SCIENTIFIC NOTEBOOK 59

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COMPANY NAME

ENGINEERING NOTEBOOK No.

User's Name ~~Joe Bangs~~ J. M. Menchaca/R. B. Hofmann

Plant Project 20-3702-1~~77/12~~ SEISM I Code Adaptation

Department 20-5702-~~002~~003

Used from 03/30/~~92~~ 19 92, To 19

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RECORD OF SEISM 1

Renner, here is the lab notebook I maintained for the SEISM 1 project. Joe Bangs

RBH

DOCUMENTATION

Primary documentation for SEISM 1 is B. Davis (1991). It is titled: "SHC Software and Data Base". The report was prepared by the Lawrence Livermore National Laboratory(LLNL) for the Office of Nuclear Reactor Regulation of the Nuclear Regulatory Commission. "SHC" is an acronym which stands for Seismic Hazard Codes, an early name for SEISM 1. Several versions of the SHC codes are under development. Therefore the name was changed to SEISM 1 for NRR's version, SEISM 2 for DOE's version and SEISM 3 for an anticipated revision for NRR. CNWRA is modifying SEISM 1 for use with high level nuclear waste repositories for the NRC Office of Nuclear Material, Safety and Safeguards. This version, under development, is termed SEISM 1.1 by CNWRA. Davis (1991) is a detailed instruction manual. Further, the code itself has many comment lines which assist the user. Additional users instructions are in the series of reports prepared by CNWRA and which are listed on page 23 of this Scientific Notebook. Descriptions of the code's functions are in a series of reports (several of the reports are in multiple volumes) by Bernreuter and various coauthors from LLNL. These are fully referenced in the reports listed on page 23, particulary in Hofmann and Bangs (1993).

RBH 6/14/1994

RBH

PRIMARY SOURCE

The SEISM 1 code (formerly named SHC and sometimes referenced as the Uniform Hazard Methodology, UHM has been under development at LLNL since 1979 (Bernreuter and Minchino, 1983 - NUREG/CR-1582, vol. 1). The SEISM 1 version of the code issued directly from them is the source of the code. It consists of one 150 megabyte tape and seven 3½ inch floppy disks which are in storage in the locked file cabinet at the CNWRA. Environment variables in the code were modified to permit it to operate on CNWRA SUN systems and the longitude range of the code extended to cover the entire U.S. The test problem supplied with SEISM 1 by LLNL was shifted 35° west and calculated with SEISM 1.1. Correct results were obtained. This version of the code, SEISM 1.1, along with the instruction manual by B. Davis (1991) have been supplied to the Idaho National Engineering Laboratory (INEL) where the code is installed on the INEL CRAY computer. Development of SEISM 1.1 is continuing. This Scientific Notebook and the reports on page 23 document CNWRA's efforts at modifying the code for use at a western U.S. high level radioactive waste repository. The code also resides on the SUN workstation, PINAFORE, under usr2/jmm and usr2/rbh. These are working copies. Those under usr2/jmm are under a software development control system.

Entries from page 1 through ~~#~~ #11 are by Joseph H. Bangs, Programmer. "Description, Equipment and Materials" are on pages 20-23. RBH 06/30/94

List of Computer Programs used in this project is on page 31 RBH 06/30/94

Compilation & Testing of SEISM code

Seismic Hazard Code

RBH

3/30/1992 Compiled modules for the SHC program. Tried to run the code but the default ~~file~~ data file directories are hardwired to non-existant directories.

Files with hardwired directories:

- bdir.f
- initial.f
- nsitecor.f
- rsitecor.f
- selsite
- shc

Hardwired files/directories

/data/hazard/results/	→ /u2/bangs/hazard/results/
/usr/codes/hazard	→ /u2/bangs/hazcodes
/data/hazard/datadir	→ /u2/bangs/hazard/datadir
/data/hazard/prdsdir	/u2/bangs/hazard/prdsdir
/data/hazard/comapdir	/u2/bangs/hazard/comapdir
/data/hazard/datadir/sitecor	/u2/bangs/hazard/datadir/sitecor
/data/hazard/datadir/psitecor	/u2/bangs/hazard/datadir/psitecor
/data/hazard/datadir/sitesid	/u2/bangs/hazard/datadir/sitesid
/psitesid	/u2/bangs/hazard/datadir/psitesid

4/3 Compiled aleas, SHC, Prds, Comap and Comb ~~Comp~~

Comp required modification of fortcomb to be a makefile

aleas required the -lX11 library to be included in the makefile libraries

Ran SHC and tried to execute resulting command script.

Did not work because data files were in wrong directories

I set up some tmp subdirectories to test filename problems

learned

PRDS expects 'afile' for ax# and writes 'bfile'

Comap - expects "disti" which is 'bfile' and 'altzoni' which is c#altz

- writes 'mapouti' and 'xiarea' and 'almapsi'

[Titles and objectives now required by QAP 001 are on pages 20 - 23]

JMM 05 Jan 94

4/3 continued Command lines for SHC processing

1. Prds i = ax1 then site number being processed
   generates 'bfile', 'print', 'plot'

2. comap i1 = bfile i2 = c1altz
   generates 'almaps:', 'mapanti', 'xiarea'

3. aleas d = ~~xiarea~~ No almaps: s = c1s:s m = menu
   program executed for 30-40 minutes the bus error occurred and core dumped

4/7 program aleas is working ok using correct input file
   output files o and t I renamed t as t1 for use in "comb"

4 comb ⇒ comb looks for 'combin' and 't1' as its input file

Test Run

4/10 I ran SHC for site 2 - Shearon Harris.
After SHC completed I followed the following sequence to run the command file generated by SHC.

0. Copied atnfb, sitecor and gmxfb from /hazcodes to /u2/bangs/hazard/datadir
1. Copied c*s:s to the /hazard/datadir directory - 1 time shot
2. Ran PRDS for each ax* file in tmp-prds directory
   using: prds i = ax? o = bfile? where ? is the expert number
   after a return I entered "2" from the Keyboard
   to indicate the site used in this run.
   see prds.bat
3. Copied Bfiles created in step 2 to tmp-comap directory
4. Ran Comap for each bfile* in the tmp-comap directory
   using: comap i1 = bfile? i2 = c?altz o1 = f?s@
   where: ? is the expert number
   @ is the site number
5. Copied f?s@ files to /u2/bangs/hazard/compdir
6. Changed directory to /u2/bangs/hazard/results/92041
7. Executed "command" script → results ⇒ everything worked but parameters are slightly different - need to work with this

4/21 I modified the "amenu" file created by SHC to match the parameters contained in the "amenu" file supplied by ~~Los Alamos~~ (Livermore?) Lawrence Livermore National Laboratory (LLNL).

PB3H 06/15/1994

I got very similar results to the original OCACZ file but not an exact match. I suspect the random number generator is accounting for the slight variation in the results. To test this I ran "aleas" five times and then plotted selected curves from the outputs for comparison. The ave of the curves showed a near exact match to the original. Thus, I believe the programs are working compatibly with the ~~original~~ performance on the original author's machine

Next
- Find attenuation function — 3 terms up to 5
- understand how it is stored / format

4/24 The attenuation functions for SHC and ALEAS are contained in the file ~~ATF~~ ATNFB. Renner wishes to get a good understanding of the coefficients in this file and how they are used to create the attenuation curves used in this application

4/29 ~~The~~ I printed and organized the SHC software
I located the subroutines containing the models used by "aleas" to derive the attenuation curves

4/23-24 I met with Renner to work through the Seism data files/structures. He would like a road map of how the codes and data sets are related to ~~each~~ one another and also the contents of the files. He asked that I spend one week deciphering this before I go on vacation

* - do first

10/4
1. - Enable graphics on Sun - any and all *
2. - Document everything I did to get Seism/ working *[2]
3. - Hanson-McGuire attenuation function find where it is in the code. *[3,4] new attenuation functions
4. - Near-field attenuation functions 3.5 - Campbell Joiner-Boore
5. - Flow diagram for fault displacement
   A. Paleo offset
   B. Historical earthquakes
6. Western US digital maps USGS or CIA maps *[3] ← before April
7. Acquire texts that are references for seism.

7a- Source zonations for western US.

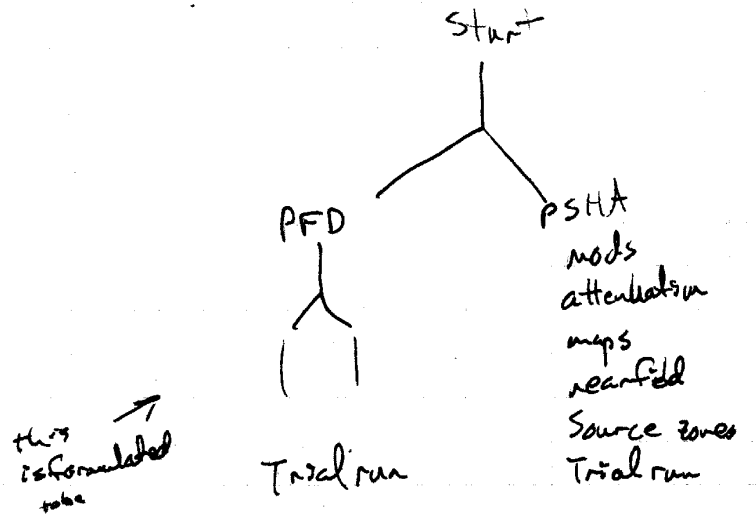
10/4/92 continued

8. Prepare example run w/ western US. code *

9. think about dividing repository into subsites for Sitesid.

10. Look at probability distributions in seism1 - understand how they work

(April) May 14 - Updates made to SEISMI
August - Documented test analysis
Sept - Training for NRC staff



Documenting Changes I made to seism1 code to get it to run on the NARA Sun 50 workstation 2, BREN. RBH 06/15/94

10/9/1992 RBH I investigated the plotter.f routine to see what kinds of device drivers were documented in the source code - none were. I decided to play around with the device type numbers. I found an undocumented postscript driver. I ran the program with this driver enabled and found that I indeed could get hardcopy printouts from the plotter.f subroutine

	Driver #	Output Format
change in Plotter.f	1	X11 window
; Comb.f	2	Postscript file
(comb.f contains plotter.f)	3	Postscript file
	4	Tek format? (garbage on the Sun)
	5	program crash
	6	

11/12/92 I reinstalled seism1 on Bren after Ron reconfigured the system for Arc/Info. I'm now on U3 instead of U2

Renner asked me to see if seism1 would work on Budhi's IPC or IPK?

My account on the IPC is as follows

account - bangs
IP - 129.162.200.73
volume - usr2
hostname - doc

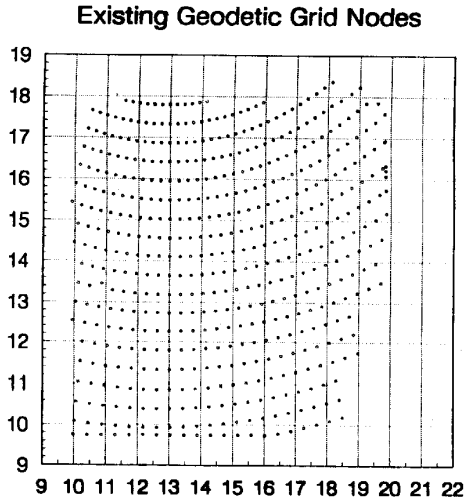
TASK: Incorporation of a whole U.S. map into the code to replace the eastern U.S. only map. RJH 06/15/1994

11/30/92 Renner has requested that I put the western US map into seism1. I created a new directory for these new modifications called $\boxed{\text{haz_wrk}}$. Determine where distance measurements are made and how are the maps used

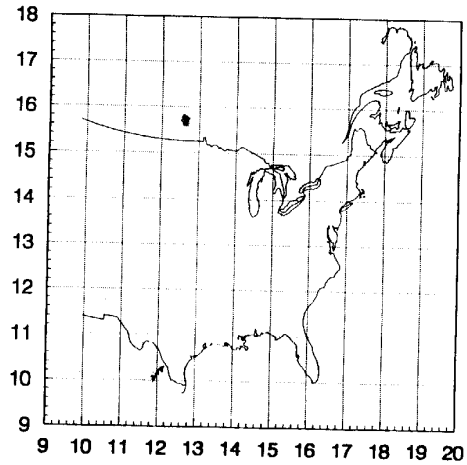
12/1/92

The file USMAP contains a set of X-Y coordinates that define the U.S. boundary - only eastern U.S.? need to plot this data

The file eltxylg contains grid nodes that describe latitude/long pairs on the USGS geodetic grid ← need to plot this to see the extent of the grid

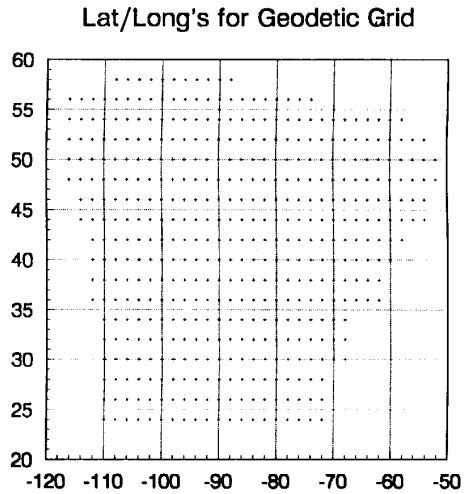


eltxylg



usmap

12/1/92



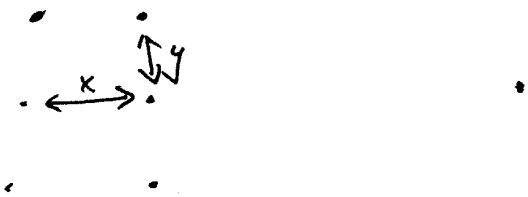
eltxylg

These files/plots were generated using Graftool

12/4/92 The eltxylg and USmap files do not contain the entire US.
∴ I need to extend the grid and the USMap lat/longs to the west coast.

Approach

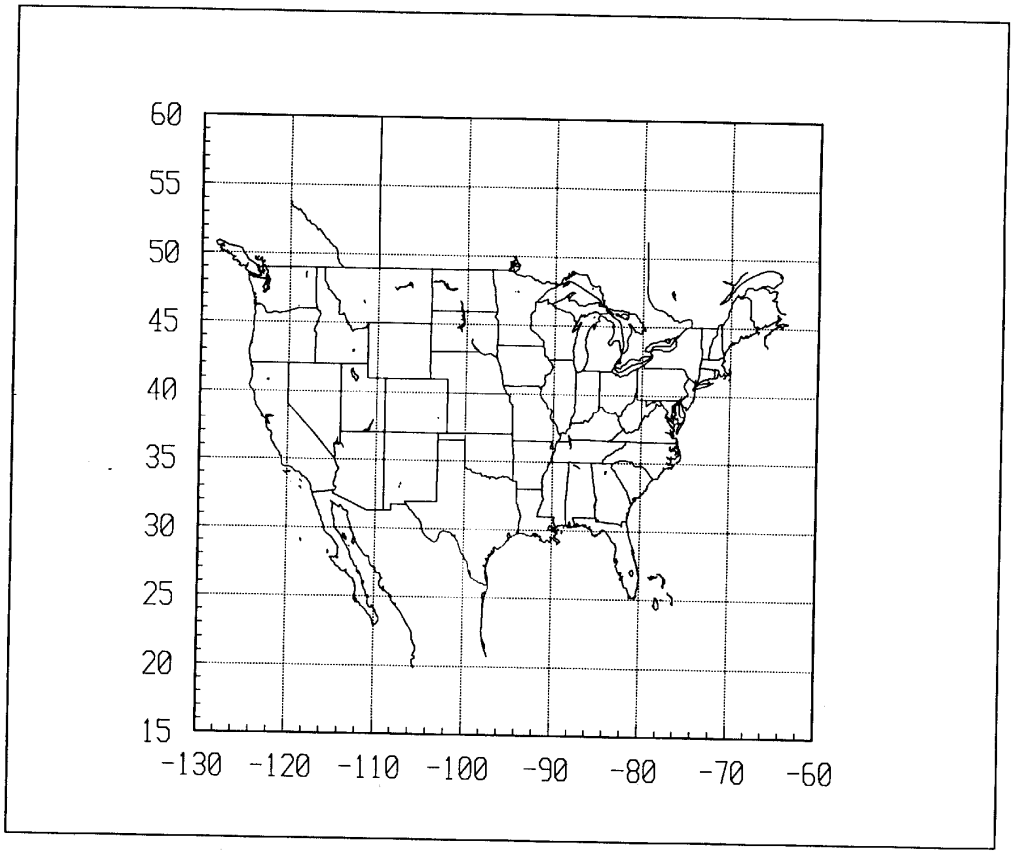
1. Determine relationship (distance) between grid nodes along latitudes and longitude



Sources of Latitudes and Longitudes are

not useful
- 129.173.4.5 /pub/comp.archives/sci.geo.geology
- 133.137.4.3 /.a/sraFTP2b/arch/arch/comb.archives/auto/sci.geo.geology
- 146.169.2.1 /usenet/comp.archives/auto/sci.geo.geology

