SEISM 1 CODE: ADAPTATIONS FOR USE IN THE WESTERN U.S.

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ABSTRACT

Modifications to the SEISM 1 code are described. The modifications permit the code to be compiled on CNWRA's SUN systems and to be applied to western U.S. sites. Several earthquake vibratory groundmotion acceleration attenuation functions, that are suitable for use in the western U.S., have been identified that may be accessed by using a proper input file of coefficients when making code calculations. To permit analysis of western U. S. sites, the digital map for the eastern U.S. has been replaced by a complete conterminous U.S. map. Comparison of calculated strong motion accelerations with accelerations recorded during the $M=5.6$ Little Skull Mountain earthquake of June 29, 1992 verify their applicability and provide a limited basis for uncertainty estimates. This earthquake is the first of its magnitude to be recorded near the proposed Yucca Mountain repository site which is 20 miles from the epicenter. A relatively simple relationship between fault offset and earthquake magnitude permits estimation of probabilistic fault displacement for a specified fault or set of faults within a specified area. Paleo-fault-displacement data may also be used to extend the historical record of seismicity or fault-displacement to time spans more appropriate for an HLW repository. The revised SEISM 1 code provides a tool for assessment of seismic and faulting hazards consequent to new seismic or tectonic models that may be proposed for the repository site, or to new data that may be developed during DOE's investigations.

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PREFACE

This report is in fulfillment of Geologic Setting (GS) Element Subtask 3.1 of Task 3: Analysis Codes and Methods in CNWRA FY93-94 Operations Plans Rev 2 Chg 0, Intermediate Milestone 003320-006, SEISM Code Update. Opinions expressed are intended to apply only to the application of probabilistic seismic hazard analysis (PSHA) codes to a high-level nuclear waste (HLW) repository.

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1 INTRODUCTION/SUMMARY

1.1 PURPOSE

SEISM 1, a probabilistic seismic hazard analysis (PSHA) computer code for the eastern U.S., has been modified to be applicable to western U.S. sites. This will permit hazard analysis at Yucca Mountain when new data become available or new tectonic models are proposed. Several code changes were made:

- SEISM 1 was adapted to the SUN SPARCstation2, ipa and ipx computers,
- An internal digital map was enlarged to include the conterminous U.S.,
- PostScript printing was enabled to permit use of a wider range of output devices,
- Seismic attenuations functions for the western U.S were incorporated,
- These functions were verified for use at Yucca Mountain,
- A method was developed to extend hazard analysis to faulting.

Coding changes have been completed for the first three items. Several attenuation functions have been selected and input files devised to use them. However, SEISM 1 uses expert opinions. Therefore, a wide range of attenuation functions may be requested by a group of experts. Experience in developing input files for the chosen attenuation functions will hasten the introduction of other functions at the time they are needed. A magnitude 5.6 earthquake 20 miles from Yucca Mountain was well recorded by strong motion instruments during the period of the code change efforts. Therefore, the chosen attenuation functions could be and were checked against these records. The comparison verified that the chosen functions predicted accelerations at Yucca Mountain with reasonable accuracy. A method was devised to extend use of SEISM 1 to the analysis of faulting hazards by using seismic moment formulae and the relationship of moment to magnitude. Currently the method is an adjunct to SEISM 1 and is not a part of its coding. Changed portions of the code have been verified as functional but a test of the entire code, as revised, has not been performed. That is the subject of another report scheduled for this fiscal year.

1.2 BACKGROUND

Probabilistic methods for determining the likelihood of fault displacements or levels of design vibratory ground motion are of interest because current criteria for regulating a high level nuclear waste repository (HLW) ultimately depend upon the probability of radionuclide releases. Therefore, the probability of events which may disrupt a repository are needed as input to calculate potential performance degradation and release consequences. Aside from this aspect of regulation, however, many aspects of earthquakes and fault movement are inadequately known, are contentious, or are interpreted differently by credible experts. Probalistic Fault Displacement and Seismic Hazard Analysis (PFD&SHA) calculational methodologies incorporate disparate expert opinions and treat them in a probabilistic manner such that their divergence is quantified as an aggregated hazard (e.g. see Bernreuter et al., 1989 and EPRI, 1988).

An expert-opinion based methodology is desirable because of the:

- Short period of historic seismicity which severely limits data for analysis
- Large uncertainties associated with age dating of prehistoric faulting
- Long time period of performance concern for a high level repository

Two PSHA methodologies were independently developed at LLNL and by EPRI (the computer codes SEISM 1 and EQHAZARD respectively) in response to concerns that the 1886 Charleston South Carolina earthquake could not be assigned to a fault and might occur anywhere in the eastern U.S. with some probability. The EPRI effort was for a consortium of nuclear power plant owners, the Seismic Owners Group (SOG). Both programs have been used to evaluate sites in the eastern U.S. DOE has provided funds to develop versions of the program which may be used for sites in the western U.S. The LLNL version is SEISM 2 but remains as DOE's proprietary code and is unavailable to others. These methodologies have not been applied to the determination of fault displacements, although single-expert probabilistic methods have been employed (e.g., Sommerville et al., 1987).

Nuclear power plants have much shorter nominal life spans than an HLW repository. CNWRA tasks have been to determine the basis in current regulations, for performing probabilistic analysis and to plan modifications to SEISM 1 so that it may be applied in the western U.S. and to fault displacements of concern in the licensing of an HLW repository. A workplan and a series of seven reports (Hofmann; 1991 and 1992a-f) document work to date. This report is the eighth in the series. A test operation of the SEISM 1 code will be documented in a future report this fiscal year. Lawrence Livermore National Laboratory (LLNL) developed SEISM 1 under the auspices of NRC's Office of Nuclear Reactor Regulation (NRR). The code was specifically developed to evaluate probabilistic seismic risk for nuclear plants in the central and eastern U.S. An LLNL revision of the code for NRR, SEISM 3, is in progress but was not available during the SEISM 1 updating effort. Observed data and expert opinions are input to the code.

SEISM 1 accepts eastern U.S. strong-motion-attenuation functions preferred by individual experts. Probability distribution functions may be estimated where data are inadequate to unambiguously define them. Expert self assessments of uncertainty in their estimated input parameters and resulting hazards are aggregated to provide a final hazard curve. These capabilities are unchanged.

1.3 SCOPE OF THIS REPORT

Code changes to implement plans to modify the SEISM 1 code are documented in detail. Fortuitously the Little Skull Mountain M=5.6 earthquake occurred 20 miles from the proposed Yucca Mountain repository site on June 29, 1992. Attenuation functions which extend SEISM 1's capability for western U.S. analyses were checked against its recorded strong motion accelerations. Results confirm that the functions are generally appropriate.

2 CODE CHANGES FOR OPERATION ON CNWRA SUN SYSTEMS

This section describes an initial set of modifications made to the SEISM 1 program to facilitate its operation on CNWRA SUN SPARCstation 2, ipx and ipc work stations, and to generate hardcopy plots of the graphical output generated by the program. Five program modules are sequentially executed during a SEISM 1 computation: SHC, PRDS, COMAP, ALEAS and COMB. The functions of these modules are described in the SHC Code Users Manual (Davis, 1991) and are summarized in Hofmann (1991 and 1992b). SHC Code was the LLNL developmental name for SEISM 1. Required changes to modules are documented in the following sections.

File names are sometimes acronyms for longer descriptions but not all have a simple description related to an acronym. If a longer file description is documented it is described. Some documentation is in Davis (1991) and some is obtained from comment lines in the code.

The architecture of the SEISM 1 code is in three levels. The first level is the executive routine which organizes or directs data flow between modules. However, other modules may also share in first level responsibilities. An example is the module ALEAS. Calculations may be performed in a module, the second level, but it will always contain instructions for routing data from or to other modules and from or to subprograms (also called subroutines), the third level, within the module.

Source code for both modules and subroutines are usually files that end with a ".f". The "f" indicates that the source code is FORTRAN. A file that ends in ".c" is a C code source file. After the program is compiled, the machine language versions of these files end with a ".e". The "e" means the file is executable. These files often cannot be directed to a screen or printer without using an interpretive routine and special "drivers". Drivers are parts of computer code that interpret (convert) machine generated information and create an output that can be understood by another device (for example a particular computer screen, printer or plotter) or program. Drivers are a part of the coding in subroutines and are often not otherwise identified. A fourth kind of file is a data file. These files are usually created by a subroutine or a module for use by another module. Data files in a large code usually do not have an ending with a dot ".". They are not always documented. The passing of information via files in SEISM 1 is described in Davis (1991) and is summarized in Hofmann (1992b).

2.1 MAKEFILE CHANGES

A makefile contains instructions to the computer regarding which source code files in a directory should be converted to machine language executable files. The makefile may also contain other instructions concerning the conversion of higher level source code, e.g., FORTRAN, to machine language executable code. The NRC SUN system accepts abbreviated makefiles that the CNWRA SUN systems will not except. Consequently, the makefile instructions are different but perform the same tasks on both machines. The following sections describe specific changes to makefiles for each of the affected modules.

Makefile changes were required for the modules ALEAS and COMB.

ALEAS makefile

ALEAS is the module of the code in which hazard computations are made. ALEAS is not an acronym. It is French for "risk" or "hazard". A code module is a separate program whose input may be entirely from the output of another module or which may obtain its input from keyboard entries by the user.

Line 12 of the ALEAS module makefile was altered as follows:

```
old: f77 -g -libmil -o aleas $(OB) $(OBJ2) $(OBJ3) $(OBJ4) $(OBJ5) $(OBJ6) $(OBJ7) crayfl.o
     $(LIB) -lsunwindow -lsuntool -lpixrect
```

new: same as above with ‘ -lX11’, added after ‘-lpixrect’

COMB makefile

COMB is an acronym for "combine". This module of the code combines hazard results from several experts who have chosen various source regions and attenuation functions to make their preferred calculations.

```
old: #!/bin/csh
     f77 -O -libmil -o comb comb.f [tv80lib.a,diglib.a} -lsunwindow -lsuntool -lpixrect -lX11

new: FFLAGS = -g -c -libmil
     OB = comb.o
     LIB = imsl.a tv80lib.a digilib.a
     comb: $(OB)
         f77 -g -libmil -o comb $(OB) $(LIB) -lsunwindow -lsuntool -lpixrect -lX11
     comb.o : comb.f
         f77 $(FFLAGS) comb.f
```

2.2 EXECUTIVE ROUTINE MODIFICATIONS

The following changes are required to correctly identify the directories and subdirectories in which the files reside on the particular machine that makes the calculations. These will usually differ for each machine and possibly for each user of the code. The example changes provide a template for similar changes that will be required should the code be used on other computers. The examples given here are for Joseph Bangs who copied the code to his directory on a SUN hard drive to make the required changes. Because the path name for files on a computer/storage device or for a particular user will differ from that in the NRC SUN, changes will be required in several routines to properly address SEISM 1 files and subroutines.

The executive routine is the SHC module. SHC is an acronym for "seismic hazard codes". The principal function of this routine is to instruct the various modules or separate subprograms of

SEISM 1 where to direct their output, e.g. to another module or to an output file, and from where to obtain their input.

The following code changes implement the path names on the CNWRA SUN SPARCstation 2. Changes are required that are likely to differ for each computer system on which SEISM 1 is installed. The subroutine in which path name changes are required is identified, followed by the line number in the subroutine, and the new and old path names.

bdir.f

A longer description of the file bdir.f was not found.

Line 18.

```
 old:  data bname /’/data/hazard/results/’/

new:  data bname /’/u2/bangs/hazard/results/’/
```

initial.f

A longer description of the file initial.f was not found. This subroutine accesses initial data files required as input to various routines.

Lines 17 through 20 were altered as follows:

```
 old: data exedir /’/usr/codes/hazard’/
      data datadir /’/data/hazard/datadir’/
      data prdsdir /’/data/hazard/prdsdir’/
      data comapdir /’/data/hazard/comapdir’/

new: data exedir /’/u2/bangs/hazcodes’/
     data datadir /’/u2/bangs/hazard/datadir’/
     data prdsdir /’/u2/bangs/hazard/prdsdir’/
     data comapdir /’/u2/bangs/hazard/comapdir’/
```

nsitecor.f

The acronym sitecor represents "site correction". The "n" represents "no". The file name indicates that that no site correction is used in the base case, according to code comment lines.

Lines 24 and 25 were altered as follows:

```
 old: data site  /’/data/hazard/datadir/sitecor’/
      data psite /’/data/hazard/datadir/psitecor’/
```

```
new: data site  /'/u2/bangs/hazard/datadir/sitecor'/
      data psite /'/u2/bangs/hazard/datadir/psitecor'/
```

rsitecor.f

The "r" represents "single". The file name indicates that there is a single site correction to the base case, according to code comment lines.

Line 18 was altered as follows:

```
 old:  data fname / '/data/hazard/datadir/psitecor'/

new:  data fname / '/u2/bangs/hazard/datadir/psitecor'/
```

selsite.f

This acronym means "select a site to analyze".

Lines 31 through 33 were altered as follows:

```
old:  data sitesid /'/data/hazard/datadir/sitesid'/
      data prudeid /'/data/hazard/datadir/psitesid'/
      data sitecor /'/data/hazard/datadir/sitecor'/

new: data sitesid /'/u2/bangs/hazard/datadir/sitesid'/
      data prudeid /'/u2/bangs/hazard/datadir/psitesid'/
      data sitecor /'/u2/bangs/hazard/datadir/sitecor'/
```

shc.f

"shc" is an abbreviation for "seismic hazard characterization.

Line 35 was altered as follows:

```
 old: data cname /'/data/hazard/comapdir/'/

new: data cname /'/u2/bangs/hazard/comapdir/'/
```

2.3 IMPLEMENTATION OF POSTSCRIPT GRAPHICS PRINTING

A device driver number in the subroutine plotter.f was changed to activate a PostScript output file generator in the plotting subroutines for the ALEAS and COMB modules. The subroutine is contained in both modules. The plotter subroutine in COMB is named comf.f.

Line 61 in the plotter.f subroutine was modified.

```
 old: dev=4
```

new: dev=2

Line 694 in the comf.f subroutine was modified.

No long description of the file "com.f" was found.

old: dev=4

new: dev=2

3 CODE CHANGES TO ADAPT TO THE WESTERN U.S.

A digital map containing the western U.S. and the addition of appropriate attenuation functions are required to enable seismic risk computations for the Yucca Mountain area.

3.1 INCORPORATION OF A COMPLETE DIGITAL CONTERMINOUS U.S. MAP

The original version of SEISM 1 was designed for use on eastern U.S. sites. The program provides the facility for plotting a base map of the eastern U.S. with seismic expert's zonations optionally overlaid on the base map. Map display capabilities of SEISM 1 were extended by incorporating the political boundaries of the western U.S. in the base map database. Adding this capability to SEISM 1 required modification of two data files and one source code file. The data files: USMAP and ELTXYLG contain the coordinate and map projection grid, respectively. The source code file PRDS.F was modified to process the new versions of USMAP and ELTXYLG.

USMAP

The USMAP file stores longitude-latitude coordinates for the United States boundary. It originally contained the boundary data for points east of longitude 110°. A newer, more detailed data set was obtained from an Internet geography database located at the Internet address 192.70.225.78. This new data set was formatted to match the required input format for the PRDS program and then defined as the new USMAP data file. New and old USMAP files are in Appendix A of this report.

