  color  or monochrome? \_\_\_\_\_

Do you have a printer?  Yes  No. What model? SHARED w/ Bill & Ron LASERwriter II SC

Do you have a modem? Yes  No . What model? \_\_\_\_\_

Internal or External? What baud (data trans rate)? \_\_\_\_\_

Do you have a pass word and user identification on either the NRC or a Southwest Research Inst. mainframe?  Yes  No

6. What applications software is currently installed on your PC?

- MS WORD 4.0
- ENDNOTE
- ILLUSTRATOR
- Word Perfect
- Cricketgraph
- Teachtext
- File Exchange
- Termay Plot

PART TWO -- INVENTORY (cont.)

7. Do you have access to a minicomputer workstation with 3-dimensional graphics capability? Yes  No. What model? \_\_\_\_\_  
Do you consider the location convenient? \_\_\_\_\_ Yes No

8. Do you have access to a plotter? *well, it depends on what you mean by access...* Yes  No  
What model? \_\_\_\_\_ Yes  No  
Is the location convenient? \_\_\_\_\_ Yes  No

9. Do you have access to a digitizing table? Yes  No  
What model? \_\_\_\_\_  
What computer is it attached to \_\_\_\_\_  
What application do you use it with? \_\_\_\_\_

*I not from my computer.*

SURVEY OF TECHNICAL COMPUTING REQUIREMENTS  
 GEOLOGIC SETTING PROGRAM ELEMENT  
 CENTER FOR NUCLEAR WASTE REGULATORY ANALYSIS  
 SOUTHWEST RESEARCH INSTITUTE

RESPONDENTS NAME: Wes Patrick  
 TELEPHONE: 522-5158  
 PROFESSIONAL DISCIPLINE(S): Mining Engr. / Rock Mechanics / Geology

PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do?  
 Please consider needs for FYs 91-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC		NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - OFTEN
	- SUPERCOMP (SC)		

WORD PROCESSING: PC DW4 OF

DATA BASE ACCESS AND MANAGEMENT: PC VARIABLE-- VARIABLE

* relational DBMS		<u>OF</u>
* access to SEPDB		<u>OC</u>
* DOE/NNWSI RIDB (Reference Info. Data Base)		<u>OC</u>
* USGS (US Geological Survey)		<u>NU</u>
* NOAA (Nat. Oceanic Atm. Admin)		<u>NU</u>
* NIST (Nat. Instit. Std & Tech)		<u>NU</u>

PROJECT MANAGEMENT: PC AS/PMC OF

\* AS

PROGRAM ARCH. SUPPORT SYSTEM: PC PASS OF

\* Sys. Reg. Analysis

SPREADSHEETS: PC LOTUS OF

BUSINESS REPORTS/ GRAPHICS: PC VARIABLE OC-OF

* flow charts		<u>OC</u>
* organizational charts		<u>OF</u>
* scheduling		<u>OC</u>
* other charts		<u>OC</u>
* data graphs		<u>OC</u>

AS/PMC

\* Generally provided by Support Staff.  
 \* H " (Not H DIRECT LABOR).

**PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)**  
Please consider needs for FYs 90-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC		NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - OFTEN
	- SUPERCOMP (SC)		

COMMUNICATION/ EMULATION:	<u>PC</u>	<u>PROFS</u>	<u>VARIABLE</u>
* USNRC E-mail			<u>OF NU</u>
* CNWRA E-mail			<u>CF</u>
* USNRC-CNWRA E-mail			<u>CF</u>
* national network E-mail			<u>NU</u>
* PC Emulation of mainframe terminal:			<u>OC</u>
- IBM 3270			
- tgraf tektronix (VAX)			
- etc.			

DISTRIBUTED COMPUTING / NETWORK OPS:			
* ethernet			
* tcp/ip			
* modem			
* local area network (lan)			

AS NEEDED  
TO SUPPORT  
ABOVE  
ACTIVITIES

PLOTTING/HARD- COPY:	<u>PC</u>	<u>AS/PMC</u>	<u>VARIABLE</u>
* dot-matrix			<u>OF</u>
* color			<u>CF</u>
* thermal			<u>NU</u>
* pen-plotting			<u>OF</u>
* raster			<u>NU</u>
* digital-analog film recording			<u>NU</u>
* video recording			<u>NU</u>

DIGITIZATION:	<u>NOT APPLICABLE</u>		<u>NU</u>
* contour maps			
- digitizing tablet or table			<u>NU</u>
- contour to grid conversion			<u>NU</u>
- scanning			
* photographic imagery			<u>NU</u>
* video imagery			<u>NU</u>

PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)  
 Please consider needs for FYs 91-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC		NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - OFTEN
	- SUPERCOMP (SC)		

.....