12/8/92 New data source 192.70.225.78 ← not reall

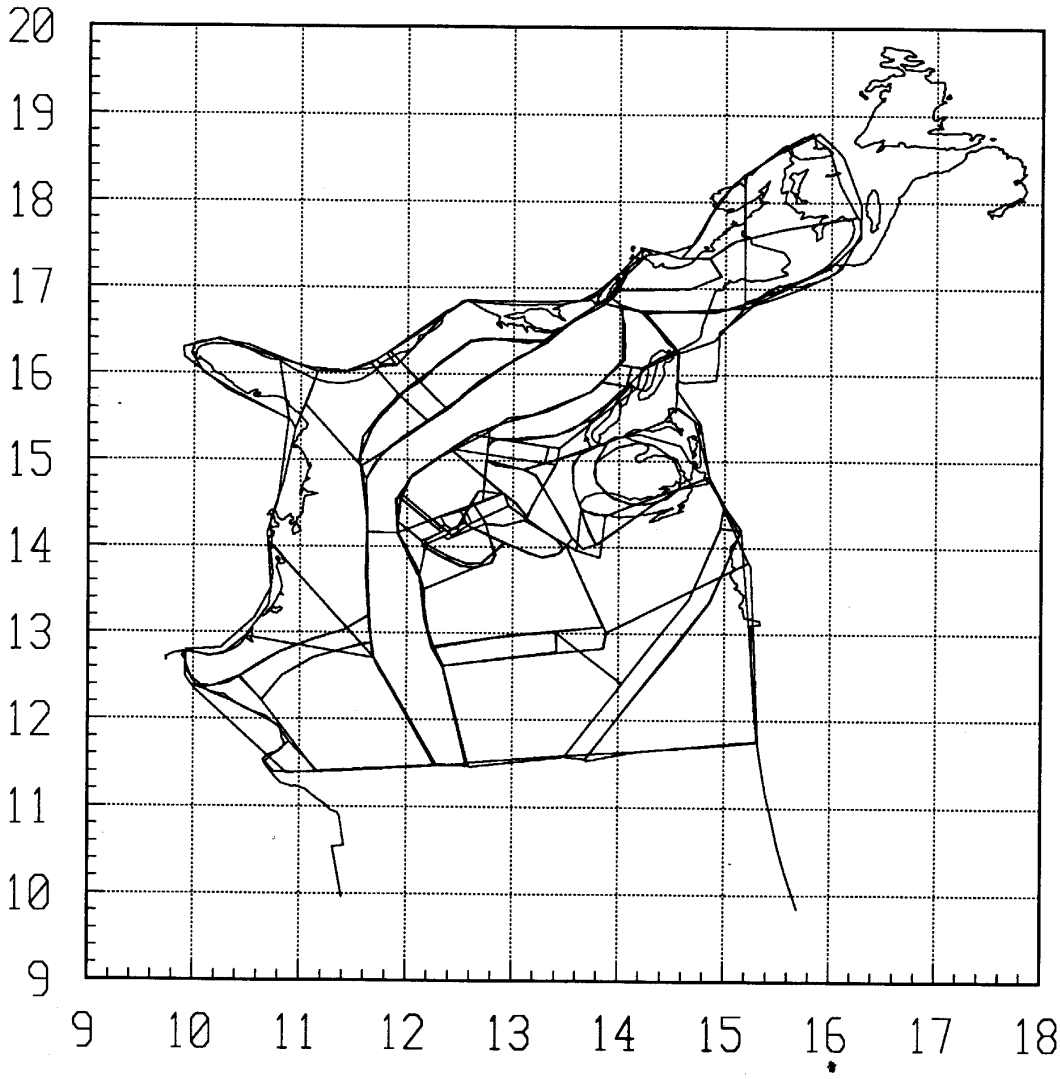


12/11/92 I have data for Western U.S. now

12/14/92 Need to test how to get a map out of seism1
Am testing switches in AK# files that select the zone and US map plotting options. Am trying to generate map output file - successful. Work on reformatting the plot file for display with Grafted

New charge number for SEISM1 20-5702-003

Install SEISM1 on SS10 and test speed.
Tomorrow work with plot files



12/15/92 This is a Grafted plot of the zone / US map for expert 1 generated by PRDS.

Notes: 1. Do not exchange X-Y columns, they are correct as is

2. a 15.000 0.000 indicates the start of a new vector.

Next step: 1. write an X windows plotting program to display this data on the Sun Console.

2. Extend the grid west

3. Add western US. coordinates / modify source to read and process the new coordinate

TASK: Determine if SEISM 1 will compile on the SGI 30 workstation 10. RBH 06/15/1994

12/29/92 I installed SEISM1 on the SS10 to evaluate the performance of the code compared to the SSZ (bran)

error when I run command ldso Undefined symbol -d_mod ha

I'm having alot of trouble finding the correct object files to run SEISM1 on the SS10. The problem was due to a compiler compatible with LLNL mathematical libraries used in the code. RBH 06/15/94.

RBH

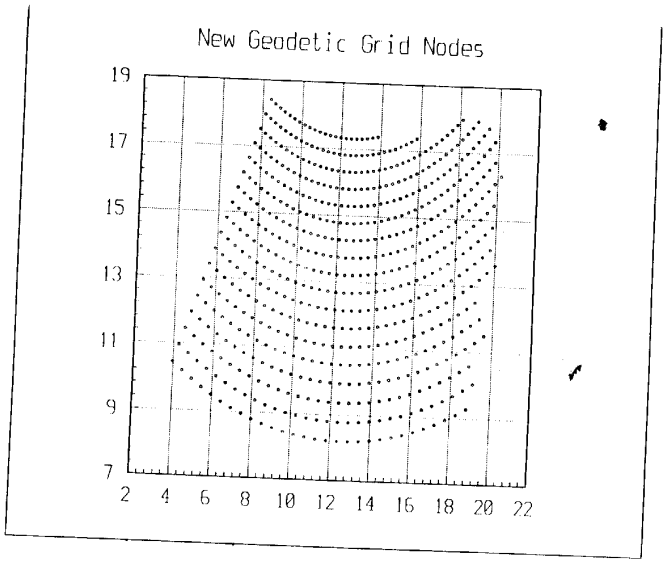
1/20 1993 Found out problem with SEISM1 on SS10: need to recompile all object files with new version of compiler. Renner says to hold off on pursuing this

1/25-1/27 Getting projection parameters set for western US coords incorporation into map data contained in SEISM1

1/29 Parameters for Lambert Conformal Projection in GMT

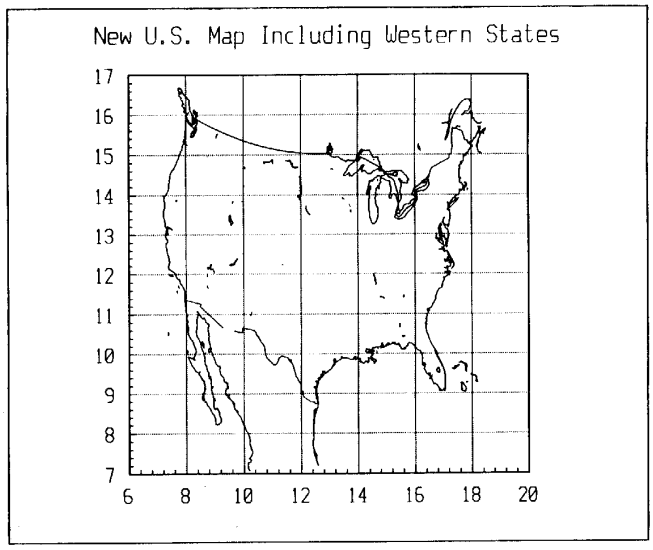
mapproject <filename> -R-130/-5/0/90 -J1-97/45/27/85/1:15,000,000

2/4 Created a new eltxylg data file for the SEISM1 code. The new file contains a large enough grid to define the entire U.S. Some processing still remains to complete the new file. Also need to plot the grid to verify that it has a reasonable match to the previous eltxylg grid.



2/9 Above is the new geodetic grid for plotting USmap and zonations. Next step is to build a US map file containing western US coordinates.

2/10



This is the new USmap for SEISM1 - has been converted to the geodetic grid used by the SEISM1 Code.

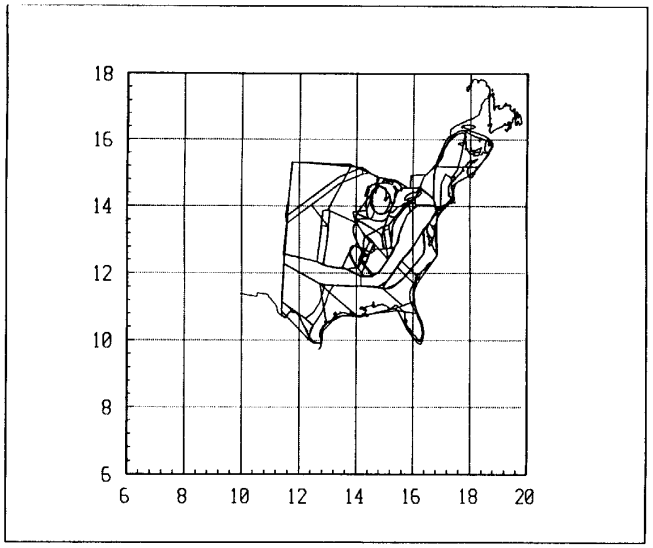
Next steps:

2/11 ✓ 1. Convert this map file to the format used by the SEISM1 code

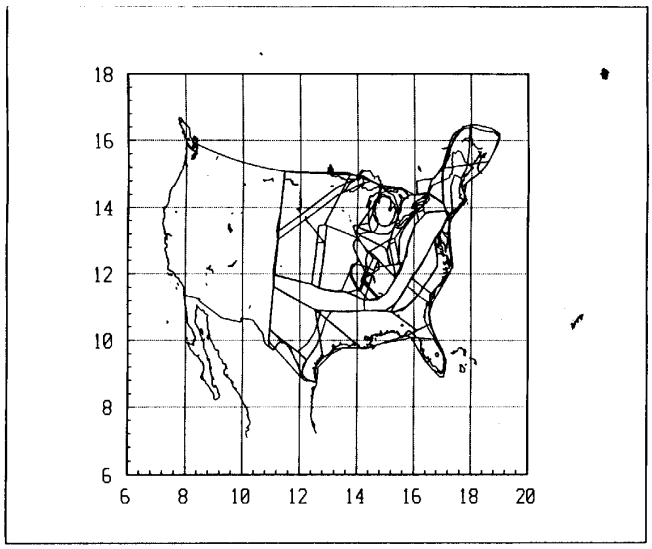
2. Modify SEISM1 to read the additional coordinates in both the USmap file as well as the ELTXYLG file

2/16 Implemented changes in PRDS.f to read the new eltxylg and USmap files necessary to display western US. Map.

Old USmap w/ expert 1 zonation



New USMap w/ expert 1 zonation

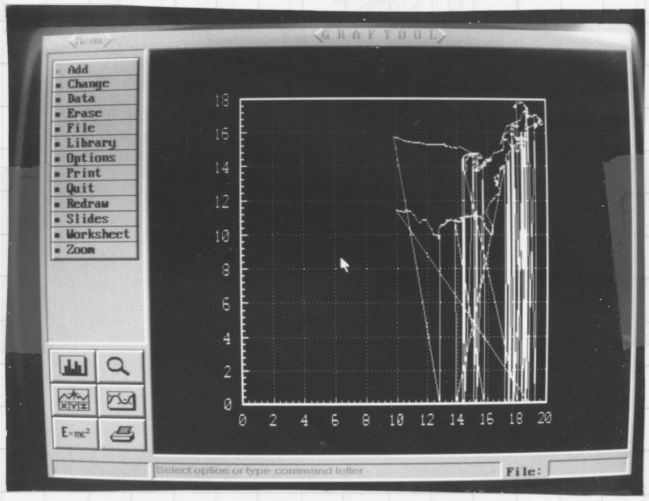


Entries on this and following pages are by J. M. Menchaca unless otherwise noted RJH 06/15/94

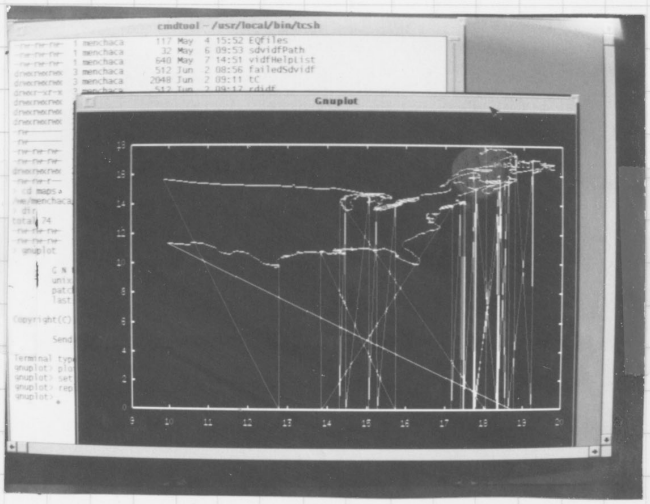
04 Aug 93 Task is to generate a map as shown on page 5

generated map using Graftool, Gnuplot and Quattro Pro

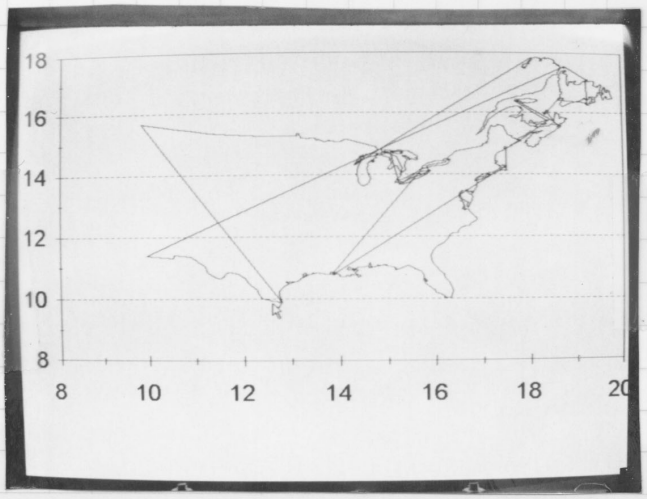
Graftool



~~Quattro~~ ~~or~~ Gnuplot



Quattro Pro



using if(B?=0, B?-1, B?)

These are the data points that are causing the problem.

Possiply the 0 values are vector terminators. (see note 2 on page 8)

X	Y
1.80382e+01	0.000000e+00
1.43008e+01	0.000000e+00
1.44627e+01	0.000000e+00
1.50524e+01	0.000000e+00
1.52680e+01	0.000000e+00
1.57377e+01	0.000000e+00
1.38492e+01	0.000000e+00
1.71625e+01	0.000000e+00
1.73892e+01	0.000000e+00
1.74660e+01	0.000000e+00
1.74647e+01	0.000000e+00
1.77525e+01	0.000000e+00
1.83304e+01	0.000000e+00
1.77200e+01	0.000000e+00
1.85323e+01	0.000000e+00
1.83569e+01	0.000000e+00
1.83218e+01	0.000000e+00
1.86273e+01	0.000000e+00
1.92301e+01	0.000000e+00
1.92241e+01	0.000000e+00
1.87599e+01	0.000000e+00
1.27822e+01	0.000000e+00
1.77359e+01	0.000000e+00

these data points are distributed throughout the file and not in a contiguous block as shown here.

generated using grep 00000 usmap

06 Aug Spoke with J. Bangs. Says I need access to bren. That's where haz-wrk is. Called A Johnson left message on phone mail requesting access to bren.

16 Aug 93 need to get (from bren)

data dir ✓
comapdir ✓
results ✓
prdsdir ✓

29 Nov 93 Problem: to convert the formulas posted on the opposite page to FORTRAN subroutines.

results are on pages 16

06/15/1994

— ex Sect

Equations

— 1 Campbell (1987) for soils <10m thick, constrained

— This may be the same as model D RBH 30/11/93

Modified Formula: (1) $\ln a = -2.5508 + 0.85M - 1.25\ln[(R_{rp}^2 + 16)^{1/2} + 0.0872\, e^{0.678M}] - 0.0059R$

Note that the last term is not corrected for epicentral distance because its value is significant only at large distances where distance definition differences are small.

2 Campbell (1987) for soils <10m thick, constrained fault directivity added.

Modified Formula: (2) $\ln a = -1.6008 + 0.85M - 1.25\ln[(R_{rp}^2 + 16)^{1/2} + 0.0872e^{0.678M}] - 0.0059R$

See note for the previous modified formula above. This formula is to be used only with faults whose strike to fault-to-site-line angle is less than 10 arc degrees.

3 Atkinson (1981)

Modified Formula: (3) ~~$\ln a = \ln 34.9 + 0.575M - \ln(R_{rp}^2 + 196)^{1/2} + \frac{1}{2}\ln(1.15M - 2.35) + \ln 1.13$~~

$\ln a = 3.4305 + 0.575M - \ln(R_{rp}^2 + 196)^{1/2} + \frac{1}{2}\ln(1.15M - 2.35)$ for ~~<20°~~ R<111km

(4) ~~$\ln a = \ln 82.4 + 0.573M - \ln R - 0.00587R$~~

$\ln a = 4.4116 + 0.573M - \ln(R_{rp}^2 + 196)^{1/2} - 0.00587R$ for ~~>20°~~. R>111km

4 Joyner and Boore (1981).

Modified Formula: (5) $\text{Log } a = -1.02 + 0.249M - \log(R_{JB}^2 - 53.29)^{1/2} - 0.00255(R_{JB}^2 + 53.29)^{1/2}$

These may be a typo & some model structure form. RBH 30/11/93

5 Author: (6) Schnabel and Seed (1973). These curves are empirical and are difficult to fit with formulae. Either a table-look up scheme is employed or a curve fit or spline algorithm is used to represent the curves. Distance is to the surface projection of the causative fault which is assumed here to be equivalent to the surface projection of the fault rupture area. Acceleration is the peak recorded on either of the two horizontal accelerograph components. There is no modified formula. These curves are used as presented by the authors.

Table RBH 30/11/93

30 Nov 93

Definition of terms:

M = Richter magnitude defined as ML to M = 6.5 and MS for M > 6.5, where ML is the Richter Local magnitude (Richter, 1935 and Gutenberg and Richter, 1942), and MS is the 20 second surface wave magnitude (e.g., Gutenberg and Richter, 1945).

R or r = distance in km as defined by various authors.

R_{rp} = shortest distance to the rupture plane. Note that this distance is difficult to define prior to an earthquake. Estimates are developed as discussed in Section 3.1.2 and on Figure 23.

A = Acceleration in 'g's

e = 2.7183

RBH 30/11/93

Equations (1) $\ln a = c_1 + c_2 M + c_3 \ln[(R^2 + c_4)^{1/2} + c_5 e^{c_6 M}] - c_7 R$ | Same form

(2) $\ln a = c_1 + c_2 M + c_3 \ln[(R^2 + c_4)^{1/2} + c_5 e^{c_6 M}] - c_7 R$

(3) $\ln a = c_1 + c_2 M - \ln(R^2 + c_3)^{1/2} + \frac{1}{2}\ln(c_4 M + c_5)$

(5) $\text{Log } a = c_1 + c_2 M - \log(R^2 - c_3)^{1/2} + c_6 R$

(4) $\ln a = c_1 + c_2 M - \ln(R^2 + c_3)^{1/2} - c_6 R$

(6) – Table look up and interpolation.

