CNWRA *A center of excellence in earth sciences and engineering*

A Division of Southwest Research Institute™
6220 Culebra Road • San Antonio, Texas, U.S.A. 78228-5166
(210) 522-5160 • Fax (210) 522-5155

September 27, 2001
Contract No. NRC–02–97–009
Account No. 20.01402.471

U.S. Nuclear Regulatory Commission
ATTN: Dr. Philip S. Justus
Office of Nuclear Material Safety and Safeguards
TWFN Mail Stop 7 C6
Washington, DC 20555

Subject: SEISM 1.2—Portability Task Summary (AI 01402.471.070)

Re: Letter, Justus to McKague, April 23, 1997

Dear Dr. Justus:

Attached is Milestone AI 01402.471.070 entitled SEISM 1.2—Portability Task Summary. This is a modification of the report you requested in the letter, Justus to McKague, April 23, 1997. This report documents code modifications and related processes for porting SEISM 1.1 from Pinafore, a Sun IPX (4/50) computers (on which it was originally used and modified at CNWRA) to other Sun computers. The ported version of SEISM is designated SEISM 1.2. Because of difficulties in routinely running the code and the availability of newer, simplified, user-friendly PSHA codes, it was decided to archive SEISM 1.1. The original software design of SEISM 1.1. required that it be recompiled every time it was installed on a new computer and that several libraries be included in the recompilation. For this reason, the code was modified to allow it to be more easily ported to different computers prior to archiving. A compact disk containing SEISM 1.2 was previously shipped to NRC. EZ-FRISK, version 4.4 has been purchased to replace SEISM 1.2 for Probabilistic Seismic Hazard Analysis.

If you have any further questions about this deliverable please contact me at 210-522-5183.

Sincerely,

H. Lawrence McKague

rae

Attachment

cc: J. Linehan, W. Reamer, B. Leslie, D. DeMarco, E. Whitt, B. Meehan, J. Greeves, J. Piccone, S. Wastler, T. Essig, D. Brooks, A-B. Ibrahim, W. Patrick, CNWRA Directors, CNWRA Element Managers, T. Nagy (SwRI Contracts)

D:\GLGP Group\letters\sds\seism-LM09-27-2001hlm.wpd

Washington Office • Twinbrook Metro Plaza #210
12300 Twinbrook Parkway • Rockville, Maryland 20852-1606

SEISM 1.2

PORTABILITY TASK SUMMARY

Prepared for

U.S. Nuclear Regulatory Commission
Contract NRC–02–97–009

Prepared by

Peter Bowman, Consultant
Jose M. Menchaca, SwRI
Carol Scherer, SwRI
H. Lawrence McKague, CNWRA

September 2001

TABLE OF CONTENTS

Section — Page

ACKNOWLEDGMENTS v
QUALITY OF DATA, ANALYSES, AND CODE DEVELOPMENT v

1 INTRODUCTION 1-1
1.1 Purpose 1-1
1.2 SEISM Background 1-1
1.3 Difficulties in Using SEISM 1-3

2 TASK LIST 2-1
2.1 Archive Existing Files 2-1
2.2 Library Inclusion 2-1
2.3 Benchmark Test 2-2
2.4 Sun to Sun Migration 2-2
2.5 Documentation 2-2

3 DISCUSSION OF COMPLETED TASKS 3-1
3.1 Archive Existing Files 3-1
3.2 Library Inclusion 3-1
3.3 Benchmark Test 3-1
3.4 Sun to Sun Migration 3-1
3.5 Documentation 3-2

4 CONCLUSIONS AND RECOMMENDATIONS 4-1
4.1 Corrections/Enhancements to SEISM 1.2 Source Code 4-1
4.2 Configuration Control 4-2
4.3 Improve Documentation 4-2

5 REFERENCES 5-1

ATTACHMENT A — DIRECTORY LISTING FOR /SEISM
ATTACHMENT B — SOURCE CODE CONTROL SYSTEM FILE LIST FOR SEISM 1.2
ATTACHMENT C — INSTRUCTIONS FOR USING SEISM 1.2
ATTACHMENT D — INSTRUCTIONS FOR PORTING SEISM
ATTACHMENT E — SEISM README FILES
ATTACHMENT F — EXAMPLES OF SEISM INPUT FILE FORMAT

ACKNOWLEDGMENTS

This report was prepared to document work performed by the Center for Nuclear Waste Regulatory Analyses (CNWRA) for the U.S. Nuclear Regulatory Commission (NRC) under contract No. NRC–02–97–009. The studies and analyses reported here were performed on behalf of the NRC Office of Nuclear Material Safety and Safeguards, Division of Waste Management. The report is an independent product of the CNWRA and does not necessarily reflect the views or regulatory position of the NRC.

The authors would like to thank Rebecca Emmot for her dedication to report preparation. We also thank Drs. Rui Chen and Budhi Sagar for their reviews.

QUALITY OF DATA, ANALYSES, AND CODE DEVELOPMENT

Data: CNWRA-generated data contained in this report meet quality assurance requirements described in the CNWRA Quality Assurance Manual. Sources for other data should be consulted for determining the level of quality of those data.

Analyses and Codes: This report summarizes the modifications to SEISM 1.1 that were required to make it portable to other machines, prior to archiving the code as SEISM 1.2. SEISM 1.1 is controlled under TOP–018 requirements. SEISM 1.2 is not under TOP–018 control.

1 INTRODUCTION

1.1 Purpose

It was decided to archive SEISM 1.1 because of on going difficulties in utilizing the code and the availability of new user friendly Probabilistic Seismic Hazard Analysis codes, such as *E-Frisk* (Risk, 1996). Because of its original software design and structure, SEISM 1.1 could only be run on a specific Sun machine, *Pinafore*, at the Center for Nuclear Waste Regulatory Analyses (CNWRA). In order to archive SEISM 1.1 it was necessary to modify the code so that it could be used on other machines in the future, if a need arose and resources were available. Additional software changes to make SEISM 1.1 easier to use and less costly to run were not implemented because of the anticipated costs and the prospect for very few future applications. Prior to archiving SEISM 1.1 it was placed under configuration control in accordance with TOP–018. The purpose of this report is to briefly document the software changes made to SEISM 1.1 to make it portable to other machines and provide limited operating instructions. More complete operating instructions can be obtained from Lawrence Livermore National Laboratory (Davis, 1991) the originator of the code. To address future Probabilistic Seismic Hazard Analysis needs, CNWRA has purchased EZ-FRISK™, Version 4.4.

1.2 SEISM Background

In 1991 the U.S. Nuclear Regulatory Commission (NRC) requested that CNWRA develop or acquire a Probabilistic Seismic Hazard Analysis code. The decision was made to acquire a computer program to perform Probabilistic Seismic Hazard Analysis rather than develop a new code. At that time, there were two programs available: SEISM 1 and *EQHAZARD*. SEISM 1 is a *FORTRAN* code developed by Lawrence Livermore National Laboratory for the NRC's Office of Nuclear Reactor Regulation. *EQHAZARD* was developed by the Electric Power Research Institute with funding provided by a consortium of electric power utilities. The latter code was obtainable only on a cost reimbursable basis for about $20,000. The Division of High-Level Waste Management directed the CNWRA to determine if SEISM 1.1 was applicable to the analyses of seismic hazard at the high-level nuclear waste repository at Yucca Mountain, Nevada. Consequently, efforts were concentrated on SEISM 1 [also known as Seismic Hazard Code (commonly referred to as *shc*) during its development at Lawrence Livermore National Laboratory].

SEISM 1 was designed to take expert opinions regarding the locations and sizes of seismic source zones in the eastern United States and to include ground motion attenuation models suitable to the eastern United States. It was used by Lawrence Livermore National Laboratory to reevaluate the seismic hazard and associated uncertainty for the 69 eastern United States nuclear power plant sites. SEISM 1.1 evaluation of seismic hazard was based on new interpretations of historic seismic and geologic data specific to the eastern United States. Because of these new interpretations the original design bases of these reactors were questioned by NRC. Probability analyses made using SEISM 1.1 and *EQHAZARD* afforded a means of evaluating the impact of these new interpretations on the 69 nuclear power plants.

Evaluation of the code was performed by R.B. Hofmann, seismologist at CNWRA, and J.H. Bangs and J.M. Menchaca, programmers in Division 15 of Southwest Research Institute. A draft SEISM1 users manual (Davis, 1991) was obtained from Lawrence Livermore National Laboratory. Code principles and functions are described in a series of Lawrence Livermore National Laboratory reports, most of which are published as NUREGs by the NRC. Examples are NUREG/CR 1582, 3756 and 5250 (NRC, 1980; 1984; 1989). Most of the material in these reports is related to results obtained in the study of seismic hazard at the 69 nuclear power plants or comparisons of results from SEISM 1 and *EQHAZARD.*

CNWRA's second task was to make SEISM 1 executable on CNWRA computers. Because several libraries used by the code and environment variables (path names to files) were programmed into the source code, recompilation was required for each new computer (even for computers of the same model) on which the program was to be used. SEISM 1 was supplied with a test problem which was successfully calculated on a SUN SparcStation 2, SUN IPC, and SUN IPX. Two of the function libraries developed by Lawrence Livermore National Laboratory required the compiler version under which they were developed be used. The code is portable across three platforms/operating-systems provided that the previously mentioned criteria are met. The platforms are: (i) SUN (all of which are binary compatible), (ii) CDC 7600, and (iii) CRAY using the CTSS operating system. Libraries need to be supplied for each of the platforms. The CTSS operating system has been supplanted by the UNICOS operating system, therefore new libraries for the UNICOS operating system need to be located for the CRAY.

CNWRA's third task was to modify SEISM 1 to calculate seismic hazards in the western United States. A new digital map of United States was installed in the code and longitude restraints expanded to encompass the western United States. The test case was moved from the eastern United States to the western United States by adding 25° of longitude to all the longitudes in the test problem. A successful computation was made. Earthquake ground motion attenuation functions suitable for the western United States were incorporated in the code and an "error free" successful computation was made using published opinions concerning western United States earthquakes. In the process of making this calculation, several undocumented input requirements were identified with the help of Lawrence Livermore National Laboratory staff. Because the original test case was in the eastern United States, the western United States computation result has not been tested with a known test case. Input to the computation was fault length and offset information converted to earthquake data through published formulae (Wells and Coppersmith, 1994). To be applicable to assessing the performance of a high-level waste repository over 10,000 years, this modification was necessary because the level of earthquake activity in the western United States does not appear to be stationary over long periods of time. Once this modification was completed a decision was made regarding whether further efforts to develop this code for the Division of High-Level Waste Management were appropriate and if so, what level of quality assurance was required for its application. About this time *EZ-FRISK*™ became available and the decision was made to make SEISM 1.1 portable to other machines in order to subsequently archive the code. The decision to make the code portable prior to arching allows the code to be run in the future on machines available at that time.

1.3 Difficulties in Using SEISM

Using the original version of *SEISM* as received by CNWRA, the user was required to modify, recompile, and relink outer environment variables, such as paths for the source code and input and output data files. A shell script named *GOSHC* was written to ease this weakness in portability of the original code. Changing the program environment still requires a modification of *GOSHC* but not recompiling and relinking. *SEISM* also currently requires the user to clean up files by manually saving previous runs, changing directories, modifying a file called *COMMAND*, and run the script file to start the *SEISM* program.

Other difficulties with of SEISM 1.1 include a precise knowledge of the input and output file locations is required and manual editing of all input files is needed. Editing requires precise knowledge of the file format and functionality of input parameters. The problem resides in the complexity of the file format for not only the *ax(i)*, individual expert input files, but the other input files *c(j)sis* and *c(j)altz*. If used in the future, a graphical user interface for inputting and modifying the expert input files - *ax(i)* files should be added. In addition, the output files are difficult to interpret and an effort to clarify the output should be included in any future modifications.

Furthermore, the existing documentation for *SEISM* is poorly organized and does not completely and clearly present necessary information. Future use would require SEISM 1.2 to be placed under configuration control per TOP–018.

2 TASK LIST

The major tasks completed under the SEISM 1.1 Portability Task are listed below. A more detailed discussion is included in the following sections.

1. Archive existing files. Create tape backup of *FORTRAN* source libraries, including *IMSL*, *TV80LIB* and *DIGLIB* along with existing versions of the *SEISM* source code and data files located on *usr2/pinafore* and *usr3/pinafore*.