ELTXYLG

The ELTXYLG file contains a Lambert Conformal projection grid on 2 degree grid centers. No long description of this file was found. It is likely that LT means latitude and LG means longitude. The letter "E" may mean "exchange". This file is used as a lookup table for converting longitude-latitude pairs into X-Y coordinate pairs. The projection parameters used in creating the original ELTXYLG grid are not available, therefore the new ELTXYLG lookup table that includes the western U.S. was generated using parameters that yield a very similar but not identical projection of the U.S. map. The difference, however, is not important because this projection is used only for displaying the map. It is not used in calculations performed by other SEISM 1 routines. Figure 3-1 overlays the old eastern U.S. Map and source zones for expert No. 1, which are included in the SEISM 1 test example, on the new map. The new ELTXYLG file was expanded to include the grid nodes for the western U.S. and was formatted to be consistent with the original ELTXYLG file. The program Generic Mapping was used to make the map projection conversion table in ELTXYLG. New and Old versions of the ELTXYLG file are in Appendix B of this report.

PRDS

The only significant modifications to PRDS (probability of distance from the source) included modifying DO LOOP statements to read the additional file records associated with the Western U.S. data. An error checking statement was also changed to extend the valid longitude range from 110° to 130° (west). The PRDS source code was recompiled and executed successfully. The PRDS program will

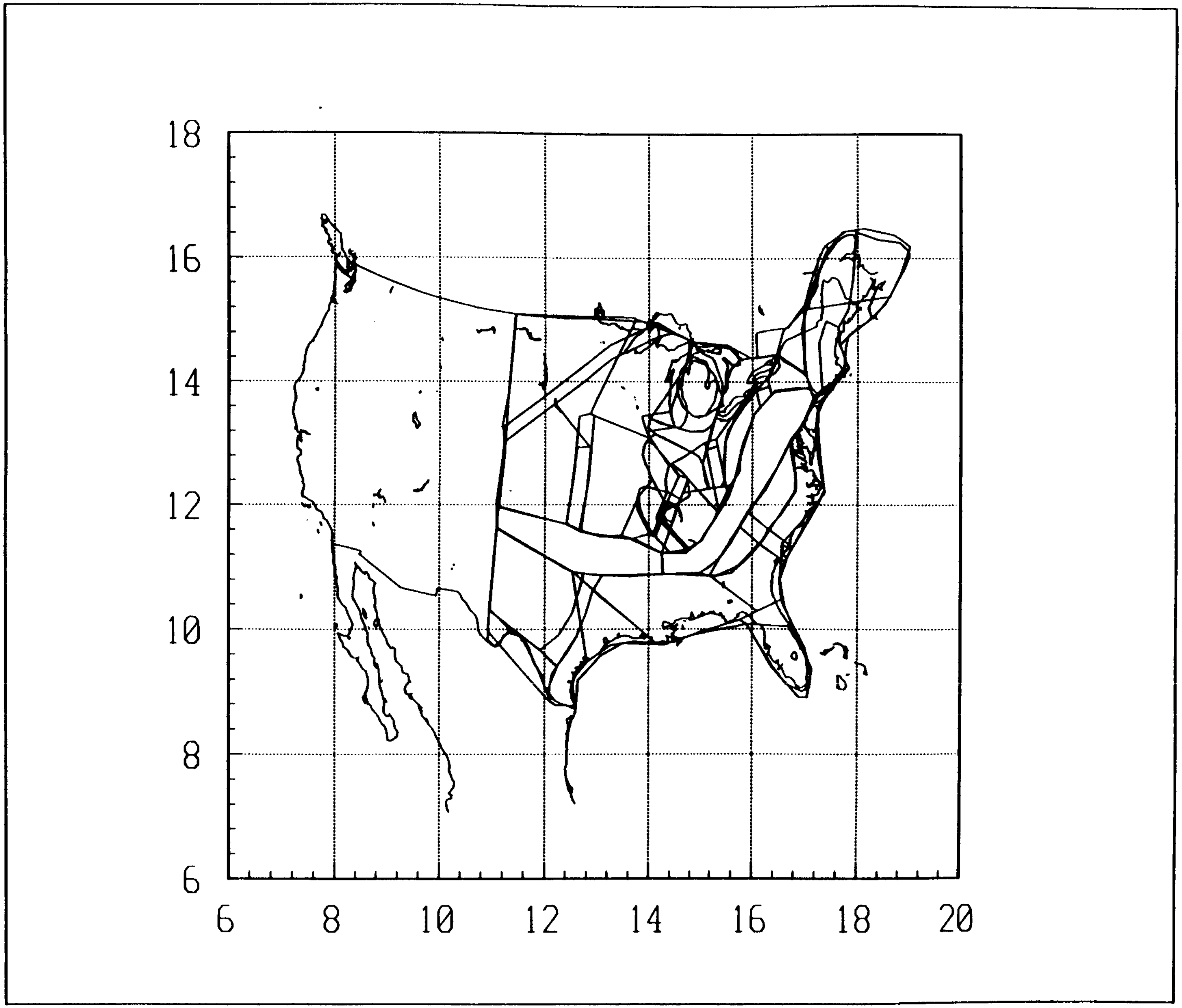


Figure 3-1. New and Old Digital U.S. Maps

now generate a base map of the conterminous U.S. with the seismic expert zonations plotted as map overlays.

```
Line Number: 20

 old: common /lnltxy/ xlg(457),ylg(457),xmap(4,457),ymap(4,457)

new: common /lnltxy/ xlg(614),ylg(614),xmap(4,614),ymap(4,614)

Line Number: 191

 old: &      (xlg(i),ylg(i),(xmap(j,i),ymap(j,i),j=1,4),i=1,457))

new: &      (xlg(i),ylg(i),(xmap(j,i),ymap(j,i),j=1,4),i=1,614))

Line Number: 361

 old: do 165 iuss = 1,1475

new: do 165 iuss = 1,3042

Line Number: 1216

 old: common /lnltxy/ xlg(457),ylg(457),xmap(4,457),ymap(4,457)

new: common /lnltxy/ xlg(614),ylg(614),xmap(4,614),ymap(4,614)

Line Number: 1233

 old: do 100 i = 1,456

new: do 100 i = 1,614
```

3.2 ADDITION OF WESTERN U.S. ATTENUATION FUNCTIONS

Several acceleration attenuation functions developed from western U.S. data were considered for implementation in the SEISM 1 code. These functions were thought to be likely selections by experts who might be elicited for future analyses of the Yucca Mountain, Nevada area. The initial computations by LLNL described in Bernreuter et al. (1984) for the eastern U.S. also contained several attenuation functions anticipated to be selected by experts. However, later analyses with the SEISM 1 code for the eastern U.S. (e.g., Bernreuter et al., 1989a and b) used a quite different selection of attenuation functions. We anticipate that should expert elicitation in a formal sense be applied to the Yucca Mountain area, it is likely that a similar circumstance may develop. Development of rationale for choosing attenuation functions and the exercise of accessing them with SEISM 1, provides insight into the problems that are addressed by experts during elicitation. This experience should greatly ease the installation of other attenuation functions that might be desired in the future and will provide a basis for building a user interface for SEISM codes that will simplify selection of attenuation functions for sensitivity studies and other computations.

3.2.1 Selection of Attenuation Functions

Discussions concerning selection of attenuation functions for the Yucca Mountain area are given in Hofmann (1991 and 1992b), Sommerville et al. (1987) and Rogers et al. (1977). Sommerville et al. (1987) use the attenuation functions of Campbell (1980 and 1982). Campbell's (1980) report is not publicly available. Rogers et al. (1977) use Schnabel and Seed's (1973) attenuation curves. Proposals for the use of so-called stochastic methods which might be applied to the Yucca Mountain area are in Toro et al. (1992) and McGuire (1990). Two empirically derived functions were chosen for consideration, Campbell (1987) for Utah and Joyner and Boore (1981) for the western U.S. Campbell (1987) used mostly California data and included many earthquakes with strike slip faulting sources. Also included, were data from larger thrust fault source earthquakes which helped control attenuation with distance. Joyner and Boore (1981) used largely thrust fault earthquakes in their compilation because large amounts of strong motion data were available from these events. Updates have been made to both Joyner and Boore's (1981 and Campbell's (1987) curves. Joyner and Boore's (1981) curves have remained essentially the same with the addition of new data.

Campbell (1993) proposes changes to apply to soft rock and for thrust fault earthquake sources. Comparisons of strong motion from the recent Little Skull Mountain earthquake indicate that the Campbell (1987) and Joyner and Boore (1981) attenuation functions predicted within their estimated error bounds.

Campbell (1987) argues that the inclusion of thrust fault earthquakes does not diminish the applicability of his functions to the largely normal fault sources in the Basin and Range, because vibratory ground motion is used to establish both earthquake magnitudes and vibratory-ground-motion-attenuation curves. Therefore the less energetic sources, anticipated for the Basin and Range tectonic province, does not influence the curves. This point is well taken except for establishing the equivalence of paleo-fault offsets with magnitudes to extend the seismic record for facilities with a long period of performance concern. Consideration of the potential effect of stress drop in stochastic methods provides a relationship between fault slip area, magnitude and fault source type.

Distance to an earthquake source has been defined in different ways by authors of the various attenuation functions. Usually it is defined as the distance to the surface projection of the fault slip area. Campbell defines it as the distance to the fault slip area. Therefore if fault slip does not reach the surface as evidenced by aftershocks, distance in the near-field of shaking would be greater than to the surface projection of the fault slip area. Where earthquake sources are identified as broad zones, these definitions cannot be effectively employed and are, for practical purposes, really defined as epicentral distances. Schnabel and Seed (1973) define distance to be to the surface projection of fault rupture. Their data, however, are largely recorded further away than a fault dimension. A these distances there is little difference between epicentral and fault-slip-area distances to a site.

3.2.2 Old Code/New Code

New code was not required to use the empirical Campbell and Joiner and Boore acceleration attenuation functions with the updated SEISM 1 code. The general form and FORTRAN coding for the equations are already in the code or is available in the literature, e.g. Bernreuter et al., (1989). New input data forms are required to make the coefficients and exponents of the general-form equation equal to those of the specific empirical functions to be used. The Schnabel and Seed (1973) curves are not readily put in equation form. Separate coefficients and exponents must be developed for each magnitude and interpolation between curves used for fractional magnitudes. An alternative is a table look-up scheme. These curves are not implemented in the code at this time but the level of effort to do so is not great. Implementation is anticipated as a possible future effort. Currently, most seismic risk near Yucca Mountain is anticipated to be from specific faults where the fault rupture geometry can be estimated prior to earthquake occurrence, although with significant uncertainty.

3.2.3 Input Files

An example of the input data file to be modified to include other attenuation curves, e.g. those of Joyner and Boore (1981), is in Figure 3-2. A maximum of eight coefficients is permitted. Some equations use less than eight. If the model equation has fewer than eight coefficients, only the proper number of fields in the example input file at the top of figure 3-2 will be read by SEISM 1. The equation number must be specified as well as the coefficients. The example equation is the most general and appears applicable to a wide range of relatively simple empirical attenuation curves. The SEISM 1, example problem Attenuation Input File is in Appendix C.

Campbell's 1987 acceleration-attenuation curves for Utah are implemented in SEISM 1 without coding changes. There are two differences in the Campbell curves that distinguish it from most others:

- Distance is defined as the closest distance to the fault rupture area.
- Predicted accelerations are the average of peaks of the two horizontal components.

These variables are defined, for most other attenuation functions, as follows:

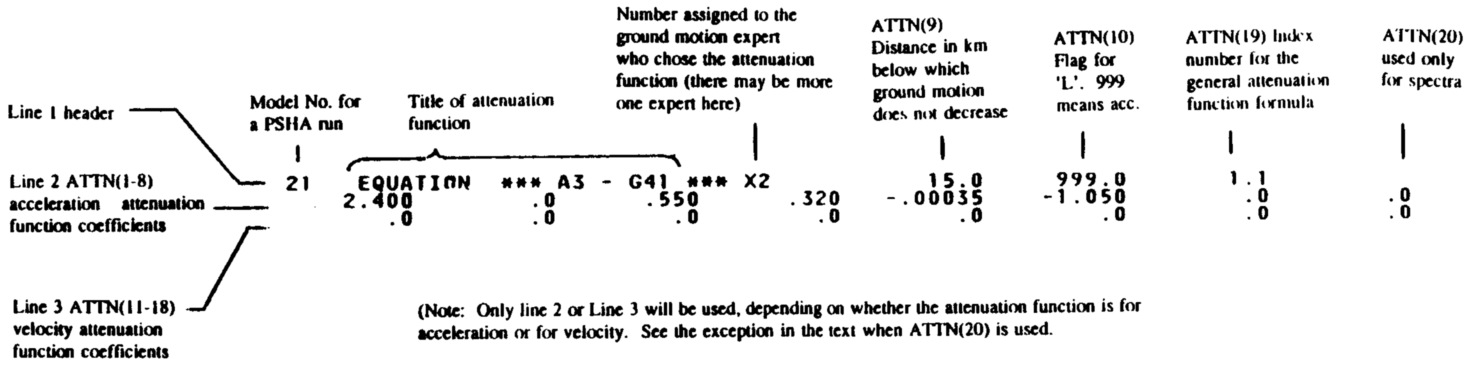
- Distance is the closest distance to causative fault or to the surface projection of the rupture area.
- Predicted acceleration is the highest peak acceleration of the two horizontal components.

The coefficients and exponents for Utah can be substituted for the eastern U.S. coefficients in Model 4 / equation D13 in SEISM 1. This equation with eastern U.S. coefficients is found on page Q10-89 of volume 7 of Bernreuter et al. (1989). The D model equation is on page Q6-155 of the same publication:

$$\mathrm{LOG(acc)} = D_1 + D_2M + D_3R + D_4\mathrm{LOG}[R + D_5^{(D_6M + D_7)}$$

where D_i are coefficients, M is magnitude and R is the closest distance to the fault rupture area.

This equation will model Campbell's unconstrained curves for all but very deep sediment filled basins. For his constrained curves, the D_7 coefficient is an added separate term and not within the exponent of the last term in equation (3-2). Resulting curves will apply in the free field, not in the basements of tall buildings. Campbell's curves for soil greater than 10 meters thick would be expected to attenuate high frequencies more than for a rock site. Campbell has an extra term designed to roughly compensate for the changes in base-input spectrum for tall buildings. In effect, the "embedment" term



```
 21   EQUATION   *** A3 - G41 *** X2              15.0      999.0      1.1
    2.400        .0       .550        .320    -.00035     -1.050       .0        .0
       .0        .0         .0          .0         .0         .0       .0        .0
```

(Note: Only line 2 or Line 3 will be used, depending on whether the attenuation function is for acceleration or for velocity. See the exception in the text when ATTN(20) is used.

General formula for an index of 1 in ATTN(19) above:

$$\text{Log (acc)} = A_1 + A_2\, m_b + A_3\, M_L + A_4\, I_o + A_5\, R + A_6 \log R + A_7\, m_b\, R + A_8$$

Where A_1 to A_8 are in the 8 fields of Line 2 in the example Model 21 above.