← Line is not a "cross out". It is intended to ensure that all 2 sets in items are identified on drawings and none are missed. RBH 06/5/94

JMM

17 Dec 93

```
C---+----1----+----2----+----3----+----4----+----5----+----6----+----7--
C
C     model a (model index=1)
C     Campell (1987), for soils < 10m, constrained
C
C---+----1----+----2----+----3----+----4----+----5----+----6----+----7--

      real*8 function amodel (xm,d,c)

c  IMPLICIT STATEMENT

      implicit real*8 (a-h,o-z)

      dimension c(1)

      r=dsqrt(d*d+16)

      alnr=dlog(r)

      alna=c(1) + c(2)*xm + c(3)*alnr + c(4)*dexp(c(5)*xm) + c(6)*d
C---+----1----+----2----+----3----+----4----+----5----+----6----+----7--

      amodel = exp(alna)
      return
      end
```

used xm

revised 17 Dec 93 JMM

```
C---+----1----+----2----+----3----+----4----+----5----+----6----+----7--
C
C     model b (model index=2)
C     Campell (1987), for soils < 10m, constrained, fault directivity added
C
C---+----1----+----2----+----3----+----4----+----5----+----6----+----7--

      real*8 function bmodel (xm,d,c)

c  IMPLICIT STATEMENT

      implicit real*8 (a-h,o-z)

      dimension c(1)

      r=dsqrt(d*d+16)

      blnr=dlog(r)

      blna=c(1) + c(2)*xm + c(3)*blnr + c(4)*dexp(c(5)*xm) + c(6)*d
C---+----1----+----2----+----3----+----4----+----5----+----6----+----7--

      bmodel = exp(blna)
      return
      end
```

17 Dec 93 JMM

please note that model a & b are identical. Their coefficients will be different.

17 Dec 93

```
C---+----1----+----2----+----3----+----4----+----5----+----6----+----7--

c      ********   functions for prediction models

C---+----1----+----2----+----3----+----4----+----5----+----6----+----7--

c     model a (model index=1)
c     Campell (1987), for soils < 10m, constrained

      real*8 function amodel (xm,d,c)

c  IMPLICIT STATEMENT

      implicit real*8 (a-h,o-z)

      dimension c(1)

      r=dsqrt(d*d+16)

      alnr=dlog(r)

      alna=c(1) + c(2)*xm + c(3)*alnr + c(4)*dexp(c(5)*xm) + c(6)*d

C---+----1----+----2----+----3----+----4----+----5----+----6----+----7--

      amodel = exp(alna)
      return
      end
```

Jim M 17 Dec 93

rev JSI

```
C---+----1----+----2----+----3----+----4----+----5----+----6----+----7--
C
C     model b (model index=2)
C     Campell (1987), for soils < 10m, constrained, fault directivity added
C
C---+----1----+----2----+----3----+----4----+----5----+----6----+----7--

      real*8 function bmodel (xm,d,c)

c  IMPLICIT STATEMENT

      implicit real*8 (a-h,o-z)

      dimension c(1)

      r=dsqrt(d*d+16)

      blnr=dlog(r)

      blna=c(1) + c(2)*xm + c(3)*blnr + c(4)*dexp(c(5)*xm) + c(6)*d

C---+----1----+----2----+----3----+----4----+----5----+----6----+----7--

      bmodel = exp(blna)
      return
      end
```

17 Dec 93 Jim

please note that model a & b are identical. Their coefficients will be different.

```
C---+----1----+----2----+----3----+----4----+----5----+----6----+----7--
C
C     model c (model index=3)
C     Atkinson (1981)
C
C---+----1----+----2----+----3----+----4----+----5----+----6----+----7--

      real*8 function cmodel (xm,d,c)

c  IMPLICIT STATEMENT

      implicit real*8 (a-h,o-z)

      dimension c(1)

      c1=dlog(c(1))
      c7=dlog(c(7))

      r=dsqrt(d*d+196)

      clnr=dlog(r)

      clna=c1 + c(2)*xm + c(3)*clnr + c(4)*dlog(c(5)*xm+c(6)) + c(7)

C---+----1----+----2----+----3----+----4----+----5----+----6----+----7--

      cmodel = dexp(clna)/980
      return
      end
```

JMM
17Dec93

```
C---+----1----+----2----+----3----+----4----+----5----+----6----+----7--
C
C     model d (model index=4)
C     Joyner and Boore (1981)
C
C---+----1----+----2----+----3----+----4----+----5----+----6----+----7--

      real*8 function dmodel (xm,d,c)

c  IMPLICIT STATEMENT

      implicit real*8 (a-h,o-z)

      dimension c(1)

      r=dsqrt(d*d+53.29)

      dlogr=dlog10(r)

      dloga=c1 + c(2)*xm + c(3)*dlogr + c(4)*d

C---+----1----+----2----+----3----+----4----+----5----+----6----+----7--

      dmodel = 10**(dloga)
      return
      end
```

JMM
17Dec93

20 Dec 93 For an equation of the form $y = mx + b$

$$m = \frac{(y_2 - y_1)}{(x_2 - x_1)}$$

~~$b = -y$ wrong~~ should be $y = b$ for $x = 0$ (from assuming a value of $x = 0$)

$$y - y_1 = m(x - x_1) + b$$

$$m = \frac{0.3950 - 0.4264}{5 - 4} = -0.0314$$

$$y - 0.4264 = -0.0314(x - 4) + b$$

$$y - 0.4264 = -0.0314x +$$

wrong try again

$$\frac{y - y_1}{x - x_1} = \frac{y_2 - y_1}{x_2 - x_1} = m$$

$$y - y_1 = m(x - x_1)$$

$$y - y_1 = mx - mx_1$$

$y = mx - \{mx_1 + y_1\}$ no need ~~for the~~ for the parenthesis. It's a matter of fact the parentheses make the equation wrong the way I wrote them. JMM

for $x = 0$

$$y = -mx_1 + y_1$$

$$y = -(-0.0314)(4) + 0.4264$$

$$y = 0.3008$$

Distance: JMM

	Schnabel & Seed 6
1	
2	
3	
4	0.42640
5	0.39500
6	0.36860
7	0.34570
8	0.32140
9	0.30000
10	0.28210
14	0.22140
20	0.15510
30	0.09710
40	0.06690
50	0.04930
60	0.03800
70	0.02820
80	0.02180
90	0.01550
100	0.01000

20/20

20 Dec 93

JMM

Distance:	Schnabel & Seed 6	m (slope)	b (interrce
1			
2			
3			
4	0.42640		
5	0.39500	-0.03140	0.55200
6	0.36860	-0.02640	0.52700
7	0.34570	-0.02290	0.50600
8	0.32140	-0.02430	0.51580
9	0.30000	-0.02140	0.49260
10	0.28210	-0.01790	0.46110
14	0.22140	-0.01518	0.43385
20	0.15510	-0.01105	0.37610
30	0.09710	-0.00580	0.27110
40	0.06690	-0.00302	0.18770
50	0.04930	-0.00176	0.13730
60	0.03800	-0.00113	0.10580
70	0.02820	-0.00098	0.09680
80	0.02180	-0.00064	0.07300
90	0.01550	-0.00063	0.07220
100	0.01000	-0.00055	0.06500

20 Dec 93

27 Dec 93

Schnabel & Seed for 5 Magnitudes

distance (km)	m = 5.2	m = 5.6	m = 6.6	m = 7.6	m = 8.5
1					
2					
3					
4	0.1800	0.4264	0.6261	0.7000	0.7102
5	0.1633	0.3950	0.5841	0.6659	0.6796
6	0.1433	0.3686	0.5443	0.6307	0.6489
7	0.1289	0.34570	0.5114	0.6002	0.6250
8	0.1146	0.3214	0.4796	0.5773	0.6080
9	0.1023	0.3000	0.4534	0.5534	0.5875
10	0.0909	0.2821	0.4284	0.5330	0.5705
14	0.0636	0.2214	~~0.2484~~ 0.3489	0.4648	0.5148
20	0.0386	0.1557	0.2682	0.3886	0.4546
30	0.0205	0.0971	0.1844	0.2956	0.3750
40	0.0136	0.0669	0.1320	0.2341	0.3159
50	0.0091	0.0493	0.0977	0.1921	0.2682
60	0.0080	0.0380	0.0705	0.1556	0.2296
70	0.~~0057~~ 0068	0.0282	0.0614	0.1244	0.1943
80	0.~~0034~~ 0046	0.0218	0.0432	0.1004	0.1622
90	0.0023	0.0155	0.0341	0.0886	0.1356
100		0.0100	0.0284	0.0705	0.1144

Posted
5 Jan 94

Title: SEISM 1 code modification for western U.S. sites

Names of investigators:	Dates
Renner B. Hofmann, seismologist	3/30/1992 -
Joseph Bangs, programmer	3/30/1992 - 4/30/1993
J. Martin Menchaca, programmer	8/03/1993 -

JMM

Objectives:

1. Modify the Lawrence Livermore National Laboratory (LLNL) SEISM 1 probabilistic seismic hazard analysis (PSHA) code to permit its operation on computers available to CNWRA. The source code is commented for CDC, CRAY and SUN systems. Environment variables are embedded in the code to some extent so paths to input files must be fully specified in several subroutines before compiling. There may be other problems in commenting out lines of code not specific to a particular platform. Three libraries of functions are used in the code. They have compiled under the SUN FORTRAN compiler version 2.3.1. Linking may not be possible with other SUN compilers.

2. Modify the code for use at western U.S. sites, specifically the Yucca Mountain, Nevada area. The LLNL Seism 1 code was created for only eastern U.S. sites. The code was developed to reevaluate seismic risk at 69 nuclear power plant sites east of the Rocky Mountains. Longitudes for sites west of this area are not accepted by the code. An internal map for locating seismically active regions encompasses only the eastern part of the U.S.

3. Create coding for earthquake ground motion attenuation functions which are applicable in the western U.S. The code version supplied contains only a selection of attenuation functions for the eastern U.S. Other computations made with SEISM 1 (also known as SHC) contained other attenuation function coding. The general form of the attenuation functions must be in the code. Coefficients and exponents for these general forms are supplied in an input file. Therefore, some eastern U.S. attenuation functions may be applicable in the western U.S. by changing the input file.

JMM

Posted
5 Jan 94

4. Develop input data typical of the Yucca Mountain, Nevada area and perform a test analysis computation.

5. Investigate the practicability of using portions of the SEISM 1 code for the probabilistic analysis of fault movement.

6. Modify code by development of a graphical user interface to ease data entry of inputs. This objective was added for FY94

Equipment and materials to be used: JMM

1. The SEISM 1 code and CNWRA SUN systems

Measurement parameters and calibration requirements:

1. A test input file and CRAY results were provided by LLNL. The file is for the Shearon Harris nuclear power plant. Note that these files are sometimes labeled "Limerick" but are not to be confused with other input files for the Limerick nuclear power plant. The test problem is to be calculated after modifications in objective 1 and again after modifications in objective 2 but with -35° of longitude added to each longitude in the test problem.

2. There is no test input file for a calculation using Yucca Mountain data. Individual attenuation functions will be checked by hand calculation and/or commercially available equation solvers to ensure that they return the correct values.

Personnel requirements:

The seismologist should be experienced in the use of and methodologies used in probabilistic seismic hazard analyses. Programmers should be experienced in FORTRAN and the development of user interfaces

Controlled environmental conditions - no requirement

Measurement accuracy and precision:

JMM

Posted
5 Jan 94

The SEISM 1 code uses a Monte Carlo calculational procedure with either a random or specified seed. On SUN platforms. results will not be identical for individual calculations. Risk calculations are adequate if within 5% of the supplied test results. Variations are usually much less than 5%. Higher precision may be obtained by increasing the number of iterations. See "SHC Software and Data Base" by B.C. Davis, March 1991, a draft LLNL report for instructions concerning the SEISM 1 code including the method of increasing precision.

Potential sources of uncertainty and error:

1. Earthquake ground motion attenuation functions supplied with the code use epicentral distance. Western U.S. attenuation functions, to be incorporated in the code, use various other distance measures. The functions or the code should be altered to provide a consistent distance measure preferably one compatible with epicentral distance. Differences in distance are pronounced at short distances, e.g. less than 30km and usually are negligible at distances beyond about 70km

JMM

2. When using faults as source zones, compensation for shallow dipping fault s, e.g. less than 70° may be necessary by broadening the fault zone and restricting earthquake depths to specified zones parallel to the fault strike.

3. For computers with precisions less than a CRAY, increased numbers of iterations will be required to maintain the same precision in risk calculations.

JMM

Posted 5 Jan 94

REPORTS

Several CNWRA reports have been prepared which document stages in planning and carrying out modifications to the SEISM 1 code. The following list is as of 01/05/1994. The code version under software control as per CNWRA TOP-18 has been verified to operate correctly on SUN system computers with modifications described in the reports to permit calculations throughout the united states. Verification was performed by comparing the results of the Shearon Harris test calculation and again with the test problem shifted 35° to the West.

JMM

JMM

Posted 5 Jan 94

1. Identification of Pertinent Regulatory Requirements for Systematic Regulatory Analysis of Issues Related to Probabilistic Fault Displacement and Seismic Hazard Analysis in 10 CFR Part 60, 7 pages. February 1991. Prepared by R.B. Hofmann

2. Probabilistic Fault Displacement and Seismic Hazard Analysis Literature Review. CNWRA 91-013, 147 pages. November 1991. Prepared by R.B. Hofmann

3. Work Plan: To Assist the NRC in the Development of Probabilistic Fault Displacement and Seismic Hazards Analysis Codes and Methods, 6 pages. February 1992. Prepared by R.B. Hofmann

JMM

4. Acquisition of the LLNL SEISM 1 Source Code, 3 pages. March 1992. Prepared by R. B. Hofmann

5. Assessment of requirements for Exercising the SEISM Code on Computer Systems Available to the CNWRA, 8 pages. May 1992. Prepared by R.B. Hofmann

6. Selection of Alternate Acceleration Attenuation Functions for the Basin and Range, 12 pages. August 1992. Prepared by R.B. Hofmann

7. SEISM 1 Code Modifications and Application: Assessment of Needed Effort, 6 pages. August 1992. Prepared by R.B. Hofmann

8. Regulatory History and Intent for Probabilistic Fault displacement and Seismic Hazard Analysis (PFD&SHA), 31 pages. September 1992. Prepared by R.B. Hofmann

9. Probabilistic Fault Displacement and Seismic Hazard analysis Literature Assessment. CNWRA 91-013, Rev. 1. 176 pages. February 1993

10. SEISM 1 Code: Adaptations for Use in the Western U.S., 43 pages May 1993. Prepared by R.B. Hofmann and J.H. Bangs

11. Summary of the May 17-18, 1993 CNWRA Advisors Meeting and Reports on Fault Displacement and Seismic Hazard analysis. 135 pages. July 1993. Prepared by R.B. Hofmann

JMM

21 Jan 94 Modifying C Model (Atkinson, 1981) (~~dividing~~ multiplying by 980)

JMM

Expert 3

JMM

Author: Atkinson (1981) for hypocentral distance with acceleration given in cm/sec^2.

Basic Formula: $a = 34.9\, e^{(0.575M)} R^{-1} (1.15M - 2.35)^{1/2}$ for distances less than 20°. (2nd figure of App. C.)

$a = 82.4\, e^{(0.573M)} R^{-1} e^{(-0.00587R)}$ for distance >20°. (Atkinson's version of Joyner and Boore's formula)

JMM

JMM

Modified Formula: $\ln a = \ln 34.9 + 0.575M - \ln(R_{rp}^2 + 196)^{1/2} + \frac{1}{2}\ln(1.15M - 2.35) + \ln 1.13$ (3.5525; 0.1222)

$- \ln 980$

$= -3.213 + 0.575M - \ln(R_{rp}^2 + 196)^{1/2} + \frac{1}{2}\ln(1.15M - 2.35)$ for <20 km (3.675) (3rd figure of App. C.)

$\ln a = \ln 82.4 + 0.573M - \ln R - 0.00587R - \ln 980$ (4.4116)

$= -2.476 + 0.573M - \ln(R_{rp}^2 + 196)^{1/2} - 0.00587R$ for >20°. km (4.4116)

21 Jan 94 Modifying A & B model (multiplying by 980)

JMM

Expert 1

Author: Campbell (1987) for soils <10m thick, constrained by far-field recordings, for average peak accelerations from 2 horizontal components, with distance defined as the shortest to the fault rupture plane.

Basic Formula: $\ln a = -2.893 + 0.85M - 1.25\ln[R + 0.0872\, e^{0.678M}] - 0.0059R$ (9th figure of App. C.)

ln 980 = 6.8876

Modified Formula: $\ln a = -2.771 + 0.85M - 1.25\ln[(R_{rp}^2 + 16)^{1/2} + 0.0872\, e^{0.678M}] - 0.0059R$ (4.1166)

Note that the last term is not corrected for epicentral distance because its value is significant only at large distances where distance definition differences are small. For peak acceleration.

Expert 2

Author: Campbell (1987) for soils <10m thick, constrained by far-field recordings plus fault directivity, for average peak accelerations from 2 horizontal components, with distance defined to the closest part of the fault plane and compensation for fault directivity added.

Basic Formula: $\ln a = -2.370 + 0.85M - 1.25\ln[R + 0.0872\, e^{0.678M}] - 0.0059R$ (10th figure of App. C.)

Modified Formula: $\ln a = -2.251 + 0.85M - 1.25\ln[(R_{rp}^2 + 16)^{1/2} + 0.0872 e^{0.678M}] - 0.0059R$ (4.6366)

See note for the previous modified formula above. This formula is to be used only with faults whose strike to fault-to-site-line angle is less than 10 arc degrees. For peak acceleration.

Revising Cmodel.f 25 Jan 94

$a_{max} = 82.4\ e^{(-0.573M)}\ R^{-1}\ e^{(-0.00587R)}$ where R is hypocentral distance.

If in terms of epcentral distance, r, the equation becomes:

J.M.M. 25 Jan 94

For a focal depth of 10km

$$a_{max} = 82.4\ e^{(0.573M)}\ (100 + r^2)^{-½}\ e^{[-0.00587(100 + r^2)^{1/2}]}$$

For a focal depth of 14 km substitute 196 for 100 in the above.