2. Include source code for the new versions of the libraries: *IMSL*, *TV80LIB* and *DIGLIB*.

3. Run benchmark test using SEISM 1.1 and input data for Yucca Mountain (western United States).

4. Implement and test procedures to make *SEISM* code portable to different platforms.

5. Document findings and recommend future tasks.

2.1 Archive Existing Files

Various versions of similar files existed throughout the directories on *Pinafore*. Initially it was not known which files were the latest versions or which files were used to produce published results (Hofmann et al., 1993 and Hofmann, 1994). Disk space was taken up with extra copies of files, yet it was not clear which files could be safely deleted. The first task was to archive the existing files to tape so that files could be restored if they were deleted or incorrectly modified.

2.2 Library Inclusion

With the release of updated *FORTRAN* source libraries, it was necessary to upgrade the CNWRA version of SEISM 1.1 and verify that it would still execute in a consistent manner. At the same time, by acquiring the source code for the libraries, the system could be made more portable. Libraries compiled on one platform may not be compatible with another. By distributing library source code instead of executable with *SEISM*, each user will be able to recompile and relink the code for execution on a specific platform. The following steps were carried out for this task:

- copy libraries from Lawrence Livermore National Laboratory to CNWRA
- 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 the object library to *SEISM* programs
- move *GOSHC* to *SEISM* directory
- modify environment for current directories
- test *GOSHC*
- run *SEISM* and check for errors

2.3 Benchmark Test

One purpose of the portability task was to confirm that the results published by Hofmann (1993, 1994) could be replicated. First it was necessary to determine which source code files and input data files were used to generate those results. Once the files were located, the code was recompiled and relinked and executed using the original libraries. The results were checked against the published results. Steps completed in this task included:

- determine benchmark input files
- run *SEISM* using selected input and original libraries
- verify output against existing benchmark output using:
  - visual check of files
  - difference check of routines
  - comparison of graphical output

2.4 Sun to Sun Migration

Once the original results had been replicated, it was necessary to recompile and relink *SEISM* using the new libraries. The results from *SEISM* with relinked new libraries were consistent with the original results. The library modifications had no impact on the results. Thus using the new source code libraries, *SEISM* was portable to different platforms. Steps included in this task are:

- run *SEISM* using selected input and new libraries
- verify output against existing benchmark output
- select Sun system similar to NRC or DOE system
- copy *SEISM* to the selected system
- recompile and relink *SEISM*
- run and test against benchmark data
- verify output against existing benchmark output

2.5 Documentation

In order to augment the existing documentation for the *SEISM* system, the following tasks were completed:

- develop and document procedures for system migration and benchmark testing
- keep scientific notebook up-to-date
- note errors in source code and/or possible modifications to make code more usable.

3 DISCUSSION OF COMPLETED TASKS

3.1 Archive Existing Files

All files were backed up to magnetic tapes. The input data files and source files used to generate the benchmark results were identified. Copies of the original files were stored in Source Code Control System. Where this had not been done, modified files were checked into Source Code Control System.

At the end of the portability task, a new directory (*/seism*) was created. All known good files and files necessary to run SEISM 1.1 were copied to this directory. This directory structure was stored on a compact disk read only memory to Source Code Control System as SEISM 2.0. A copy of this compact disk is available in the CNWRA quality assurance files, in San Antonio, Texas. This version will be the starting point for any future tasks. Attachment A contains the directory listing for */seism*; the Source Code Control System files list for SEISM 1.2 is contained in Attachment B.

3.2 Library Inclusion

Recompiling SEISM 1.2 using the original libraries did not work initially, due to missing files. Once these files were identified, located, and copied to the correct directory, *SEISM* compiled and linked with no problems. The process of replacing the executable library with the new source library presented no difficulties and *SEISM* was recompiled and relinked.

3.3 Benchmark Test

On the first benchmark test of SEISM 1.2, runtime warnings about the data were encountered. It was determined that the correct input data files were not being used. Once the correct input files were located, SEISM 1.2 was rerun using the old libraries to ensure that the earlier results could be replicated (Hofmann 1994). When the correct input files were used the new results were identical with the earlier results (Hofmann, 1994).

After demonstrating that the published results could be replicated using the old libraries, the SEISM 1.2 code was recompiled and relinked with the new libraries to make a benchmark run. When SEISM 1.2 was rerun with the new libraries, the results were consistent with the earlier runs. SEISM 1.2 was rerun when all the files had been transferred to make sure that all the necessary and correct files were in one location.

3.4 Sun to Sun Migration

SEISM 1.2 runs were made successfully on two different SUN platforms: *Pinafore* and *Skippy*. *Pinafore* is a SUN IPX (4/50) running SUNOS 4.1.3. *Skippy* is a SPARCStation 20 running SUNOS 4.1.3_U1, Version B. These machines no longer exist at CNWRA. However, with the modifications, SEISM 1.2 should run on any SUN workstation.

3.5 Documentation

In order to make it easier for future users to execute and understand *SEISM*, several documents were prepared. These include: instructions for using SEISM 1.2 (Attachment C), instructions for porting SEISM 1.2 (Attachment D), readme files (Attachment E), and examples of input files (Attachment F).

Readme files are placed in the directories under *SEISM* directories. Readme files describe the contents and purpose of the files in each directory. Operating instructions are included in the readme files. See Attachment C for a list of the readme files. Attachment C also contains a sample set of formats for the input files: *ax(i)*, *c(j)sis*, and *c(j)altz*.

Scientific Notebook No. 59 contains descriptions of the progress made on the tasks as they were accomplished. Copies of output results are also included in the notebook. This notebook is with CNWRA quality assurance records in San Antonio, Texas.

4 CONCLUSIONS AND RECOMMENDATIONS

The software design and structure of the *SEISM* code makes it extremely time-consuming and difficult to port and modify input parameters for testing. Production use, even with the improvements described above, requires a skilled and experienced user assisted by a programmer. Following recommendations are made to improve the effectiveness of SEISM 1.2, if it is to be used in the future.

- enhance user-friendliness of the code
- ensure that code and input data are placed under configuration control
- improve documentation

4.1 Corrections/Enhancements to SEISM 1.2 Source Code

If SEISM 1.2 is to be used in the future, the following problems should be noted and solutions implemented to make the code more user friendly.

1. The SEISM 1.2 program expects certain directories to exist and places output files in those directories. If the directories do not exist, the program crashes. The code should be modified to check for directory existence before writing the file. If the directory does not exist, the program should create it.

2. SEISM 1.2 has a hardcoded limit for the length of a file path. This limit is much lower than the current operating system allows. In order to avoid truncation of path names, this limit should be increased.

3. At present, *GOSHC* allows the user to select which experts to use for an analysis. However, all the experts are written to the command file and the command file must be edited manually to delete unwanted expert inputs. The code should be modified to write out only the selected experts to the command file. Also, *GOSHC* will abort if an input of the wrong data type is made. For instance, if the program expects a character, entering a number will cause it to fail. Type checking and automatic conversion of input data type should be added. *GOSHC* could also be modified to allow the user to input new environment designators and to modify the necessary files or variables automatically. Other additions which could be made to *GOSHC* to provide a more user-friendly input environment include:

    - add option to run SEISM 1.2 with input text file of choices
    - make selected parameters effective—sometimes a hardcoded value is used even though the user inputs another value
    - display a screen to read and interpret input/output formats
    - the ability to change and correct previous inputs
    - display standard, default, or previous inputs
    - run SEISM 1.2 directly from the input screen
    - view results on the screen, one page at a time (currently displayed without pause, one screen overwrites the previous screen)
    - add option to generate printouts

4. If any or all of the above options are added to *GOSHC*, *GOSHC* can be interfaced with a graphical user interface application to allow input of *ax(i)* [expert opinion] files. Or, a shell can be written that interfaces both the *ax(i)* graphical user interface and *GOSHC*. This shell would allow the user to run *GOSHC* or *SEISM* by selecting an option from a menu. All necessary directory changes would occur automatically without having to be entered manually by the user. This shell program could also check for the presence of the command file and either delete it, change its name or overwrite it when *GOSHC* is selected (at present, if the command file is present, *GOSHC* will not run).

5. An additional future task may be to increase portability by incorporating source code for the library functions and removing path names from files.

6. Future enhancements of the SEISM 1.2 source code need to include features that would prevent the program from aborting under certain conditions or would verify the validity of input parameters. The addition of *GOSHC* was an improvement and made the program easier to use, especially when the user lacks seismological background. Further enhancements could include input data type checking and the display of lists of options from which the user could select.

4.2 Configuration Control

Once the necessary files were identified and isolated in the seism directory, other directories that contain extra copies of the files were cleaned up. Redundant and out-of-date files and directories were deleted, freeing disk space for other uses.

SEISM 1.1 is under software configuration control. Before using SEISM 1.2 it should be placed under configuration control. A software release notice was issued on January 14, 1994.

Any time modifications to SEISM 1.2 code or files are necessary, the files should be checked out of Source Code Control System and checked back in upon completion of modifications. This will make tracking software changes and code versions easier to follow.

4.3 Improve Documentation

In addition to the new documentation provided with this report, the following documentation would be useful, if the code is used in the future.

- documentation on the sensitivity of certain SEISM 1.2 input parameters
- organize and develop easy to understand procedures for recognizing correct output from SEISM 1.2
- organize and develop easy to understand documentation on developing input files

5 REFERENCES

Davis, B.C. "SHC Software and Data Base SEISM 1 Code Manual." Manuscript prepared by NRC. Livermore, California: Lawrence Livermore National Laboratory/NRC. 1991.

Hofmann, R.B. and J.H. Bangs. "SEISM 1 Code: Adaptations for Use In the Western U.S." Letter Report to NRC. San Antonio, Texas: CNWRA. 1993.

Hofmann, R.B. "SEISM 1.1 Test Analysis." Report to NRC. San Antonio, Texas: CNWRA. 1994.

NRC. "Seismic Hazard Analysis, Vol. 1–4." NUREG/CR 1582. Livermore, California: Lawrence Livermore National Laboratory. 1980.

NRC. "Seismic Hazard Characterization of the Eastern United States: Methodology and Interim Results for Ten Sites." NUREG/CR 3756. Livermore, California: Lawrence Livermore National Laboratory. 1984.

NRC. "Seismic Hazard Characterization of 69 Nuclear Plant Sites East of the Rocky Mountains, Vols. 1–7." NUREG/CR 5250. Livermore, California: Lawrence Livermore National Laboratory. 1989.

Risk. "EZ-FRISK™ User's Manual." Boulder, Colorado: Risk Engineering, Inc. 1996.

Wells, D.L. and K.J. Coppersmith. "New Empirical Relationships Among Magnitude, Rupture Length, Rupture Width, Rupture Area, and Surface Displacement." *Bulletin of the Seismological Society of America.* Vol. 84. pp. 974–1,002. 1994.