Code, in file ATTN of the routine ALEAS of SEISM 1, for the above formula.

```
C         MODEL A  (MODEL INDEX = 1)
C         *******
C         LOG(ACC) = A1 + A2*MB + A3*ML + A4*IO + A5*R + A6*LOG(R) +
C                    A7*MB*R + A8
          FUNCTION AMODEL (XM,XI,R,ALR,ATTN,L)
          DIMENSION ATTN(1)
          AMODEL = ATTN(1+L) + XM*(ATTN(2+L)+ATTN(3+L)) + XI*ATTN(4+L) +
     +       R*ATTN(5+L) + ATTN(6+L)*ALR + ATTN(7+L)*XM*R + ATTN(8+L)
          RETURN
          END
```

Figure 3-2. Attenuation Function Input File Example compensates for soil-structure-interaction and has little to do with the effects of earthquake source depth. The additional term is not recommended for application at Yucca Mountain unless very tall structures are employed during the preclosure period. The term is not included here or in Bernreuter (1989).

Campbell produced two curves. They are referred to as unconstrained and constrained. The constrained curve has a term which contains the variable γ, attenuation which improves predictions for locations a distances larger than 50km. He advises the use of 0.0059 which is very close to the California value of 0.006 reported in the literature, e.g., Joyner and Boore (1981). Several recent publications suggest that attenuation in the Basin and Range tectonic province is similar to that in California, although older publications reported otherwise. See Hofmann (1992a) for a discussion of this literature. When Campbell (1987) included the attenuation term in the equation, he redetermined other coefficients from his data. Campbell states that the resulting curves apply well for distances to 200 km. There is a slight reduction in peak accelerations in the very near field as a consequence.

Although Campbell used a large number of strike-slip source earthquakes, there is also a significant amount of strong motion data from reverse or thrust earthquakes in his data set. One of these, the 1971 San Fernando earthquake, has many recordings and contributes significantly to how the curves attenuate with distance for all magnitudes. Accelerations in the near field are likely to be higher for a thrust earthquake than for dip-slip or strike-slip sources according to McGarr (1984). Therefore, the slight reduction in peak accelerations in the near field, caused by using the constrained equation, appears acceptable. For large earthquakes (e.g. $M > 7$), it is preferable to use the unconstrained curve which is conservative only to about a 50 km distance. For smaller earthquakes (e.g. $M < 6$), the unconstrained curve may be preferable because accelerations of engineering significance do not occur beyond 50 km. Because of the inclusion of some reverse and thrust earthquakes, these attenuation curves are expected to be conservative for the Basin and Range tectonic province. Reductions of acceleration at proposed repository depths are not addressed by these curves. Proposals for such reductions have been published, e.g., by Seed and Idriss (1969). A crude rule is that the effect of the free surface (about a two-fold amplification) diminishes with depth to zero over about one wavelength. Therefore, if the velocity and frequency of seismic waves are known, strong motion observed on the surface will be less by one half at a determinable depth. This analysis assumes that the strong motion is in the elastic range for site media, a sometimes contentious assumption.

Earthquake sources in the Basin and Range tectonic province are usually centered less than 15 kilometers deep, e.g., Rogers et al., (1987). Therefore, because of the reduced distance and consequent reduced attenuation, accelerations may be higher at depth than at the surface for faults that are adjacent to or intersect a mine. This observation is based, in part, on McGarr's (1984) observations at South African mines and the theories used to explain them. Both this effect and the free surface effect should be expected to occur and perhaps to compensate for each other in some circumstances.

Investigations of low amplitude teleseismically recorded waves in deep bores suggest zones of increasing and decreasing amplitude with depth. These variations are attributed to waves traveling along interfaces between rock layers with differing acoustic impedances (Douze, 1964).

In the regulation of nuclear facilities important to safety, it is better to err conservatively. Therefore, unless evidence to the contrary can be developed, attenuation curves based on surface strong motion recordings should be applied at depth if the repository site is in the near field of a potentially seismogenic fault. For a probabilistic analysis, both expert opinions discussed above, could be used. Such a procedure would increase uncertainty. Consequently, this process would be expected to average to little difference in peak attenuation. Campbell's constrained (1987) formula to be used for Utah or the Basin and Range tectonic province, would be:

$$\ln a = -3.303 + 0.850M - 1.25\ln[R + 0.08720^{.678M}] - 0.0059R \qquad (3\text{-}2)$$

where "a" is acceleration in g's, M is M_L for magnitudes less than 6.5 and M_S for larger magnitudes, and "R" is distance in kilometers.

The eastern U.S. coefficients for Model 4 / equation D13, equation (3-1), are (Bernreuter et al., 1989):

2.6 .777 .7697 .012 .898 0.0 -.0027

The format of the coefficients and exponents in the input form are illustrated in Figure 3-2.

The entry 0.0 in these coefficients means that there is no distance at which accelerations cannot increase as the source is approached. However, there is a view that accelerations higher than those which have been recorded, should not be predicted on the basis of theory or extrapolations. Consequently some models of equation D13 impose a 25 km distance for this effect in the eastern U.S.. This may reflect a particular expert's opinions that Campbell's curves should be so modified because there are few strong motion recordings close to a source to verify the high near-field accelerations in his extrapolation. To change Campbell's average acceleration of two horizontal components to the more commonly used largest horizontal acceleration, his values must be multiplied by 1.13, or ln 1.13 must be added to the equation. The ln 1.13 = 0.1222. This may be added to the term -3.303 in the equation for ln a. This constant then becomes -3.181.

New coefficients, for a constrained estimate of the highest horizontal observed peak acceleration on rock or sediments less than 10 m thick in Utah and which is recommended as conservative for the Basin and Range tectonic province are:

3.181 .850 1.25 .0872 .678 0.0 -.0059

or results from the original formula may be multiplied by 1.13 and the first coefficient retained as 3.303. Differences between observed and predicted accelerations are reduced, however when Campbell's original definition of average peak acceleration is used with his curves.

The earlier publications did not describe random vibration (rv) models. Later references, e.g. Bernreuter et al. (1989a), page Q10-33 of vol. 7, however do include them. The only description of how to input attenuation formulae coefficients into ALEAS is in Bernreuter et al. (1984), which does not list the rv models. Equations and input to the rv models are not described but can be determined from the form of the code in the ATTN routine of the ALEAS module of SEISM 1 as described, e.g. in Bernreuter et al. (1989a), vol.6. page 43. Bernreuter et al. (1984) cites ten different attenuation formulae. Presumably, the current version of the code contains at least one additional attenuation formula corresponding to the rv formula approximation listed in Bernreuter et al. (1989a), vol. 6 pg 43:

$$\log a = C_1 + C_2\, m_b + C_3\, m_b^2 + C_4\, m_b^3 + C_5 R + C_6 \log R \qquad (3\text{-}3)$$

The coefficients for several rv models are given in Bernreuter et al. (1989a), vol. 7 in Tables M6.1 and M6.2 starting on page Q10-87. Their Table M6.3 lists rv spectra models.

Davis (1991) states that spectral models are not implemented. However, examples are given in Bernreuter et al. (1985) for approximating the more complex rv spectral models by a series of frequencies and amplitudes.

Bernreuter et al. (1985) and Davis (1991) address how to add new acceleration and velocity attenuation models or modify them by changing their coefficients. These models are largely empirical in nature and may contain damage intensity (MMI) or magnitude (ML, MB Mb_{lg} etc.) data, or both kinds of data. Table B.2 of appendix B to Bernreuter et al. (1985) lists models 'A' through 'I' which have an equivalent model index number of 1 through 9. These models are general in nature. Each of them could represent more than one, possibly several, published attenuation models by changing coefficients. Each model has up to eight coefficients. In addition to these eight coefficients, four other terms: ATTN(9), (10), (19) and (20) are required. These are described in Bernreuter et al. (1985), page B-2 using model 21, page B-4. This equation is illustrated on Figure 3-2 as an example. Coefficients of the equation are in order on the 2nd line. A title is on the first line of the 3 lines which describe the model. The fields on the first line of input are:

> ATTN(9) represents a distance below which, acceleration or velocity does not increase. This term is used to prevent the formula from predicting very large or infinite values at distances of zero.
>
> ATTN(10) is a control for the value 'L'. L has a value of 0 or 10. If L is 0, only fields 1 through 8 (those on the 2nd of 3 lines of input for each model) will be used. If L is 10, only fields 11 through 18 (those on the third line of the 3 line entry for each model) will be used. If L=0 and fields 1-8 are used, the formula describes an acceleration attenuation function. If L=10 and fields 11-18 are used, the formula describes a velocity attenuation function. ATTN(10) is often arbitrarily set to 999 to indicate a value that a magnitude or Intensity cannot exceed. the 999 is used to indicate that the magnitude or intensity is not constrained. Under this circumstance L=0.
>
> ATTN(19) is the model index number. It tells ALEAS which attenuation function formula to use. The number 1.1 is given in the example. The integer 1, is the index. No explanation is given for the number after the decimal.
>
> ATTN(20) is not used when the model represents an acceleration or velocity attenuation function. It is used only when the model is describing a Newmark-Hall spectrum. When a value is used in this field, it represents a model index number for a velocity spectrum. When a value is in this field, the value in the field for ATTN(19) represents the index for an acceleration model. Under these circumstances, ATTN(1-8) and ATTN(11-18) will also be filled.

As part of the model title, an X appears followed by a number, e.g. X2. This represents the number of an expert. Some of these examples on pages B-3 to B-16 of Bernreuter et al. (1989a) have more than one X number following the title and sometimes other descriptors follow the X number(s). These are not explained but are descriptive and not used to make calculations by the code. The attenuation input file example is in Figure 3-2 of this report. Fields in the input file, the general equation and code for it, plus example-input-file coefficients are identified.

Adding attenuation functions appropriate for the Western U.S. is usually relatively simple. If an appropriate general formula is already in the SEISM 1 code, only its coefficients need be altered to match Western U.S. attenuation functions. If a general formula of similar form to a desired western U.S. attenuation equation is not in the code, a new general formula would have to be added. The random-vibration-approximation equation which resides in the code could be used with different coefficients, if justified, for the Western U.S. Only the 1972 Schnabel and Seed attenuation curves cannot be replicated with a single formula. If these empirical curves are selected by a ground motion expert, a table look-up approach or a different curve fit function for each magnitude with interpolation between curves could be implemented.

Some means of including a near field magnitude independent acceleration attenuation for Western U.S. sites may be needed for magnitudes larger than about 6.5. (See Hofmann, 1992a). This component of strong motion is a function of stress drop and distance to a breaking asperity or barrier. Its higher frequency content would require a steeper attenuation curve than the component of strong motion caused by the average slip along the fault dislocation area. The probability of its occurrence is less than for far-field accelerations generated by the average displacement because the asperities or barriers are smaller than the total dislocation area. The problem with peak acceleration is discussed in Bernreuter et al. (1989a), vol. 7, section 4.3 (see also e.g., Hofmann, 1974 and Morrison et al., 1966). Campbell's (1987 and 1993) curves appear to accommodate this problem but without a reduction in probability of occurrence, for magnitudes less than about 6.5. Therefore, the unconstrained Campbell curves are conservative. His constrained curves appear conservative for all but the largest earthquakes expected in the Basin and Range tectonic province. If more precise probabilities of high near-field acceleration is ultimately required, additional code modifications may be made. The modification would permit making calculations for both near-asperity and far-field accelerations but with different probabilities. The occurrence of high near-field accelerations 20 percent of the time as recommended by Hofmann (1974) should be substantiated by a study of peak accelerations recorded since 1972. The 20 percent estimate was based upon a very limited data set.

4 COMPARISON WITH THE JUNE 29, 1992 M=5.6 LITTLE SKULL MOUNTAIN EARTHQUAKE ACCELERATIONS

Maps showing regional faults and epicenters from DOE (1988) are reproduced on Figures 4-1 and 4-2. Strong motion data from the M=5.6 Little Skull Mountain, Nevada earthquake of June 29, 1992 were recently published by Lum and Honda (1993). Their sketch map of strong motion stations is reproduced on figure 4-3. The epicenter of the Little Skull Mountain Earthquake, from University of Nevada at Reno (UNV/R) and USGS (1992) is added to the figures.

A summary list of peak accelerations by component and station (Table 4-1) are from Lum and Honda (1993). Descriptions of topography or instrument foundation, however were not included. Telephone conversations with Kenneth Honda, one of the author's, and James O'Donnell of DOE at NTS, indicated that the three stations nearest the epicenter were on rock or on shallow sediments over rock.

Figure 4-3 is a reproduction of the Lum and Honda (1993) map of station locations excluding those in Las Vegas, Nevada. Added to the map is a sketch of the currently proposed buried Northeast striking fault plane which was determined from fault plane solutions in UNV/R and USGS (1992). Dip is stated to be either Southeast or Northwest. Aftershocks suggest that the dip is Southeast as indicated on Figure 4-3. Both long (Harvard moment tensor) and short period fault plane solutions indicated similar solutions. Normal dip-slip movement is indicated although there appears to be a component of strike-slip motion and aftershocks exhibit a variety of focal mechanisms. Additional discussion of fault plane solutions for this earthquake are in Walter (1993). See also Smith et al. (1993) who suggest that the focal mechanism may have involved two faults striking at right angles to each other. If movement on the two faults was simultaneous, some degradation of the fault plane solution would be expected. At this time there is no further information available on this topic in the literature. The UNV/R now operates the NTS network of sensitive seismic stations. Data from more distant stations than those in the NTS network were also used in these analyses. The UNV/R and USGS (1992) epicenter and aftershock-depth maps are provided on Figure 4-4.