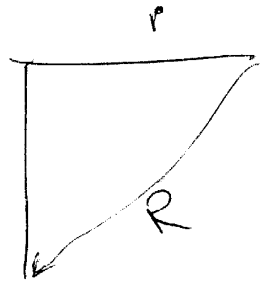
Plot both equations on a log-log scale for M = 5.6. It may be more convenient to use a logarithmic equation:

$$\ln a_{max} = 0.573M - 0.00587(100 + r^2)^{+½} - ½\ln (100 + r^2) + \ln 82.4$$

196 196

J.M.M. 25 Jan 94

h=10 or 14



revising Cmodel.f

J.M.M. 25 Jan 94

$\ln a_{max} = \ln 82.4 + 0.573M - 1/2 \ln(100+r^2)$ ~~$- 0.00587R$~~

$- .00587(100+r^2)^{1/2}$

$4.4116 + 0.573*m - \frac{1}{2}\ln(196+r^2) - 0.00587(196+r^2)^{1/2}$

$4.4116 + 0.573*m - \ln[(196+r^2)^{1/2}] - 0.00587[(196+r^2)]^{1/2}$

(c1) = 4.4116 (c2) = 0.573* (c3) = -1 c4 = -0.00587

Modifying d model 25 Jan 94

Expert 4

Author: Joyner and Boore (1981). This is an empirical equation. Distance is measured to the surface projection of the fault slip area assuming that the effective fault slip area is 7.3 km below the earth's surface for magnitudes of 5.3 to 7.4. Acceleration is defined as the peak acceleration recorded by a horizontal accelerograph component.

Basic Formula: $\text{Log } A = -1.02 + 0.249M - \log r - 0.00255r + 0.26P$ (1st figure of App.C)

25 Jan 94 Wrong multiplying by 980

Note that if P = 1 in the last term the formula is for the 84th percentile. If P = 0, the formula is for the 50th percentile. Separate formulae are not provided for rock and soil sites. $r = (d^2 + 7.3^2)^{1/2}$, where d = distance to the surface projection of the fault rupture zone. Log is to the base 10.

This is in 980-1.02 Jan may need for 980-1.02

Modified Formula: $\text{Log } a = \cancel{-1.02} + 0.249M - \log (R_{JB}^2 + 53.29)^{1/2} - 0.00255R_{JB}$

~~5.8676~~ 1.9712

Note that the last term is not modified for distance measures because it is significant only at distances where the correction is small. For peak accleration. The assumed depth to the fault rupture zone is decreased from 7.3km to 4km.

RBH 06/15/1994

Modifying Source Zones

4 Feb 94

Objective:

Many of the source zones near the site (those within 40 km) were defined too ~~rare~~ narrowly. (0.23 km) At this point I will make them at least 1 km wide.

Using the scale printed on the "Fault map of the Site Vicinity", I have determined that ~~for~~ each 1/10 degree latitude represents 8.63 km. I understand this is an estimate since the length of each degree of latitude decreases with each degree ~~moved~~ of longitude moved northward but for this study we will define those differences as negligible.

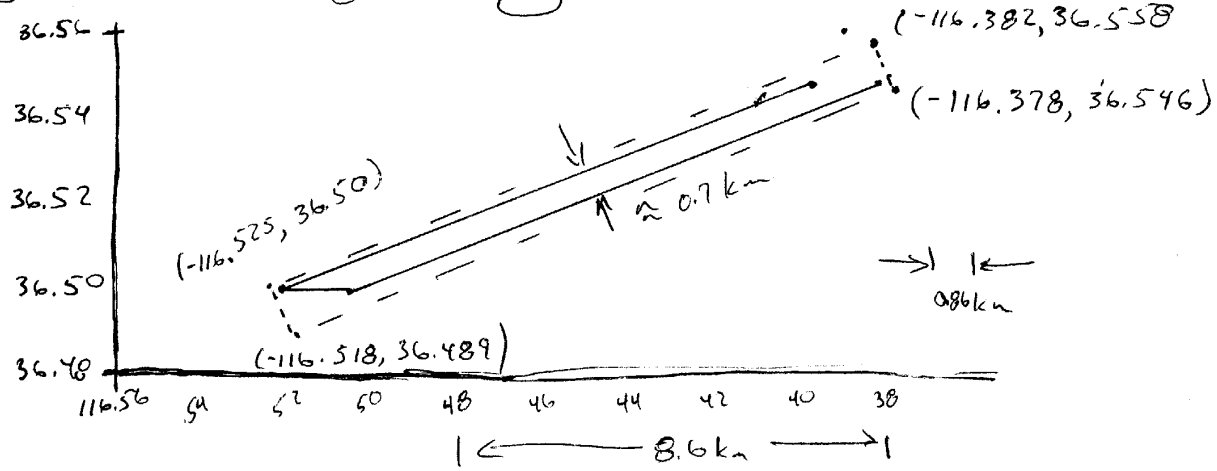
In order to have a zone 1 km wide the separation of the left & right latitude lines should be separated by 0.0116 degrees latitude and each ~~latitude~~ longitude by 0.0092 degrees (see below)

$$\frac{8.63\,\text{km}}{0.1\,\text{degrees}} = \frac{1\,\text{km}}{x\,\text{degrees}}\ ; \quad x\ \text{degrees} = 0.0116$$

Each longitude degree is estimated to represent 109 degrees and each 1/10 degree is ≈ 11 degrees

$$\frac{10.90\,\text{km}}{0.1\,\text{degree}} = \frac{1\,\text{degree}}{y\,\text{degrees}}\ ; \quad y = 0.0092\ \text{degrees}$$

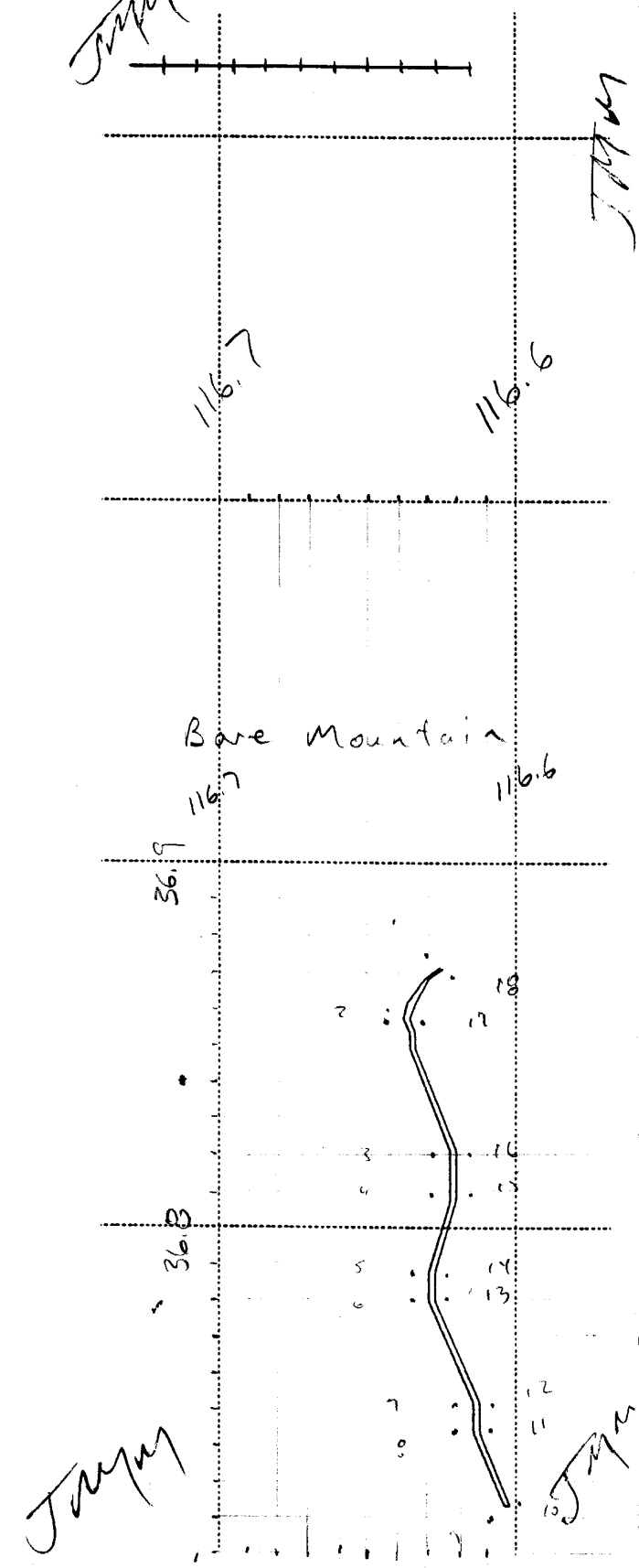
Adjustment to Armagosa Valley (AR)



Bare Mountain Modifications 7 Feb 94

JMM

	Long	Lat
1	116.6301	36.875
2	116.6230	36.858
3	116.6290	36.820
4	116.6290	36.809
5	116.6350	36.788
6	116.6350	36.780
7	116.6210	36.751
8	116.6210	36.743
9	116.6010	36.720
10	116.5980	36.723
11	116.6090	36.743
12	116.6240	36.751
13	116.6240	36.780
14	116.6160	36.788
15	116.6160	36.809
16	116.6310	36.820
17		36.857
18	116.6210	36.869



RJH 6/15/94

Fault Displacement Hazard Coding

12 April 94

$$M = 6.5 + 1.260 \log D$$

$$M - 6.5 = 1.260 \log D$$

$$\log D = \frac{M - 6.5}{1.260}$$

$$D = 10^{\left(\frac{M-6.5}{1.260}\right)}$$

Revised by R. Hofman

$$\ln(D) = 1.82745 * (M - 4.23)$$

14 June 94 The ln (D) formula, above, is from Slemmons (1977) which is referenced in the 9th listed document on page 23. RBH 6/14/94

An error-message-free calculation for fault displacement hazard was accomplished May 12th by J. M. Menduca using the Slemmons formula. The calculation was for the Solitario Canyon fault. Resulting Risks were an order of magnitude less than reported by Somerville (1987) using a different procedure. Somerville (1987) is also referenced in the 9th report listed on page 23. The range of presumption made in Somerville (1987) resulted in 2 orders of magnitude in estimated hazard (annual exceedance return period for a specified displacement somewhere on the entire fault plane. Budgetary constraints at the time have not permitted resolution of the differences in risk between the 2 studies. A report concerning development of the SEISMI.1 Code to date has been submitted for review within CNWRA. Its title is: RBH 6/14/94

"SEISMI.1 Test Analysis" RBH.

An additional source of information is a "history notebook" containing the first and last screenful of entries on each of three windows for each day work by J. M. Menduca. The notebook is kept by J. M. Menduca. RBH 6/14/94

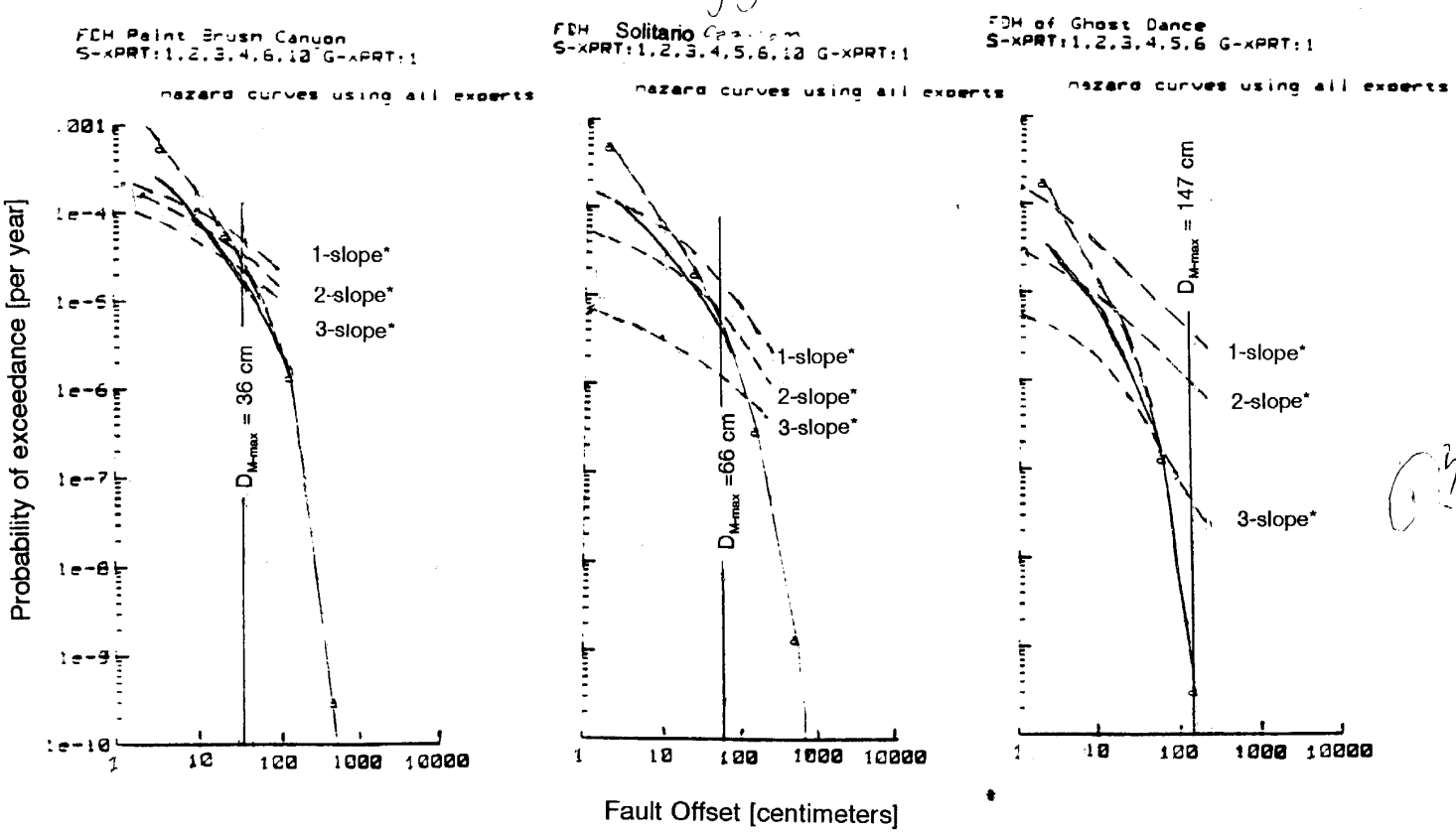
16 June 1994 A Summary of work performed, with input files and output, are in CNWRA 94-014 in preparation on this date. The title of the report is: "SEISMI.1 Test Analysis". The report is approximately 70 page long with approximately 200 page of appendices.

RBH 6/16/94

June 29, 1994. RBH

Re. 2nd 14 June 94 paragraph on page 29. additional plots of Somerville et al. (1987) results were made on graphs of SEISMIC.1 output generated for 3 faults by J. M. Menchaca. Results of this manalysis, and their analysis, are reasonably compatible over the range of displacements to the maximum average displacement that the fault can support. The figure below was drafted for the SEISMIC.1 Test Analysis Report in preparation.

RBH



RBH

RBH

*Fault Displacement Hazards calculated by Somerville et al. (1987) assuming 1, 2, or 3 slope slip-rate functions.

Range of hazards calculated by Somerville et al., (1987)

Figure 4-2 Arithmetic Average Hazard for Several Faults

RBH 06/29/1994

RJH 6/29/94

List of Computer Programs used in the Analysis of and Updating of the SEISM 1 Code

FORSTRUCT v 4.1
SCCS (Unix Utility - Source Code Control System as implemented in SPARCworks v 2.0 and the SOLARIS v 2.0 UNIX Operating Sytem.
QUATTROPRO v 1.0 (for plotting).
GRAPHTOOL v 3.3 (for plotting).
MATLAB v. 7 (for plotting and Monte Carlo simulations).
F77 FORTRAN SPARC Compiler v. 1.3.1
International Mathmatical and Statistical Library (IMSL) v 1.0 (1985)
TV80LIB (A proprietary Lawrence Livermore National Laboratory, LLNL, library of graphics functions) 1982 version or later to 1985.
DIGLIB (A proprietary Sandia National Laboratory library of mathematical functions updated by LLNL) 1986 version.

Note: The versions of TV80LIB and DIGLIB functions supplied with the SEISM 1 code were compiled under Sun FORTRAN compiler v. 1.3.1. Use of more recent compilers may not allow proper linking of the functions with the machine code created from SEISM 1 source code. These libraries are available for public use but versions for new equipment and updated operating systems are not regularly provided and may not be readily available outside of the respective National Laboratories that generated them.

RJH 06/29/94

November 14, 1994 — No further work on SEISM 1 was performed from 06/29/94 to this date. Initiated work to determine the sensitivity of SEISM 1 output to the presence of a background seismic zone. The 1991 SHC Software and Database manual by B. Davis of LLNL does not discuss how to enter background zone information in the input files except that a flag must be set to 1 and zone information must be at the end of the list of digitized zones. Therefore, M. Moshesh printed out the 3 source zone export input files for the test case (Shearon Harris NPP). The files are labled "Limerick". These plants may be close enough geographically that they share the same source zone input files and other files. Using these input files as a model, preparation of a revised set of AX/J, CJ/SIS and alternate zone files was initiated. RJH

Pages 1 through 31 of this Scientific Notebook were reviewed for compliance with QAP-001 in response to Corrective Action Request 94-02. Corrections and clarifications were made as appropriate. In some cases, the date of a change will reflect the date of this review rather than the date of the original Scientific Notebook entry.

Randy Folck
SwRI - QA
12/01/94

Editing axj files

08 Dec 94

Expert files ax1, ax2, ax3, ax4, ax5, ax6 and ax10 were edited to incorporate one background zone

```
pinafore% sccs edit -r1.3 ax*

SCCS/s.ax1:
1.3
new delta 1.3.3.1
194 lines

SCCS/s.ax10:
1.3
new delta 1.3.2.1
244 lines

SCCS/s.ax2:
1.3
new delta 1.3.4.1
174 lines

SCCS/s.ax3:
1.3
new delta 1.3.3.1
114 lines

SCCS/s.ax4:
1.3
new delta 1.3.3.1
154 lines

SCCS/s.ax5:
1.3
new delta 1.3.2.1
118 lines

SCCS/s.ax6:
1.3
new delta 1.3.3.1
388 lines

SCCS/s.ax7:
1.3
new delta 1.4
214 lines
pinafore% 214 lines
pinafore%
```

This is a list of the SID version of each axj file that was edited with the new background zone.