ATTACHMENT A

DIRECTORY LISTING FOR /SEISM

```
seism:
hzcds/
hzrd/
printme
readmesi.txt
seism_dirlist.txt

seism/hzcds:
03JanHis
EVcheck
SCCS/
aleas
aleas.f
aleas.o
aleas.trace
amean.f
amean.o
amodel.dif
amodel.f
amodel.o
attprob.f
attprob.o
bdir.dif
bdir.f
bdir.o
bmodel.dif
bmodel.f
bmodel.o
checkp.f
checkp.o
clear.f
clear.o
cmodel.dif
cmodel.f
cmodel.o
comap
comap.f
comb
comb.dif
comb.f
comb.o
confid.f
confid.o
convds.f
convds.o
crayfl.f
crayfl.o
dattim.f
dattim.o
diglib.a
diglibold.a
dmodel.dif
dmodel.f
dmodel.o
doac.f
doac.o
editFiles
emodel.dif
emodel.f
emodel.o
endcmmd.f
endcmmd.o
fmodel.f
fmodel.o
fortprds
```

```
gdir.f
gdir.o
gen.f
gen.o
getmagi.f
getmagi.o
gmean.f
gmean.o
gmodel.f
gmodel.o
goshc
goshc.ps
hazard.f
hazard.o
hmodel.f
hmodel.o
imsl.a
imslold.a
info.lst
initial.dif
initial.f
initial.o
lamda.f
lamda.o
listn.f
listn.o
listp.f
listp.o
makefile
makefile.aleas
makefile.com
makefile.shc
making.aleas
misc.f
misc.o
move.f
move.o
mytest
newInfo.lst
newlib/
newloc.dif
newloc.f
newloc.o
nsitecor.dif
nsitecor.f
nsitecor.o
numark2.f
numark2.o
olsq.f
olsq.o
opatex.f
opatex.o
pathNameFiles
plotter.dif
plotter.f
plotter.o
poly.f
poly.o
prds
prds.f
prds.trace
prin.f
prin.o
prompt.f
prompt.o
```

```
quick
raleas.dif
raleas.f
raleas.o
rcomb.f
rcomb.o
rdatex.dif
rdatex.f
rdatex.o
rdattn.dif
rdattn.f
rdattn.o
rddis.f
rddis.o
rdin.f
rdin.o
readmehc.txt
readsite.f
readsite.o
rnmaps.f
rnmaps.o
rnseism.f
rnseism.o
rsexpert.f
rsexpert.o
rsitecor.dif
rsitecor.f
rsitecor.o
savePrds.f
seism.dif
seism.f
seism.o
seiswt.f
seiswt.o
selsite.dif
selsite.f
selsite.o
setcor.f
setcor.o
shc
shc.dif
shc.f
shc.o
shc.trace
shc1
sia.dif
sia.f
sia.o
sitedat.f
sitedat.o
skip.f
skip.o
sortz.f
sortz.o
spec.f
spec.o
stor.f
stor.o
triang.f
triang.o
trifun.f
trifun.o
trims.f
trims.o
tv80lib.a
```

```
tv80libold.a
vscale.f
vscale.o
weight.f
weight.o
wrtap.f
wrtap.o
ximod.f
ximod.o

seism/hzcds/SCCS:
s.03JanHis
s.EVcheck
s.aleas
s.aleas.f
s.aleas.o
s.aleas.trace
s.amean.f
s.amean.o
s.amodel.dif
s.amodel.f
s.amodel.o
s.attprob.f
s.attprob.o
s.bdir.dif
s.bdir.f
s.bdir.o
s.bmodel.dif
s.bmodel.f
s.bmodel.o
s.checkp.f
s.checkp.o
s.clear.f
s.clear.o
s.cmodel.dif
s.cmodel.f
s.cmodel.o
s.comap
s.comap.f
s.comb
s.comb.dif
s.comb.f
s.comb.o
s.confid.f
s.confid.o
s.convds.f
s.convds.o
s.crayfl.f
s.crayfl.o
s.dattim.f
s.dattim.o
s.diglib.a
s.diglibold.a
s.dmodel.dif
s.dmodel.f
s.dmodel.o
s.doac.f
s.doac.o
s.editFiles
s.emodel.dif
s.emodel.f
s.emodel.o
s.endcmmd.f
s.endcmmd.o
s.fmodel.f
```

```
s.fmodel.o
s.fortprds
s.gdir.f
s.gdir.o
s.gen.f
s.gen.o
s.getmagi.f
s.getmagi.o
s.gmean.f
s.gmean.o
s.gmodel.f
s.gmodel.o
s.goshc
s.goshc.ps
s.hazard.f
s.hazard.o
s.hmodel.f
s.hmodel.o
s.imsl.a
s.imslold.a
s.info.lst
s.initial.dif
s.initial.f
s.initial.o
s.lamda.f
s.lamda.o
s.listn.f
s.listn.o
s.listp.f
s.listp.o
s.makefile
s.makefile.aleas
s.makefile.com
s.makefile.shc
s.making.aleas
s.misc.f
s.misc.o
s.move.f
s.move.o
s.mytest
s.newInfo.lst
s.newloc.dif
s.newloc.f
s.newloc.o
s.nsitecor.dif
s.nsitecor.f
s.nsitecor.o
s.numark2.f
s.numark2.o
s.olsq.f
s.olsq.o
s.opatex.f
s.opatex.o
s.pathNameFiles
s.plotter.dif
s.plotter.f
s.plotter.o
s.poly.f
s.poly.o
s.prds
s.prds.f
s.prds.trace
s.prin.f
s.prin.o
s.prompt.f
```

s.prompt.o
s.quick
s.raleas.dif
s.raleas.f
s.raleas.o
s.rcomb.f
s.rcomb.o
s.rdatex.dif
s.rdatex.f
s.rdatex.o
s.rdattn.dif
s.rdattn.f
s.rdattn.o
s.rddis.f
s.rddis.o
s.rdin.f
s.rdin.o
s.readsite.f
s.readsite.o
s.rnmaps.f
s.rnmaps.o
s.rnseism.f
s.rnseism.o
s.rsexpert.f
s.rsexpert.o
s.rsitecor.dif
s.rsitecor.f
s.rsitecor.o
s.savePrds.f
s.seism.dif
s.seism.f
s.seism.o
s.seiswt.f
s.seiswt.o
s.selsite.dif
s.selsite.f
s.selsite.o
s.setcor.f
s.setcor.o
s.shc
s.shc.dif
s.shc.f
s.shc.o
s.shc.trace
s.shc1
s.sia.dif
s.sia.f
s.sia.o
s.sitedat.f
s.sitedat.o
s.skip.f
s.skip.o
s.sortz.f
s.sortz.o
s.spec.f
s.spec.o
s.stor.f
s.stor.o
s.triang.f
s.triang.o
s.trifun.f
s.trifun.o
s.trims.f
s.trims.o
s.tv80lib.a

```
s.tv80libold.a
s.vscale.f
s.vscale.o
s.weight.f
s.weight.o
s.wrtap.f
s.wrtap.o
s.ximod.f
s.ximod.o

seism/hzcds/newlib:
diglib.f/
imsl.f/
libf77.tar
tv80.f/

seism/hzcds/newlib/diglib.f:
sources/
sources.x/

seism/hzcds/newlib/diglib.f/sources:
Makefile
SCCS/
axis.f
bgnplt.f
camrot.f
clline.f
cszmap.f
cursor.f
curvey.f
devsel.f
diglib.a
diglib.a.save
draw3d.f
drawpq.f
endplt.f
extrma.f
fulmap.f
gbempt.f
gbfini.f
gbgin.f
gbinit.f
gbinse.f
gbinst.f
gbnewb.f
gbnote.f
gbsenc.f
gbsend.f
gbtest.f
gbuset.f
gd4can.f
gd4con.f
gdaid.f
gdgaid.f
gdpsdu.f
gdpsin.f
gdpsit.f
gdpsop.f
gdpst.f
gdpstc.f
gdrtro.f
gdsun1.c
gdsun2.c
gdwait.f
goodcs.f
```

```
grafin.f
gsclc.f
gsccmp.f
gschit.f
gscolr.f
gscrsr.f
gsdlns.f
gsdnam.f
gsdraw.f
gsdrgb.f
gsdrvr.f
gsdrw2.f
gsdrw3.f
gsetdp.f
gsfill.f
gsfont.f
gsgdev.f
gsgin.f
gshght.f
gsinpt.f
gsirst.f
gsivis.f
gslens.f
gsltyp.f
gsmove.f
gspoly.f
gspstr.f
gsrclp.f
gsrst.f
gssclp.f
gssetc.f
gsstrk.f
gswndo.f
gsxlcm.f
gsylcm.f
hatch.f
iand.f
ilabsz.f
ior.f
ivis.f
laxis.f
ldivds.f
len.f
linlab.f
loglab.f
mapit.f
mapprm.f
mapset.f
mapsiz.f
mapsml.f
mapsz2.f
minmax.f
mpclip.f
numstr.f
pause.f
pltbox.f
pltbx2.f
pointc.f
points.f
purjoy.f
rlsdev.f
rotate.f
rstmap.f
savmap.f
scale.f
```

```
scopy.f
seldev.f
syaxis.f
symbol.f
tester.f
tickl.f
tickln.f
traccy.f
trace.f
tracec.f
tracey.f
xyprm.f

seism/hzcds/newlib/diglib.f/sources/SCCS:
s.Makefile
s.axis.f
s.bgnplt.f
s.camrot.f
s.clline.f
s.cszmap.f
s.cursor.f
s.curvey.f
s.devsel.f
s.diglib.a
s.diglib.a.save
s.draw3d.f
s.drawpq.f
s.endplt.f
s.extrma.f
s.fulmap.f
s.gbempt.f
s.gbfini.f
s.gbgin.f
s.gbinit.f
s.gbinse.f
s.gbinst.f
s.gbnewb.f
s.gbnote.f
s.gbsenc.f
s.gbsend.f
s.gbtest.f
s.gbuset.f
s.gd4can.f
s.gd4con.f
s.gdaid.f
s.gdgaid.f
s.gdpsdu.f
s.gdpsin.f
s.gdpsit.f
s.gdpsop.f
s.gdpst.f
s.gdpstc.f
s.gdrtro.f
s.gdsun1.c
s.gdsun2.c
s.gdwait.f
s.goodcs.f
s.grafin.f
s.gscclc.f
s.gsccmp.f
s.gschit.f
s.gscolr.f
s.gscrsr.f
s.gsdlns.f
s.gsdnam.f
```