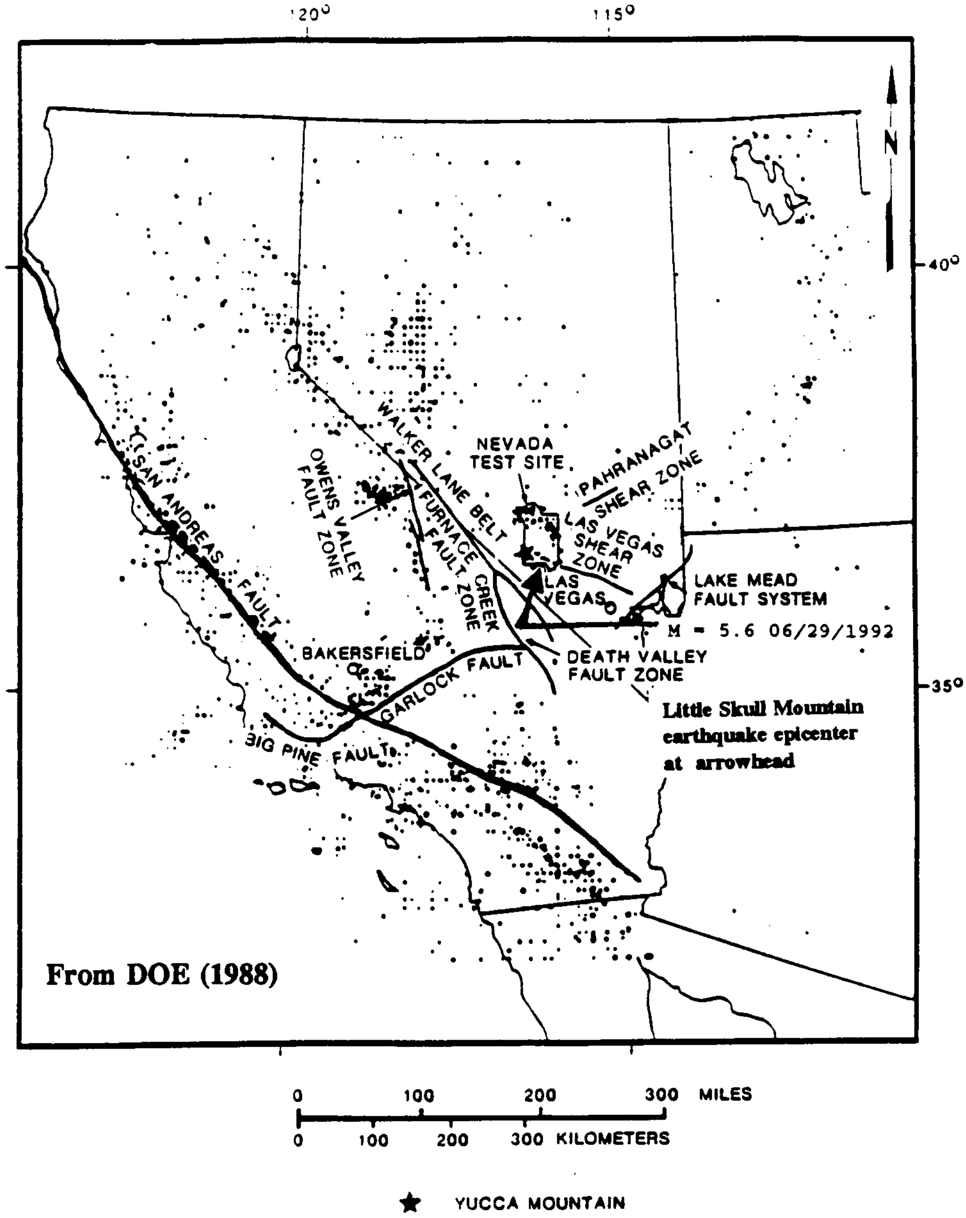
Stations 1 and 2, may be seen on Figure 4-3 to lie along the surface projection of the buried fault . A projection of aftershocks with depth perpendicular to this plane was not shown. Therefore it is not known whether the aftershock distribution strongly supports the preferred fault plane or the alternate solution. The horizontal extent of the slip plane, as suggested by the aftershock distribution is also unavailable at this time although bounds may be estimated. High accelerations at stations 1 and 2 support the strike of the chosen solution.

Epicentral distances measured on the sketch map (Figure 4-1) and those listed Table 4-1 (Lum and Honda, 1993) are not in perfect agreement. The Table 4-1 values are accepted as being more accurate than the sketch map distances.

Distances in published attenuation curves are usually expressed as the distance to the surface expression of fault rupture. For smaller earthquakes, whose rupture plane does not reach the surface, the definition may be the distance to the projection of the rupture plane to the surface. For Campbell (1987) it is the closest distance to the rupture plane as defined by aftershocks.

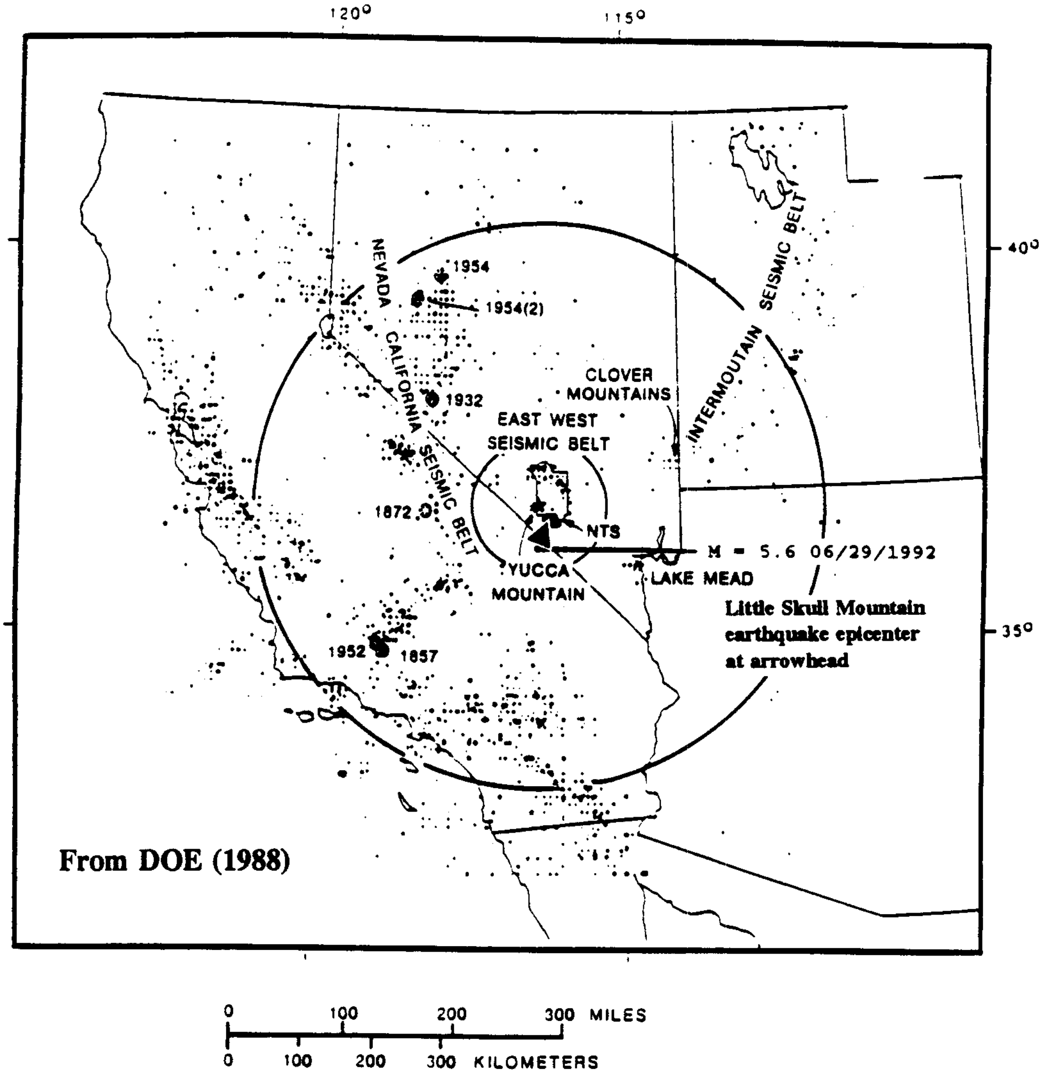
Table 4-1. Little Skull Mountain Earthquake Peak Accelerations

Station		<------- Corrected	------->		
No.	Comp	Accel. (cm/sec²)	Velocity (cm/sec)	Disp (cm)	Distance from Epicenter (Km)
1 A	DOWN	84.485	-2.465	0.455	15
1 A	NORTH	132.736	4.234	0.524	
1 A	WEST	-204.277	11.247	0.773	
1 B	DOWN	80.697	-2.405	0.429	
1 B	NORTH	128.704	-4.114	-0.471	
1 B	WEST	-208.734	11.477	-0.825	
2 A	DOWN	-66.300	2.567	0.267	30
2 A	NORTH	-118.275	5.044	-0.499	
2 A	WEST	89.243	-4.609	-0.576	
2 B	DOWN	-68.179	2.615	0.252	
2 B	NORTH	-116.673	5.053	-0.497	
2 B	WEST	88.807	-4.642	-0.623	
3	DOWN	-33.004	-0.669	-0.191	49
3	NORTH	-35.931	-1.069	-0.109	
3	WEST	-60.592	-2.065	0.183	
4	DOWN	15.120	-0.558	0.160	58
4	NORTH	-18.631	1.055	0.193	
4	WEST	20.999	1.263	-0.232	
5	DOWN	-11.009	0.423	-0.170	62
5	NORTH	-15.785	0.833	-0.199	
5	WEST	14.812	0.744	-0.147	
6	DOWN	-5.505	0.218	-0.116	99
6	NORTH	7.631	0.266	-0.080	
6	WEST	-8.173	0.309	-0.134	
7	DOWN	-4.746	0.326	-0.159	99
7	NORTH	-7.039	0.524	0.119	
7	WEST	-5.345	0.364	-0.125	
8	DOWN	8.602	-0.305	0.084	102
8	NORTH	12.101	-0.521	-0.092	
8	WEST	12.637	0.432	-0.084	
9	DOWN	-2.570	-0.273	-0.074	109
9	NORTH	-3.987	-0.412	0.085	
9	WEST	-6.288	-0.511	0.088	
10	DOWN	5.408	0.369	-0.140	113
10	NORTH	8.896	-0.768	-0.192	
10	WEST	8.961	-0.914	-0.311	
11	DOWN	4.951	0.330	-0.136	114
11	NORTH	10.842	0.371	0.156	
11	WEST	8.521	0.324	0.164	
12	DOWN	15.126	0.905	0.110	117
12	NORTH	9.622	-0.822	0.128	
12	WEST	19.704	0.796	-0.111	
13	DOWN	-3.546	0.396	-0.163	117
13	NORTH	7.427	0.779	0.292	
13	WEST	-7.929	1.169	0.312	
14 A	DOWN	-9.412	0.831	-0.142	118
14 A	NORTH	-15.448	1.322	-0.306	
14 A	WEST	16.795	-1.877	0.250	
14 B	DOWN	-9.769	0.820	-0.143	
14 B	NORTH	-15.391	-1.343	-0.279	
14 B	WEST	16.523	-1.869	0.260	
15 A	DOWN	-3.104	-0.271	0.073	121
15 A	NORTH	-5.273	-0.390	-0.148	
15 A	WEST	4.823	0.467	0.118	
15 B	DOWN	-3.091	0.303	-0.108	
15 B	NORTH	-4.722	0.514	-0.155	
15 B	WEST	5.669	0.626	0.146	
16	DOWN	4.817	-0.629	0.151	123
16	NORTH	7.212	0.710	0.174	
16	WEST	9.188	-1.345	0.362	
17	DOWN	-2.293	-0.163	0.109	126
17	NORTH	-2.718	-0.170	0.034	
17	WEST	-3.258	0.267	0.118	
18	DOWN	-3.584	0.267	-0.097	130
18	NORTH	5.637	-0.524	-0.129	
18	WEST	7.665	-0.628	-0.134	
19	DOWN	2.319	0.228	0.074	139
19	NORTH	5.861	-0.936	0.156	
19	WEST	5.585	-0.446	0.093	
20	DOWN	-3.361	-0.113	0.050	232
20	NORTH	-3.158	-0.167	-0.065	
20	WEST	-3.413	-0.172	-0.051	



From DOE (1988)

Figure 4-1. Seismicity of the SW U.S. and Major Faults

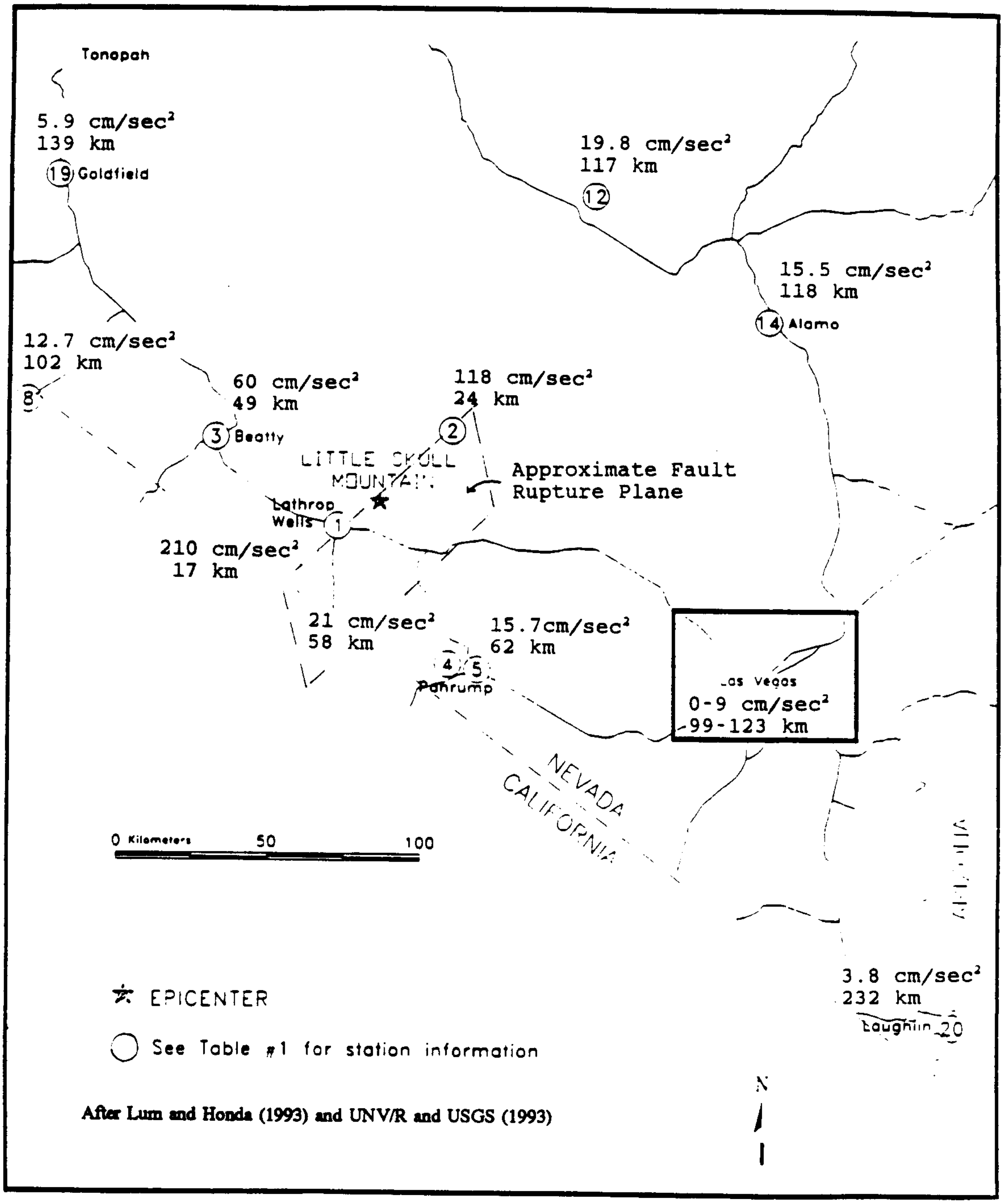


M = 5.6 06/29/1992

Little Skull Mountain earthquake epicenter at arrowhead

From DOE (1988)

Figure 4-2. Little Skull Mtn. Earthquake and Seismicity of SW U.S. from 1978



After Lum and Honda (1993) and UNV/R and USGS (1993)