JMM 08 Dec 94

JMM 08 Dec 94

```
Window 1 @ 13:09
 1  gdata
 2  dir
 3  sccs info
 4  sccs prs ax1
 5  sccs edit ax1 ax2 ax3 ax4 ax5 ax6 ax7 ax10
 6  vi ax1
 7  sccs unedit ax1 ax2 ax3 ax4 ax5 ax6 ax7 ax10
 8  sccs prs ax1 ax2 ax3 ax4 ax5 ax6 ax7 ax10
 9  sccs prs ax1 ax2 ax3 ax4 ax5 ax6 ax7 ax10 > prs.lst
10  vi prs.lst
11  pcxput prs.lst
12  man sccs
13  sccs edit -r1.3 ax*
14  214 lines
15  pinafore% vi ax1
16  vi ax1
17  grep background ax*
18  vi ax1
19  grep background ax*
20  history | grep vi
21  vi ax[1-7] ax10
22  cat > ~/08DecHist
23  history > ~/08DecHist
24  history >> ~/08DecHist

Window 2 @ 13:10
 1  dir
 2  cls
 3  cat 120894axjFileStatus
 4  cat > 120894axjFileStatus
 5  dir
 6  vi 120894axjFileStatus
 7  pcxput 120894axjFileStatus
 8  pwd
 9  dir hi*
10  ls -lD h*
11  ls -ld
12  ls -ld h*
13  cat >> ~/08DecHist
14  history >> ~/08DecHist
```

JMM 08 Dec 94

This is a complete list of the commands issued on 8 Dec 94.

In particular, please note command 13 of Window 1. This command was used to generate the editable files listed immediately above.

JMM 08 Dec 94

No sccs delta will be issued until the files have been finalized.

JMM 08 Dec 94

Editing cjaltz files 09 Dec 94

Attempt to edit cjaltz files. After closer study of Renner Hofmann's notes on the single sheet of cjaltz files, I see the need to clarify some of his comments

```
pinafore% sccs edit -r1.1 c*altz

SCCS/s.c10altz:
1.1
new delta 1.1.1.1
27 lines

SCCS/s.c1altz:
1.1
new delta 1.1.1.1
25 lines

SCCS/s.c2altz:
1.1
new delta 1.1.1.1
22 lines

SCCS/s.c3altz:
1.1
new delta 1.1.1.1
19 lines

SCCS/s.c4altz:
1.1
new delta 1.1.1.1
21 lines

SCCS/s.c5altz:
1.1
new delta 1.1.1.1
21 lines

SCCS/s.c6altz:
1.1
new delta 1.1.1.1
38 lines

SCCS/s.c7altz:
1.1
new delta 1.2
26 lines
pinafore%
```

JMM 09 Dec 94

This is a list of of the S10 version of each cjaltz file ~~version~~ being edited, ~~of~~ Editing is not yet complete. Need to clarify some points with R. Hofman.

JMM 09 Dec 94

Window 1

```
espsun
grep rlogin .cshrc
rlogin espsun -l menchaca
gdata
dir
vi ax[1-7] ax10
grep number ax*
vi ax10
grep number ax
number ax
grep number ax*
grep number ax* > numberOfZones
sccs info
sccs prs c[1-7] c10sis
sccs prs c[1-7]sis c10sis
sccs prs c*sis
dir SCCS
man sccs
ddir
sccs prs c1sis
sccs prs c*sis
sccs prs c1sis > cjsisFileStatus
sccs prs c2sis >> cjsisFileStatus
sccs prs c3sis >> cjsisFileStatus
sccs prs c4sis >> cjsisFileStatus
sccs prs c5sis >> cjsisFileStatus
sccs prs c6sis >> cjsisFileStatus
sccs prs c7sis >> cjsisFileStatus
sccs prs c10sis >> cjsisFileStatus
vi cjsisFileStatus
vi cjsisFileStatus
pcxput cjsisFileStatus
sccs prs c1altz c2altz c3altz c4altz c5altz c6altz c7altz c10altz > cjaltzPrs.lst
vi cjaltzPrs.lst
pcxput cjaltzPrs.lst
cat > ~/09DecHist
vi ~/09DecHist
history >> ~/09DecHist @ 13:48
vi ~/09DecHist
copy cjaltzPrs.lst checkoutcjaltz.scr
cp cjaltzPrs.lst checkoutcjaltz.scr
vi checkoutcjaltz.scr
del checkoutcjaltz.scr
sccs edit -r1.1 c*altz
pinafore%
vi c[1-7]altz c10altz
cat >> ~/09DecHist
history >> ~/09DecHist @ 14:47
```

These are the list of commands issued on 9 Dec 94 while attempting to edit the cjaltz files

JMM 09 Dec 94

Window 2 @ 14:48

```
gdata
cat numberOfZones
sccs info
cat > 120994cjaltzFileStatus
pcxput 120994cjaltzFileStatus
history | grep cat
cat numberOfZones
pushd .
ghzrd
grep altz
grep altz *.f
grlts
gresults
gresult
dir
cd 008
dir
vi command
ghzrd
vi comap.f
grep comap *.f
pwd
dir
cat >> ~/09DecHist
history >> ~/09DecHist
```

JMM 09 Dec 94

JMM 09 Dec 94

Editing cjaltz files (continued) 16 Dec 94

After detailed analysis of c2altz, c3altz and c4altz of the original limerick files, the cjaltz files of Yucca Mountain were edited. An additional zone was added to the columnar list of zones and the linear list of zones the number of zones count above and below the linear list ~~was~~ were each incremented by 1.

JMM 16 Dec 94

```
Window 1
14  dir
15  cd full
16  dir
17  cd hzrd
18  dir
19  cd ..
20  dir
21  cd hzcds
22  dir
23  cd
24  dir
25  df /usr2
26  df /usr3
27  pwd
28  gdata
29  dir
30  pcxput c3altz
31  cd
32  cd seism1
33  dir c*.altz
34  dir c*altz
35  dir
36  cd ..
37  cd
38  dir
39  ddir
40  cd bran
41  cd bren
42  dir
43  cd bags
44  cd bangs
45  dir
46  cd haz_wrk
47  dir
48  vi c3altz
49  pcxput c3altz
50  pcxput c3altz
51  pwd
52  cat > ~/16DecHist
53  history >> ~/16DecHist @ ~ 10:30
54  gdata
55  vi c[1-7]altz c10altz
56  sccs info
57  pcxput c*altz
58  history
59  cat >> ~/16DecHist
60  history >> ~/16DecHist @ 13:01
```

JMM 16 Dec 94

JMM 16 Dec 94

This is a partial list of commands issued during the analysis of the original limerick files and editing of the Yucca Mountain cjaltz files.

JMM 16 Dec 94

Editing cjsis files

19 Dec 94

This is a list of each SID version being edited.

```
pinafore% sccs edit -r1.1 c1sis
1.1
new delta 1.1.3.1
96 lines
pinafore% ^c1s^c2s
sccs edit -r1.1 c2sis
1.1
new delta 1.1.3.1
82 lines
pinafore% ^2^3
sccs edit -r1.1 c3sis
1.1
new delta 1.1.3.1
61 lines
pinafore% ^3^4
sccs edit -r1.1 c4sis
1.1
new delta 1.1.3.1
75 lines
pinafore% ^4^5
sccs edit -r1.1 c5sis
1.1
new delta 1.1.2.1
68 lines
pinafore% ^5^6
sccs edit -r1.1 c6sis
1.1
new delta 1.1.3.1
181 lines
pinafore% ^6^7
sccs edit -r1.1 c7sis
1.1
new delta 1.2
110 lines
pinafore% ^7^10
sccs edit -r1.1 c10sis
1.1
new delta 1.1.2.1
110 lines
pinafore%
```

JMM 19 Dec 94

JMM 19 Dec 94

JMM 19 Dec 94

This is a partial list of the commands issued while editing the cjsis files

JMM 19 Dec 94

```
Window 1 @ 15:55
 19  cd datadir
 20  dir
 21  dir SCSC
 22  dir SCCS
 23  sccs prs c[1-7]altz
 24  gdata
 25  dir
 26  vi c[1-7]altz
 27  dir
 28  sccs prs c[1-7]sis c10sis
 29  dir *sis
 30  sccs prs c[1-7]sis
 31  dir SCCS
 32  sccs prs c1sis
 33  sccs prs c[1-7]sis
 34  history
 35  dir SCCS/c*sis
 36  dir SCCS
 37  pwd
 38  dir
 39  sccs edit -r1.1 c[1-7]sis c10sis
 40  sccs edit -r1.1 c1sis
 41  sccs edit -r1.1 c2sis
 42  sccs edit -r1.1 c3sis
 43  sccs edit -r1.1 c4sis
 44  sccs edit -r1.1 c5sis
 45  sccs edit -r1.1 c6sis
 46  sccs edit -r1.1 c7sis
 47  sccs edit -r1.1 c10sis
 48  pwd
 49  dir
 50  pwd
 51  grep expert c*sis
 52  grep exp c*sis
 53  grep exp\. c*sis
 54  grep region c*sis
 55  pwd
 56  vi c[1-7]sis c10sis
 57  cat > ~/19DecHist
 58  history >> ~/19DecHist
```

JMM 19 Dec 94

JMM 19 Dec 94

```
Window 2 @ 15:56
  1  cat cjsisEditStatus
  2  cat > cjsisEditStatus
  3  pcxput cjsisEditStatus
  4  cd
  5  cd histories
  6  dir
  7  cd ..
  8  dir
  9  cat 15JunHist
 10  ^[^[
 11  cat 05AugHist
 12  cat 05Aug94Hist
 13  who
 14  pwd
 15  cd seism1
 16  dir
 17  pwd
 18  cd ..
 19  cd bren
 20  dir
 21  cd bangs
 22  dir
 23  cd haz_wrk
 24  dir
 25  vi *.sis
 26  vi c*sis
 27  grep zones c*.sis
 28  grep zones c*sis
 29  pwd
 30  cd ..
 31  dir
 32  cd hazcodes
 33  dir
 34  vi seism.f
 35  pwd
 36  gdata
 37  vi ax[1-7] ax10
 38  cat >> ~/19DecHist
 39  history >> ~/19DecHist
```

JMM 19 Dec 94

Editing cjsis files (continued) 20 Dec 94

Editing of cjsis files completed

JMM 20 Dec 94

JMM 20 Dec 94

```
Window 1 @ 13:32
     1  pcxput 19DecHost
     2  pcxput 19DecHist
     3  gdata
     4  vi c[1-7]sis
     5  vi c[1-7]sis c10sis
     6  pcxput c[1-7]sis c10sis
     7  cat > ~/20DecHist
     8  history ?? ~/20DecHist
     9  history >> ~/20DecHist
```

This is a list of commands executed during the editing of the cjsis files

JMM 20 Dec 94

Changing ~~Editing~~ Fortran Files

JMM 20 Dec 94

```
pinafore% sccs prs comb.f
SCCS/s.comb.f:

D 1.2 94/12/20 14:21:17 mmencha 2 1      00033/00010/02739
MRs:
COMMENTS:
axis adjustments to display Fault Displacement Hazard Plots

D 1.1 94/05/05 14:22:30 mmencha 1 0      02749/00000/00000
MRs:
COMMENTS:
date and time created 94/05/05 14:22:30 by mmencha

pinafore% ^comb^plotter
sccs prs plotter.f
SCCS/s.plotter.f:

D 1.2 94/12/20 14:21:19 mmencha 2 1      00029/00008/00572
MRs:
COMMENTS:
axis adjustments to display Fault Displacement Hazard Plots

D 1.1 94/05/05 10:46:05 mmencha 1 0      00580/00000/00000
MRs:
COMMENTS:
date and time created 94/05/05 10:46:05 by mmencha

pinafore% sccs get -r1.1 comb.f plotter.f
```

JMM 20 Dec 94

recalled SID version 1.1 of plotter.f & comb.f to restore axis labels to normal

JMM 20 Dec 94

JMM 20 Dec 94

```
Window 1
     1  pcxput 19DecHost
     2  pcxput 19DecHist
     3  gdata
     4  vi c[1-7]sis
     5  vi c[1-7]sis c10sis
     6  pcxput c[1-7]sis c10sis
     7  cat > ~/20DecHist
     8  history ?? ~/20DecHist
     9  history >> ~/20DecHist
    10  view ~/.cshrc
    11  ghzcds
    12  ls -l *model.f
    13  sccs prs amodel.f
    14  sccs prs bmodel.f
    15  sccs get amodel.f
    16  ls -l ?model.f
    17  dir
    18  dir *.f
    19  vi plotter
    20  vi plotter.f
    21  grep maps *.f
    22  man grep
    23  grep -l maps *.f
    24  dir *.f > datedDir.lst
    25  pcxput datedDir.lst
    26  grep -l maps[sl]l *.f
    27  grep -l mapssl *.f
    28  grep -l mapsll *.f
    29  sccs info
    30  sccs prs comb.f
    31  sccs plotter.f
    32  sccs prs plotter.f
    33  sccs diffs plotter.f
    34  sccs diffs comb.f
    35  sccs delget comb.f plotter.f
    36  dir
    37  sccs prs comb.f
    38  sccs prs plotter.f
    39  sccs get -r1.1 comb.f plotter.f
    40  cat >> ~/20DecHist @ 14:34
    41  history >> ~/20DecHist
```

JMM 20 Dec 94

This is a list of commands used to find and restore the files that contain the axis scales and labels. The files affected were comb.f & plotter.f.

JMM 20 Dec 94

Running program 20 Dec 94

This is a partial list of results from running the program

JMM 20 Dec 94

```
pinafore% command
dofio: [-1] end of file
logical unit 1, named 'ax1'
lately: reading sequential formatted external IO
part of last data:    13^J|      14 zones
Abort (core dumped)
dofio: [-1] end of file
logical unit 10, named 'b1s92'
lately: reading sequential formatted external IO
part of last data: 000000E+00^J^?|
Apart of last data: 000000E+00^J^?|
Abort (core dumped)
dofio: [115] read unexpected character
logical unit 1, named 'ax2'
lately: reading sequential formatted external IO
part of last data: ?|?? 8      12 zones
Abort (core dumped)
 error: number of zones different in dist and altzon
dofio: [-1] end of file
logical unit 1, named 'ax3'
lately: reading sequential formatted external IO
part of last data:     8^J|      9 zones
Abort (core dumped)
dofio: [-1] end of file
logical unit 10, named 'b3s92'
lately: reading sequential formatted external IO
part of last data: 000000E+00^J^?|
Abort (core dumped)
dofio: [115] read unexpected character
logical unit 1, named 'ax4'
lately: reading sequential formatted external IO
part of last data:  d|igiti      11 zones
Abort (core dumped)
 error: number of zones different in dist and altzon
dofio: [-1] end of file
logical unit 1, named 'ax5'
lately: reading sequential formatted external IO
part of last data:     9^J|      10 zones
Abort (core dumped)
dofio: [-1] end of file
logical unit 10, named 'b5s92'
lately: reading sequential formatted external IO
part of last data: 000000E+00^J^?|
Abort (core dumped)
dofio: [-1] end of file
logical unit 1, named 'ax6'
lately: reading sequential formatted external IO
part of last data:    25^J|      26 zones
Abort (core dumped)
dofio: [-1] end of file
logical unit 10, named 'b6s92'
lately: reading sequential formatted external IO
part of last data: 000000E+00^J^?|
Abort (core dumped)
dofio: [-1] end of file
logical unit 1, named 'ax7'
lately: reading sequential formatted external IO
part of last data:    15^J|
Abort (core dumped)
dofio: [-1] end of file
logical unit 10, named 'b7s92'
lately: reading sequential formatted external IO
part of last data: 000000E+00^J^?|
Abort (core dumped)
dofio: [-1] end of file
logical unit 1, named 'ax10'
lately: reading sequential formatted external IO
part of last data:    15^J|
Abort (core dumped)
dofio: [-1] end of file
logical unit 10, named 'b10s92'
lately: reading sequential formatted external IO
```

no b2s92 generated

JMM 20 Dec 94

no b4s92 generated
had not increased node points to include complimentary zone

JMM 20 Dec 94

First Run Results

Running Program (continued) 20 Dec 94

JMM 94

```
40  cat >> ~/20DecHist @ 14:34
41  history >> ~/20DecHist
42  grep comb *ake*
43  grep amodel *ake*
44  dir *ake*
45  make
46  diff makefile makefile.aleas
47  del makefile
48  cp makefile.com makefile
49  make
50  del makefile
51  pwd
52  gdata
53  sccs prs gmxfb
54  sccs diffs gmxfb
55  sccs delta gmxfb
56  sccs get -r1.5 gmxfb
57  sccs prs atnfb
58  sccs diffs atnfb
59  sccs info
60  sccs delta atnfb
61  sccs prs atnfb
62  sccs get -r1.3 atnfb
63  sccs info
64  cat >> ~/20DecHist @ 15:05
65  history >> ~/20DecHist
66  pwd
67  ghzrd
68  dir
69  ghzcds
70  dir
71  dir makef*
72  copy makefile.shc makefile
73  cp makefile.shc makefile
74  make
75  vi shc.f
76  grep usr *.f
77  vi rsitecor.f
78  shc
79  gdata
80  vi ax[1-7] ax10 c[1-7]altz c10altz c[1-7]sis c10sis
81  pwd
82  gresult
83  cd 001
84  dir
85  cat >> firstRunResults
86  cat > firstRunResults
87  pcxput firstRunResults
88  cat > firstRunResults
89  cat >> 20DecHist
90  cat >> ~/20DecHist @ 16:48 (after first run)
91  history >> ~/20DecHist
```

JMM 20 Dec

} please note continuation from bottom of page 37

} restoring original axis labels on plots

JMM 20 Dec

restoring original gmxfb and atnfb files

assuring all executables are up to date

JMM 20 Dec 94

JMM 20 Dec

JMM 20 Dec 94

These are some of the other commands issued while running the seismic code on 20 Dec 94. The remainder of the commands are posted on the next page.