STATISTICS/ DATA ANALYSIS:	<u>PC/MF</u>	<u>CPLN: STATGRAPHICS, SPSS, SAS, etc.</u>	<u><del>OC</del> VARIABLE</u>
* general stat analysis			<u>OC</u>
* time series analysis			<u>NU</u>
* spatial distribution analysis			<u>NU</u>
* orientation data			<u>NU</u>
- fractures			
- faults			
- stress fields			
- etc.			

MAPPING/ CARTOGRAPHY:	<u>NOT APPLICABLE</u>		<u>NU</u>
* contouring			
* import digital elev. data			
* import other digital data			
* base maps			
* perspective display			
* well and core hole locations			
* surface facilities			
* subsurface structure			

GEOLOGIC CROSS SECTIONS:	<u>NOT APPLICABLE</u>		<u>NU</u>
* section construction			
* section display			
* section analysis (balancing, etc.)			

* GEOGRAPHIC INFO. SYSTEMS:			<u>OC-OF *</u>
--------------------------------	--	--	----------------

COMPUTER AIDED DRAFTING AND DESIGN:	<u>NOT APPLICABLE</u>		<u>NU</u>
---	-----------------------	--	-----------

\* Likely to be occasional user and/or frequent requester of GIS support.



PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)  
Please consider needs for FYs 91-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC		NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - OFTEN
	- SUPERCOMP (SC)		

.....

.....

\* VISUALIZATION: UNCERTAIN OC-OF\*

- \* interactive graphics
- \* three-dimensional graphics
- \* geometric rendering
- \* volume rendering
- \* 3D geometric models
  - solid
  - wire frame (mesh)

MODELLING: NOT APPLICABLE NU

- \* geohydrologic flow
- \* transport
  - geochemical
  - heat
- \* geological structure
  - 2D and 3D geometric
  - kinematic
  - dynamics / deformation mechanics
- \* geophysical
  - geomagnetic
  - gravity
- \* chemical / molecular
- \* meteorological
  - precipitation
  - weather patterns
  - global circulation

APPLICATION DEVELOPMENT: NOT APPLICABLE NU

- \* ARTIFICIAL INTELLIGENCE
- \* EXPERT SYSTEMS

\* Likely to be occasional user and frequent requester.

PART TWO -- INVENTORY

Please circle the appropriate response or provide the requested information.

1. Do you have a personal computer (PC) in your office? Yes No

2. What type and model? PS/2 Model 50

3. If the answer to (1.) is 'No', is a PC available for your use at another location? Yes No. If 'Yes', where? \_\_\_\_\_

4. Do you consider this location convenient? N/A Yes No

5. Please answer the following questions about the PC system in your or available for your use:

What size RAM (system memory)? \_\_\_\_\_ Mb.

Does it have a floppy disk (diskette) drive? Yes No. How many? 2

What size? 1.0Mb \_\_\_\_\_ 2.0Mb \_\_\_\_\_

Does it have a hard disk drive? Yes No. What size? 20 Mb.

Does it have a math (floating point) coprocessor? Yes No

What type of coprocessor? N/A

Is it linked to a mainframe? Yes No. What mainframe(s)? IBM 4381

and to NRC IBM 9370 via PCFS.

Is it on a Local Area Network (LAN)? Yes No

Does it have an Ethernet card? Yes No

Can you access the CNWRA Program Architecture Support System (PASS)?

Yes No

What model of monitor do you have? PS/2 Color Monitor

Is the monitor color or monochrome? Color

Do you have a printer? Yes No. What model? N/A

Do you have a modem? Yes No. What model? N/A

Internal or External? What baud (data trans rate)? N/A

Do you have a pass word and user identification on either the NRC or a Southwest Research Inst. mainframe? Yes No

6. What applications software is currently installed on your PC?

PROFS, DW4, PCTOOLS, 3270, PCLK,  
EPOPA5F, RDOC, DOS

PART TWO -- INVENTORY (cont.)

7. Do you have access to a minicomputer workstation with 3-dimensional graphics capability? Yes  No. What model? N/A (Not yet)  
Do you consider the location convenient? N/A Yes No
8. Do you have access to a plotter?  Yes  No  
What model? HP DRAFTER MASTER II & COLOR PLOTTER  
Is the location convenient? to  Yes  No
9. Do you have access to a digitizing table?  Yes  No  
What model? N/A N/A  
What computer is it attached to? N/A  
What application do you use it with? N/A

SURVEY OF TECHNICAL COMPUTING REQUIRMENTS  
 GEOLOGIC SETTING PROGRAM ELEMENT  
 CENTER FOR NUCLEAR WASTE REGULATORY ANALYSIS  
 SOUTHWEST RESEARCH INSTITUTE

RESPONDENTS NAME: R. Ababian  
 TELEPHONE: 5304  
 PROFESSIONAL DISCIPLINE(S): Environmental

**PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do?  
 Please consider needs for FYs 91-95.**

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC		NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - OFTEN
	- SUPERCOMP (SC)		