Figure 4-3. Strong Motion Seismograph Locations

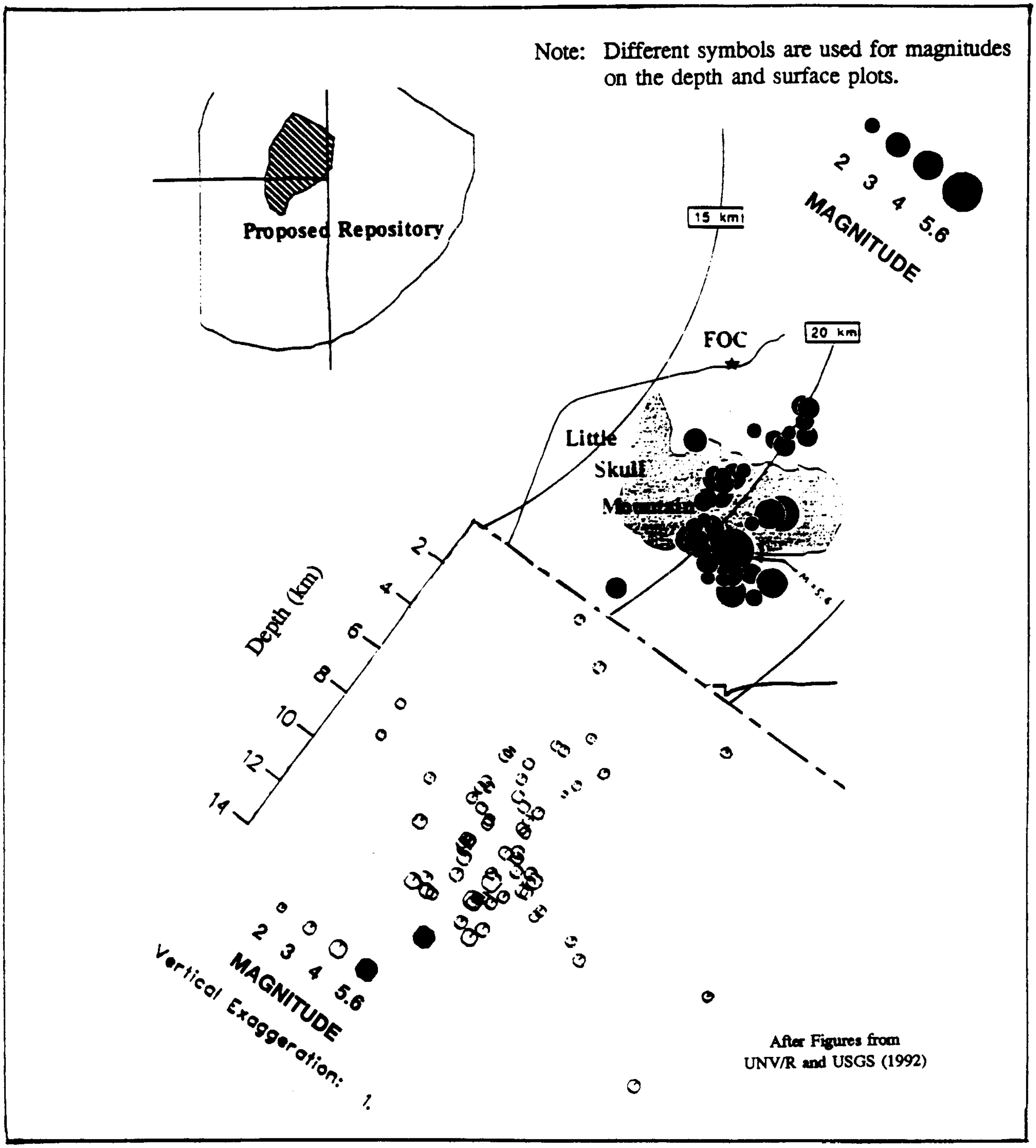


Figure 4-4. Main and Aftershock Locations

For probabilistic analyses that involve seismic regions rather than specific faults, the distance to the fault rupture area cannot be specified prior to the event. Whether distance to the fault-rupture area or epicentral distance is a better measure, is important only for distances less than the fault rupture length. Wyss (1979) graphs fault rupture area versus magnitude. It is reproduced in dePolo and Slemmons (1990). dePolo and Slemmon's figure is reproduced on Figure 4-5. A magnitude 7 earthquake is associated with about 500 km^2 of rupture area. If rupture is constrained to depths less than 15 km, which appears appropriate for the Basin and Range tectonic province, approximately 33 km of surface rupture would be expected for a rectangular rupture area. At distances greater than 33 km from the rupture plane, there is only a small difference in distances to the epicenter and to the rupture surface. For a magnitude 6, the rupture area is given as 80 km^2. For a square shaped fault slip area, the horizontal extent of slip may be approximated by taking the square root of the slip area. The square root of 80 is about 9 km. There are few recordings at distances less than 9 km. Therefore, empirical curves for strong motion attenuation can be said to be largely based on epicentral distances, for magnitudes of 6 and less.

For the Little Skull Mountain earthquake, aftershocks are prevalent from the main shock initiation at a 14 km depth to about 4 km from the surface. This 10 km vertical range of slip for a magnitude 5.6 earthquake results in a slip area of about 30 km^2 and suggests a horizontal fault rupture distance of only 3 km. The generally lower stress drops in the Basin and Range tectonic province, however, would require larger slip areas than Wyss' (1979) relationship for all types of earthquakes averaged together (Figure 4-5). An average stress drop of 100 bars is proposed by Brune (1970) and Hanks and McGuire (1981). However, an average stress drop for Basin and Range earthquakes is about 36 bars (Stark and Silva 1992) or 20 bars for dip slip normal faults (McGarr, 1984). If we assume that the plot of Wyss (1979) samples earthquakes having an average stress drop of 100 bars, the horizontal extent of fault slip for a magnitude 5.6 Basin and Range tectonic province earthquake, where stress drops are 20-36 bars, could be about 3 to 5 times larger than implied by Wyss' curve, or 8 to 13.5 km. In either case, the distance is less than the entire proposed fault plane sketched in Figure 4-3.

The fault slip plane outlined by the majority of aftershocks is an area of about 7 km by 10 km as determined from Figure 4-4, or 70 km^2, an area that is 2.3 times larger than the 30 km^2 for Wyss' average stress drop. This area would imply a stress drop of about 30 bars. A stress drop for the Little Skull Mountain earthquake has not been published at this time but the 30 bar value is similar to Stark and Silva's (1992) 36 bar average for the region. If a few more outlying aftershocks are assumed to represent the initial fault slip plane, the area could be 3 to 5 times larger than calculated for an average 100 bar stress drop.

The 7 km by 10 km (from depths of 4 kms to 14 kms) outline encompasses most of the aftershocks in Figure 4-4. A larger area about 12 by 10 km, encompasses almost all the aftershocks. Using these outlines, stations 1 and 2 are about 10 to 12 km and 20 to 22 km respectively from the edge of the rupture plane. Assuming these distances, Predictions are made from Campbell's curves and compared to observed accelerations (Table 4-2). This excercise is speculative but serves to show that observed results differ within expected bounds for Campbell's curves. Depth of the main shock and locations of aftershocks will almost certainly change as work to define them progresses beyond the preliminary stage now available.

The Little Skull Mountain earthquake of 1992 did not produce obvious surface offsets. Lum and Honda (1993) list epicentral distances. At the time Lum and Honda wrote their report, fault plane solutions had not been published. When first-P-motion fault-plane solutions are available, there are two possible

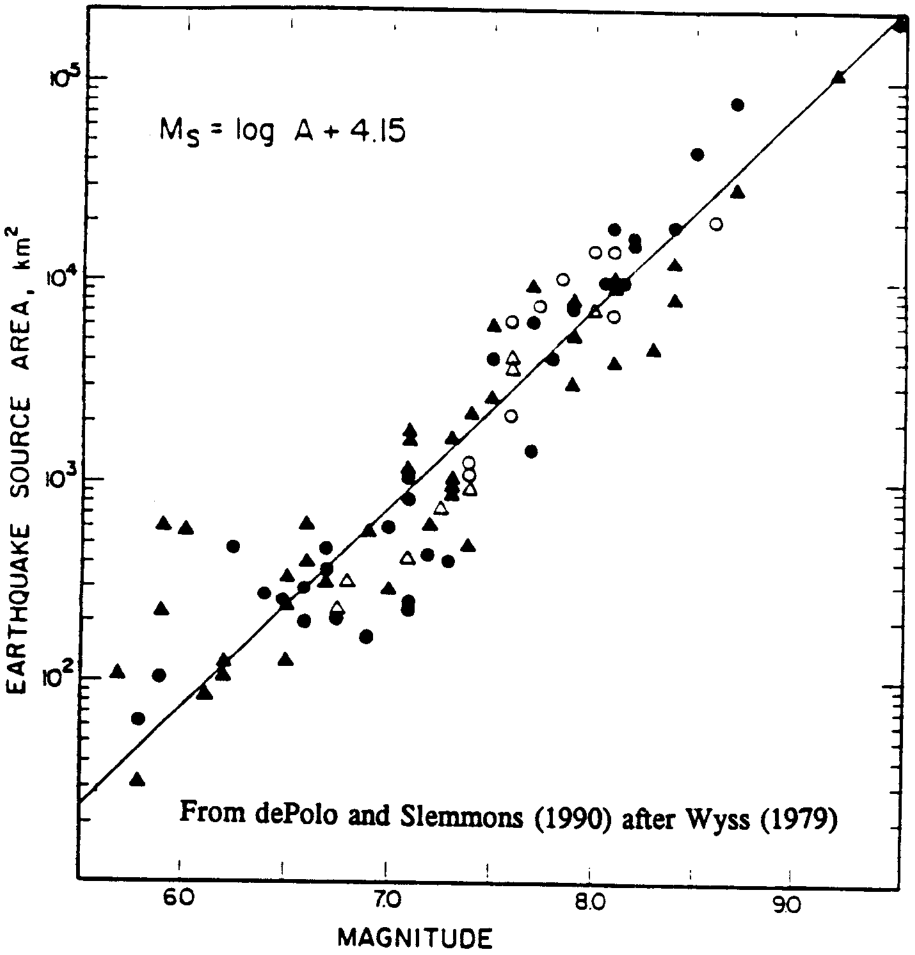


Figure 4-5. Fault Rupture Area Versus Magnitude

Table 4-2. **Predicted and Observed Accelerations**

FAULT SLIP AREA	DISTANCE TO STATION		AVERAGE PEAK ACCELERATION	
	Station 1	Station 2	Station 1	Station 2
Prediction from Campbell's unconstrained curve for sedimets > 10 m thick				
7X10 km (most aftershocks)	12 km	22 km	0.11 g	0.06 g
12X10 km (almost all aftershocks)	10 km	20 km	0.13 g	0.07 g
Predictions from Campbell's unconstrained curve for sediments < 10 m thick				
7x10 km (most aftershocks)	12 km	22 km	0.12 g	0.07 g
12X10 km (almost all aftershocks)	10 km	20 km	0.2 g	0.1 g
Observed average of peak horizontal accelerations				
	10-12 km	20-22 km	0.17 g	0.11 g
Observed peak horizontal accelerations			PEAK HORIZONTAL ACCELERATION	
	10-12 km	20-22 km	0.2 g	0.13 g

solutions for each determination. Therefore results may be ambiguous. There is a temptation to use epicentral distances rather than the distance to the fault rupture when comparing earthquake vibratory ground motion to published curves. Because of the uncertainty in fault plane solutions, comparisons based solely on them, and resultant distances to the rupture surface, may not provide a desired level of certainty. Comparisons using both measures of distance are made in following paragraphs.

If the preferred fault plane solution depicted on Figure 4-3 is accepted, stations 1 and 2 are in the near-field of faulting and epicentral distance is not an appropriate measure of the distance to the fault. The high values at station 3 (Beatty) remain an enigma. According to Honda (personal communication, 1993) the station is on shallow sediments over rock and not on a pronounced topographic high or in a valley. Station 1 values (Lathrop Wells) may also be influenced by its location in a valley. Aftershock activity is highest from depths of 4 km to 14 km according to Figure 4-4. Possible future theoretical modeling may better resolve which fault plane solution is correct and may explain why station 3 recorded accelerations more appropriate to a magnitude 7 or 7.5 than the measured 5.6. Smith et al. (1993) state that aftershocks of the Little Skull Mountain earthquake appear in an "L" shaped pattern. This suggests that two perpendicular faults were involved in the focal mechanism. [Note that this reference is an abstract and there are no illustrations]. The secondary fault may pass under or close to Station 3. The high acceleration values may have been caused by movement on the fault beneath Station 3 or wave propagation along the fault zone directed toward the station from a distant rupture.

4.1 Campbell Attenuation Functions

The purpose of comparing Little Skull Mountain accelerations with published attenuation curves was to verify that the Campbell (1987) attenuation equation was suitable for predicting vibratory ground motion in the vicinity of Yucca Mountain which is about 20 kilometers NW of the epicenter. That strong motion from this earthquake may be typical or may be at the extremes of the data distribution about the Campbell (1987) curves is acknowledged.

The Campbell (1981) procedure, also used in Campbell (1987), predicts the average of the two peak horizontal components, as previously noted. Joyner and Boore (1981) indicate that Campbell's curves may be multiplied by 1.13 to produce curves that will predict the equivalent of the largest of the two horizontal components. Most published attenuation functions predict the highest acceleration recorded by a horizontal component of a strong motion seismograph. The correction, 1.13, is usually not easily discernable on a log-log plot. Campbell's (1987) curves predict the average of peak horizontal accelerations well but would underestimate the Little Skull Mountain earthquake peak-horizontal accelerations when the corrected curve is used.

A nominal depth to the rupture surface of about 4 km may be interpreted from the aftershock distribution in Figure 4-4. If the definition of distance to the rupture surface of Campbell (1987) is used accelerations at stations 1 and 2 are well predicted by Campbell's (1987) curve for sites with a sediment thickness less than 10m (Figure 4-6). If the slip plane is as narrow as the band of aftershocks on Figure 4-4, distances to the slip plane for these stations will be longer than 4 km and will differ slightly for the two stations because the aftershock zone is not exactly centered on the hypocenter.

Campbell (1987) proposed modifications to his formulae for sites on sediments over 10 meters thick, to produce curves which may be applied to a rock site or a site covered by sediments less than 10 meters thick. Stations near to the epicenter are either on hard rock (volcanic tuffs but not basement rock) or are covered by shallow sediments, according to Honda (personal communication, 1993). Therefore a modification for hard rock is used for one of the Campbell curve comparisons (Figure 4-7). Refinements in comparing observed accelerations with Campbell's (1987) curves may be possible when information concerning the stations' foundation material becomes available. Distance to the aftershock-defined-rupture surface is used for stations 1 and 2. Epicentral distance and distance to the rupture surface are so similar that they cannot be distinguished on the plot for stations 3 and higher. Stations 1,2,4, 5 and 19 lie on the $M = 5.6$ curve. Stations 3, 8, 12, 14 and 20 register higher accelerations than are predicted for a magnitude 5.6 earthquake on the Campbell curves whether epicentral or fault-slip-plane distances are used. The accelerations recorded are more appropriate to Campbell's magnitude 6.5 or 7 hard rock curves.

An intermediate set of curves between those for shallow sediment and deep sediment is proposed by Campbell (1993) for soft rock sites. Tuff rock at Yucca Mountain, which is appears less hard than granite or basalt, may be considered a candidate for these curves. Campbell (1993) applies this concept to plate margin thrusts but it may also be applied to other fault types with appropriate adjustments to his formulae. This proposal is essentially an average of Campbell's (1987) curves for sites with sediment thickness greater than 10 meters and for less than 10 meters. The differences between values predicted by his new soft-rock curve and accelerations predicted by his 1987 curves are not likely to be large. Consequently, investigation of the proposed curve modified for a low stress drop earthquake, rather than the thrust earthquake for which it was developed, is left as a future exercise.