JMM

20 Dec 94

Running Program (continued) 20 Dec 94

Window 2

```
 1  dir 16*
 2  view 16DecHist
 3  pcxput 16DecHist
 4  pwd
 5  vi 20DecHist
 6  pcxput 20DecHist
 7  pcxput 20DecHist
 8  vi 20DecHist
 9  pcxput 20DecHist
10  cat > DisplayFiles
11  pcxput DisplayFiles
12  gresults
13  pwd
14  view .cshrc
15  gresult
16  pwd
17  dir
18  cat >> ~/20DecHist @ 15:06
19  history >> ~/20DecHist
      .
      .
      .
40  cd result
41  dir
42  vi command
43  dir ../springResults
44  dir ../springResults/006
45  fc command ../springResutls/006
46  diff command ../springResutls/006
47  pwd
48  diff command ../springResults/006
49  vi command
50  cat > 001/backgroundZone.shc
51  vi 001/backgroundZone.shc
52  dir
53  command
54  pwd
55  cd ..
56  dir
57  cd goodResutls
58  cd goodResults
59  dir
60  cd 006
61  diff command ../../result
62  dir
63  view printDigPlots
64  cd ../../springResults
65  dir
66  view printDigPlots
67  pwd
68  cd ../result
69  cp ../springResults/printDigPlots .
70  dir
71  view printDigPlots
72  mv printDigPlots 001
73  cd 001
74  dir
75  vi printDigPlots
76  vi printDigPlots
77  source printDigPlots
78  cat >> ~/20DecHist @ 16:48 (after first run)
79  history >> ~/20DecHist
80  vi ~/20DecHist
81  pwd
82  cd ..
83  cd ..
84  dir
85  find . -name b2s92 -print
86  cd prdsdir
87  dir
88  vi b[1-7]s92 b10s92
89  vi c[1-7]s92 c10s92
90  pwd
91  gdat
92  gdata
93  vi ax1 c1altz c1sis
94  vi ax2 c2altz c2sis
95  vi ax3 c3altz c2sis
96  vi ax3 c3altz c3sis
97  cat >> ~/20DecHist @ 15:21 (trying to find error)
98  history >> ~/20DecHist
```

JMM 20 Dec 94

JMM 20 Dec 94

running seismic code

printing plots on Renner's printer

JMM 20 Dec 94

trying to find error

JMM 20 Dec 94

Re Running Program

21 Dec 94

```
Window 1
     1  df /usr2
     2  gdata
     3  vi ax[1-7] ax10
     4  vi ax1 c1altz c1sis
     5  :q
     6  grep expert ax*
     7  vi ax[1-7] ax10 c[1-7]sis c10sis
     8  df /usr2
     9  dir
    10  vi gmxfb atnfb
    11  cat > ~/21DecHist @ 10:42 (after editing ax4 and cjsis files)
    12  history >> ~/21DecHist
    13  gdata
    14  dir b*
    15  cd ../prdsdir
    16  dir
    17  pwd
    18  mv [bc]*s92 ../result/001/run_1
    19  vi log
    20  rm core
    21  df /usr2
    22  cd ..
    23  dir
    24  cd ..
    25  find . -name core -print
    26  cd hzrd/comapdir
    27  dir
    28  rm core
    29  df /usr2
    30  vi g*s92
    31  dir
    32  vi g*s92
    33  vi xi*area
    34  dir xi*
    35  vi xi[1-7]area xi10area
    36  dir
    37  pwd
    38  cd ..
    39  ls -lR | grep "Dec 20"
    40  cat >> ~/21DecHist @ 11:03
    41  history >> ~/21DecHist
    42  geo
        1       14:00   mail
        2       14:01   dir
        3       14:01   pwd
        4       14:02   df /we
        5       14:02   del sampledata.tar.gz
        6       14:03   df /we
        7       14:03   ls -lR
        8       14:07   dir
        9       14:07   df /we
       10       14:07   vi prnt*
       11       14:07   vi printDigPlots
       12       14:08   source printDigPlots
       13       14:32   rm dig.*
       14       14:33   dir
       15       14:33   rm dig.*
       16       14:37   source printDigPlots
       17       15:00   cat printDigPlots
       18       15:00   lpq -Pvaxps
       19       15:01   history
       20       15:01   history > geoHistory
    43  cat >> ~/21DecHist @ 15:32 ( before executing command again)
    44  history >> ~/21DecHist
    45  cd
    46  vi 21DecHist
    47  geo
    48  cat secondRunResults
    49  pw
    50  pwd
    51  gdata cd 001
    52  gdata
    53  cd 001
    54  gresult
    55  cd 001
    56  cat > secondRunResults
    57  pcxput secondRunResults
    58  cat >> ~/21DecHist @ 16:56 ( at the end of the day)
    59  history >> ~/21DecHist
```

JMM 21 Dec 94

saving run 1 results

looking for errors

JMM 21 Dec 94

commands issued from geordi.space.swri.edu

printing 20 Dec results

printing original 16 mar 94 results

– logging on to geordi to print 21 Dec results

JMM 21 Dec 94

Re Running Program (continued) 21 Dec 94

Window 2

```
 1  gdata
 2  ghzcds
 3  grep dist *.f
 4  gdata
 5  vi c[1-7]zltz c10altz
 6  vi c[1-7]altz c10altz
 7  gfull
 8  dir
 9  cd hzrd
10  cd datadir
11  dir
12  dir sccs
13  dir SCCS
14  pwd
15  vi c[1-7]altz c10altz
16  gdata
17  vi c[1-7]altz c10altz
18  pwd
19  cd ..
20  find . -name ax1 -print
21  cd ..
22  gdata
23  dir
24  gresult
25  dir
26  vi command
27  cat >> ~/21DecHist @ 10:43
28  history >> ~/21DecHist
29  vi ~/21DecHist
30  pwd
31  dir
32  cd 001
33  mkdir run_1
34  cd run_1
35  mv ../dig* .
36  dir
37  dir
38  pwd
39  cd ..
40  dir
41  vi txt[1-7]s92 txt10s92
42  vi tac[1-7]s92 txt10s92
43  vi oac[1-7]s92 oac10s92
44  dir
45  cat >> ~/21DecHist @ 11:03
46  history >> ~/21DecHist
```

JMM 21 Dec 94

Most of these commands were issued while looking for the errors listed on page 38

JMM 21 Dec 94

21 Dec 94 JMM

```
 .
 .
 .
73  cd 001
74  dir
75  dir *s92
76  mv *s92 run_1
77  dir
78  vi amenu
79  vi combin
80  dir
81  cd ..
82  cd ..
83  dir
84  dir datadir
85  dir
86  dir prdsdir
87  cd ..
88  dir
89  cd hzrd
90  dir
91  dir comapdir
92  mv g*s92 ../result/001/run_1
93  pwd
94  cd comapdir
95  mv g*s92 ../result/001/run_1
96  mv xi*area ../result/001/run_1
97  dir
98  vi f*s92
99  pwd
100 gresult
101 dir
```

JMM 21 Dec 94

```
102 vi command
103 ghzrd
104 find . -name f1s92 -print
105 dir
106 cd result
107 dir
108 dir 001
109 mv 001/ocac92 001/run_1
110 dir 001
111 cat >> ~/21DecHist @ 15:33 ( before executing command again )
112 history >> ~/21DecHist
113 pwd
114 dir
115 command
116 ftp
117 feo
118 cat >> ~/21DecHist @ 16:57 ( at the end of the day)
119 history >> ~/21DecHist
```

JMM 21 Dec 94

JMM 21 Dec 94

rerunning program + transferring to another

JMM 21 Dec 94

Results of Re Running Program 21 Dec 94

JMM 21 Dec 94

```
cat > seconfpinafore% command
dofio: [-1] end of file
logical unit 1, named 'ax1'
lately: reading sequential formatted external IO
part of last data:    13^J|
Abort (core dumped)
dofio: [-1] end of file
logical unit 10, named 'b1s92'
lately: reading sequential formatted external IO
part of last data: 000000E+00^J^?|
Abort (core dumped)
dofio: [115] read unexpected character
logical unit 1, named 'ax2'
lately: reading sequential formatted external IO
part of last data: ?|?? 8
Abort (core dumped)
 error: number of zones different in dist and altzon
dofio: [-1] end of file
logical unit 1, named 'ax3'
lately: reading sequential formatted external IO
part of last data:     8^J|
Abort (core dumped)
dofio: [-1] end of file
logical unit 10, named 'b3s92'
lately: reading sequential formatted external IO
part of last data: 000000E+00^J^?|
Abort (core dumped)
dofio: [-1] end of file
logical unit 1, named 'ax4'
lately: reading sequential formatted external IO
part of last data:    10^J|
Abort (core dumped)
dofio: [-1] end of file
logical unit 10, named 'b4s92'
lately: reading sequential formatted external IO
part of last data: 000000E+00^J^?|
Abort (core dumped)
dofio: [-1] end of file
logical unit 1, named 'ax5'
lately: reading sequential formatted external IO
part of last data:     9^J|
Abort (core dumped)
dofio: [-1] end of file
logical unit 10, named 'b5s92'
lately: reading sequential formatted external IO
part of last data: 000000E+00^J^?|
Abort (core dumped)
dofio: [-1] end of file
logical unit 1, named 'ax6'
lately: reading sequential formatted external IO
part of last data:    25^J|
Abort (core dumped)
dofio: [-1] end of file
logical unit 10, named 'b6s92'
lately: reading sequential formatted external IO
part of last data: 000000E+00^J^?|
Abort (core dumped)
dofio: [-1] end of file
logical unit 1, named 'ax7'
lately: reading sequential formatted external IO
part of last data:    15^J|
Abort (core dumped)
dofio: [-1] end of file
logical unit 10, named 'b7s92'
lately: reading sequential formatted external IO
part of last data: 000000E+00^J^?|
Abort (core dumped)
dofio: [-1] end of file
logical unit 1, named 'ax10'
lately: reading sequential formatted external IO
part of last data:    15^J|
Abort (core dumped)
dofio: [-1] end of file
logical unit 10, named 'b10s92'
lately: reading sequential formatted external IO
part of last data: 000000E+00^J^?|
Abort (core dumped)
 aleas working on :  f1s92
```

JMM 21 Dec 94

JMM 21 Dec 94

21 Dec 94 JMM

JMM 27 Dec 94

Successful Run 27 Dec 94

```
bren
grep rlogin .cshrc
vi .cshrc
esp
source .cshrc
esp
history
dir
pcxput 21dechist
pcxput 21DecHist
pwd
ghcds
ghzcds
dir plotter.f
find ~ -name plotter.f -print
diff plotter.f ~/seism1
diff plotter.f ~/haz_wrk
diff comb.f ~/haz_wrk
sccs prs comb.f
sccs info
vi comb.f plotter.f
sccs prs plotter.f
sccs get -r1.2 plotter.f
view plotter.f
grep maps plotter.f comb.f
grep maps[ls]l plotter.f comb.f
grep maps.l plotter.f comb.f
echo 'grep indicates that the x and y coordinates passed are variable'
echo 'history @ 15:29 ( after looking for x values in plotter and comb )'
history > ~/27DecHist
cat > thirdRunResults
pcxput thirdRunResults
pwd
mv thirdRunResults ../hzrd/result/001
dir ../hzrd/result/001
geo
1       16:46   dir
2       16:47   rm dig*
3       16:48   source printDigPlots
4       16:50   rm geoHistory
5       16:51   history > geoHistory
echo 'Window 1 @ 16:40, after printing dig.* plots'
history > ~/27DecHist
history >> ~/27DecHist
```

JMM 27 Dec 94

JMM 27 Dec 94

print to Vax

JMM 27 Dec 94

JMM 27 Dec 94

```
gresult
dir
cd 001
dir
pwd
cd ..
view command
man echo
echo 'history of Window 2 @ 15:31'
history >> ~/27DecHist
vi ~/27DecHist
pwd
gdata
vi ax[1-7] ax10
grep WW ax*
vi ax1 ax2 ax4 ax6 ax10
diff ax1 ax1Temp
rm ax1Temp
echo 'ax2 had an error on the # of 4 sided figures for WW'
grep ??? ax*
man grep
grep \? ax*
vi ax2
grep \? ax*
vi ax2
echo 'Window 2 @ 15:59 after correcting ax2'
history >> ~/27DecHist
vi ~/27DecHist
vi ax[1-7] ax10
echo 'each expert included background zone in its zone count'
echo ' reduced zone count of each by one and put index of complimentary'
echo 'zone before each zone count'
gresult
dir
cd oo1
cd 001
dir
unalias rm
rm dig*
rm *s92
dir
rm ocac92
alias rm "rm -i"
rm comment
pwd
cd ..
command
source printDigPlots
dir
cd 001
source printDigPlots
feo
feo
feo
cat geoHistory >> ~/27DecHist
echo 'Window 2 @ 16:41, after passing dig.* files and getting geoHistory'
history >> ~/27DecHist
```

JMM 27 Dec 94

produced successful run with no errors

print to Remer's

JMM

JMM 27 Dec 94

Scale changes 28 Dec 94

Edited comb.f and plotter.f so that each call to mapssl and mapsll would be passed an x min of 0 and a y min of 1000. I used two parameters defined earlyon

xfxd1 = 0
xfxd2 = 1000

It is possible that an xfxd1 value of 0 will cause proplems on a log log graph but I will have to wait to get plots of the graph to determine that. Currently the server's hard disk has crashed and I am unable to print the plots. I'm also not able to remotely logon to pinafore to transfer the dig.ps* files to another computer.

JMM
28 Dec 94

Recovering files unattainable 28 Dec 30 Dec 94

Because of the servers being down, I was unable to get this 28 Dec Hist list and post it on that day

```
esp
ghzrd
sccs info
pwd
ghzcds
sccs info
dir comb.f plotter.f
sccs prs comb.f
sccs edit -r1.1 comb.f
sccs prs plotter.f
sccs edit -r1.1 plotter.f
vi comb.f plotter.f
egrep "maps.l" comb.f plotter.f
grep xFxd comb.f plotter.f
grep comb makefile.*
view amodel.f
dir make*
make
del makefile
man make
dir make*
make -f makefile.com
make -f makefile.aleas
geo
echo 'Window 1 after running "command" @ 11:05, server down, no access to geordi'
history > ~/28DecHist
```

JMM 30 Dec 94

JMM 30 Dec 94

```
ghzcds
pwd
grslt
dir
cd 001
dir
rm geoHistory
rm geoHistory
ddir
rmdir run_1
cd run_1
dir
unalias rm
pwd
rm *
dir
cd ..
rmdir run_1
dir
ddir
mkdir run_3
mv *s92 run_3
mv dig* run_3
dir
mv ocac92 run_3
mv third* run_3
dir
cd ..
dir
command
dir
cd 001
dir
source printDigPlots
echo Window 2 @ 11:07 after trying to print plots, server down, no plots
history >> ~/28DecHist
```

JMM 30 Dec 94

non - window session

printing plots from 28 Dec 94

JMM 30 Dec 94

JMM 30 Dec 94

JMM 30 Dec 94

```
vi mbox
set term=vg100
set term=vt100
vi mbox
grslt
dir
cd 001
dir
dir p*
source printDigPlots
echo XView wouldn't work, commands issued from telnet session ~ 10:15
history > ~/30DecHist
```

30Dec94

JMM 30Dec94

```
Start of new Telnet session
 1  grslt
 2  cd 001
 3  dir *.shc
 4  dir ../../goodResults/006/*.shc
 5  diff backgroundZone.shc ../../goodResults/006/YMlnAccel.shc > shc.diffs
 6  set term=vt100
 7  vi shc.diff
 8  vi shc.diffs
 9  vi backgroungZone.shc
10  vi backgroundZone.shc
11  pwd
12  dir | more
13  diff amenu ../../goodResults/006
14  vi amenu
15  echo history after discovering pga value string in amenu
16  history >> ~/30DecHist
17  vi ~/30DecHist
18  pwd
19  ghzcds
20  grep amenu *.c
21  grep amenu *.f
22  vi raleas.f
23  grep pga *.f
24  grep pga *.f > pga.lst
25  vi pga.lst
26  pwd
27  pwd
28  sccs info
29  sccs info > info.lst
30  cat >> info.lst
31  sccs info > info.lst
32  sccs info >> info.lst
33  vi info.lst
34  echo history just before exiting to ftp info.lst
35  history >> ~/30DecHist
```

JMM 30Dec94

need to change raleas.f

JMM 30Dec94

JMM 30Dec94

```
Start of new Telnet session
 1  grslt
 2  cd 001
 3  diff amenu ../../goodResults/006
 4  diff amenu ../../goodResults/006 >> amenu
 5  vi amenu
 6  set term=vt100
 7  vi amenu
 8  vi amenu
 9  mv amenu badAmenu
10  dir
11  mv newAmenu amenu
12  dir
13  diff amenu ../../goodResults/006 >> amenu
14  vi amenu
15  pwd
16  dir
17  del *s92
18  fg
19  unalias rm
20  rm *s92
21  dir
22  del dig*
23  rm dig*
24  dir
25  del *92
26  dir
27  diff combin ../../goodResults/006
28  dir
29  dir
30  dir
31  cd ..
32  dir
33  command
34  cd 001
35  printDigPlots
36  source printDigPlots
37  dir
38  feo
39  echo history after printing plots on both pinafore and geordi
40  history >> ~/30DecHist
```

JMM 30Dec94

30Dec94 JMM

22 March 96

files containing pathnames

bdir.f
initial.f
nsitecor.f
rsitecor.f
selsite.f
shc.f

JMM

July 18, 1996 JCSmith

TABLE OF CONTENTS FOR REMAINING SEISM 1.1 ENTRYS

50 INITIAL ENTRY SHOWING CHANGE IN PRINCIPAL INVESTIGATORS
51 PRESENT SOFTWARE/HARDWARE CONFIGURATION
52 UPDATED SOFTWARE CONTROL

Initial Entry into Scientific notebook by John Stamatakos

NOTE: This was the condition of the Scientific notebook when I received it July 1, 1996. I have accepted this notebook in this "as is" condition after Renner Hofmann retired in May, 1996. I will not attempt to reconstruct work on SEISM1.1 code made prior to July 1, 1996. Code will be check against previous results reported in Hofmann (1995) and benchmarked against existing SEISM1.1 benchmarks.