s.gsdraw.f
s.gsdrgb.f
s.gsdrvr.f
s.gsdrw2.f
s.gsdrw3.f
s.gsetdp.f
s.gsfill.f
s.gsfont.f
s.gsgdev.f
s.gsgin.f
s.gshght.f
s.gsinpt.f
s.gsirst.f
s.gsivis.f
s.gslens.f
s.gsltyp.f
s.gsmove.f
s.gspoly.f
s.gspstr.f
s.gsrclp.f
s.gsrst.f
s.gssclp.f
s.gssetc.f
s.gsstrk.f
s.gswndo.f
s.gsxlcm.f
s.gsylcm.f
s.hatch.f
s.iand.f
s.ilabsz.f
s.ior.f
s.ivis.f
s.laxis.f
s.ldivds.f
s.len.f
s.linlab.f
s.loglab.f
s.mapit.f
s.mapprm.f
s.mapset.f
s.mapsiz.f
s.mapsml.f
s.mapsz2.f
s.minmax.f
s.mpclip.f
s.numstr.f
s.pause.f
s.pltbox.f
s.pltbx2.f
s.pointc.f
s.points.f
s.purjoy.f
s.rlsdev.f
s.rotate.f
s.rstmap.f
s.savmap.f
s.scale.f
s.scopy.f
s.seldev.f
s.syaxis.f
s.symbol.f
s.tester.f
s.tickl.f
s.tickln.f
s.traccy.f

```
s.trace.f
s.tracec.f
s.tracey.f
s.xyprm.f

seism/hzcds/newlib/diglib.f/sources.x:
COMPARE
DIFFLOG
Makefile
Makefile.diglib
SCCS/
axis.f
bgnplt.f
camrot.f
clline.f
cszmap.f
cursor.f
curvey.f
devsel.f
diglib.a
diglib.a.ANSIF77
diglib.a.save
draw3d.f
drawpq.f
endplt.f
extrma.f
fulmap.f
gbempt.f
gbfini.f
gbgin.f
gbinit.f
gbinse.f
gbinst.f
gbnewb.f
gbnote.f
gbsenc.f
gbsend.f
gbtest.f
gbuset.f
gd4can.f
gd4con.f
gdaid.f
gdgaid.f
gdpsdu.f
gdpsin.f
gdpsit.f
gdpsop.f
gdpst.f
gdpstc.f
gdrtro.f
gdwait.f
goodcs.f
grafin.f
gscclc.f
gsccmp.f
gschit.f
gscolr.f
gscrsr.f
gsdlns.f
gsdnam.f
gsdraw.f
gsdrgb.f
gsdrvr.f
gsdrw2.f
gsdrw3.f
```

```
gsetdp.f
gsfill.f
gsfont.f
gsgdev.f
gsgin.f
gshght.f
gsinpt.f
gsirst.f
gsivis.f
gslens.f
gsltyp.f
gsmove.f
gspoly.f
gspstr.f
gsrclp.f
gsrst.f
gssclp.f
gssetc.f
gsstrk.f
gswndo.f
gsxlcm.f
gsylcm.f
hatch.f
iand.f
ilabsz.f
ior.f
ivis.f
laxis.f
ldivds.f
len.f
linlab.f
loglab.f
mapit.f
mapprm.f
mapset.f
mapsiz.f
mapsml.f
mapsz2.f
minmax.f
mpclip.f
numstr.f
pause.f
pltbox.f
pltbx2.f
pointc.f
points.f
purjoy.f
rlsdev.f
rotate.f
rstmap.f
savmap.f
scale.f
scopy.f
seldev.f
syaxis.f
symbol.f
tester.f
tickl.f
tickln.f
traccy.f
trace.f
tracec.f
tracey.f
x11_sun.c
xyprm.f
```

```
seism/hzcds/newlib/diglib.f/sources.x/SCCS:
s.COMPARE
s.DIFFLOG
s.Makefile
s.Makefile.diglib
s.axis.f
s.bgnplt.f
s.camrot.f
s.clline.f
s.cszmap.f
s.cursor.f
s.curvey.f
s.devsel.f
s.diglib.a
s.diglib.a.ANSIF77
s.diglib.a.save
s.draw3d.f
s.drawpq.f
s.endplt.f
s.extrma.f
s.fulmap.f
s.gbempt.f
s.gbfini.f
s.gbgin.f
s.gbinit.f
s.gbinse.f
s.gbinst.f
s.gbnewb.f
s.gbnote.f
s.gbsenc.f
s.gbsend.f
s.gbtest.f
s.gbuset.f
s.gd4can.f
s.gd4con.f
s.gdaid.f
s.gdgaid.f
s.gdpsdu.f
s.gdpsin.f
s.gdpsit.f
s.gdpsop.f
s.gdpst.f
s.gdpstc.f
s.gdrtro.f
s.gdwait.f
s.goodcs.f
s.grafin.f
s.gscclc.f
s.gsccmp.f
s.gschit.f
s.gscolr.f
s.gscrsr.f
s.gsdlns.f
s.gsdnam.f
s.gsdraw.f
s.gsdrgb.f
s.gsdrvr.f
s.gsdrw2.f
s.gsdrw3.f
s.gsetdp.f
s.gsfill.f
s.gsfont.f
s.gsgdev.f
s.gsgin.f
```

```
s.gshght.f
s.gsinpt.f
s.gsirst.f
s.gsivis.f
s.gslens.f
s.gsltyp.f
s.gsmove.f
s.gspoly.f
s.gspstr.f
s.gsrclp.f
s.gsrst.f
s.gssclp.f
s.gssetc.f
s.gsstrk.f
s.gswndo.f
s.gsxlcm.f
s.gsylcm.f
s.hatch.f
s.iand.f
s.ilabsz.f
s.ior.f
s.ivis.f
s.laxis.f
s.ldivds.f
s.len.f
s.linlab.f
s.loglab.f
s.mapit.f
s.mapprm.f
s.mapset.f
s.mapsiz.f
s.mapsml.f
s.mapsz2.f
s.minmax.f
s.mpclip.f
s.numstr.f
s.pause.f
s.pltbox.f
s.pltbx2.f
s.pointc.f
s.points.f
s.purjoy.f
s.rlsdev.f
s.rotate.f
s.rstmap.f
s.savmap.f
s.scale.f
s.scopy.f
s.seldev.f
s.syaxis.f
s.symbol.f
s.tester.f
s.tickl.f
s.tickln.f
s.traccy.f
s.trace.f
s.tracec.f
s.tracey.f
s.x11_sun.c
s.xyprm.f

seism/hzcds/newlib/imsl.f:
Makefile
Makefile.imsl
SCCS/
```

```
erfc.f
ggda.f
ggnml.f
ggubfs.f
ggubs.f
imsl.a
leqt1f.f
ludatn.f
luelmn.f
mdnor.f
mdnris.f
merfi.f
uertst.f
ugetio.f
vsrta.f
vsrtr.f

seism/hzcds/newlib/imsl.f/SCCS:
s.Makefile
s.Makefile.imsl
s.erfc.f
s.ggda.f
s.ggnml.f
s.ggubfs.f
s.ggubs.f
s.imsl.a
s.leqt1f.f
s.ludatn.f
s.luelmn.f
s.mdnor.f
s.mdnris.f
s.merfi.f
s.uertst.f
s.ugetio.f
s.vsrta.f
s.vsrtr.f

seism/hzcds/newlib/tv80.f:
Makefile
Makefile.tv80
SCCS/
crtbcd.f
dders.f
fr80id.f
frame.f
keep80.f
line.f
map.f
mapi.f
maps.f
mapsll.f
mapsls.f
mapssl.f
plote.f
pointc.f
setbox.f
setch.f
setlch.f
setpch.f
tracecc.f
tracel.f
tv80.a.save
tv80.a.sv
tv80lib.a
```

```
seism/hzcds/newlib/tv80.f/SCCS:
s.Makefile
s.Makefile.tv80
s.crtbcd.f
s.dders.f
s.fr80id.f
s.frame.f
s.keep80.f
s.line.f
s.map.f
s.mapi.f
s.maps.f
s.mapsll.f
s.mapsls.f
s.mapssl.f
s.plote.f
s.pointc.f
s.setbox.f
s.setch.f
s.setlch.f
s.setpch.f
s.tracecc.f
s.tracel.f
s.tv80.a.save
s.tv80.a.sv
s.tv80lib.a

seism/hzrd:
comapdir/
datadir/
goodResults/
prdsdir/
readme.txt
readmehc.txt
readmehr.txt
readmesi.txt
results/

seism/hzrd/comapdir:
SCCS/
f10s91
f10s92
f10s93
f10s94
f11s91
f12s91
f13s91
f1s91
f1s92
f1s92.nmb
f1s93
f1s94
f2s91
f2s92
f2s93
f2s94
f3s91
f3s92
f3s93
f3s94
f4s91
f4s92
f4s93
f4s94
f5s91
```

```
f5s92
f5s93
f5s94
f6s91
f6s92
f6s93
f6s94
f7s91
f7s92
f7s93
f7s94
g10s91
g10s92
g10s93
g10s94
g11s91
g12s91
g13s91
g1s91
g1s92
g1s93
g1s94
g2s91
g2s92
g2s93
g2s94
g3s91
g3s92
g3s93
g3s94
g4s91
g4s92
g4s93
g4s94
g5s91
g5s92
g5s93
g5s94
g6s91
g6s92
g6s93
g6s94
g7s91
g7s92
g7s93
g7s94
number
numbered.f1s
oldfiles/
xi10area
xi1area
xi2area
xi3area
xi4area
xi5area
xi6area
xi7area

seism/hzrd/comapdir/SCCS:
s.f10s91
s.f10s92
s.f10s93
s.f10s94
s.f11s91
s.f12s91
```

s.f13s91
s.f1s91
s.f1s92
s.f1s92.nmb
s.f1s93
s.f1s94
s.f2s91
s.f2s92
s.f2s93
s.f2s94
s.f3s91
s.f3s92
s.f3s93
s.f3s94
s.f4s91
s.f4s92
s.f4s93
s.f4s94
s.f5s91
s.f5s92
s.f5s93
s.f5s94
s.f6s91
s.f6s92
s.f6s93
s.f6s94
s.f7s91
s.f7s92
s.f7s93
s.f7s94
s.g10s91
s.g10s92
s.g10s93
s.g10s94
s.g11s91
s.g12s91
s.g13s91
s.g1s91
s.g1s92
s.g1s93
s.g1s94
s.g2s91
s.g2s92
s.g2s93
s.g2s94
s.g3s91
s.g3s92
s.g3s93
s.g3s94
s.g4s91
s.g4s92
s.g4s93
s.g4s94
s.g5s91
s.g5s92
s.g5s93
s.g5s94
s.g6s91
s.g6s92
s.g6s93
s.g6s94
s.g7s91
s.g7s92
s.g7s93
s.g7s94

```
s.number
s.numbered.f1s
s.xi10area
s.xi1area
s.xi2area
s.xi3area
s.xi4area
s.xi5area
s.xi6area
s.xi7area

seism/hzrd/comapdir/oldfiles:
SCCS/
f10s91
f10s92
f10s93
f10s94
f11s91
f12s91
f13s91
f1s91
f1s92
f1s92.nmb
f1s93
f1s94
f2s91
f2s92
f2s93
f2s94
f3s91
f3s92
f3s93
f3s94
f4s91
f4s92
f4s93
f4s94
f5s91
f5s92
f5s93
f5s94
f6s91
f6s92
f6s93
f6s94
f7s91
f7s92
f7s93
f7s94
g10s91
g10s92
g10s93
g10s94
g11s91
g12s91
g13s91
g1s91
g1s92
g1s93
g1s94
g2s91
g2s92
g2s93
g2s94
g3s91
```

g3s92
g3s93
g3s94
g4s91
g4s92
g4s93
g4s94
g5s91
g5s92
g5s93
g5s94
g6s91
g6s92
g6s93
g6s94
g7s91
g7s92
g7s93
g7s94

seism/hzrd/comapdir/oldfiles/SCCS:
s.f10s91
s.f10s92
s.f10s93
s.f10s94
s.f11s91
s.f12s91
s.f13s91
s.f1s91
s.f1s92
s.f1s92.nmb
s.f1s93
s.f1s94
s.f2s91
s.f2s92
s.f2s93
s.f2s94
s.f3s91
s.f3s92
s.f3s93
s.f3s94
s.f4s91
s.f4s92
s.f4s93
s.f4s94
s.f5s91
s.f5s92
s.f5s93
s.f5s94
s.f6s91
s.f6s92
s.f6s93
s.f6s94
s.f7s91
s.f7s92
s.f7s93
s.f7s94
s.g10s91
s.g10s92
s.g10s93
s.g10s94
s.g11s91
s.g12s91
s.g13s91
s.g1s91

```
s.g1s92
s.g1s93
s.g1s94
s.g2s91
s.g2s92
s.g2s93
s.g2s94
s.g3s91
s.g3s92
s.g3s93
s.g3s94
s.g4s91
s.g4s92
s.g4s93
s.g4s94
s.g5s91
s.g5s92
s.g5s93
s.g5s94
s.g6s91
s.g6s92
s.g6s93
s.g6s94
s.g7s91
s.g7s92
s.g7s93
s.g7s94

seism/hzrd/datadir:
120994cjaltzFileStatus
12AprilStatusofaxFiles
FDHsccsFiles
SCCS/
YMgmxfb
atnfb
ax1
ax1.bak
ax10
ax10.bak
ax2
ax2.bak
ax3
ax3.bak
ax4
ax4.bak
ax5
ax5.bak
ax6
ax6.bak
ax7
ax7.bak
bzsis
c10altz
c10sis
c10sis%
c10sis.old
c1altz
c1altz%
c1s93
c1sis
c1sis%
c1sisR1.1
c1sisR1.1.1.1
c1sisR1.1.2.1
c1sisR1.2
```

```
c1sisR1.3
c2altz
c2altz%
c2sis
c2sis%
c3altz
c3altz%
c3sis
c3sis%
c4altz
c4altz%
c4sis
c4sis%
c5altz
c5altz%
c5sis
c5sis%
c6altz
c6altz%
c6altz.old
c6sis
c6sis%
c7altz
c7sis
c7sis%
c7sis.old
cjsis.zones
cjsisPrsReport
command
comp.zone
current.atnfb
data-bad/
data-bad2/
datadirPrs
datedFileList
fileUnit.txt
fileUnitXref
firstFModelAtnfb
gmxfb
gmxfb.nmb
gmxfb.old
mvSCfiles
nmbrd.csis
number
numberOfZones
numbered.atn
numbered.gmx
oldAx7
origPsitecor
origPsitesid
origSitesid
out9out10.diffs
prds
prdsDiag
printins.bat
psitecor
psitesid
ruler.txt
sitecor
sitecor.nrc
sitesid
sitesid.old

seism/hzrd/datadir/SCCS:
s.120994cjaltzFileStatus
```