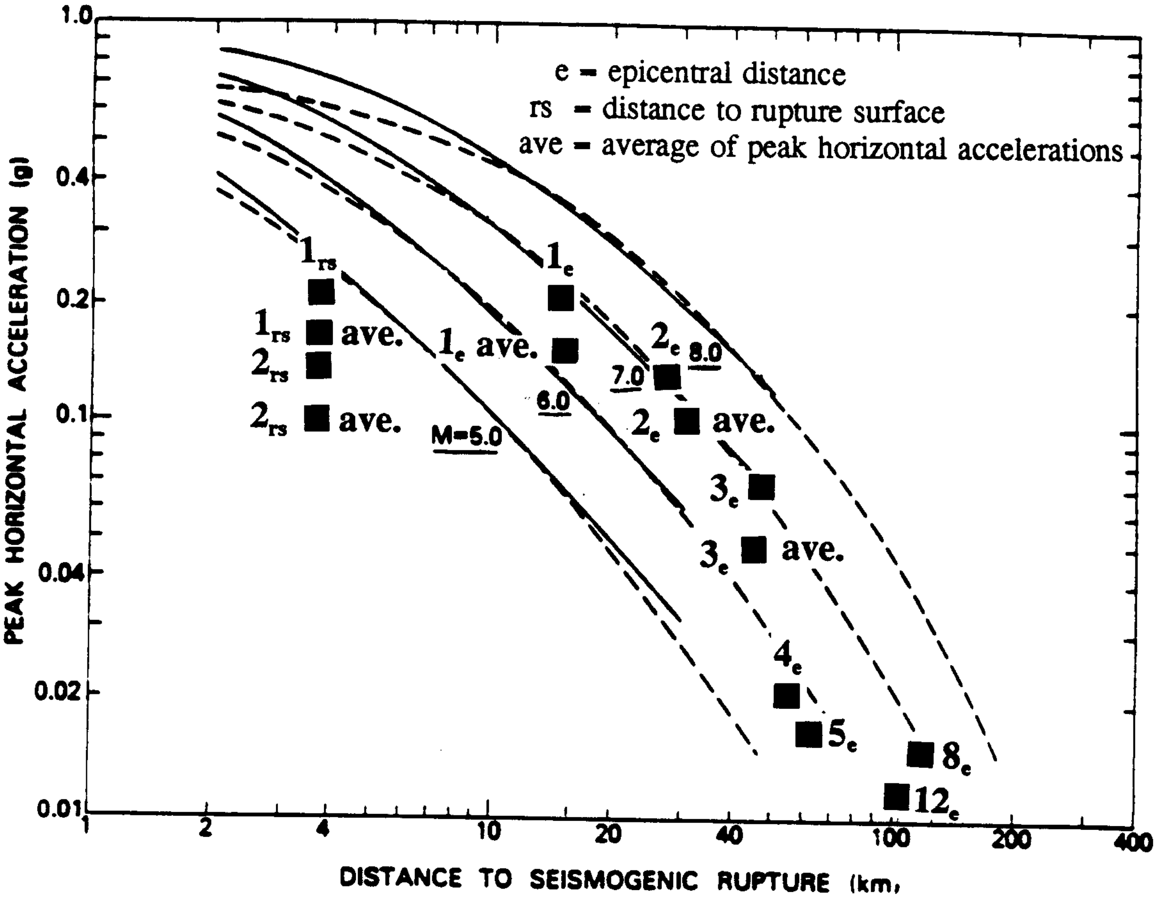


Figure 4-6. Campbell's (1987) Attenuation for Sediment

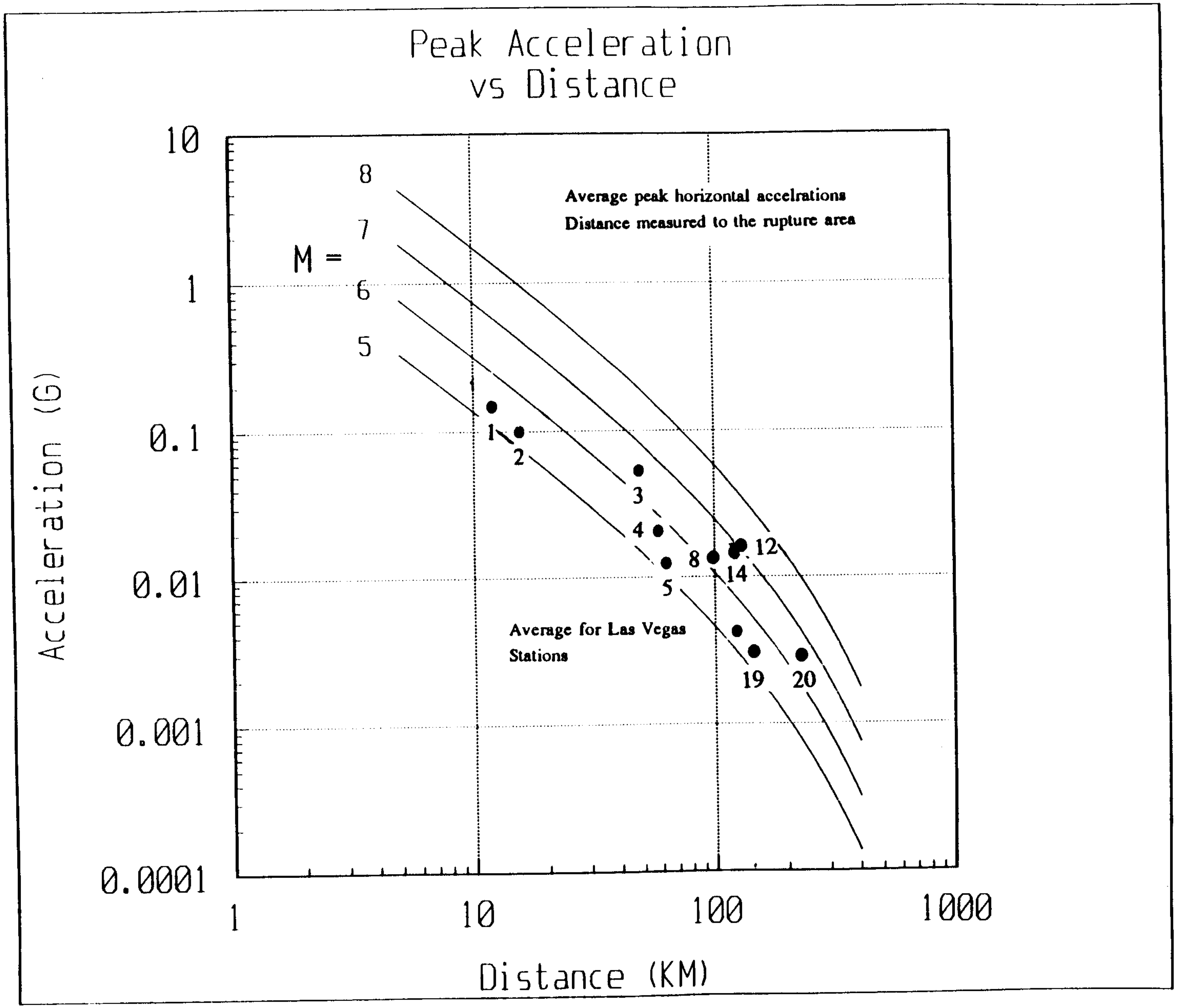


Figure 4-7. Cambell's (1987) Attenuation for Rock

4.2 Joyner (1981) Attenuation Functions

Joyner and Boore (1981) define distance to be "... the shortest distance to the surface projection of the rupture." The range of distances for stations 1 and 2 is indicated on Figure 4-3, assuming that the aftershock area on figure 4-4 represents the rupture area. As with all attenuation curves, distances to the other stations are equivalent to epicentral distance within the plotting accuracy of this figure. It is worthy of note, that the Joyner and Boore (1981) peak acceleration formula implicitly incorporates an equivalent average depth to rupture area of 7.3 km for $5.3 < m < 7.7$. The word "equivalent" is used because the 7.3KM is modified by other factors inherent in their empirical analysis.

Figure 4-8 depicts the acceleration attenuation curves of Joyner and Boore (1981). The peak horizontal acceleration from each strong motion station recording the Little Skull Mountain earthquake is plotted against this curve. Values from these curves are compared to the highest of the horizontal recorded strong motions at each station. The observed acceleration data fits the data well when stations near the fault rupture (stations 1 and 2) are plotted with the distance-measure prescribed by Joyner and Boore. Their distance measure and epicentral distance are indistinguishable on these plots for more distant stations. About an equal number of accelerations plot above $M = 5.6$ values as plot below them. The Joyner and Boore curves are a good fit to the observed data. These curves are adequate for the distances at which accelerations were recorded during the Little Skull Mountain earthquake. They may have a slight advantage over the Campbell curves in that the distance-measure is not as complex and the more traditional peak acceleration of the two horizontal components, is used. Joyner and Boore's data fit this definition of peak acceleration better than Campbell's curves after modification with a factor of 1.13 to correct for his definition of peak acceleration (the average of peak accelerations on each of the two horizontal components. Campbell's curves appear to predict the Little Skull Mountain accelerations, as he defines them, slightly more accurately than the Joyner and Boore curves. However it is usually not possible to predict rupture areas well. Consequently it is difficult to predict distances as defined by Campbell before an earthquake happens. For the practical purpose of using these functions in SEISM 1, these curves appear to have equal usefulness. If there is a substantial difference, it will be discerned only after use as a prediction tool.

4.3 Schnabel and Seed (1973) Attenuation Curves

Figure 4-9 is the Lum and Honda (1993) data plotted against the attenuation curves of Schnabel and Seed (1973). Data for accelerations greater than 0.1 g, stations 1 and 2, plot well assuming epicentral distance is the measure of distance. Therefore, these curves may be useful for predicting accelerations where fault rupture areas cannot be defined in advance of an earthquake and only zones of seismicity may be defined. Arabasz et al., (1992) state that there are "Fundamental problems in correlating diffuse seismicity with mapped Cenozoic faulting and subsurface geologic structure in the Utah region ..." "Problems include (1) uncertain subsurface structure ... (2) observations of discordance between surface fault patterns and seismic fault slip at depth ... (3) a paucity of historical surface faulting, and (4) inadequate focal-depth resolution from regional seismic monitoring." Another problem is that the seismic cycle for major faults in the Basin and Range tectonic province appears to be about 1,000 years long and these faults appear to become seismic in a random manner (e.g., VanWormer and Ryall, 1980). These problems are manifest throughout the Basin and Range tectonic province to some degree. Arabasz et al. (1992) suggest that using surface mapped fault zones as the sole seismic sources for an analysis of seismic risk may not be feasible. Consequently, a source zone approach may also be required