Scientific Notebook # 059 ***July 18, 1996***
Entry by: John Stamatakos ***Initial entry under new Pi's***

Purpose: Initial entry to document changes in the principal investigators (PI) for the SEISM1.1 project and to outline proposed future modifications to the SEISM1.1 code for use in upcoming Probabilistic Seismic Hazard Analyses (PSHA). Current working group for SEISM1.1 includes two CNWRA scientists and three consultants.

PI's : John Stamatakos and Larry McKague - CNWRA scientists

Consultants: Peter Bowman, Ph.D. Professor of Computer Science, St. Mary's University, San Antonio, Texas

David Lincoln, Senior Research Analyst, Division 09, Southwest Research Institute, San Antonio, Texas

Carol Scherer, Senior Research Analyst, Division 09, Southwest Research Institute, San Antonio, Texas

Scientific Notebook # 059 *July 18, 1996*
Entry by: John Stamatakos *Present software/hardware configuration*

Purpose: To document the current names and locations of SEISM1.1 modules and hardware/software requirements.

SEISM1.1 resides on A SUN Sparc Station IPX designated as Pinafore. The machine runs standard SUN O/S. The code is programmed in FORTRAN 77.

Current working codes is at /usr3/pinafore/full/calnev

Data files and shell file (called 'Command') for running SEISM1.1 is at /usr3/pinafore//full/hzrd
FORTRAN source, object, modules and MOKE files are at /usr3/pinafore//full/hzcds

Earlier versions are at: /usr2/pinafore/jmm
/usr2/pinafore/Rhofmann
/usr2/pinafore/Bangs

IMSL Library functions are at / usr2/pinafore/pbowman

J.C. Stamatakos

Scientific Notebook # 059
Entry by: John Stamatakos

July 22, 1996
Software Control

Purpose: Document updated version of Software Control Checklist for SEISM1.1

Changes since last version of software control checklist: (1) Change principal investigator from Renner Hofmann to John Stamatakos and (2) Change to project number from 20-5708-472 to 20-5708-471. Copy of current Software Control Checklist follows.

J. Stamatakos

CENTER FOR NUCLEAR WASTE REGULATORY ANALYSES
SOFTWARE CONTROL CHECKLIST

Name of Software: SEISM1 **Version:** 1.1

Primary User: John Stamatakos, KTI - Structural Deformation, 20-5708-471

☐	SOFTWARE REQUIREMENTS DESCRIPTION	
	Documentation	☐
☐	DESIGN AND DEVELOPMENT	
	Documentation (Scientific Notebook)	☐
☐	DESIGN VERIFICATION	
	Computer runs uniquely identified	☐
	Software analysis tools have been applied and discrepancies resolved	☐
	Design Verification Report	☐
X	INSTALLATION TESTING	
	Installation test documentation: Assessment of Requirements for Exercising the SEISM Code on Computer Systems Available to the CNWRA, R. B. Hofmann, 5/15/1992 Sun Sparc Station*.	X
	Discrepancy resolution: N/A	N/A
X	CONFIGURATION CONTROL	
	Software Summary Form	X
	User's Manual: SHS Software and Database, draft NUREG/CR, 3/1991 (LLNL)*. SEISM 1 Code: Adaptions for use in the Western U.S. 5/93 (CNWRA)*.	X
	Technical Description: SHS Software and Database, draft NUREG/CR, 3/1991 (LLNL)*. SEISM 1 Code: Adaptions for use in the Western U.S. 5/93 (CNWRA)*.	X
	Source Code: SEISM1 Software, version 1.1 Source/Executable Files, SUN Version, 2 disks, 7/8/93*.	X
	Version Control	☐
	Software Release Notice: 1/14/93*	X
X	SOFTWARE PROBLEM REPORTING AND RESOLUTION	
	Software Problem and Change Request	☐
☐	SOFTWARE VALIDATION	
	Software Validation Test Plan	☐
	Software Validation Test Report	☐
	Software Validation Review	☐
☐	SOFTWARE RETIREMENT	
	Software Release Notice	☐

* Located in QA Records packege QAR305 Q199307130001.

Initial Entry into Scientific Notebook by Carol Scherer

NOTE: I accepted this notebook "as is" from John Stamatakos 7/25/96.

Scientific Notebook # 059 ***July 25, 1996***
Entry by: Carol Scherer ***Project Notebook***

Purpose: Initial entry to document change of personnel responsible for updating SEISM1 project scientific notebook. This task now will be performed by Carol Scherer. The plan is to have at least a weekly entry as long as tasks are being actively performed on the project. In addition, special events and meetings will have their own entries.

Scientific Notebook # 059 ***July 30, 1996***
Entry by: Carol Scherer ***Software Benchmark Plan***

Purpose: To provide a list of the tasks to be accomplished on SEISM1 project. On 30 July 1996, a project team meeting was held. Peter Bowman presented a proposed list of remaining tasks for discussion. The following tasks need to be accomplished:

1. Create tape backup of FORTRAN source libraries for IMSL, TV80LIB and DIGLIB along with various versions of SEISM program and data located on usr2/pinafore and usr3/pinafore.

2. Library inclusion - IMSL, TV80LIB and DIGLIB (new versions of libraries)

    - copy libraries from Lawrence Livermore to SwRI
    - expand and un-tar libraries
    - build FORTRAN source library for selected IMSL, TV80LIB and DIGLIB routines
    - create object library for selected IMSL, TV80LIB and DIGLIB routines
    - link to SEISM programs
    - move goshc to SEISM directory
    - modify environment for current directories
    - test goshc
    - run SEISM and check for errors

3. Benchmark test SEISM for Yucca Mountain (Western US) with combined IMSL, TV80LIB and DIGLIB library

    - determine benchmark input files
    - run SEISM using selected input
    - verify output against existing benchmark output using:
        - visual check of files
        - difference check routine
        - compare graphical output

C. Scherer

4. Sun to Sun migration

- Select Sun system similar to NRC or DOE system
- Copy SEISM to selected system
- Recompile and relink SEISM
- Run and test against benchmark data

5. Documentation

- Develop written procedures for system migration and benchmark testing
- Document procedures used to accomplish tasks listed above
- Keep scientific notebook uptodate
- Note errors in source code and/or possible modifications to make code more usable.

Carl S. Scherer

CSS

Scientific Notebook # 059 ***August 2, 1996***
Entry by: Carol Scherer ***Current Status***

Purpose: To document progress on tasks. Carol Scherer asked Pat Starkweather to back up all files on usr2/pinafore to tape. A listing of files contained in the backup set was printed and placed in a notebook. Carol has been reading reports and other project documentation to come up to speed. Project team meeting was held 8/1. Peter Bowman decompressed the source libraries and moved the IMSL, DIGLIB and TV80LIB libraries to /usr2/pinafore/pbowman. He also moved goshc to /usr2/pinafore/jmm/hzcds. The object library was created and linked to SEISM. Peter modified goshc for the .jmm directory and moved the new shc from /usr3/pinafore/full/hzcds to .jmm. The makefile for DIGLIB failed.

C.S. Scherer

Scientific Notebook # 059 ***August 9, 1996***
Entry by: Carol Scherer ***Current Status***

Purpose: To document progress on tasks. Carol Scherer had Pat Starkweather back up all files on usr2/pinafore to tape. A listing of files contained in the backup set was printed and placed in a notebook. Project team meeting was held 8/9. Peter Bowman worked with Pat Starkweather to find the correct linkages (missing header files for C library calls) to allow DIGLIB's makefile to function correctly. The files in /jmm were copied to /usr3/pbowman to test SEISM without disturbing existing files and directories. Ranlib was used to update the new libraries.a (IMSL, DIGLIB, and TV80LIB). Goshc is running under /usr3/pbowman with the new libraries. It appears to function correctly.

C.S. Scherer

Scientific Notebook # 059 ***August 16, 1996***
Entry by: Carol Scherer ***Current Status***

Purpose: To document progress on tasks. A standard test input for SEISM was set up. Peter Bowman completed a process for obtaining a snapshot of goshc to be used for documenting SEISM runs.

C.S. Scherer

Scientific Notebook # 059 ***August 23, 1996***
Entry by: Carol Scherer ***Current Status***

Purpose: To document progress on tasks. SEISM was run for Yucca Mountain under both/usr2/pinafore/jmm and /usr3/pbowman and the resulting graphs were printed. The results did not match. The runs made in /jmm should match Renner Hoffman's original runs. Runs made in /pbowman are using the new libraries - we are attempting to determine if there are any significant differences in the output files using the old libraries and the new ones.

C.S. Scherer

Scientific Notebook # 059 ***August 30, 1996***
Entry by: Carol Scherer ***Current Status***

<u>Purpose:</u> To document progress on tasks. SEISM was run on Shearon-Harris (western US) data, but runtime errors occurred. Attempting to determine cause of errors.

C. S. Scherer

Scientific Notebook # 059 ***September 6, 1996***
Entry by: Carol Scherer ***Current Status***

<u>Purpose:</u> To document progress on tasks. Pat Starkweather has copied the configuration-controlled versions of the data onto usr/3/pbowman. He is in the process of identifying the latest version of the code. Made 3 runs of shc under usr2/jmm and 3 under usr3/pbowman using the same input parameters to see effects of random seed in generating output. John Stamatakos examined graphical output and believes that all runs from both versions are essentially the same. Fifty iterations are used; it will require a code change to allow 100 iterations. More iterations are expected to cause the results to converge and create smoother curves. Met with Marty Menchaca to discuss the software and modifications he and Renner Hoffman made to it. Marty is identifying the latest versions of the code and data. He plans to locate the files associated with Renner's successful runs which are documented in the reports.

David Lincoln is working to develop a GUI that will allow a SEISM user to select a map of faults, select a series of zones within each fault, and generate an output file that can be input into SEISM. He plans to implement the GUI using GALAXY. The GUI is currently in a very rough state. Next step is to determine input file format. David needs to know what priority to place on such capabilities as ZOOMing and importing a map vs. having it manually entered.

C. S. Scherer

Scientific Notebook # 059
Entry by: Carol Scherer

C.S. Scherer

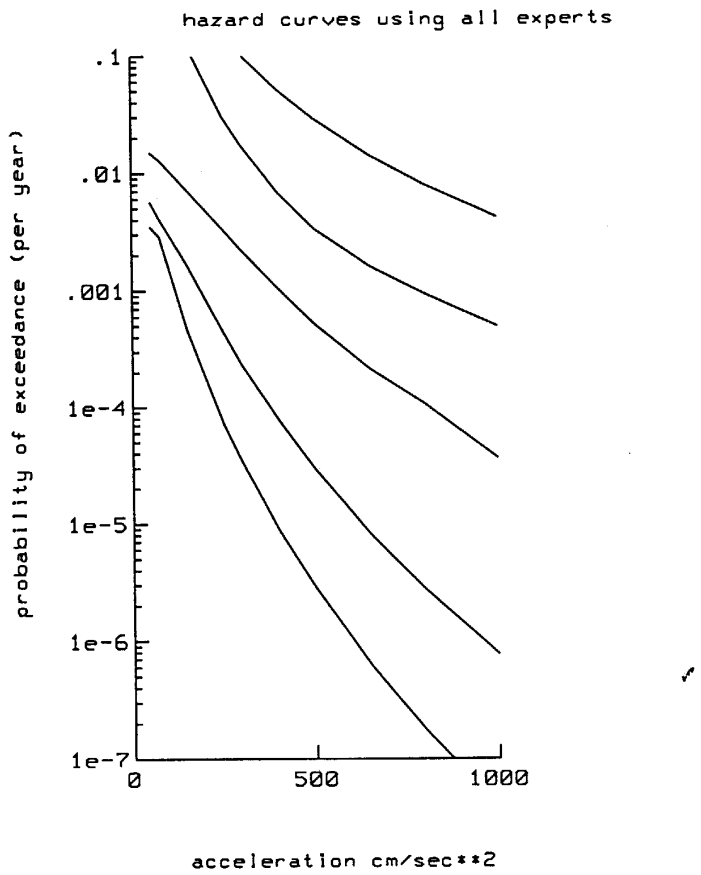
September 13, 1996
Current Status

Purpose: To document progress on tasks. This week, Marty Menchaca from Division 15 came over to look at the files to try to determine which were the files used by Renner Hoffman to make the run documented in his report. We still are trying to regenerate the same results he got. Once Marty thought that he had located the correct source and input data files, he and Peter Bowman ran SEISM using the old libraries. Unfortunately, the results did not match Renner's. The next task will be to determine why the results differed. We suspect that we are not using the correct input files.

old libraries; wrong cjs's files for input 9/13/96

YM test 960913
S-XPRT:1,2,3,4,5,6,7,10 G-XPRT:1,2,3,4,5
percentiles = 5., 15., 50., 85., and

run on SKIPPY:
SPARCSTATION 20
SUNOS 4.1.3-U1
Version B



Carol S Scherer

Yucca Mountain n

(9/13 continued)

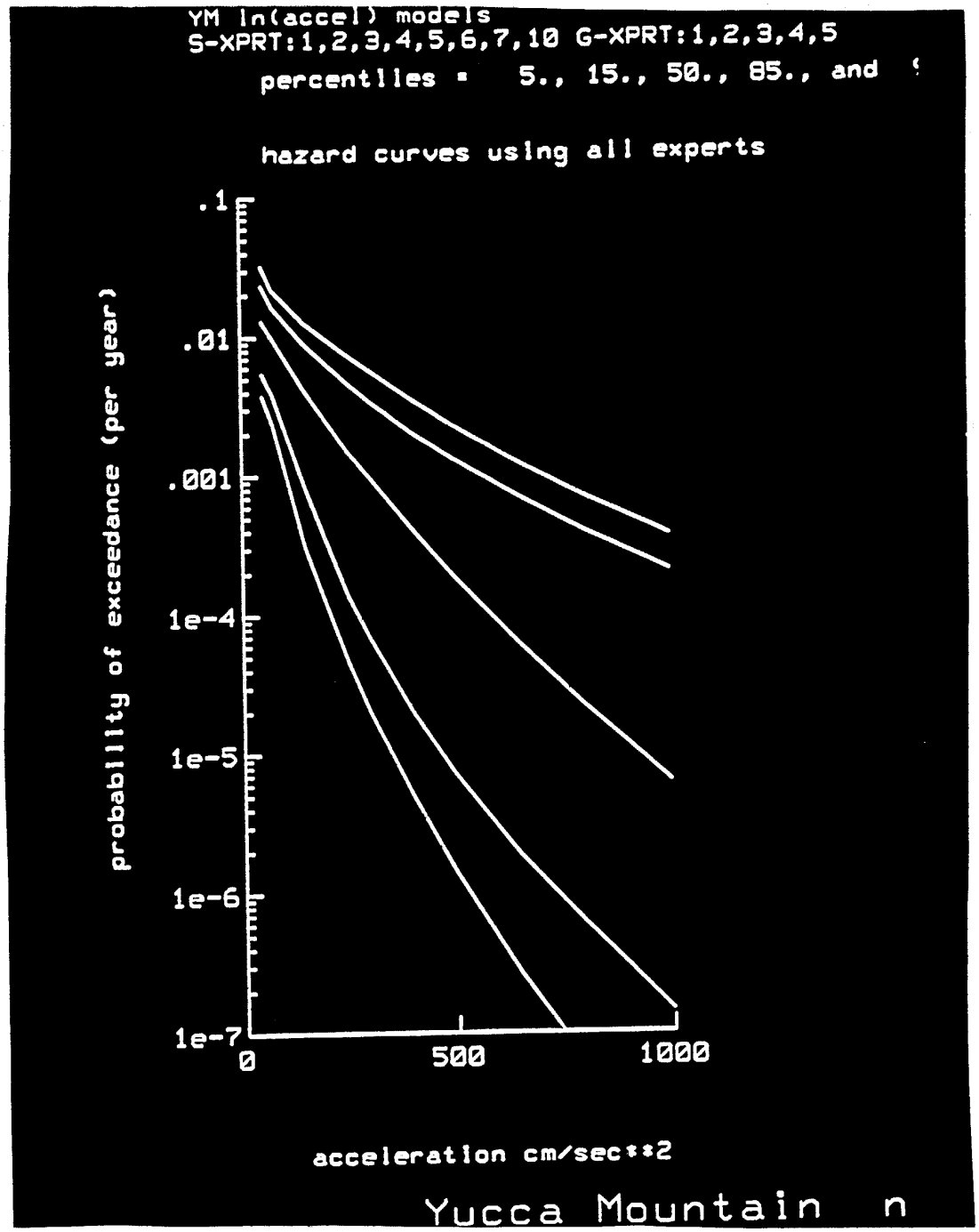
Graph from SEISM run made 3/16/94 - published in SEISM Lel Test Analysis by Rennner Hoffman 8/94, page 5-3. Output printed from microfiche.

It is obvious from inspecting the two graphs that they differ significantly.

It is necessary to be able to recreate Rennner's output to ensure that the SEISM code is operating as correctly as it did in 1994.

Carol S. Scheer

run on PINAFORE:
SUN 1IX (4/50)
SUNOS 4.1.3
CSS



Scientific Notebook # 059 ***September 20, 1996***
Entry by: Carol Scherer ***Current Status***

Purpose: To document progress on tasks. On Monday, I printed out copies of the input files (axi, c/j/sis, and c/j/altz) used by Renner Hoffman that were stored on microfiche. I compared these with the input files used to make the runs last week. There were significant differences in the c/j/sis files. After searching several different directories, I found matching input files in /usr3/pinafore/full/hzrd/old-datadir. On Tuesday, Peter, Marty and I ran the SEISM code against the recovered input data files. This time, the results ***did*** match the results published by Renner. Once it was confirmed that we had a version of SEISM that would execute in the same manner as the one Renner used with the same input files and using the old libraries, we could test SEISM using the new libraries (IMSL, DIGLIB, and TV80LIB). This was also done Tuesday, 17 September. The results were the same as the earlier run and Renner's published results.