WORD PROCESSING: PC WPS.1 OF

DATA BASE ACCESS AND MANAGEMENT: PC Reflex OC

- \* relational DBMS
- \* access to SEPDB
- \* DOE/NNWSI RIDB (Reference Info. Data Base)
- \* USGS (US Geological Survey)
- \* NOAA (Nat. Oceanic Atm. Admin)
- \* NIST (Nat. Instit. Std & Tech)

PROJECT MANAGEMENT: \_\_\_\_\_

- \* AS

PROGRAM ARCH. SUPPORT SYSTEM: \_\_\_\_\_

- \* Sys. Reg. Analysis

SPREADSHEETS: \_\_\_\_\_

BUSINESS REPORTS/ GRAPHICS: PC Signaplot OC

- \* flow charts
- \* organizational charts
- \* scheduling
- \* other charts
- \* data graphs

**PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)**  
**Please consider needs for FYs 90-95.**

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC - WORKSTATION (WS) - MAINFRAME (MF) - SUPERCOMP (SC)		NU - NOT USED OC - OCCASIONAL OF - OFTEN
.....			
.....			
<b>COMMUNICATION/ EMULATION:</b>	<u>PC</u>	_____	_____
* USNRC E-mail			<u>NU</u>
* CNWRA E-mail			<u>OC</u>
* USNRC-CNWRA E-mail			<u>NU</u>
* national network E-mail			<u>OC</u>
* PC Emulation of mainframe terminal:			<u>OC</u>
- IBM 3270			<u>OC</u>
- tgraf tektronix (VAX)			<u>OC</u>
- etc.			<u>OC</u>
<b>DISTRIBUTED COMPUTING / NETWORK OPS:</b>	<u>PC</u>	_____	_____
* ethernet			<u>OF</u>
* tcp/ip			<u>OF</u>
* modem			<u>OC</u>
* local area network (lan)			<u>OC</u>
<b>PLOTTING/HARD-COPY:</b>	<u>PC</u>	_____	_____
* dot-matrix			<u>OF</u>
* color			<u>NU</u>
* thermal			<u>NU</u>
* pen-plotting			<u>OC</u>
* raster			<u>NU</u>
* digital-analog film recording			<u>NU</u>
* video recording			<u>NU</u>
<b>DIGITIZATION:</b>	_____	_____	<u>NU</u>
* contour maps			_____
- digitizing tablet or table			_____
- contour to grid conversion			_____
- scanning			_____
* photographic imagery			_____
* video imagery			_____

**PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)**  
Please consider needs for FYs 91-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC		NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - OFTEN
	- SUPERCOMP (SC)		
-----			
-----			
STATISTICS/ DATA ANALYSIS:	_____	_____	_____ NU
* general stat analysis			_____
* time series analysis			_____
* spatial distribution analysis			_____
* orientation data			_____
- fractures			_____
- faults			
- stress fields			
- etc.			
MAPPING/ CARTOGRAPHY:	_____	_____	_____ NU
* contouring			_____
* import digital elev. data			_____
* import other digital data			_____
* base maps			_____
* perspective display			_____
* well and core hole locations			_____
* surface facilities			_____
* subsurface structure			_____
GEOLOGIC CROSS SECTIONS:	_____	_____	_____ NU
* section construction			_____
* section display			_____
* section analysis (balancing, etc.)			_____
GEOGRAPHIC INFO. SYSTEMS:	_____	_____	_____
COMPUTER AIDED DRAFTING AND DESIGN:	_____	_____	_____ NU

**PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)**  
Please consider needs for FYs 91-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC		NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - OFTEN
	- SUPERCOMP (SC)		

DIGITAL IMAGE

PROCESSING/

ANALYSIS:

- \* landsat
- \* digital photo imagery
- \* petrographic image analysis
- \* scanned bore hole imagery
  - bore hole televiewer
  - formation micro-scanner

REFLEC/REFRAC

SEISMIC:

- \* display / analysis
- \* interpretation
- \* mapping
- \* merge with grav/mag

GEOPHYSICAL

LOG INTERP:

- \* display / analysis
- \* interpretation
- \* correlation
- \* mapping

GRAVITY/

MAGNETICS:

- \* display
- \* mapping
- \* overlay on surface geol
- \* merge with seismic

HYDROLOGY

- \* data display
- \* mapping
- \* merge w/other data sets

GEOCHEMISTRY

- \* data display
- \* mapping
- \* merge w/other data sets

UCI

UCI

UCI

UCI

UCI

PC

Signaplot

OF  
OF  
OF

**PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)**  
Please consider needs for FYs 91-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC		NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - OFTEN
	- SUPERCOMP (SC)		

.....  
.....  
**VISUALIZATION:**

* interactive graphics	_____	_____	_____ <i>OC</i>
* three-dimensional graphics	_____	_____	_____
* geometric rendering	_____	_____	_____
* volume rendering	_____	_____	_____
* 3D geometric models	_____	_____	_____
- solid	_____	_____	_____
- wire frame (mesh)	_____	_____	_____