s.12AprilStatusofaxFiles
s.FDHsccsFiles
s.YMgmxfb
s.atnfb
s.ax1
s.ax1.bak
s.ax10
s.ax10.bak
s.ax2
s.ax2.bak
s.ax3
s.ax3.bak
s.ax4
s.ax4.bak
s.ax5
s.ax5.bak
s.ax6
s.ax6.bak
s.ax7
s.ax7.bak
s.bzsis
s.c10altz
s.c10sis
s.c10sis%
s.c10sis.old
s.c1altz
s.c1altz%
s.c1s93
s.c1sis
s.c1sis%
s.c1sisR1.1
s.c1sisR1.1.1.1
s.c1sisR1.1.2.1
s.c1sisR1.2
s.c1sisR1.3
s.c2altz
s.c2altz%
s.c2sis
s.c2sis%
s.c3altz
s.c3altz%
s.c3sis
s.c3sis%
s.c4altz
s.c4altz%
s.c4sis
s.c4sis%
s.c5altz
s.c5altz%
s.c5sis
s.c5sis%
s.c6altz
s.c6altz%
s.c6altz.old
s.c6sis
s.c6sis%
s.c7altz
s.c7sis
s.c7sis%
s.c7sis.old
s.cjsis.zones
s.cjsisPrsReport
s.command
s.comp.zone
s.current.atnfb

```
s.datadirPrs
s.datedFileList
s.fileUnit.txt
s.fileUnitXref
s.firstFModelAtnfb
s.gmxfb
s.gmxfb.nmb
s.gmxfb.old
s.mvSCfiles
s.nmbrd.csis
s.number
s.numberOfZones
s.numbered.atn
s.numbered.gmx
s.oldAx7
s.origPsitecor
s.origPsitesid
s.origSitesid
s.out9out10.diffs
s.prds
s.prdsDiag
s.printins.bat
s.psitecor
s.psitesid
s.ruler.txt
s.sitecor
s.sitecor.nrc
s.sitesid
s.sitesid.old

seism/hzrd/datadir/data-bad:
SCCS/
ax1.bad
ax10.bad
ax10.bad%
ax2.bad
ax3.bad
ax4.bad
ax5.bad
ax6.bad
ax6.bad%
ax7.bad
ax7.bad%
c10altz.bad
c10sis.bad
c1altz.bad
c1sis.bad
c2altz.bad
c2sis.bad
c3altz.bad
c3sis.bad
c4altz.bad
c4sis.bad
c5altz.bad
c5sis.bad
c6altz.bad
c6sis.bad
c7altz.bad
c7sis.bad

seism/hzrd/datadir/data-bad/SCCS:
s.ax1.bad
s.ax10.bad
s.ax10.bad%
s.ax2.bad
```

```
s.ax3.bad
s.ax4.bad
s.ax5.bad
s.ax6.bad
s.ax6.bad%
s.ax7.bad
s.ax7.bad%
s.c10altz.bad
s.c10sis.bad
s.c1altz.bad
s.c1sis.bad
s.c2altz.bad
s.c2sis.bad
s.c3altz.bad
s.c3sis.bad
s.c4altz.bad
s.c4sis.bad
s.c5altz.bad
s.c5sis.bad
s.c6altz.bad
s.c6sis.bad
s.c7altz.bad
s.c7sis.bad

seism/hzrd/datadir/data-bad2:
SCCS/
ax1
ax1%
ax1.1cz
ax1.2cz
ax1.bak
ax10
ax10%
ax10.1cz
ax10.2cz
ax10.bak
ax2
ax2%
ax2.1cz
ax2.2cz
ax2.bak
ax3
ax3%
ax3.1cz
ax3.2cz
ax3.bak
ax4
ax4%
ax4.1cz
ax4.2cz
ax4.bak
ax5
ax5%
ax5.1cz
ax5.2cz
ax5.bak
ax6
ax6%
ax6.1cz
ax6.2cz
ax6.bak
ax7
ax7%
ax7.1cz
ax7.2cz
```

```
ax7.bak
c10altz
c10sis
c1altz
c1sis
c2altz
c2sis
c3altz
c3sis
c4altz
c4sis
c5altz
c5sis
c6altz
c6sis
c7altz
c7sis
cCZsis

seism/hzrd/datadir/data-bad2/SCCS:
s.ax1
s.ax1%
s.ax1.1cz
s.ax1.2cz
s.ax1.bak
s.ax10
s.ax10%
s.ax10.1cz
s.ax10.2cz
s.ax10.bak
s.ax2
s.ax2%
s.ax2.1cz
s.ax2.2cz
s.ax2.bak
s.ax3
s.ax3%
s.ax3.1cz
s.ax3.2cz
s.ax3.bak
s.ax4
s.ax4%
s.ax4.1cz
s.ax4.2cz
s.ax4.bak
s.ax5
s.ax5%
s.ax5.1cz
s.ax5.2cz
s.ax5.bak
s.ax6
s.ax6%
s.ax6.1cz
s.ax6.2cz
s.ax6.bak
s.ax7
s.ax7%
s.ax7.1cz
s.ax7.2cz
s.ax7.bak
s.c10altz
s.c10sis
s.c1altz
s.c1sis
s.c2altz
```

```
s.c2sis
s.c3altz
s.c3sis
s.c4altz
s.c4sis
s.c5altz
s.c5sis
s.c6altz
s.c6sis
s.c7altz
s.c7sis
s.cCZsis

seism/hzrd/goodResults:
002/
003/
004/
005/
006/
007/
008/
SCCS/
allCombins
command
number
printDigPlots

seism/hzrd/goodResults/002:
SCCS/
SHWestYMmodels.shc
amenu
combin
command
command13
comment
dig.ps
dig.psa
dig.psb
dig.psc
dig.psd
dig.pse
dig.psf
dig.psg
dig.psh
dig.psi
dig.psj
dig.psk
dir.lst
oac10s91
oac11s91
oac12s91
oac13s91
oac1s91
oac2s91
oac3s91
oac4s91
oac5s91
oac6s91
oac7s91
ocac91
tac10s91
tac11s91
tac12s91
tac13s91
tac1s91
```

```
tac2s91
tac3s91
tac4s91
tac5s91
tac6s91
tac7s91

seism/hzrd/goodResults/002/SCCS:
s.SHWestYMmodels.shc
s.amenu
s.combin
s.command
s.command13
s.comment
s.dig.ps
s.dig.psa
s.dig.psb
s.dig.psc
s.dig.psd
s.dig.pse
s.dig.psf
s.dig.psg
s.dig.psh
s.dig.psi
s.dig.psj
s.dig.psk
s.dir.lst
s.oac10s91
s.oac11s91
s.oac12s91
s.oac13s91
s.oac1s91
s.oac2s91
s.oac3s91
s.oac4s91
s.oac5s91
s.oac6s91
s.oac7s91
s.ocac91
s.tac10s91
s.tac11s91
s.tac12s91
s.tac13s91
s.tac1s91
s.tac2s91
s.tac3s91
s.tac4s91
s.tac5s91
s.tac6s91
s.tac7s91

seism/hzrd/goodResults/003:
2exsCommand
OrigCommand
SCCS/
YMwEastGMX.shc
amenu
combin
comment
dig.ps
dig.psa
dig.psb
dig.psc
dig.psd
dig.pse
```

```
dig.psf
dig.psg
oac10s92
oac1s92
oac2s92
oac3s92
oac4s92
oac5s92
oac6s92
oac7s92
ocac92
origCommand.003
save/
t11
t12
t13
tac10s92
tac1s92
tac2s92
tac3s92
tac4s92
tac5s92
tac6s92
tac7s92
txt10s92
txt1s92
txt2s92
txt3s92
txt4s92
txt5s92
txt6s92
txt7s92

seism/hzrd/goodResults/003/SCCS:
s.2exsCommand
s.OrigCommand
s.YMwEastGMX.shc
s.amenu
s.combin
s.comment
s.dig.ps
s.dig.psa
s.dig.psb
s.dig.psc
s.dig.psd
s.dig.pse
s.dig.psf
s.dig.psg
s.oac10s92
s.oac1s92
s.oac2s92
s.oac3s92
s.oac4s92
s.oac5s92
s.oac6s92
s.oac7s92
s.ocac92
s.origCommand.003
s.t11
s.t12
s.t13
s.tac10s92
s.tac1s92
s.tac2s92
s.tac3s92
```

```
s.tac4s92
s.tac5s92
s.tac6s92
s.tac7s92
s.txt10s92
s.txt1s92
s.txt2s92
s.txt3s92
s.txt4s92
s.txt5s92
s.txt6s92
s.txt7s92

seism/hzrd/goodResults/003/save:
SCCS/
comment
dig.ps
dig.psa
dig.psb
dig.psc
dig.psd
dig.pse
dig.psf
dig.psg
oac10s92
oac1s92
oac2s92
oac3s92
oac4s92
oac5s92
oac6s92
oac7s92
ocac92
t11
t12
t13
tac10s92
tac1s92
tac2s92
tac3s92
tac4s92
tac5s92
tac6s92
tac7s92
txt10s92
txt1s92
txt2s92
txt3s92
txt4s92
txt5s92
txt6s92
txt7s92

seism/hzrd/goodResults/003/save/SCCS:
s.comment
s.dig.ps
s.dig.psa
s.dig.psb
s.dig.psc
s.dig.psd
s.dig.pse
s.dig.psf
s.dig.psg
s.oac10s92
s.oac1s92
```

```
s.oac2s92
s.oac3s92
s.oac4s92
s.oac5s92
s.oac6s92
s.oac7s92
s.ocac92
s.t11
s.t12
s.t13
s.tac10s92
s.tac1s92
s.tac2s92
s.tac3s92
s.tac4s92
s.tac5s92
s.tac6s92
s.tac7s92
s.txt10s92
s.txt1s92
s.txt2s92
s.txt3s92
s.txt4s92
s.txt5s92
s.txt6s92
s.txt7s92

seism/hzrd/goodResults/004:
SCCS/
YMszexsEastgmxs.shc
amenu
combin
command
comment
dig.ps
dig.psa
dig.psb
dig.psc
dig.psd
dig.pse
dig.psf
dig.psg
dig.psh
oac10s92
oac1s92
oac2s92
oac3s92
oac4s92
oac5s92
oac6s92
oac7s92
ocac92
output.004
tac10s92
tac11s92
tac12s92
tac13s92
tac1s92
tac2s92
tac3s92
tac4s92
tac5s92
tac6s92
tac7s92
txt10s92
```

```
txt1s92
txt2s92
txt3s92
txt4s92
txt5s92
txt6s92
txt7s92

seism/hzrd/goodResults/004/SCCS:
17944.844461630
s.YMszexsEastgmxs.shc
s.amenu
s.combin
s.command
s.comment
s.dig.ps
s.dig.psa
s.dig.psb
s.dig.psc
s.dig.psd
s.dig.pse
s.dig.psf
s.dig.psg
s.dig.psh
s.oac10s92
s.oac1s92
s.oac2s92
s.oac3s92
s.oac4s92
s.oac5s92
s.oac6s92
s.oac7s92
s.ocac92
s.output.004
s.tac10s92
s.tac11s92
s.tac12s92
s.tac13s92
s.tac1s92
s.tac2s92
s.tac3s92
s.tac4s92
s.tac5s92
s.tac6s92
s.tac7s92
s.txt10s92
s.txt1s92
s.txt2s92
s.txt3s92
s.txt4s92
s.txt5s92
s.txt6s92
s.txt7s92

seism/hzrd/goodResults/005:
SCCS/
YMreducedModels
amenu
combin
command
comment
dig.ps
dig.psa
dig.psb
dig.psc
```

```
dig.psd
dig.pse
dig.psf
dig.psg
dig.psh
oac10s92
oac1s92
oac2s92
oac3s92
oac4s92
oac5s92
oac6s92
oac7s92
ocac92
output.005
printDigPlots
save/
tac10s92
tac11s92
tac12s92
tac13s92
tac1s92
tac2s92
tac3s92
tac4s92
tac5s92
tac6s92
tac7s92
txt10s92
txt1s92
txt2s92
txt3s92
txt4s92
txt5s92
txt6s92
txt7s92

seism/hzrd/goodResults/005/SCCS:
s.YMreducedModels
s.amenu
s.combin
s.command
s.comment
s.dig.ps
s.dig.psa
s.dig.psb
s.dig.psc
s.dig.psd
s.dig.pse
s.dig.psf
s.dig.psg
s.dig.psh
s.oac10s92
s.oac1s92
s.oac2s92
s.oac3s92
s.oac4s92
s.oac5s92
s.oac6s92
s.oac7s92
s.ocac92
s.output.005
s.printDigPlots
s.tac10s92
s.tac11s92
```

```
s.tac12s92
s.tac13s92
s.tac1s92
s.tac2s92
s.tac3s92
s.tac4s92
s.tac5s92
s.tac6s92
s.tac7s92
s.txt10s92
s.txt1s92
s.txt2s92
s.txt3s92
s.txt4s92
s.txt5s92
s.txt6s92
s.txt7s92

seism/hzrd/goodResults/005/save:
SCCS/
dig.ps
dig.psa
dig.psb
dig.psc
dig.psd
dig.pse
dig.psf
dig.psg
dig.psh
oac10s92
oac1s92
oac2s92
oac3s92
oac4s92
oac5s92
oac6s92
oac7s92
ocac92
tac10s92
tac11s92
tac12s92
tac13s92
tac1s92
tac2s92
tac3s92
tac4s92
tac5s92
tac6s92
tac7s92
txt10s92
txt1s92
txt2s92
txt3s92
txt4s92
txt5s92
txt6s92
txt7s92

seism/hzrd/goodResults/005/save/SCCS:
s.dig.ps
s.dig.psa
s.dig.psb
s.dig.psc
s.dig.psd
s.dig.pse
```

```
s.dig.psf
s.dig.psg
s.dig.psh
s.oac10s92
s.oac1s92
s.oac2s92
s.oac3s92
s.oac4s92
s.oac5s92
s.oac6s92
s.oac7s92
s.ocac92
s.tac10s92
s.tac11s92
s.tac12s92
s.tac13s92
s.tac1s92
s.tac2s92
s.tac3s92
s.tac4s92
s.tac5s92
s.tac6s92
s.tac7s92
s.txt10s92
s.txt1s92
s.txt2s92
s.txt3s92
s.txt4s92
s.txt5s92
s.txt6s92
s.txt7s92

seism/hzrd/goodResults/006:
SCCS/
YMlnAccel.shc
amenu
badRun/
combin
command
comment
dig.ps
dig.psa
dig.psb
dig.psc
dig.psd
dig.pse
dig.psf
dig.psg
dig.psh
digf.ps
oac10s92
oac1s92
oac2s92
oac3s92
oac4s92
oac5s92
oac6s92
oac7s92
ocac92
printDigPlots
tac10s92
tac11s92
tac12s92
tac13s92
tac1s92
```

```
tac2s92
tac3s92
tac4s92
tac5s92
tac6s92
tac7s92
txt10s92
txt1s92
txt2s92
txt3s92
txt4s92
txt5s92
txt6s92
txt7s92

seism/hzrd/goodResults/006/SCCS:
s.YMlnAccel.shc
s.amenu
s.combin
s.command
s.comment
s.dig.ps
s.dig.psa
s.dig.psb
s.dig.psc
s.dig.psd
s.dig.pse
s.dig.psf
s.dig.psg
s.dig.psh
s.digf.ps
s.oac10s92
s.oac1s92
s.oac2s92
s.oac3s92
s.oac4s92
s.oac5s92
s.oac6s92
s.oac7s92
s.ocac92
s.printDigPlots
s.tac10s92
s.tac11s92
s.tac12s92
s.tac13s92
s.tac1s92
s.tac2s92
s.tac3s92
s.tac4s92
s.tac5s92
s.tac6s92
s.tac7s92
s.txt10s92
s.txt1s92
s.txt2s92
s.txt3s92
s.txt4s92
s.txt5s92
s.txt6s92
s.txt7s92

seism/hzrd/goodResults/006/badRun:
SCCS/
comment
dig.ps
```

```
dig.psa
dig.psb
dig.psc
dig.psd
dig.pse
dig.psf
dig.psg
dig.psh
oac10s92
oac1s92
oac2s92
oac3s92
oac4s92
oac5s92
oac6s92
oac7s92
ocac92
tac10s92
tac11s92
tac12s92
tac13s92
tac1s92
tac2s92
tac3s92
tac4s92
tac5s92
tac6s92
tac7s92
txt10s92
txt1s92
txt2s92
txt3s92
txt4s92
txt5s92
txt6s92
txt7s92

seism/hzrd/goodResults/006/badRun/SCCS:
s.comment
s.dig.ps
s.dig.psa
s.dig.psb
s.dig.psc
s.dig.psd
s.dig.pse
s.dig.psf
s.dig.psg
s.dig.psh
s.oac10s92
s.oac1s92
s.oac2s92
s.oac3s92
s.oac4s92
s.oac5s92
s.oac6s92
s.oac7s92
s.ocac92
s.tac10s92
s.tac11s92
s.tac12s92
s.tac13s92
s.tac1s92
s.tac2s92
s.tac3s92
s.tac4s92
```

```
s.tac5s92
s.tac6s92
s.tac7s92
s.txt10s92
s.txt1s92
s.txt2s92
s.txt3s92
s.txt4s92
s.txt5s92
s.txt6s92
s.txt7s92

seism/hzrd/goodResults/007:
SCCS/
amenu
combin
command
comment
dig.ps
dig.psa
dig.psb
dig.psc
dig.psd
dig.pse
dig.psf
dig.psg
oac10s93
oac1s93
oac2s93
oac3s93
oac4s93
oac5s93
oac6s93
oac7s93
ocac93
output.007
save/
tac10s93
tac11s93
tac12s93
tac13s93
tac1s93
tac2s93
tac3s93
tac4s93
tac5s93
tac6s93
tac7s93
txt10s93
txt1s93
txt2s93
txt3s93
txt4s93
txt5s93
txt6s93
txt7s93

seism/hzrd/goodResults/007/SCCS:
s.amenu
s.combin
s.command
s.comment
s.dig.ps
s.dig.psa
s.dig.psb
```

```
s.dig.psc
s.dig.psd
s.dig.pse
s.dig.psf
s.dig.psg
s.oac10s93
s.oac1s93
s.oac2s93
s.oac3s93
s.oac4s93
s.oac5s93
s.oac6s93
s.oac7s93
s.ocac93
s.output.007
s.tac10s93
s.tac11s93
s.tac12s93
s.tac13s93
s.tac1s93
s.tac2s93
s.tac3s93
s.tac4s93
s.tac5s93
s.tac6s93
s.tac7s93
s.txt10s93
s.txt1s93
s.txt2s93
s.txt3s93
s.txt4s93
s.txt5s93
s.txt6s93
s.txt7s93

seism/hzrd/goodResults/007/save:
SCCS/
YMSurfaceSite.shc
comment
dig.ps
dig.psa
dig.psb
dig.psc
dig.psd
dig.pse
dig.psf
dig.psg
oac10s93
oac1s93
oac2s93
oac3s93
oac4s93
oac5s93
oac6s93
oac7s93
ocac93
origCombin
output.007
tac10s93
tac11s93
tac12s93
tac13s93
tac1s93
tac2s93
tac3s93
```

```
tac4s93
tac5s93
tac6s93
tac7s93
txt10s93
txt1s93
txt2s93
txt3s93
txt4s93
txt5s93
txt6s93
txt7s93

seism/hzrd/goodResults/007/save/SCCS:
s.YMSurfaceSite.shc
s.comment
s.dig.ps
s.dig.psa
s.dig.psb
s.dig.psc
s.dig.psd
s.dig.pse
s.dig.psf
s.dig.psg
s.oac10s93
s.oac1s93
s.oac2s93
s.oac3s93
s.oac4s93
s.oac5s93
s.oac6s93
s.oac7s93
s.ocac93
s.origCombin
s.output.007
s.tac10s93
s.tac11s93
s.tac12s93
s.tac13s93
s.tac1s93
s.tac2s93
s.tac3s93
s.tac4s93
s.tac5s93
s.tac6s93
s.tac7s93
s.txt10s93
s.txt1s93
s.txt2s93
s.txt3s93
s.txt4s93
s.txt5s93
s.txt6s93
s.txt7s93

seism/hzrd/goodResults/008:
SCCS/
YMnewSurfSite.shc
amenu
combin
comment
oac10s94
oac1s94
oac2s94
oac3s94
```

```
oac4s94
oac5s94
oac6s94
oac7s94
ocac94
output.008
save/
tac10s94
tac11s94
tac12s94
tac13s94
tac1s94
tac2s94
tac3s94
tac4s94
tac5s94
tac6s94
tac7s94
txt10s94
txt1s94
txt2s94
txt3s94
txt4s94
txt5s94
txt6s94
txt7s94

seism/hzrd/goodResults/008/SCCS:
s.YMnewSurfSite.shc
s.amenu
s.combin
s.comment
s.oac10s94
s.oac1s94
s.oac2s94
s.oac3s94
s.oac4s94
s.oac5s94
s.oac6s94
s.oac7s94
s.ocac94
s.output.008
s.tac10s94
s.tac11s94
s.tac12s94
s.tac13s94
s.tac1s94
s.tac2s94
s.tac3s94
s.tac4s94
s.tac5s94
s.tac6s94
s.tac7s94
s.txt10s94
s.txt1s94
s.txt2s94
s.txt3s94
s.txt4s94
s.txt5s94
s.txt6s94
s.txt7s94

seism/hzrd/goodResults/008/save:
SCCS/
atnfb
```

```
f7s94
oac1s94
oac2s94
oac3s94
oac4s94
oac5s94
oac6s94
output.008
tac1s94
tac2s94
tac3s94
tac4s94
tac5s94
tac6s94
txt1s94
txt2s94
txt3s94
txt4s94
txt5s94
txt6s94

seism/hzrd/goodResults/008/save/SCCS:
s.atnfb
s.f7s94
s.oac1s94
s.oac2s94
s.oac3s94
s.oac4s94
s.oac5s94
s.oac6s94
s.output.008
s.tac1s94
s.tac2s94
s.tac3s94
s.tac4s94
s.tac5s94
s.tac6s94
s.txt1s94
s.txt2s94
s.txt3s94
s.txt4s94
s.txt5s94
s.txt6s94

seism/hzrd/goodResults/SCCS:
s.allCombins
s.command
s.number
s.printDigPlots

seism/hzrd/prdsdir:
SCCS/
awkAx
awkProg
ax10New
ax11New
ax12New
ax13New
ax1New
ax2New
ax3New
ax4New
ax5New
ax6New
ax7New
```