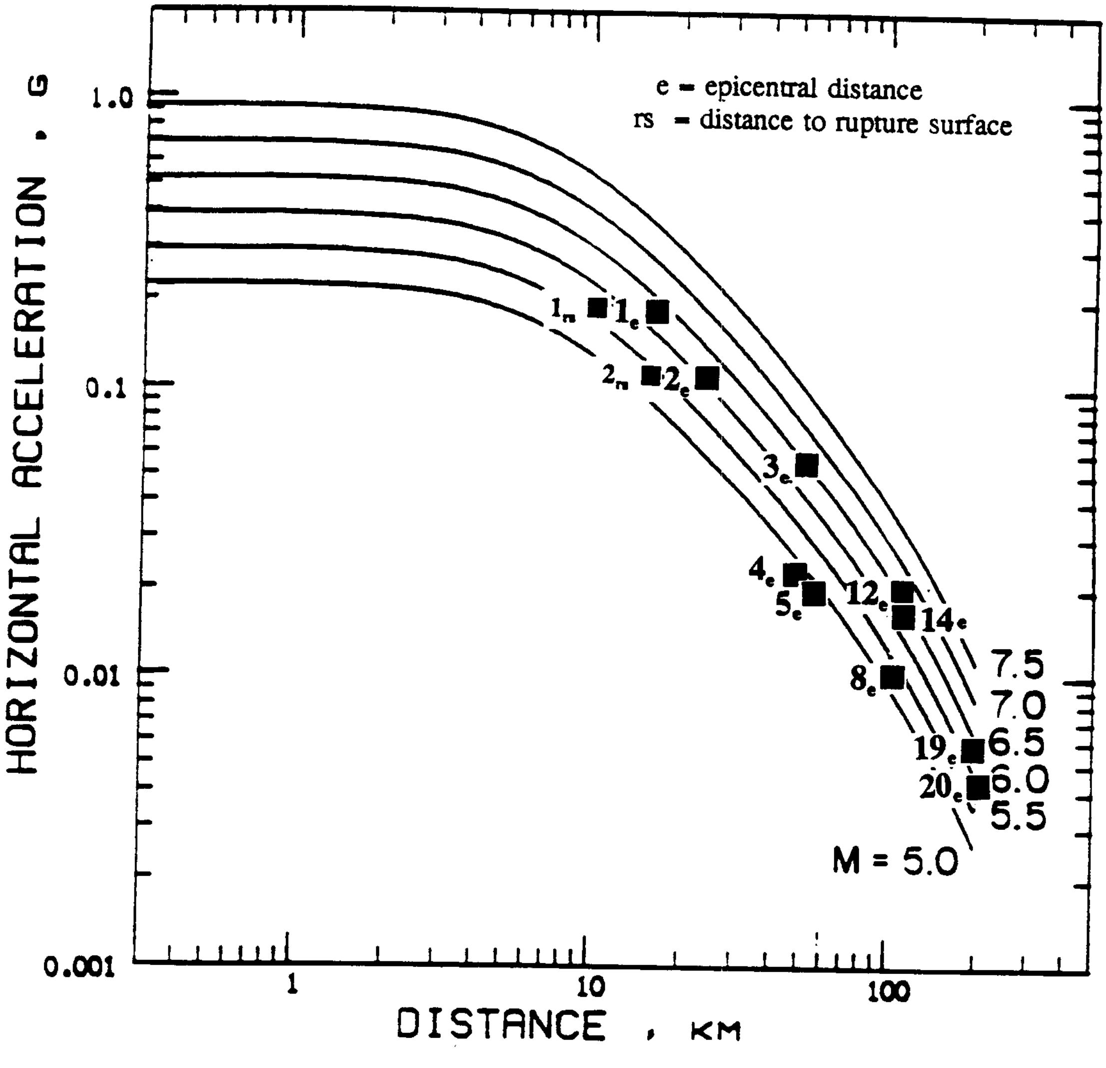


Figure 4-8. Joyner and Boore's (1981) Attenuation

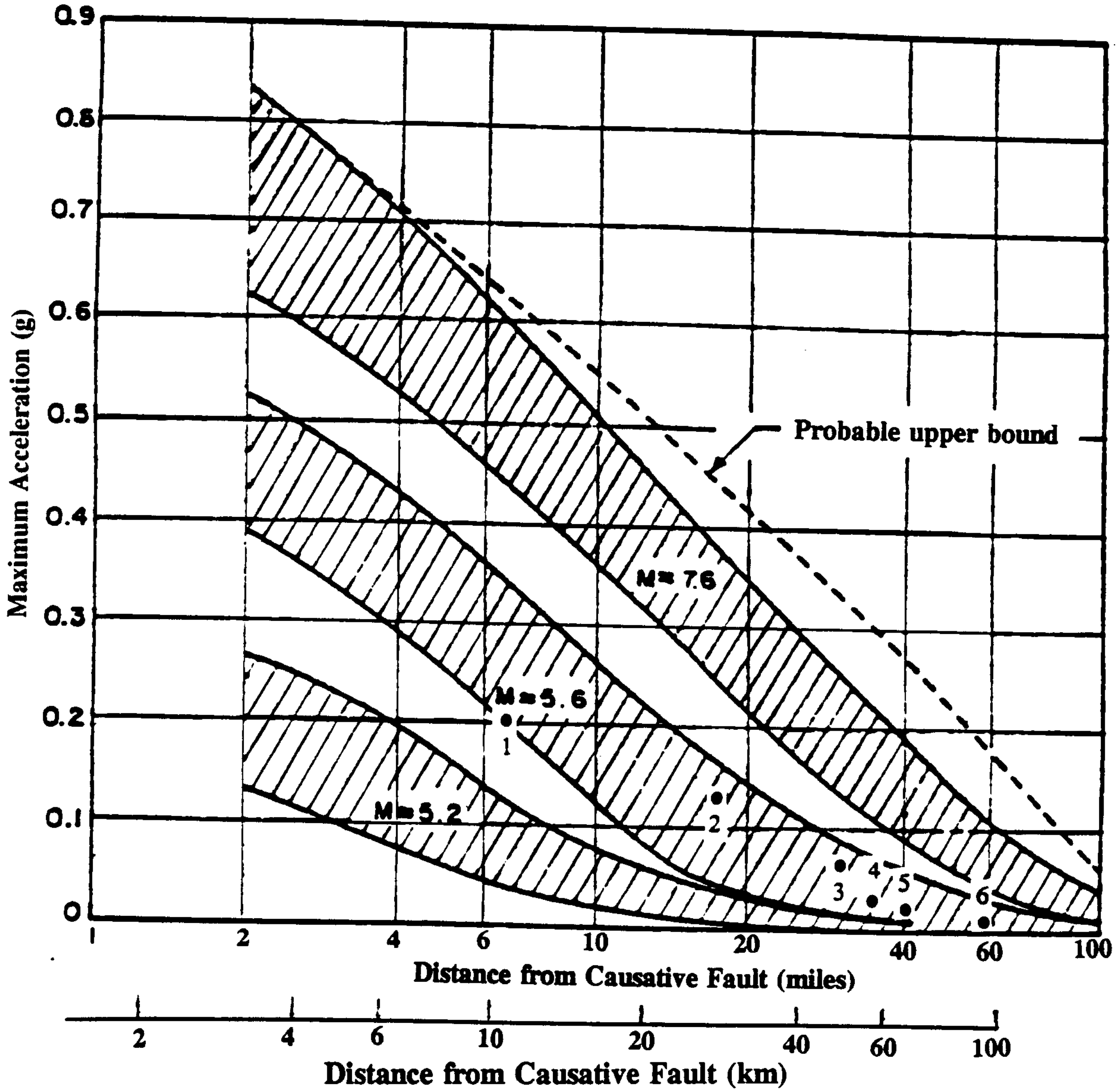


Figure 4-9. Schnabel and Seed's (1973) Attenuation

and there may be a need for an attenuation function that provides reasonable results when site to source distance is defined as epicentral distance.

Ryall and Van Wormer's (1980) concern that the Schnabel and Seed curves may overestimate Basin and Range accelerations by a factor of two or more seems not to apply for the Little Skull Mountain earthquake records greater than 0.1 g.

4.4 Other Potential Attenuation Functions

Other potential attenuation functions could be incorporated into SEISM 1 for western U.S. sites and their results also checked against the Little Skull Mountain earthquake recorded accelerations. This would remain a future effort but some discussion is appropriate here.

The SEISM 1 code version available to the CNWRA contains several attenuation function formulae based upon the stochastic method. This method employs spectra of the S wave portion of teleseismic records to develop estimates of strong vibratory ground motion or their spectra for use in design. This methodology is also named the band-limited-white-noise method, random vibration theory or source theory method. They are all similar and are based on Hanks and McGuire (1981) which, in turn, is based upon Brune (1970).

There are several variables in the method that may be adjusted, although Hanks and McGuire propose that several of them should be assumed constant. These variables and citations concerning them are discussed in Hofmann (1991). The method or methods were popular among experts elicited for the eastern U.S. studies (e.g. in Bernreuter et al., 1989a). Seven of the attenuation formula types in SEISM 1 are for random vibration (rv) models. Two of these are for the generation of spectra for design. Although rv methods may not be desirable for use with a HLW repository with its 10,000 year period of performance concern, it is likely that some experts elicited for a PSHA analysis of Yucca Mountain will strongly recommend their use. Formulae for this method are discussed in Toro and McGuire (1987) and in Boore and Atkinson (1987). Equations for the rv method are summarized in McGuire et al. (1993). Using the equations is a complex procedure. Bernreuter et al. (1989a) performed the rv attenuation calculations as a separate exercise, fit the final acceleration versus distance for each of several magnitudes with a curve-fitting formula, and used the formula's coefficients and exponents with an existing equation in SEISM 1. This is also the approach that is proposed here for adding rv attenuation functions, suitable for the western U.S., to SEISM 1 in the future. This procedure is less complex and more computationally efficient than the direct use of the rv method in the code. Bernreuter et. al. (1989) states that their curve-fit procedure replicates the rv attenuation curve within 5 percent.

Appendix D contains a listing of sections of FORTRAN source code that apply to the various types of attenuation functions that were employed for the eastern U.S. analyses. Final analyses of eastern U.S. power plants may have used other attenuation functions. This discourse is not intended to be a historical discussion of the eastern U.S. analyses but an evaluation of the available code and how it may be used at the proposed Yucca Mountain site. See Bernreuter et al., (1989a, volumes 6 and 7) for a discussion of rv formulae used in the SEISM 1 code. The rv method is derived from teleseismic moment determination methods which do not differ between the eastern and western U.S. Adherents of the rv method have argued that the long period portion of the seismic spectrum attenuates differently in the eastern compared to the western U.S. and that seismic sources generate about two times higher accelerations in the eastern U.S. at distances less than 10 km. (e.g., Atkinson and Boore, 1989). The latter characteristic is attributed to a higher f_{max} and probably a higher stress drop. These observations suggest that the same rv equation cannot be used for both the eastern and western U.S. The rv theory is not likely to predict near field variations in accelerations with a higher precision than other methods, considering its origins in teleseismic moment calculations.

Toro and McGuire (1987) state that their attenuation curve for the eastern U.S. is a modification of Boore's 1983 development for the western U.S. A draft 1991 ASCE report regarding design loads for an HLW repository (authors are not indicated) lists alternative coefficients for this method for the eastern and western U.S. Boore (1983) describes a method for determining the amplitudes of spectral bands. He did not publish a relationship for acceleration versus magnitude and distance. This method has not been prepared as an input file for attenuation functions to SEISM 1 but probably should be a future effort because it appears to be a method of choice by many experts. Considering the variety of rv formulae presently in the SEISM 1 code (see Appendix D), it is likely that other experts will have differing opinions regarding coefficients or the basic formula.

5 CONVERSION OF MAGNITUDE TO FAULT OFFSET

Elements of rv theory are necessary to convert paleo-fault displacements into prehistoric earthquake magnitude estimates and to utilize a PSHA code to develop PFD hazards. Early proponents of the method (e.g. Hanks and McGuire, 1981) believed that their rv method was broadly applicable and did not suggest modifications for eastern and western U.S. sites. Subsequent literature e.g., Hough and Anderson (1989) and Atkinson and Boore (1990) suggests that modifications of stress drop, the high frequency spectral corner, f_{max}, and a form of spectral attenuation may be appropriate for region-specific rv attenuation formulae.

Seismic moment has been defined as a function of fault slip area and stress drop (e.g., Keiles-Borok, 1957). Seismic moment may be related to either a moment magnitude or other magnitudes, e.g. Kanamori and Anderson (1975) and Kanamori (1983). A combination of these relationships can provide a means of determining magnitude from fault slip area for a typical stress drop associated with a particular style of faulting. Bonilla et al. (1984) demonstrate relationships between magnitude and fault rupture length or offset for data from all types of faults combined. Slemmons (1977) produces similar information separated by fault type, although statistical treatments are not identical. Alternative, largely empirical procedures, are described by Sommerville et al. (1987) which could be programmed separately. Currently only a procedure based on stress drop and seismic moment appropriate to Basin and Range earthquakes has been formulated for use with SEISM 1.

5.1 FAULT OFFSET HAZARD WITHIN A REPOSITORY: METHODOLOGY

The equation:

$$M_0 = \mu A \bar{D} \qquad (5\text{-}1)$$

relates the fault slip area, A, and average slip displacement $\bar{D}$ to seismic moment, M_0 and rigidity at the source, μ. Moment is related to magnitude by:

$$\text{Log } M_0 = 1.5\ M_w + 1.61 \qquad (5\text{-}2)$$

M_w is the moment magnitude. The above definitions and formulae are from Hanks and Kanamori (1979). The same equation has been shown to apply for M_S by Pucaru and Berkhammer (1978) for $5 < M_S > 7.5$.

A relationships for stress drop and rigidity from Keilis-Borok (1957) for a circular fault slip area is:

$$\Delta\sigma = \mu(7/16)\pi(\bar{D}/r) \qquad (5\text{-}3)$$

$$M_0 = (16/7)\Delta\sigma(a^3) \qquad (5\text{-}4)$$

The variable, r, is the radius of the circular fault dislocation and $\Delta\sigma$ is stress drop. These formulae, combined, yield a function of magnitude, stress drop, average fault displacement and fault slip area.

Stress drop for several larger Basin and Range earthquakes has been determined to be about 36 bars (Stark and Silva, 1992). This value or future refinements permit a relationship between moment magnitude fault slip area and average displacement. Figure 4-5 of this report presents a relationship between fault slip area and magnitude for an average stress drop, assumed to be 100 bars. This relationship may be modified for a 36 bar stress drop. Average fault displacement may then be related to moment magnitude. Kanamori (1983), also in Campbell (1985), relates moment magnitude to magnitudes commonly used in SEISM 1. These relationships, together, can convert earthquake magnitudes to fault slip and fault slip area or the reverse. They permit the conversion of paleo-fault-offset data to earthquake magnitude to extend historical seismicity to longer periods of time and to convert earthquake magnitudes in SEISM 1 to fault slip. The proposed process is illustrated in Figure 5-1.

The final hazard curve from SEISM 1 is given in terms of acceleration and probability. This output of SEISM 1 would not be used. Expert opinion of source regions or faults and the seismic activity on them, however, would be used. If random earthquakes are assumed to occur on randomly distributed faults throughout Yucca Mountain, these earthquakes can be converted to fault offset and the probabilities of their occurrence can be determined over an area or volume of the repository. Estimates of seismic activity on particular faults can also be interpreted in terms of fault slip probability in this manner.

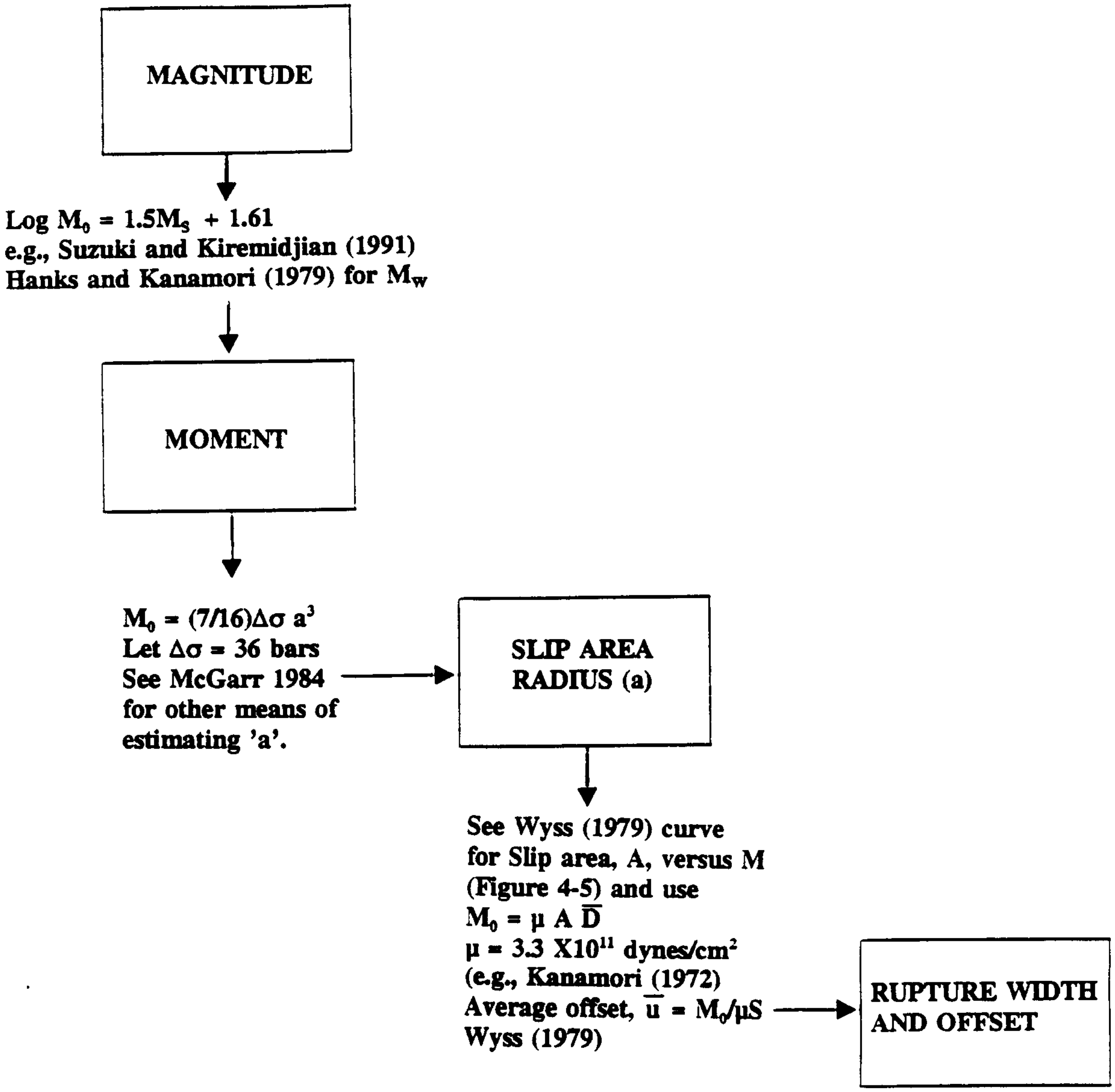


Figure 5-1. Process to Convert Magnitudes to Fault Displacement for Statistical Analysis

6 CONCLUSIONS AND RECOMMENDATIONS

SEISM 1 has been modified for use at western U.S. sites. The next step is a trial computation with published theories and information largely substituted for an elicitation of expert opinion. Informal elicitations may be made of CNWRA and NRC staff to augment published material. The purpose of the test computations will be to ascertain if modifications made to SEISM 1 function properly and to determine the kind of problems that may arise from a more formal elicitation of expert opinion. Several vibratory ground motion attenuation functions have been added to SEISM 1 for use in the western U.S. However, based on past experience by LLNL in their eastern U.S. analyses, experts may desire quite different attenuation functions than those added to SEISM 1. The experience gained in the SEISM 1 modification procedure by CNWRA is anticipated to make the introduction of additional attenuation functions a relatively minor task.