**MODELLING:**

* geohydrologic flow	_____	_____	_____ <i>OC</i>
* transport	_____	_____	_____
- geochemical	_____	_____	_____
- heat	_____	_____	_____
* geological structure	_____	_____	_____
- 2D and 3D geometric	_____	_____	_____
- kinematic	_____	_____	_____
- dynamics / deformation mechanics	_____	_____	_____
* geophysical	_____	_____	_____
- geomagnetic	_____	_____	_____
- gravity	_____	_____	_____
* chemical / molecular	_____	_____	_____
* meteorological	_____	_____	_____
- precipitation	_____	_____	_____
- weather patterns	_____	_____	_____
- global circulation	_____	_____	_____

**APPLICATION**

<b>DEVELOPMENT:</b>	_____	_____	_____ <i>OC</i>
* ARTIFICIAL INTELLIGENCE	_____	_____	_____
* EXPERT SYSTEMS	_____	_____	_____

PART TWO -- INVENTORY

Please circle the appropriate response or provide the requested information.

1. Do you have a personal computer (PC) in your office?  Yes  No

2. What type and model? PS 2 / model 90

3. If the answer to (1.) is 'No', is a PC available for your use at another location? Yes No. If 'Yes', where? \_\_\_\_\_

4. Do you consider this location convenient?  Yes  No

5. Please answer the following questions about the PC system in your or available for your use:

What size RAM (system memory)? 1 Mb.

Does it have a floppy disk (diskette) drive?  Yes  No. How many? 2

What size? 1.0Mb 2 0Mb 1

Does it have a hard disk drive?  Yes  No. What size? 30 Mb.

Does it have a math (floating point) coprocessor?  Yes  No

What type of coprocessor? \_\_\_\_\_

Is it linked to a mainframe? Yes No. What mainframe(s)? VAX / IBM

Is it on a Local Area Network (LAN)?  Yes  No

Does it have an Ethernet card?  Yes  No

Can you access the CNWRA Program Architecture Support System (PASS)?

Yes  No

What model of monitor do you have? PS 2 color

Is the monitor  color or monochrome? \_\_\_\_\_

Do you have a printer?  Yes  No. What model? EPSON EX-111

Do you have a modem?  Yes  No. What model? \_\_\_\_\_

Internal or External? What baud (data trans rate)? \_\_\_\_\_

Do you have a pass word and user identification on either the NRC or a Southwest Research Inst. mainframe?  Yes  No

6. What applications software is currently installed on your PC?

MS-DOS 5.1  
Signature  
TCPE  
MS-D

PART TWO -- INVENTORY (cont.)

7. Do you have access to a minicomputer workstation with 3-dimensional graphics capability? Yes/No) What model? \_\_\_\_\_  
Do you consider the location convenient? Yes No
8. Do you have access to a plotter? Yes/No)  
What model? \_\_\_\_\_  
Is the location convenient? Yes No
9. Do you have access to a digitizing table? Yes/No)  
What model? \_\_\_\_\_  
What computer is it attached to \_\_\_\_\_  
What application do you use it with? \_\_\_\_\_

SURVEY OF TECHNICAL COMPUTING REQUIRMENTS  
 GEOLOGIC SETTING PROGRAM ELEMENT  
 CENTER FOR NUCLEAR WASTE REGULATORY ANALYSIS  
 SOUTHWEST RESEARCH INSTITUTE

RESPONDENTS NAME: RON GREEN  
 TELEPHONE: 512-522-5301  
 PROFESSIONAL DISCIPLINE(S): HYDROGEOLOGIST, LOGIST, GEOL.

PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do?  
 Please consider needs for FYs 91-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC		NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - OFTEN
	- SUPERCOMP (SC)		

WORD PROCESSING: PC WPS, DWT OF

DATA BASE ACCESS AND MANAGEMENT: \_\_\_\_\_ NU

- \* relational DBMS \_\_\_\_\_
- \* access to SEPDB \_\_\_\_\_
- \* DOE/NNWSI RIDB (Reference Info. Data Base) not used \_\_\_\_\_
- \* USGS (US Geological Survey) this file \_\_\_\_\_
- \* NOAA (Nat. Oceanic Atm. Admin) \_\_\_\_\_
- \* NIST (Nat. Instit. Std & Tech) \_\_\_\_\_

PROJECT MANAGEMENT: \_\_\_\_\_ NU

- \* AS \_\_\_\_\_

PROGRAM ARCH. SUPPORT SYSTEM: \_\_\_\_\_ NU

- \* Sys. Reg. Analysis \_\_\_\_\_

SPREADSHEETS: PC 123 NU

BUSINESS REPORTS/ GRAPHICS: \_\_\_\_\_ NU

- \* flow charts \_\_\_\_\_
- \* organizational charts \_\_\_\_\_
- \* scheduling \_\_\_\_\_
- \* other charts \_\_\_\_\_
- \* data graphs \_\_\_\_\_

**PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)**  
Please consider needs for FYs 90-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC - WORKSTATION (WS) - MAINFRAME (MF) - SUPERCOMP (SC)		NU - NOT USED OC - OCCASIONAL OF - OFTEN
.....			
.....			
COMMUNICATION/ EMULATION:	PC	?	
* USNRC E-mail			OF
* CNWRA E-mail			OF
* USNRC-CNWRA E-mail			OF
* national network E-mail			OC
* PC Emulation of mainframe terminal:			OF
- IBM 3270			
- tgraf tektronix (VAX)			
- etc.			
DISTRIBUTED COMPUTING / NETWORK OPS:	PC		
* ethernet			OF
* tcp/ip			NU
* modem			NU
* local area network (lan)			NU
PLOTTING/HARD- COPY:			NU
* dot-matrix			
* color		<i>Not used present time but will be a great need in future</i>	
* thermal			
* pen-plotting			
* raster			
* digital-analog film recording			
* video recording			
DIGITIZATION:			NU
* contour maps			
- digitizing tablet or table		<i>will have some need of this in future</i>	
- contour to grid conversion			
- scanning			
* photographic imagery			
* video imagery			

**PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)**  
Please consider needs for FYs 91-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC		NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - OFTEN
	- SUPERCOMP (SC)		

STATISTICS/  
DATA ANALYSIS: PC/WS 2 OC

\* general stat analysis general math package OC

\* time series analysis OC

\* spatial distribution analysis could have future needs - OC

\* orientation data etc. OC

- fractures

- faults

- stress fields

- etc.

MAPPING/  
CARTOGRAPHY: PC/WS/MF 2 OF

\* contouring OC

\* import digital elev. data OF

\* import other digital data OC

\* base maps OC

\* perspective display OC

\* well and core hole locations OC

\* surface facilities OC

\* subsurface structure OC

GEOLOGIC CROSS  
SECTIONS: WS 2 OC

\* section construction OC

\* section display OC

\* section analysis (balancing, etc.) OC

GEOGRAPHIC INFO. SYSTEMS: \_\_\_\_\_ NU

COMPUTER AIDED DRAFTING AND DESIGN: \_\_\_\_\_ NU

**PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)**  
Please consider needs for FYs 91-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC - WORKSTATION (WS) - MAINFRAME (MF) - SUPERCOMP (SC)		NU - NOT USED OC - OCCASIONAL OF - OFTEN
-----			
-----			
DIGITAL IMAGE PROCESSING/ ANALYSIS:	<u>PC/WS</u>	<u>?</u>	<u>OC</u>
* landsat			<u>OC</u>
* digital photo imagery			<u>OC</u>
* petrographic image analysis			<u>OC</u>
* scanned bore hole imagery			<u>OC</u>
- bore hole televiewer			
- formation micro-scanner			
REFLEC/REFRAC SEISMIC:			<u>NU</u>
* display / analysis			
* interpretation			
* mapping			
* merge with grav/mag			
GEOPHYSICAL LOG INTERP:	<u>PC/WS</u>	<u>?</u>	<u>OC</u>
* display / analysis			<u>OC</u>
* interpretation			<u>OC</u>
* correlation			<u>OC</u>
* mapping			<u>OC</u>
GRAVITY/ MAGNETICS:	<u>PC/WS</u>	<u>?</u>	<u>OC</u>
* display			<u>OC</u>
* mapping			<u>OC</u>
* overlay on surface geol			<u>OC</u>
* merge with seismic			<u>OC</u>
HYDROLOGY	<u>PC/WS</u>	<u>?</u>	<u>OF</u>
* data display			
* mapping			<u>OF</u>
* merge w/other data sets			<u>OF</u>
GEOCHEMISTRY			<u>NU</u>
* data display			
* mapping			
* merge w/other data sets			

PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)  
Please consider needs for FYs 91-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC		NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - OFTEN
	- SUPERCOMP (SC)		

.....

.....

VISUALIZATION: MS Dynamic graphics OF

- \* interactive graphics
- \* three-dimensional graphics
- \* geometric rendering
- \* volume rendering
- \* 3D geometric models
  - solid
  - wire frame (mesh)

MODELLING: PC/WS/SC/MF Several OF

- \* geohydrologic flow
- \* transport
  - geochemical
  - heat
- \* geological structure
  - 2D and 3D geometric
  - kinematic
  - dynamics / deformation mechanics
- \* geophysical
  - geomagnetic
  - gravity
- \* chemical / molecular
- \* meteorological
  - precipitation
  - weather patterns
  - global circulation

APPLICATION DEVELOPMENT: \_\_\_\_\_ NU

- \* ARTIFICIAL INTELLIGENCE
- \* EXPERT SYSTEMS

PART TWO -- INVENTORY

Please circle the appropriate response or provide the requested information.