b10s91
b10s92
b10s93
b10s94
b11s91
b12s91
b13s91
b1s91
b1s92
b1s93
b1s94
b2s91
b2s92
b2s93
b2s94
b3s91
b3s92
b3s93
b3s94
b4s91
b4s92
b4s93
b4s94
b5s91
b5s92
b5s93
b5s94
b6s91
b6s92
b6s93
b6s94
b7s91
b7s92
b7s93
b7s94
c10s91
c10s92
c10s93
c10s94
c11s91
c12s91
c13s91
c1s91
c1s92
c1s93
c1s94
c2s91
c2s92
c2s93
c2s94
c3s91
c3s92
c3s93
c3s94
c4s91
c4s92
c4s93
c4s94
c5s91
c5s92
c5s93
c5s94
c6s91
c6s92
c6s93

```
c6s94
c7s91
c7s92
c7s93
c7s94
eltxylg
log
longawk
oldfiles/
plot
sitnum
test.file
usmap

seism/hzrd/prdsdir/SCCS:
s.awkAx
s.awkProg
s.ax10New
s.ax11New
s.ax12New
s.ax13New
s.ax1New
s.ax2New
s.ax3New
s.ax4New
s.ax5New
s.ax6New
s.ax7New
s.b10s91
s.b10s92
s.b10s93
s.b10s94
s.b11s91
s.b12s91
s.b13s91
s.b1s91
s.b1s92
s.b1s93
s.b1s94
s.b2s91
s.b2s92
s.b2s93
s.b2s94
s.b3s91
s.b3s92
s.b3s93
s.b3s94
s.b4s91
s.b4s92
s.b4s93
s.b4s94
s.b5s91
s.b5s92
s.b5s93
s.b5s94
s.b6s91
s.b6s92
s.b6s93
s.b6s94
s.b7s91
s.b7s92
s.b7s93
s.b7s94
s.c10s91
s.c10s92
```

```
s.c10s93
s.c10s94
s.c11s91
s.c12s91
s.c13s91
s.c1s91
s.c1s92
s.c1s93
s.c1s94
s.c2s91
s.c2s92
s.c2s93
s.c2s94
s.c3s91
s.c3s92
s.c3s93
s.c3s94
s.c4s91
s.c4s92
s.c4s93
s.c4s94
s.c5s91
s.c5s92
s.c5s93
s.c5s94
s.c6s91
s.c6s92
s.c6s93
s.c6s94
s.c7s91
s.c7s92
s.c7s93
s.c7s94
s.eltxylg
s.log
s.longawk
s.plot
s.sitnum
s.test.file
s.usmap

seism/hzrd/prdsdir/oldfiles:
SCCS/
ax10New
ax11New
ax12New
ax13New
ax1New
ax2New
ax3New
ax4New
ax5New
ax6New
ax7New
b10s91
b10s92
b10s93
b10s94
b11s91
b12s91
b13s91
b1s91
b1s92
b1s93
b1s94
```

```
b2s91
b2s92
b2s93
b2s94
b3s91
b3s92
b3s93
b3s94
b4s91
b4s92
b4s93
b4s94
b5s91
b5s92
b5s93
b5s94
b6s91
b6s92
b6s93
b6s94
b7s91
b7s92
b7s93
b7s94
c10s91
c10s92
c10s93
c10s94
c11s91
c12s91
c13s91
c1s91
c1s92
c1s93
c1s94
c2s91
c2s92
c2s93
c2s94
c3s91
c3s92
c3s93
c3s94
c4s91
c4s92
c4s93
c4s94
c5s91
c5s92
c5s93
c5s94
c6s91
c6s92
c6s93
c6s94
c7s91
c7s92
c7s93
c7s94

seism/hzrd/prdsdir/oldfiles/SCCS:
s.ax10New
s.ax11New
s.ax12New
s.ax13New
```

```
s.ax1New
s.ax2New
s.ax3New
s.ax4New
s.ax5New
s.ax6New
s.ax7New
s.b10s91
s.b10s92
s.b10s93
s.b10s94
s.b11s91
s.b12s91
s.b13s91
s.b1s91
s.b1s92
s.b1s93
s.b1s94
s.b2s91
s.b2s92
s.b2s93
s.b2s94
s.b3s91
s.b3s92
s.b3s93
s.b3s94
s.b4s91
s.b4s92
s.b4s93
s.b4s94
s.b5s91
s.b5s92
s.b5s93
s.b5s94
s.b6s91
s.b6s92
s.b6s93
s.b6s94
s.b7s91
s.b7s92
s.b7s93
s.b7s94
s.c10s91
s.c10s92
s.c10s93
s.c10s94
s.c11s91
s.c12s91
s.c13s91
s.c1s91
s.c1s92
s.c1s93
s.c1s94
s.c2s91
s.c2s92
s.c2s93
s.c2s94
s.c3s91
s.c3s92
s.c3s93
s.c3s94
s.c4s91
s.c4s92
s.c4s93
s.c4s94
```

```
s.c5s91
s.c5s92
s.c5s93
s.c5s94
s.c6s91
s.c6s92
s.c6s93
s.c6s94
s.c7s91
s.c7s92
s.c7s93
s.c7s94

seism/hzrd/results:
96092/
96100/

seism/hzrd/results/96092:
001/
SCCS/
command1

seism/hzrd/results/96092/001:
SCCS/
amenu
benchmark/
combin
comment

seism/hzrd/results/96092/001/SCCS:
s.amenu
s.combin
s.comment

seism/hzrd/results/96092/001/benchmark:
SCCS/
amenu
combin
comment
dig.ps
dig.psa
dig.psb
dig.psc
dig.psd
dig.pse
dig.psf
dig.psg
dig.psh
oac10s92
oac1s92
oac2s92
oac3s92
oac4s92
oac5s92
oac6s92
oac7s92
ocac92
tac10s92
tac11s92
tac12s92
tac13s92
tac1s92
tac2s92
tac3s92
tac4s92
```

```
tac5s92
tac6s92
tac7s92
txt10s92
txt1s92
txt2s92
txt3s92
txt4s92
txt5s92
txt6s92
txt7s92

seism/hzrd/results/96092/001/benchmark/SCCS:
s.amenu
s.combin
s.comment
s.dig.ps
s.dig.psa
s.dig.psb
s.dig.psc
s.dig.psd
s.dig.pse
s.dig.psf
s.dig.psg
s.dig.psh
s.oac10s92
s.oac1s92
s.oac2s92
s.oac3s92
s.oac4s92
s.oac5s92
s.oac6s92
s.oac7s92
s.ocac92
s.tac10s92
s.tac11s92
s.tac12s92
s.tac13s92
s.tac1s92
s.tac2s92
s.tac3s92
s.tac4s92
s.tac5s92
s.tac6s92
s.tac7s92
s.txt10s92
s.txt1s92
s.txt2s92
s.txt3s92
s.txt4s92
s.txt5s92
s.txt6s92
s.txt7s92

seism/hzrd/results/96092/SCCS:
s.command1

seism/hzrd/results/96100:
001/
002/
003/
SCCS/
command

seism/hzrd/results/96100/001:
```

```
seism/hzrd/results/96100/002:

seism/hzrd/results/96100/003:
SCCS/
amenu
combin
comment
dig.ps
dig.psa
dig.psb
dig.psc
dig.psd
dig.pse
dig.psf
dig.psg
dig.psh
oac10s92
oac1s92
oac2s92
oac3s92
oac4s92
oac5s92
oac6s92
oac7s92
ocac92
tac10s92
tac11s92
tac12s92
tac13s92
tac1s92
tac2s92
tac3s92
tac4s92
tac5s92
tac6s92
tac7s92
txt10s92
txt1s92
txt2s92
txt3s92
txt4s92
txt5s92
txt6s92
txt7s92

seism/hzrd/results/96100/003/SCCS:
s.amenu
s.combin
s.comment
s.dig.ps
s.dig.psa
s.dig.psb
s.dig.psc
s.dig.psd
s.dig.pse
s.dig.psf
s.dig.psg
s.dig.psh
s.oac10s92
s.oac1s92
s.oac2s92
s.oac3s92
s.oac4s92
s.oac5s92
```

```
s.oac6s92
s.oac7s92
s.ocac92
s.tac10s92
s.tac11s92
s.tac12s92
s.tac13s92
s.tac1s92
s.tac2s92
s.tac3s92
s.tac4s92
s.tac5s92
s.tac6s92
s.tac7s92
s.txt10s92
s.txt1s92
s.txt2s92
s.txt3s92
s.txt4s92
s.txt5s92
s.txt6s92
s.txt7s92

seism/hzrd/results/96100/SCCS:
s.command
```