Carol S. Scherer

Peter printed out the mismatched data and ran a diff on the c/j/sis files for John Stamatakos. Pat Starkweather created a /usr3/seism directory. We plan to move all the known good code and data files to this directory and use it as the working directory from now on. We will have Pat create a new version of SEISM for sccs and use the files in this directory structure. The existing directories have so many versions of the code and input data that it is very confusing trying to sort out what you need. By using the /usr3/seism files and user instructions that Peter is writing, it should be much easier for a user to determine exactly what is needed. Marty Menchaca plans to work up a description of the data files, including the format of each. All of this information is to be included in a summary report to be finished by COB 27 September 1996.

Bob Marshall will check with the NRC to determine what computer configurations are being used there. We want to confirm the portability of the code using a system that is actually being used.

```
                    Welcome to SHC,
                         the
        Interactive Menu and Batch File Preprocessor
              for the Seismic Hazard Codes

Please choose a site to analyze.  Possible options are:

  1-90:  Sites defined in NUREG/CR-5250

91- 92:  Previous User Defined Sites

    93:  Site number available for definition now.

     0:  Do not select any more sites (quit)
    -1:  Produce a listing of NUREG/CR-5250 site choices
    -2:  Produce a listing of User Defined Sites

shc>92
Previous User Defined Site  92 has title: Yucca Mountain
Longitude: -116.46, Latitude:   36.85
Soil Class: r
Host Region of Site:  South Central US

Is this the correct site [y/n] (default no)? y
mkdir: /usr2/pinafore/jmm/hzrd/result: File exists
The following is the predefined site specific spectrum:
   (1)  Number of spectral points = 4
   (2)  Design pga. =       686.000
   (3)  Freq.          Velocity (cm/sec)
        0.550                31.500
        2.000                31.500
       10.000                 6.350
       33.000                 0.710
Would you like to define a different spect. for this analysis? [(y)es or (n)o]
shc>n

Files produced for site  92 will be stored on the computer in the directory:
/usr2/pinafore/jmm/hzrd/result/008
Would you like to include all 11 seismic experts in your analysis?
(y)es or (n)o, default is yes
shc>n
```

Run of 60SHC and responses made to create command file which generated the benchmark results. /usr3/seism/hzcds/go shc*

Carol S. Scherer

(continued on following pages)

(GOSHC continued)

9/20

```
Please input the index of a Seismic Expert that you wish to include
Valid responses are:
        (0) Finished
        (1-7, 10-13) Seismic Experts
shc>1
Please input the index of a Seismic Expert that you wish to include
Experts already chosen are:   1
Valid responses are:
        (0) Finished
        (1-7, 10-13) Seismic Experts
shc>2
```

```
Please input the index of a Seismic Expert that you wish to include
Experts already chosen are:   1  2
Valid responses are:
        (0) Finished
        (1-7, 10-13) Seismic Experts
shc>3
Please input the index of a Seismic Expert that you wish to include
Experts already chosen are:   1  2  3
Valid responses are:
        (0) Finished
        (1-7, 10-13) Seismic Experts
shc>4
Please input the index of a Seismic Expert that you wish to include
Experts already chosen are:   1  2  3  4
Valid responses are:
        (0) Finished
        (1-7, 10-13) Seismic Experts
shc>4
Expert  4 has already been chosen.
Please input the index of a Seismic Expert that you wish to include
Experts already chosen are:   1  2  3  4
Valid responses are:
        (0) Finished
        (1-7, 10-13) Seismic Experts
shc>5
Please input the index of a Seismic Expert that you wish to include
Experts already chosen are:   1  2  3  4  5
Valid responses are:
        (0) Finished
        (1-7, 10-13) Seismic Experts
shc>6
Please input the index of a Seismic Expert that you wish to include
Experts already chosen are:   1  2  3  4  5  6
Valid responses are:
        (0) Finished
        (1-7, 10-13) Seismic Experts
shc>7
Please input the index of a Seismic Expert that you wish to include
Experts already chosen are:   1  2  3  4  5  6  7
Valid responses are:
        (0) Finished
        (1-7, 10-13) Seismic Experts
shc>10
Please input the index of a Seismic Expert that you wish to include
Experts already chosen are:   1  2  3  4  5  6  7 10
Valid responses are:
        (0) Finished
        (1-7, 10-13) Seismic Experts
shc>0
Would you like the hazard analysis performed for:
        (1)  Peak Ground Acceleration
        (2)  Peak Ground Velocity ***Not Available***
        (3)  Pseudo Velocity Spectra
shc>1
The original 69 sites were analyzed with PGAs of 1.0 g.
For which PGA do you wish to analyze this site?
        (1)   1 g (default)
        (2)   2 g
Enter 1 or 2
shc>
```

Carl S. Schexnayder

```
Please Input a Unique Plot Label Line (it will appear on  ALL Plots).
Label must be <= 50 Characters.
    ....|....|....|....|....|....|....|....|....|....|
shc>YM ln(accel) models

The User Defined Plot Label for ALL plots is:

YM ln(accel) models

Do you wish to change it?
        (0)  No (default)
        (1)  Yes
shc>
```

CSS

```
Would you like to plot arithmetic averages along with the percentile curves?
        (0)  No (default)
        (1)  Yes
shc>
Would you like to plot arith. avgs for all return periods on a seperate frame?
        (0)  Yes (default)
        (1)  No
shc>
Would you like to plot geometric averages along with the percentile curves?
        (0)  No (default)
        (1)  Yes
shc>
Would you like to plot geom. avgs for all return periods on a seperate frame?
        (0)  No (default)
        (1)  Yes
shc>
Plot best est. with percentile curves on a sep. frame for all return periods?
        (0)  No (default)
        (1)  Yes
shc>
Plot all the best estimate haz. curves for the individual experts on one frame?
        (0)  Yes (default)
        (1)  No
shc>
Plot the pga design values on the hazard curves?
        (0)  No (default)
        (1)  Yes
shc>
Please specify random seed:
      0.0)  The computer will generate a random seed (default)
      1.0)  Use "fixed" program supplied seed
(large num)  Input own random seed (10000000<num<2147483646)
shc>
Enter the number of simulations per attenuation expert (max and default = 50)
shc>
Specify type of graphics output desired:
        (1)  Screen graphics
        (2)  Plotter grapics
        (3)  Both
For Screen graphics, you MUST be at the Sun console.
The program will pause between graphs and wait for user input
before continuing.  For unattended runs, use option 2.
shc>2
The analysis magnitude and intensity parameters must be set.
      Number     Description                        Default  Value
        (1)  Lower Earthquake Magnitude Bound        (3.75)  3.75
        (2)  Lower MMI Intensity Bound               (4.00)  4.00
        (3)  Upper Bound Earthquake Magnitude        (9.00)  9.00
        (4)  Upper Bound MMI Intensity              (12.00) 12.00

Enter 0 to accept current values, [1-4] to change a value
shc>0
Please enter the number of return periods (max is 5, default is 3)
shc>
Current values for the return periods are:
        Number   Value
        (1)      1000.
        (2)     10000.
        (3)    100000.
Enter number of value to change, 0 to accept all values.
Values do not have to be in order.  (default = 0)
shc>
How many ground motion expert's results you wish to be combined?
(Response must be between 1 and 5 inclusive)
shc>5
Enter the number of percentiles at which to plot hazard (max is 5 (default))
shc>
Current values for the percentile bounds are:
        Number   Value
        ( 1)       0.05
        ( 2)       0.15
        ( 3)       0.50
        ( 4)       0.85
        ( 5)       0.95
Enter number of value to change, 0 to accept all values.
Values do not have to be in order.  (default = 0)
shc>

Please choose a site to analyze.  Possible options are:

  1-90:  Sites defined in NUREG/CR-5250

91- 92:  Previous User Defined Sites

    93:  Site number available for definition now.

     0:  Do not select any more sites (quit)
    -1:  Produce a listing of NUREG/CR-5250 site choices
    -2:  Produce a listing of User Defined Sites

shc>0
Are you finished selecting sites [y/n] (default no)?y
Exiting "shc" having processed  1 sites.
```

CSS

END GO SAC

9/20 continued

/usr3/pinatore/full/hyd/old-data dir/clsis.out

```
4c4
<    4    4    4    4    4    4    4    4    4    4    4    4    4
---
>    4    4    4    4    4    4    4    4
11,12c11,12
<   -9.90000  -0.91000  -9.96000  -0.96000
<   -9.86000  -0.86000
---
>    0.79840  -0.91000   0.75000  -0.96000 \_ recurrence parameters for best est.
>    0.81000  -0.86000                      /   lower and upper bounds models
18,19c18,19
<   -9.90000  -0.91000  -9.96000  -0.96000
<   -9.86000  -0.86000
---
>    0.26320  -0.91000   0.24724  -0.96000
>    0.26702  -0.86000
25,26c25,26
<   -9.90000  -0.91000  -9.96000  -0.96000
<   -9.86000  -0.86000
---
>    1.36350  -0.91000   0.93938  -0.96000
>    1.38331  -0.86000
32,33c32,33
<   -9.90000  -0.91000  -9.96000  -0.96000
<   -9.86000  -0.86000
---
>    0.46610  -0.91000   0.43784  -0.96000
>    0.47287  -0.86000
39,40c39,40
<   -9.90000  -0.91000  -9.96000  -0.96000
<   -9.86000  -0.86000
---
>   -0.40580  -0.91000  -0.41170  -0.96000
>   -0.38120  -0.86000
46,47c46,47
<   -9.90000  -0.91000  -9.96000  -0.96000
<   -9.86000  -0.86000
---
>   -0.40580  -0.91000  -0.41170  -0.96000
>   -0.38120  -0.86000
53,54c53,54
<   -9.90000  -0.91000  -9.96000  -0.96000
<   -9.86000  -0.86000
---
>   -0.24610  -0.91000  -0.24968  -0.96000
>   -0.23118  -0.86000
60,61c60,61
<   -9.90000  -0.91000  -9.96000  -0.96000
<   -9.86000  -0.86000
---
>    1.12860  -0.91000   1.06018  -0.96000
>    1.14500  -0.86000
67,68c67,68
<   -9.90000  -0.91000  -9.96000  -0.96000
<   -9.86000  -0.86000
---
>    0.11710  -0.91000   0.11000  -0.96000
>    0.12000  -0.86000
74,75c74,75
<   -9.90000  -0.91000  -9.96000  -0.96000
<   -9.86000  -0.86000
---
>    0.11710  -0.91000   0.11000  -0.96000
>    0.12000  -0.86000
81,82c81,82
<   -9.90000  -0.91000  -9.96000  -0.96000
<   -9.86000  -0.86000
---
>    0.11710  -0.91000   0.11000  -0.96000
>    0.12000  -0.86000
88,89c88,89
<   -9.90000  -0.91000  -9.96000  -0.96000
<   -9.86000  -0.86000
---
>    0.11710  -0.91000   0.11000  -0.96000
>    0.12000  -0.86000
95,97c95,96
<   -9.90000  -0.91000  -9.96000  -0.96000
<   -9.86000  -0.86000
<
---
>    0.11710  -0.91000   0.11000  -0.96000
>    0.12000  -0.86000
```

p.57 graph
p.58 graph

Difference output file comparing clsis used to generate graph on page 57 and clsis input file used to generate graph on p. 58.

Carol S. Scheer

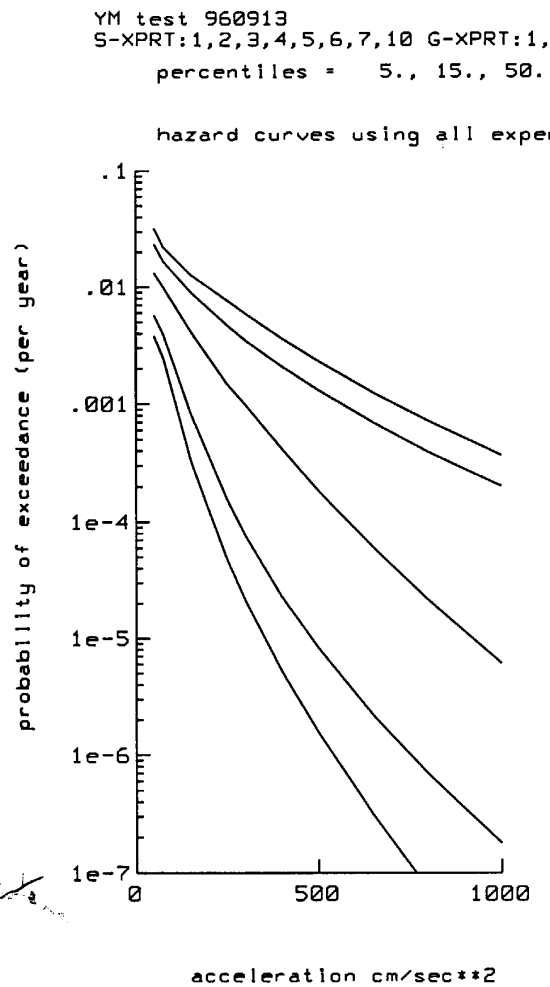
CSS

9/20 continued

old libraries

17 SEPTEMBER 1996
SEISM run from
/usr3/pinatore/full/hgrd on SKIPPY
using old libraries and
/usr3/pinatore/full/hgrd/old-datadir/clsis

run on SKIPPY:
SPARCSTATION 20
SUNOS 4.1.3-U1 version B



Carl S. Stevens

CSS

Yucca Mountain n

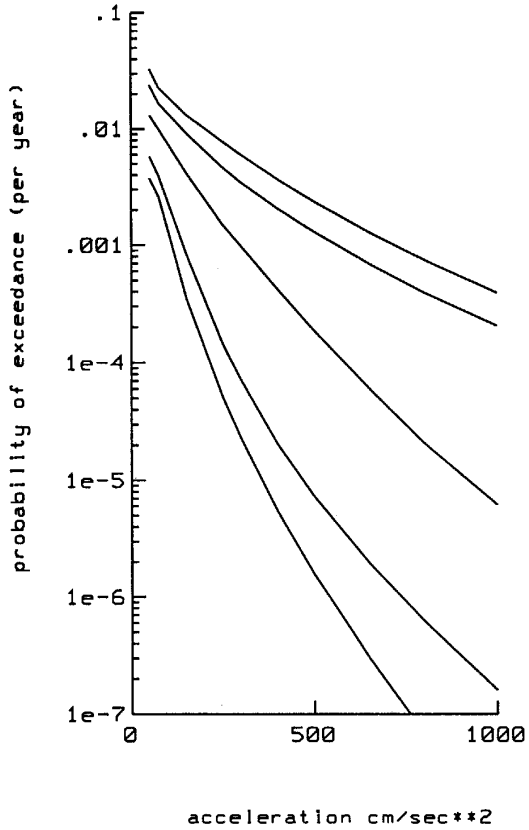
CSS

New libraries

17 SEPTEMBER 1996
SEISM run from
/usr3/pinafore/full/hyrd' on SKIPPY
using new libraries created
by Peter Bowman and
/usr3/pinafore/full/hyrd/old-datdir/elsis

YM test 960913
S-XPRT:1,2,3,4,5,6,7,10 G-XPRT:1,2,3,4,5
percentiles = 5., 15., 50., 85., and

hazard curves using all experts



Carl S. Silver

CS Yucca Mountain n

CS

Scientific Notebook # 059
Entry by: Carol Scherer

Carol S. Scherer

September 27, 1996
Current Status

Purpose: To document progress on tasks. Marty Menchaca, Peter Bowman and I created a summary document to discuss the tasks performed to make SEISM portable. The report will discuss all the tasks accomplished by the team to regenerate Renner Hofmann's published outputs, benchmark the SEISM 1.1 system, and put the correct versions of the code and data under configuration control. Consistent outputs have been generated by SEISM runs on PINAFORE and SKIPPY. PINAFORE is a SPARCSTATION 20 running SUNOS 4.1.3_U1 version B. PINAFORE is a SUN IPX (4/50) running SUNOS 4.1.3. Work on the portability task halted at COB 27 September 1996 until further notice.

24 SEPTEMBER 1996

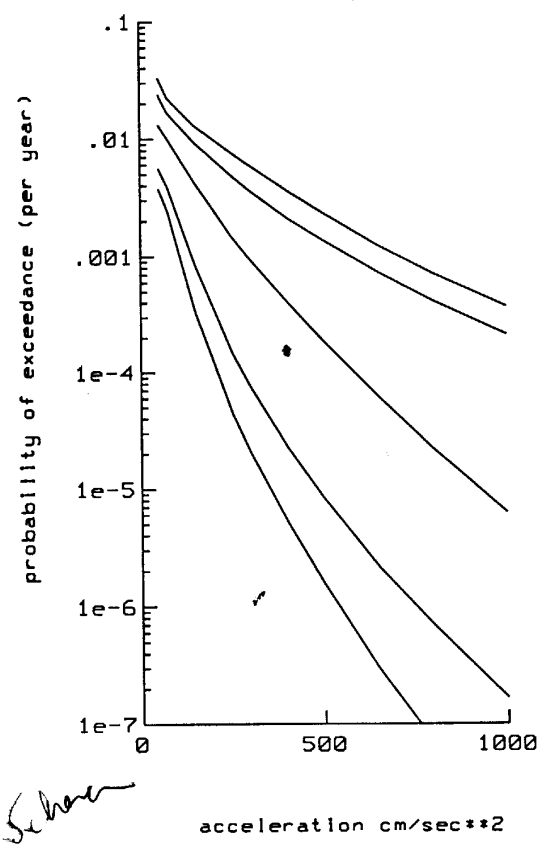
SEISM run from
/usr3/seism/hzrd/results/96092/
001/dig.ps*

Carol S. Scherer

/usr3/seism/ . . . 9/24/96

YM ln(accel) models
S-XPRT:1,2,3,4,5,6,7,10 G-XPRT:1,2,3,4,5
percentiles = 5., 15., 50., 85., and

hazard curves using all experts



Carol S. Scherer

Yucca Mountain n

I HAVE REVIEWED THIS NOTEBOOK AND FIND IT IN GENERAL COMPLIANCE WITH QAP 001 AND THERE IS SUFFICIENT TECHNICAL INFORMATION SO THAT ANOTHER QUALIFIED INDIVIDUAL COULD REPEAT THE ACTIVITY

H. Lawrence McKeyne
4/16/97

SEISM 1.1 HAS BEEN ARCHIVED. SCIENTIFIC NOTEBOOK 59 SHOULD BE ARCHIVE EFFECTIVE TODAY

H. Lawrence McKeyne
11/14/01