1. Do you have a personal computer (PC) in your office?  Yes  No

2. What type and model? PS 2/50

3. If the answer to (1.) is 'No', is a PC available for your use at another location? Yes No. If 'Yes', where? \_\_\_\_\_

4. Do you consider this location convenient?  Yes  No

5. Please answer the following questions about the PC system in your <sup>2</sup> or available for your use:

What size RAM (system memory)? \_\_\_\_\_ Mb.

Does it have a floppy disk (diskette) drive?  Yes  No. How many? 1

What size? 1.0Mb \_\_\_\_\_ 2.0Mb

Does it have a hard disk drive?  Yes  No. What size? 10 Mb.

Does it have a math (floating point) coprocessor? Yes  No

What type of coprocessor? \_\_\_\_\_

Is it linked to a mainframe?  Yes  No. What mainframe(s)? 8700, -800, IBM

Is it on a Local Area Network (LAN)? Yes  No

Does it have an Ethernet card?  Yes  No

Can you access the CNWRA Program Architecture Support System (PASS)?  Yes  No

What model of monitor do you have? IBM

Is the monitor  color or monochrome? \_\_\_\_\_

Do you have a printer? Yes  No. What model? This is a serious problem!

Do you have a modem? Yes  No. What model? \_\_\_\_\_

Internal or External? What baud (data trans rate)? \_\_\_\_\_

Do you have a pass word and user identification on either the NRC or a Southwest Research Inst. mainframe?  Yes  No

6. What applications software is currently installed on your PC?

WP, DW4, DSS, 123

PART TWO -- INVENTORY (cont.)

7. Do you have access to a minicomputer workstation with 3-dimensional graphics capability? Yes  No. What model? \_\_\_\_\_  
Do you consider the location convenient? Yes No
8. Do you have access to a plotter? Yes No  
What model? \_\_\_\_\_  
Is the location convenient? Yes  No
9. Do you have access to a digitizing table? Yes  No  
What model? \_\_\_\_\_  
What computer is it attached to \_\_\_\_\_  
What application do you use it with? \_\_\_\_\_

Comments: Plotter is not printer facilities.

SURVEY OF TECHNICAL COMPUTING REQUIRMENTS  
 GEOLOGIC SETTING PROGRAM ELEMENT  
 CENTER FOR NUCLEAR WASTE REGULATORY ANALYSIS  
 SOUTHWEST RESEARCH INSTITUTE

RESPONDENTS NAME: William M. Murphy  
 TELEPHONE: 512 522 5263  
 PROFESSIONAL DISCIPLINE(S): geochemistry / geosciences

PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do?  
 Please consider needs for FYs 91-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC - WORKSTATION (WS) - MAINFRAME (MF) - SUPERCOMP (SC)		NU - NOT USED OC - OCCASIONAL OF - OFTEN
WORD PROCESSING:	<u>PC</u>	<u>Microsoft Word, Wordperfect</u>	<u>OF</u>
DATA BASE ACCESS AND MANAGEMENT:	<u>PC, MF</u>	<u>Cricket Graph, Excel, Ingress</u>	<u>OF</u>
* relational DBMS			<u>OC</u>
* access to SEPDB			
* DOE/NNWSI RIDB (Reference Info. Data Base)			
* USGS (US Geological Survey)			
* NOAA (Nat. Oceanic Atm. Admin)			
* NIST (Nat. Instit. Std & Tech)			
PROJECT MANAGEMENT:	<u>PC, MF</u>		<u>OC</u>
* AS			
PROGRAM ARCH. SUPPORT SYSTEM:	<u>PC, MF</u>		<u>OC</u>
* Sys. Reg. Analysis			
SPREADSHEETS:	<u>PC</u>	<u>Excel</u>	<u>OC</u>
BUSINESS REPORTS/ GRAPHICS:	<u>PC</u>	<u>Cricket Graph Illustrator 88</u>	<u>OF</u>
* flow charts			
* organizational charts			
* scheduling			
* other charts			
* data graphs			<u>OF</u>

**PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)**  
Please consider needs for FYs 90-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC		NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - OFTEN
	- SUPERCOMP (SC)		

COMMUNICATION/ EMULATION:	<u>PC</u>	<u>TCP-IP</u>	<u>OF</u>
* USNRC E-mail		<u>NCSA Telnet</u>	
* CNWRA E-mail			<u>OF</u>
* USNRC-CNWRA E-mail			
* national network E-mail			<u>OF</u>
* PC Emulation of mainframe terminal:			<u>OF</u>
- IBM 3270			
- tgraf tektronix (VAX)			
- etc.			