ATTACHMENT B

SOURCE CODE CONTROL SYSTEM FILE LIST FOR SEISM 1.2

SEISM/HZCDS/SCCS:
s.03JanHis
s.EVcheck
s.aleas
s.aleas.f
s.aleas.o
s.aleas.trace
s.amean.f
s.amean.o
s.amodel.dif
s.amodel.f
s.amodel.o
s.attprob.f
s.attprob.o
s.bdir.dif
s.bdir.f
s.bdir.o
s.bmodel.dif
s.bmodel.f
s.bmodel.o
s.checkp.f
s.checkp.o
s.clear.f
s.clear.o
s.cmodel.dif
s.cmodel.f
s.cmodel.o
s.comap
s.comap.f
s.comb
s.comb.dif
s.comb.f
s.comb.o
s.confid.f
s.confid.o
s.convds.f
s.convds.o
s.crayfl.f
s.crayfl.o
s.dattim.f
s.dattim.o
s.diglib.a
s.diglibold.a
s.dmodel.dif
s.dmodel.f
s.dmodel.o
s.doac.f
s.doac.o
s.editFiles
s.emodel.dif
s.emodel.f
s.emodel.o
s.endcmmd.f
s.endcmmd.o
s.fmodel.f
s.fmodel.o
s.fortprds
s.gdir.f
s.gdir.o
s.gen.f
s.gen.o
s.getmagi.f
s.getmagi.o
s.gmean.f
s.gmean.o

s.gmodel.f
s.gmodel.o
s.goshc
s.goshc.ps
s.hazard.f
s.hazard.o
s.hmodel.f
s.hmodel.o
s.imsl.a
s.imslold.a
s.info.lst
s.initial.dif
s.initial.f
s.initial.o
s.lamda.f
s.lamda.o
s.listn.f
s.listn.o
s.listp.f
s.listp.o
s.makefile
s.makefile.aleas
s.makefile.com
s.makefile.shc
s.making.aleas
s.misc.f
s.misc.o
s.move.f
s.move.o
s.mytest
s.newInfo.lst
s.newloc.dif
s.newloc.f
s.newloc.o
s.nsitecor.dif
s.nsitecor.f
s.nsitecor.o
s.numark2.f
s.numark2.o
s.olsq.f
s.olsq.o
s.opatex.f
s.opatex.o
s.pathNameFiles
s.plotter.dif
s.plotter.f
s.plotter.o
s.poly.f
s.poly.o
s.prds
s.prds.f
s.prds.trace
s.prin.f
s.prin.o
s.prompt.f
s.prompt.o
s.quick
s.raleas.dif
s.raleas.f
s.raleas.o
s.rcomb.f
s.rcomb.o
s.rdatex.dif
s.rdatex.f
s.rdatex.o

s.rdattn.dif
s.rdattn.f
s.rdattn.o
s.rddis.f
s.rddis.o
s.rdin.f
s.rdin.o
s.readsite.f
s.readsite.o
s.rnmaps.f
s.rnmaps.o
s.rnseism.f
s.rnseism.o
s.rsexpert.f
s.rsexpert.o
s.rsitecor.dif
s.rsitecor.f
s.rsitecor.o
s.savePrds.f
s.seism.dif
s.seism.f
s.seism.o
s.seiswt.f
s.seiswt.o
s.selsite.dif
s.selsite.f
s.selsite.o
s.setcor.f
s.setcor.o
s.shc
s.shc.dif
s.shc.f
s.shc.o
s.shc.trace
s.shc1
s.sia.dif
s.sia.f
s.sia.o
s.sitedat.f
s.sitedat.o
s.skip.f
s.skip.o
s.sortz.f
s.sortz.o
s.spec.f
s.spec.o
s.stor.f
s.stor.o
s.triang.f
s.triang.o
s.trifun.f
s.trifun.o
s.trims.f
s.trims.o
s.tv80lib.a
s.tv80libold.a
s.vscale.f
s.vscale.o
s.weight.f
s.weight.o
s.wrtap.f
s.wrtap.o
s.ximod.f
s.ximod.o

ATTACHMENT C

INSTRUCTIONS FOR USING SEISM 1.2

ATTACHMENT C—INSTRUCTIONS FOR USING SEISM

Procedure for Running SEISM on Unix

- Review Davis (1991)
- Prepare answers for input filed named *shc*
- Verify that input file *ax(i)*, *c(j)sis* and *c(j)altz* match current hazard site
- Run *GOSHC*
- After finishing input to *shc*—go to result directory and edit file—*command* for the correct number of experts
- Run the file *command*—If all goes well there should be no run-time error messages
- Go to the *results/00x* directory and print the *dig.ps** files using the qp command
- If further runs are to be made either delete the data files in *results/00x* or move them to a new directory

ATTACHMENT D

INSTRUCTIONS FOR PORTING SEISM

ATTACHMENT D—INSTRUCTIONS FOR PORTING SEISM

Procedure for Porting (Moving from One Hardware Platform to Another) SEISM Modules

- Copy *SEISM* directory and subdirectories to the new machine
- Edit *GOSHC* for new directory structure
- Run makefiles for program modules—both in *hzcds* and in *newlib*
- Copy *imsl*, *diglib* and *tv80* .a files to *hzcds*
- Execute ranlib to update library header for *imsl*, *diglib* and *tv80* .a files
- Run *GOSHC* and note name of results directory missing
- Create results directory

ATTACHMENT E

SEISM README FILES

ATTACHMENT E—SEISM README FILES

seism/readmesi.txt contains—

/seism

This directory is the top level directory in the *SEISM* directory structure. The sub-directories in *SEISM* are *hzcds* and *hzrd*. *hzcds* basically contains the source and executables for the *SEISM* modules. *hzrd* contains the data input and output sub-directories. There are readme files in each of these directories describing their contents and their subdirectories' contents.

/seism/readmehc.txt contains—

/seism/hzcds

The sub-directory *hzcds* contains—

- all the source code for the *SEISM* modules
- makefiles for compiling and linking code
- program executables
- object libraries
- script file for *GOSHC*
- the sub-directory *newlib* which contains sub-directories containing source, makefile and object libraries for
  - *imsl*
  - *tv80lib*
  - *diglib*

The file *GOSHC* is a cshell script file which contains and modifies the environment variables and must be modified using a text editor to reflect the current directory structure for the input and output files. This is only done if *SEISM* is ported to a different directory structure.

GOSHC is run to setup the environment variables to pass to the *SEISM* modules. *GOSHC* calls *shc*. *shc* is an interactive program which records input parameters for running the *SEISM* modules. Samples of these parameters may be found in the *.shc* files in the sub-directory *hzrd/goodresults*. Before *GOSHC* is run the file *hzrd/resu.../.../command* must be deleted or *shc* fails.

After *shc* is run, if all experts are not used then the shell script *command*, which is built by *shc* every time it runs, should be edited to remove the extraneous expert numbers. Otherwise error messages will be displayed during the run.