DISTRIBUTED COMPUTING / NETWORK OPS:	<u>PC</u>	<u>TCP-IP</u>	<u>OF</u>
* ethernet		<u>NCSA Telnet</u>	<u>OF</u>
* tcp/ip			<u>OF</u>
* modem			
* local area network (lan)			

PLOTTING/HARD- COFY:	<u>PC</u>		<u>OF</u>
* dot-matrix			
* color			
* thermal			
* pen-plotting			
* raster			
* digital-analog film recording			
* video recording			
* laser printer			<u>OF</u>

DIGITIZATION:			
* contour maps			
- digitizing tablet or table			
- contour to grid conversion			
- scanning			
* photographic imagery			
* video imagery			

PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)  
 Please consider needs for FYs 91-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC		NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - OFTEN
	- SUPERCOMP (SC)		

STATISTICS/  
 DATA ANALYSIS: PC, MF Cricket Graph OC  
 \* general stat analysis OC  
 \* time series analysis OC  
 \* spatial distribution analysis OC  
 \* orientation data  
 - fractures  
 - faults  
 - stress fields  
 - etc.

MAPPING/  
 CARTOGRAPHY: PC, MF  
 \* contouring OC  
 \* import digital elev. data  
 \* import other digital data  
 \* base maps  
 \* perspective display  
 \* well and core hole locations OC  
 \* surface facilities  
 \* subsurface structure

GEOLOGIC CROSS  
 SECTIONS:  
 \* section construction  
 \* section display  
 \* section analysis (balancing, etc.)

GEOGRAPHIC INFO. SYSTEMS:

COMPUTER AIDED  
 DRAFTING AND  
 DESIGN: PC Illustrator OC

**PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)**  
Please consider needs for FYs 91-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC		NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - OFTEN
	- SUPERCOMP (SC)		

DIGITAL IMAGE  
PROCESSING/  
ANALYSIS:

* landsat	_____	_____	_____
* digital photo imagery			_____
* petrographic image analysis			_____
* scanned bore hole imagery			_____
- bore hole televiewer			
- formation micro-scanner			

REFLEC/REFRAC  
SEISMIC:

* display / analysis	_____	_____	_____
* interpretation			_____
* mapping			_____
* merge with grav/mag			_____

GEOPHYSICAL  
LOG INTERP:

* display / analysis	_____	_____	_____
* interpretation			_____
* correlation			_____
* mapping			_____

GRAVITY/  
MAGNETICS:

* display	_____	_____	_____
* mapping			_____
* overlay on surface geol			_____
* merge with seismic			_____

HYDROLOGY

* data display	_____	_____	_____
* mapping			_____
* merge w/other data sets			_____

GEOCHEMISTRY

* data display	<u>PC, MF</u>	<u>cricket graph</u>	<u>OF</u>
* mapping			_____
* merge w/other data sets			_____

**PART ONE -- REQUIRED COMPUTING CAPABILITIES: What do you need to do? (cont.)**  
Please consider needs for FYs 91-95.

<u>ACTIVITY</u>	<u>COMPUTING TIER</u>	<u>APPLICATION SOFTWARE</u>	<u>FREQUENCY OF USE</u>
	- PC		NU - NOT USED
	- WORKSTATION (WS)		OC - OCCASIONAL
	- MAINFRAME (MF)		OF - OFTEN
	- SUPERCOMP (SC)		

.....  
.....  
**VISUALIZATION:**

* interactive graphics	_____	_____	_____
* three-dimensional graphics	_____	_____	_____
* geometric rendering	_____	_____	_____
* volume rendering	_____	_____	_____
* 3D geometric models	_____	_____	_____
- solid	_____	_____	_____
- wire frame (mesh)	_____	_____	_____

**MODELLING:**

* geohydrologic flow	<u>PC MF</u>	<u>variety</u>	_____
* transport	_____	_____	_____
- geochemical	_____	_____	_____
- heat	_____	_____	_____
* geological structure	_____	_____	_____
- 2D and 3D geometric	_____	_____	_____
- kinematic	_____	_____	_____
- dynamics / deformation mechanics	_____	_____	_____
* geophysical	_____	_____	_____
- geomagnetic	_____	_____	_____
- gravity	_____	_____	_____
* chemical / molecular	_____	_____	<u>OF</u>
* meteorological	_____	_____	_____
- precipitation	_____	_____	_____
- weather patterns	_____	_____	_____
- global circulation	_____	_____	_____

**APPLICATION**

**DEVELOPMENT:**

* ARTIFICIAL INTELLIGENCE	_____	_____	_____
* EXPERT SYSTEMS	_____	_____	_____

PART TWO -- INVENTORY

Please circle the appropriate response or provide the requested information.

- 1. Do you have a personal computer (PC) in your office? MAC  Yes  No
- 2. What type and model? MAC SE/30
- 3. If the answer to (1.) is 'No', is a PC available for your use at another location? Yes No. If 'Yes', where? \_\_\_\_\_
- 4. Do you consider this location convenient? Yes No
- 5. Please answer the following questions about the PC system in your or available for your use:

What size RAM (system memory)? 5 Mb.  
Does it have a floppy disk (diskette) drive?  Yes  No. How many? 1  
What size? 1.0Mb \_\_\_\_\_ 2.0Mb \_\_\_\_\_ 800 kb / 1.5 Mb  
Does it have a hard disk drive?  Yes  No. What size? 20 Mb.  
Does it have a math (floating point) coprocessor? Yes No.  
What type of coprocessor? \_\_\_\_\_

Is it linked to a mainframe?  Yes  No. What mainframe(s)? VAX 8700, CCF IBM, etc.

- Is it on a Local Area Network (LAN)? Yes  No
- Does it have an Ethernet card?  Yes  No
- Can you access the CNWRA Program Architecture Support System (PASS)?  Yes  No

What model of monitor do you have? MAC SE/30  
Is the monitor color or monochrome? monochrome  
Do you have a printer?  Yes  No. What model? Laserwriter II  
Do you have a modem? Yes  No . What model? \_\_\_\_\_  
Internal or External? What baud (data trans rate)? \_\_\_\_\_  
Do you have a pass word and user identification on either the NRC or a Southwest Research Inst. mainframe?  Yes  No

- 6. What applications software is currently installed on your PC?  
Wordperfect, TCP-IP, Cricket Graph, Microsoft Word, MacDraw, Illustrator 88, MPW, FORTRAN, Excel

PART TWO -- INVENTORY (cont.)

7. Do you have access to a minicomputer workstation with 3-dimensional graphics capability? Yes  No  What model? \_\_\_\_\_  
Do you consider the location convenient? Yes No
8. Do you have access to a plotter? Yes No  
What model? \_\_\_\_\_  
Is the location convenient? Yes No
9. Do you have access to a digitizing table? Yes  No   
What model? \_\_\_\_\_  
What computer is it attached to \_\_\_\_\_  
What application do you use it with? \_\_\_\_\_

## APPENDIX C: SUMMARY OF PERSONAL INTERVIEWS

A significant number of people are interested in utilizing DW370 with PROFS on the IBM mainframe in concert with the PC based DW4. The concern is that a current path of conversion of DW4 or Word Perfect documents to .RFT format for file transfer to PROFS is too cumbersome and time consuming.

There is a lot of interest and concern about the relationship between the DOE Site and Engineering Properties Data Base (SEPDB) and the Licensing Support System (LSS). How far will SEPDB be developed and how much more and what type of data will be added? How will it compare to LSS?

Access to and management of the various data base systems is considered to be important. The need for dBaseIII compatibility is seen to be an important issue. Access to SEPDB on the SwRI CCFVAX is too difficult. People complained about too many layers to log through. SEPDB and ORACLE need to be easier to use. Need hard copy output from SEPDB.

Comprehensive data base management system will be required to utilize large amount of fracture data expected to be generated from field work on Yucca Mt. and in ESF.

The development of Local Area Network Systems (LANS) frequently came up as an issue. This is considered to be very important. The main concerns here have to do with communication, sharing of data and information and having common access to applications without having to acquire a separate license for every individual. Network software is in big demand.

The capability to generate cross sections and maps for geologic data presentation is considered to be important. Digitization and other methods of graphics input associated with maps and cross sections are required. Gridding and contouring capability is required to generate maps from scattered data points and to verify maps of scattered data.

Three-dimensional graphics capabilities was a recurring theme. Almost everyone feels as though this is an important capability. The general requirement for standard graphics, 3-D graphics and visualization tools as post-processing steps to modelling is high. Hydrologic, heat flow and transport codes can be much enhanced by sophisticated graphics displays of the computed models. Emulation of Tektronix graphics on the PC is required to run programs with graphics output on VAX mainframes.

A very important area of concern was raised over and over. That of general technical computing support and availability of tools and utilities for general computing. Things like compilers, disk maintenance utilities and file transfer utilities are needed.

A clear cut need for PC or workstation based earthquake seismic data processing is apparent. Some distributed computing capability will be required here as well. About 50 1/2" (nine track?) tapes of raw data are available for hypocenter processing and computation of earthquake focal mechanism solutions. This will require access to a mainframe or workstation with tape drive and local disk storage

capacity sufficient to hold much of this data and the computed results. This task will also benefit from 3D graphics and visualization technology.

The tasks of transporting and compilation of code is a big issue. NRC scientists need to be able to move source code from one computing system to another and compile to run. Many modelling programs are not available as object code.

Much more local disk storage capacity is required.

Staff desires flexibility to acquire software to fit individual needs.

Most participants expressed a need for a UNIX workstation with interactive graphics capability and high resolution monitor. Most applications over the short to intermediate term will require effective integration of multiple operating systems (e.g., DOS, OS2, UNIX, VMS, CMS, COS).