Note: Before running *GOSHC* must check to determine that the files *ax(i), c(j)sis and c(j)altz* in the *hzrd/datadir* match the site being used, If not erroneous results and possible run-time errors will occur. The *a-emodel* subroutines in *hzcds* must match the site being examined.

/readmehr.txt contains—

/hzrd

The sub-directory *hzrd* contains—

1. The subdirectory *datadir* which contains—

   - initial input to *SEISM*
   - the results/output data sub-directories (*results/96092/...*) which contains—
     - command—the script file built by *shc* to run *SEISM*
     - *001 .. 00x* sub-directories which contain the output files from *SEISM*
       - These files include the plot files—*dig.ps** and numeric files used to create the plots. The plots can be printed to review the data in a graphical format. These files are not true postscript format so they have to be reformatted to postscript to be printed. The *qp* command in Unix can be used to print these files. The *mp* command can also be used.

   The input files— *ax(i), c(j)sis and c(j)altz* are contained in the sub-directory *datadir.*
   - *ax(i)*—data from experts, where (i) is the number of the expert 1-7,10-13
   - *c(j)sis*—zone data
   - *c(j)altx*—alternate zone data

2. The intermediate input data sub-directories (*prdsdir* and *compdir*)

   - *prdsdir* contains intermediate data created by the *SEISM* module
   - *compdir* contains intermediate data created by the *SEISM* module

ATTACHMENT F

EXAMPLES OF SEISM INPUT FILE FORMAT

INPUT FILE ax(i)

```
expert 1
 input file for program prds - 16 Mar 94
  1  130   13
 13   1 130   0   0   0   0   0   0   1   0   0   8   1
  1    -116.460   36.908 SC    |   |   |   |   |   |   |                  / 0 ax/j/ file
  2    -116.470   36.849        |   |   |   |   |   |  14 site source <   1 sitesid
  3    -116.471   36.838        |   |   |   |   |  13 distance bands   \ 2 whatsite
  4    -116.468   36.827        |   |   |   |  12 no longer used
  5    -116.470   36.821        |   |   |  11 no longer used
  6    -116.461   36.799        |   |  10, 0=no us map, 1=us map requested
  7    -116.462   36.784        |   |                                  / 0=noplot
  8    -116.466   36.773        |   9 create zonation map file <  1=plot+calc
  9    -116.466   36.764        |                                      \ 2=plotonly
 10    -116.461   36.753    4 thru 8 = 0
 11    -116.459   36.753
 12    -116.464   36.764
 13    -116.464   36.773
 14    -116.460   36.784
 15    -116.458   36.799
 16    -116.468   36.821
 17    -116.466   36.827
 18    -116.469   36.838
 19    -116.468   36.849
 20    -116.458   36.908
 21    -116.448   36.863 GD
 22    -116.450   36.852
 23    -116.450   36.841
 24    -116.455   36.835
 25    -116.458   36.821
 26    -116.458   36.808
 27    -116.455   36.785
 28    -116.453   36.785
 29    -116.456   36.808
 30    -116.456   36.821
 31    -116.453   36.835
 32    -116.448   36.841
 33    -116.448   36.852
 34    -116.446   36.863
 35    -116.424   36.973 PB
 36    -116.402   36.873
 37    -116.406   36.851
 38    -116.414   36.838
 39    -116.417   36.816
 40    -116.413   36.804
 41    -116.462   36.734
 42    -116.482   36.683
 43    -116.479   36.683
```

44	-116.459	36.733	
45	-116.408	36.806	
46	-116.412	36.818	
47	-116.409	36.838	
48	-116.401	36.851	
49	-116.397	36.874	
50	-116.416	36.973	
51	-116.430	36.904	BR
52	-116.422	36.877	
53	-116.428	36.841	
54	-116.434	36.827	
55	-116.433	36.820	
56	-116.420	36.810	
57	-116.418	36.811	
58	-116.431	36.820	
59	-116.432	36.826	
60	-116.426	36.840	
61	-116.420	36.877	
62	-116.428	36.904	
63	-116.460	36.890	PW
64	-116.449	36.883	
65	-116.439	36.868	
66	-116.430	36.863	
67	-116.430	36.865	
68	-116.438	36.869	
69	-116.448	36.885	
70	-116.460	36.893	
71	-116.462	36.878	DW
72	-116.428	36.843	
73	-116.426	36.846	
74	-116.461	36.880	
75	-116.462	36.908	FW
76	-116.481	36.902	
77	-116.483	36.890	
78	-116.483	36.885	
79	-116.484	36.879	
80	-116.489	36.868	
81	-116.495	36.858	
82	-116.501	36.845	
83	-116.499	36.845	
84	-116.493	36.858	
85	-116.487	36.868	
86	-116.482	36.878	
87	-116.481	36.885	
88	-116.481	36.890	
89	-116.479	36.902	
90	-116.482	36.908	
91	-116.485	36.918	WW
92	-116.490	36.903	
93	-116.493	36.884	

```
 94     -116.508   36.846
 95     -116.497   36.826
 96     -116.494   36.814
 97     -116.495   36.809
 98     -116.507   36.790
 99     -116.509   36.743
100     -116.535   36.716
101     -116.533   36.716
102     -116.507   36.743
103     -116.504   36.790
104     -116.493   36.809
105     -116.492   36.814
106     -116.495   36.827
107     -116.505   36.846
108     -116.491   36.884
109     -116.488   36.903
110     -116.483   36.918
111     -116.491   36.449 BZ_49
112     -116.491   36.431
113     -116.473   36.431
114     -116.473   36.449
115     -116.491   36.161 BZ_81
116     -116.491   36.143
117     -116.473   36.143
118     -116.473   36.161
119     -116.491   35.936 BZ_106
120     -116.491   35.918
121     -116.473   35.918
122     -116.473   35.936
123     -116.491   34.584 BZ_256
124     -116.491   34.566
125     -116.473   34.566
126     -116.473   34.584
127     -116.491   33.709 BZ_356
128     -116.491   33.700
129     -116.473   33.700
130     -116.473   33.709
digitized zone  1 = zone 1          0.00 0.00 0.00 0.00   0   1   0   0
  9   0   0   0   0
digitized zone  2 = zone 2          0.00 0.00 0.00 0.00   0   2   0   0
  6   0   0   0   0
digitized zone  3 = zone 3          0.00 0.00 0.00 0.00   0   3   0   0
  7   0   0   0   0
digitized zone  4 = zone 4          0.00 0.00 0.00 0.00   0   4   0   0
  5   0   0   0   0
digitized zone  5 = zone 5          0.00 0.00 0.00 0.00   0   5   0   0
  3   0   0   0   0
digitized zone  6 = zone 6          0.00 0.00 0.00 0.00   0   6   0   0
  1   0   0   0   0
digitized zone  7 = zone 7          0.00 0.00 0.00 0.00   0   7   0   0
```

```
  7   0   0   0   0
digitized zone  8 = zone 8          0.00 0.00 0.00 0.00   0   8   0   0
  9   0   0   0   0
digitized zone  9 = zone 9          0.00 0.00 0.00 0.00   0   9   0   0
  1   0   0   0   0
digitized zone 10 = zone 10         0.00 0.00 0.00 0.00   0  10   0   0
  1   0   0   0   0
digitized zone 11 = zone 11         0.00 0.00 0.00 0.00   0  11   0   0
  1   0   0   0   0
digitized zone 12 = zone 12         0.00 0.00 0.00 0.00   0  12   0   0
  1   0   0   0   0
digitized zone 13 = zone 13         0.00 0.00 0.00 0.00   0  13   0   0
  1   0   0   0   0
  3.0000    9.0000      25.0000     49.0000     81.0000     106.0000    256.0000    356.0000
  1.0000    2.0000      4.0000      8.0000      16.0000     25.0000     50.0000     100.0000
  0.1       20.0000     0.0000      356.00      3.0000      3.0000      1.0000
 Yucca Mountain
-116.455   36.855   1   1   1
  0    (no envelope)
  0    (no background)
  13    (number of expert's zones)
  1
  1
  1
  2
  1
  3
  1
  4
  1
  5
  1
  6
  1
  7
  1
  8
  1
  9
  1
  10
  1
  11
  1
  12
  1
  13
```

INPUT FILE c(j)sis

```
information on alternative maps for expert 1, 16 Mar 94
900.    .01
     1              .65
     2              .65
     3              .65
     4              .60
     5              .60
     6              .65
     7              .65
     8              .65
     9              .65
    10              .65
    11              .65
    12              .65
    13              .65

 13  (number of zones in the seismicity file)
 1   2   3   4   5   6   7   8   9   10   11   12   13
 13    0   16
  1
```

INPUT FILE c(j)altz

```
seismicity data for expert 1                    ***** 16 Mar 94 *****
 1 13  4  1  0 exp. 1,13 zones, 4 region, truncated exponential, no correction
 0.001    0.001    0.001    10.00000
  4   4   4   4   4   4   4   4
 -4.40000  2.16000                              a, b for computing mb/MMI
1  1   1                                        exp. 1, zone 1, 1=mb scale  SC
  0  6.85000  6.00000  7.70000                  0, best est., upper, lower
  4.00000   .00144   .00100   .00155           mag., occurence rate, upper, lower
  1                                            degree of polonomial, no longer needed
  4.00000  6.85000                             occurence rate cutoff, best est. upper
  0.79840 -0.91000  0.75000 -0.96000           \_ recurrence parameters for best est.
  0.81000 -0.86000                             /  lower and upper bounds models
1  2   1                                        zone  2  GD
  0  6.20000  6.20000  6.20000
  4.00000   .00042   .00029   .00045
  1
  4.00000  6.20000
  0.26320 -0.91000  0.24724 -0.96000
  0.26702 -0.86000
1  3   1                                        zone  3  PB
  0  6.90000  6.90000  6.90000
  4.00000   .00529   .00367   .00569
  1
  4.00000  6.90000
  1.36350 -0.91000  0.93938 -0.96000
  1.38331 -0.86000
1  4   1                                        zone  4  BR
  0  6.30000  6.30000  6.30000
  4.00000   .00067   .00047   .00072
  1
  4.00000  6.30000
  0.46610 -0.91000  0.43784 -0.96000
  0.47287 -0.86000
1  5   1                                        zone  5  PW
  0  5.60000  5.60000  5.60000
  4.00000   .00009   .00006   .00010
  1
  4.00000  5.60000
 -0.40580 -0.91000 -0.41170 -0.96000
 -0.38120 -0.86000
1  6   1                                        zone  6  DW
  0  5.60000  5.60000  5.60000
  4.00000   .00009   .00006   .00010
  1
  4.00000  5.60000
 -0.40580 -0.91000 -0.41170 -0.96000
 -0.38120 -0.86000
1  7   1                                        zone  7  FW
  0  6.00000  6.00000  6.00000
```

```
 4.00000   .00013   .00009   .00014
  1
 4.00000  6.00000
-0.24610 -0.91000 -0.24968 -0.96000
-0.23118 -0.86000
1  8   1                                zone  8  WW
  0  6.00000  6.00000  6.00000
 4.00000   .00308   .00214   .00332
  1
 4.00000  6.00000
 1.12860 -0.91000  1.06018 -0.96000
 1.14500 -0.86000
1  9   1                                zone  9  BZ_
  0  5.10000  5.10000  5.10000
 4.00000   .00030   .00020   .00032
  1
 4.00000  5.10000
 0.11710 -0.91000  0.11000 -0.96000
 0.12000 -0.86000
1  10   1                               zone 10  BZ_
  0  5.10000  5.10000  5.10000
 4.00000   .00030   .00020   .00032
  1
 4.00000  5.10000
 0.11710 -0.91000  0.11000 -0.96000
 0.12000 -0.86000
1  11   1                               zone 11  BZ_
  0  5.10000  5.10000  5.10000
 4.00000   .00030   .00020   .00032
  1
 4.00000  5.10000
 0.11710 -0.91000  0.11000 -0.96000
 0.12000 -0.86000
1  12   1                               zone 12  BZ_
  0  5.10000  5.10000  5.10000
 4.00000   .00030   .00020   .00032
  1
 4.00000  5.10000
 0.11710 -0.91000  0.11000 -0.96000
 0.12000 -0.86000
1  13   1                               zone 13  BZ_
  0  5.10000  5.10000  5.10000
 4.00000   .00030   .00020   .00032
  1
 4.00000  5.10000
 0.11710 -0.91000  0.11000 -0.96000
 0.12000 -0.86000
```

Also see Davis (1991) for additional information on *SEISM* input/output information.