In a comparison with the recent Little Skull Mountain earthquake accelerations, average-peak-horizontal accelerations over 0.1 g, from stations 1 and 2, are better predicted by the Campbell hard-rock curves than they are by the other curves investigated. More distant lower acceleration values were sometimes underestimated by Campbell's curves. Joyner and Boore's (1981) curves predicted peak horizontal accelerations at stations 1 and 2 well, when distance to the rupture surface is used. Accelerations at stations 4, 5 and 8 are overestimated and accelerations at stations 3, 12, 14, 19 and 20 are underestimated. About an equal number of accelerations were overestimated as underestimated.

Observed Little Skull Mountain earthquake accelerations are conservatively represented by the Campbell (1987) curves except for one station (Beatty) when near field stations are excluded or Campbell's (1987) definition of distance is adhered to precisely. The Joyner and Boore curve fit to the data is more conservative for distant stations. The best fit for all data greater than 0.1g is obtained with the Schnabel and Seed (1973) curves when epicentral distance is assumed. These differences in prediction accuracy appear more related to the definitions for "distance" and "peak accelerations" used by these authors than by the shape of the curves.

Formulae for converting earthquakes to equivalent fault displacements are recommended as a means of using SEISM 1 to analyze fault displacement probabilities and hazard for a specified areas. Additional work on these concepts is considered advisable to automate this process. Future efforts to develop an improved user interface for SEISM 1 are recommended. As a part of that effort, fault-displacement earthquake equivalence formulae may be incorporated in a more formal and more easily used manner.

Faults near a facility that are considered to be active, should be modeled for their acceleration generating potential. Values for the near-field cannot be reliably determined from empirical attenuation functions. There are likely to be inexplicable extreme values in any collection of strong motion records near the source of an earthquake. Causes may be multiple fault sources, focusing or station proximity to a rupturing asperity. Further study of the site geology and source function of the earthquake may explain the extreme value for station 3 but we are unlikely to be able to predict all future such values. Consequently, a conservative estimate of near field accelerations is recommended.

7 REFERENCES

Arabasz, W.J., J.C. Pechmannn, and E.D. Brown. 1992. Observational seismology and the evaluation of earthquake hazards and risk in the Wasatch Front area, Utah. *Assessment of Regional Earthquake Hazards and Risk Along the Wasatch Front, Utah.* P.L. Gori and W.W. Hays, eds. U.S. Geological Survey (USGS) Professional Paper 1500-A-J D-1 - D-36.

ASCE. 1991. *ASCE Design Guideline - Definition of Design Loads* (Description of methods to develop earthquake and fault displacement inputs to the design of a high level nuclear waste repository), a draft unpublished document. New York, NY. American Society of Civil Engineers.

Atkinson, G.M. and D.M. Boore. 1990 Recent trends in ground motion and spectral response relations for North America. *Earthquake Spectra* 6:15-35.

Bernreuter, D.L., J.B. Savy, R.W. Mensing, and D.H. Chung. 1984. *Seismic Hazard Characterization of the Eastern United States: Methodology and Interim Results for Ten Sites.* NUREG/CR-3756. Washington, DC: NRC.

Bernreuter, D.L., J.B. Savy, R.W. Mensing, J.C. Chen, and B.C. Davis. 1985. *Seismic Hazard Characterization of the Eastern United States.* UC/LLNL UCID 2041, V 1 and 2. Livermore, CA: LLNL.

Bernreuter, D.L., J.B. Savy, R.W. Mensing, and J.C. Chen. 1989a. *Seismic hazard characterization of 69 Nuclear Plant Sites East of the Rocky Mountains* NUREG/CR-5250 (UCID-21517) V 6 and 7. Washington DC: NRC.

Bernreuter, D.L., J.B. Savy, and R.W. Mensing. 1989b. *Seismic Hazard Characterization of the Eastern United States: Comparative evaluation of the LLNL (Lawrence Livermore National Laboratory) and EPRI (Electric Power Research Institute) studies.* NUREG/CR-4885 (UCID-20696). Washington DC: NRC.

Bonilla, M.G., R.K. Mark, and J.J. Lienkaemper. 1984. Statistical relations among earthquake magnitude, surface rupture length, surface fault displacement. *Bulletin of the Seismological Society of America (BSSA)* 74:2379-2411.

Boore, D.M. 1983. Stochastic simulation of high-frequency ground motions based on seismological models of the radiated spectra. *BSSA.* 73:1865-1894.

Boore, D.M. and G.M. Atkinson. 1987. Stochastic prediction of ground motion and spectral parameters at hard-rock sites in eastern North America. *BSSA* 77:440-467.

Brune, J.N. 1970. Tectonic stress and the spectra of seismic shear waves. *Journal of Geophysical Research (JGR)* 75-B:4997-5009.

Campbell, K.W. 1980 *Seismic Hazard Analysis for the NTS Spent Reactor Fuel Test Site.* A Terra Corporation Report to LLNL. 64 pages.

Campbell, K. W. 1981. Near Source Attenuation of Peak Horizontal Acceleration. *BSSA* 71:2039-2070.

Campbell, K.W. 1982. A preliminary methodology for the regional zonation of peak ground acceleration. *Proceedings, Third International Microzonation Conference*, Seattle, WA., June 28 -July 1 1:365-376.

Campbell, W.K. 1985 Strong motion attenuation relations: A ten year perspective. *Earthquake Spectra.* 1:365-376

Campbell, K.W. 1987. Predicting strong ground motion in Utah. *Evaluation of Regional and Urban Earthquakes and Risk in Utah, W.W. Hayes and P.L. Gori, eds.* USGS Professional Paper 87-585II, L1-L90. Washington DC: Department of the Interior.

Campbell, K. W.. 1993. Empirical prediction of near-source ground motion from large earthquakes. *Preprint to Proceedings of the International Workshop on Earthquake Hazard and Large Dams in the Himalaya*, New Delhi, India January 15-16, 1993, 17 pages.

Davis, B. C. 1991. *SHC Software and Data Base.* (draft) UCID-XXXX. Livermore, CA: Lawrence Livermore National Laboratory.

dePolo, C.M. and D.B. Slemmons. 1990. Estimation of earthquake size for seismic hazards. *Reviews in Engineering Geology, Volume VIII*:1-28. Boulder Colorado. Geological Society of America.

DOE. 1988. *Site Characterization Plan, Yucca Mountain Site Nevada Research and Development Area.* Washington D.C.. U.S. Department of Energy Office of Civilian Radioactive Waste Management.

EPRI. 1988. *Seismic Hazard Methodology for the Central and Eastern United States.* EPRI NP-4726. Palo Alto, CA: EPRI.

Hanks, T.C. and H. Kanamori. 1979. A moment magnitude scale. *JGR.* 84B:2348-2350

Hanks, T.C., and R.K. McGuire. 1981. The character of high frequency strong ground motion. *BSSA* 71:2071-2075.

Hofmann, R.B. 1974. *Factors in the Specification of Ground Motions for Design Earthquakes in California.* Report No. 3, Miscellaneous Paper S-73-1 series: State-of-the-Art for Assessing Earthquake Hazards in the United States. Vicksburg, MS: U.S. Army Corps of Engineers Waterways Experiment Station.

Hofmann, R. B. 1991. *Probabilistic fault displacement and seismic hazard analysis literature assessment.* CNWRA 91-013 (Rev.1). San Antonio. Center for Nuclear Waste Regulatory Analyses.

Hofmann, R. B. 1992a. *Select Alternative Acceleration attenuation functions for the Basin and Range.* Letter Report to the NRC/DHLWM. San Antonio, TX, SwRI/CNWRA.

Hofmann, R. B. 1992b. *SEISM 1 Code Modifications and Application: Assessment of Needed Effort.* Letter Report to the NRC/DHLWM. San Antonio, TX, SwRI/CNWRA.

Hofmann, R. B. 1992c. *Regulatory Analysis of Probabilistic Fault Displacement and Seismic Hazard Analysis (PFD&SHA).* Letter Report to the NRC/DHLWM. San Antonio, TX, SwRI/CNWRA.

Hofmann, R.B. 1992d. *Assessment of Requirements for Exercising the SEISM Code on Computer Systems Available to the CNWRA.* Letter Report to the NRC/DHLWM. San Antonio, TX, SwRI/CNWRA.

Hofmann, R.B. 1992e. *SEISM 1 Code Modifications and Application: Assessment of Needed Effort.* Letter Report to the NRC/DHLWM. San Antonio, TX, SwRI/CNWRA.

Hofmann, R.B. 1992f. *Selection of Alternative Acceleration Attenuation Functions for the Basin and Range.* Letter Report to the NRC/DHLWM. San Antonio, TX, SwRI/CNWRA.

Hough, S.E. and J.G. Anderson. 1989. Attenuation in western Nevada: Preliminary results from earthquake and explosion sources. *Geophysical Research Letters* 16:207-210.

Joyner, W.B., and D.M. Boore. 1981. Peak horizontal accelerations and velocity from strong motion records including records from the 1979 Imperial Valley Earthquake. *BSSA* 71:2011-2038.

Kanamori, H. 1983. Magnitude scale and quantification of earthquakes. *Tectonophysics* 93:185-199

Kanamori, H. and D.L. Anderson. 1975. Theoretical basis of some empirical relations in seismology. *BSSA 65:1073-1095.*

Keiles-Borok, V.I. 1957. On the estimation of the Displacement in an earthquake source and of source dimensions. *Annali de Geophysica* 12:205-214.

Lum, P.K. and K.K. Honda. 1993. *Processed Seismic Motion Records from Little Skull Mountain, Nevada Earthquake of June 29, 1992 Recorded at Stations in Southern Nevada.* URS/John A. Blume & Associates, Engineers Report JAB-10733-TM6, UC-703 for the USDOE. San Francisco. URS/John A Blume & Associates, Engineers.

McGarr, A. 1984. Some applications of seismic source mechanism studies to assessing underground hazard. *Proceedings of the 1st International Congress on Rockbursts and Seismicity in Mines.* N.C. Gay and E.H. Wainwright, eds. Johannesburg 1082, South African Institute of Mines and Metallurgy (SAIMM):99-208.

McGuire, R.K. 1990. *Demonstration of a Risk-Based Approach to High-Level Waste Repository Evaluation.* EPRI NP-7057. Palo Alto, CA: EPRI.

McGuire, R.K., G.R. Toro and W.J. Silva. 1993. *Engineering Model of Earthquake Ground Motion for Eastern North America.* EPRI NP-6074. Palo Alto, CA: EPRI.

Morrison, P.W., R.B. Hofmann, and J.E. Wolfe. 1966. Parkfield earthquakes. *Earthquake Notes* 27:3-12.

Pucaru, G. and H. Berkhammer. 1978. A magnitude scale for very large earthquakes. *Tectonophysics* 49:189-198.

Rogers, A.M., S.C. Harmeson, and M.E. Meremonte. 1987. *Evaluation of the Seismicity of the Southern Great Basin and its Relationship to the Tectonic Framework of the Region.* USGS Open File Report 87-408. Denver, Colorado. U.S. Department of Interior, U.S. Geological Survey.

Rogers A.M., D.M. Perkins, F.A. McKeown. 1977. Preliminary Assessment of Seismic Hazard at the Nevada Test Site. *BSSA* 77:1587-1606.

Ryall, A.S. and J.D. VanWormer. 1980. Estimation of maximum magnitude and recommended seismic zone changes in the western Great Basin. *BSSA* 70:1573-1581.

Schnabel, P.B., and H.B. Seed. 1973. Acceleration of rock for earthquakes in the Western United States. *BSSA* 63:501-516.

Seed, H.B. and I.M. Idriss. 1969 Influence of soil conditions on ground motions during earthquakes. *Journal of Soil Mechanics and Foundations Division, Proceedings, American Society of Civil Engineers (ASCE).*

Slemmons, D.B. 1977. *Faults and Earthquake Magnitude.* Report No. 6 in the Miscellaneous Paper S-73-1 series: State-of-the Art for Assessing Earthquake Hazards in the United States. Vicksburg, MS: U.S. Army Corps of Engineers Waterways Experiment Station.

Smith, K.D., A.F. Sheehan, M.K. Savage, D. dePolo, J.N. Brune and J.G. Anderson. 1993. Aftershocks of the June 29, 1992 M_L 5.6 Little Skull Mountain earthquake (Abstract). *Seismological research Letters* 64:22

Sommerville, M.R., R.C. Lee, and G.N. Owen. 1987. *Technical Basis and Parametric Study of Ground Motion and Surface Rupture Hazard Evaluations at Yucca Mountain, Nevada.* URS/John A. Blume Assoc. report to SNL. SAND86-7013. Albuquerque, NM: SNL.

Stark, C. L. and W. J. Silva. 1992. Assessment of stress drops of normal-faulting earthquakes in the Basin and Range Province (Abstract). *Seismological Research Letters* 63: 39.

Suzuki, S. and A.S. Kiremidjian. 1991. A random slip rate model for earthquake occurrences with Bayesian parameters. *BSSA* 81:781-795

Toro, G.R. and R.K. McGuire. 1987. An investigation into earthquake ground motion characteristics in eastern North America. *BSSA* 77:468-589.

Toro, G.R., W.J. Silva, R.K. McGuire and R.B. Herrmann. 1992. Probabilistic seismic hazard mapping of the Mississippi embayment. *Seismological Research Letters* 63:449-475.

University of Nevada at Reno (UNV/R) and USGS. 1992. *Summary of Findings on the Little Skull Mountain Earthquake of June 29th, 1992.* Reno, Nevada. University of Nevada at Reno.

University of Nevada at Reno (UNV/R) and U.S. Geological Survey, Branch of Geological Risk Assessment, Golden Colorado (USGS/Golden). 1992. *The Little Skull Mountain Earthquake of June 29, 1992.* Letter Report of August 11, 1992 to the U.S. Department of Energy (USDOE), Reno, NV. University of Nevada.

VanWormer, J.D. and A.S. Ryall. 1980. Sierra Nevada-Great Basin boundary zone: Earthquake Hazard related to structure, active tectonic processes, and anomalous patterns of earthquake occurrence. *BSSA* 70:1472-1557

Walter, W. R. 1993. Source parameters of the June 29, 1992 Little Skull Mountain Earthquake from complete regional waveforms at a single station. *Geophysical Research Letters* 20:403-406. *BSSA* 57:857-874.

Wyss, M. 1979. Estimating maximum expectable magnitude of earthquakes from fault dimensions. *Geology* 7:336-340.

APPENDIX A

PRINTOUTS OF OLD AND NEW USMAP FILES

NEW FILE: USMAP

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digitized contours of us map.
digitized s  2/16/93  10:10:24
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OLD fILE: USMAP

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digitized s 10/22/82  10:10:24
acceptance band (in bits) =  2
x y savy
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1.27037e+01 9.741879e+00
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APPENDIX B

PRINTOUTS OF OLD AND NEW ELTXYLG FILES

OLD FILE: ELTXYLG

1	88.	58.	13.966	17.383	14.213	17.419	14.140	17.879	13.907	17.851
2	90.	58.	13.721	17.360	13.966	17.383	13.904	17.857	13.674	17.820
3	92.	58.	13.476	17.339	13.721	17.360	13.674	17.820	13.445	17.805
4	94.	58.	13.228	17.325	13.476	17.339	13.443	17.805	13.209	17.796
5	96.	58.	12.984	17.321	13.228	17.325	13.210	17.797	12.983	17.796
6	98.	58.	12.729	17.323	12.984	17.321	12.981	17.790	12.740	17.788
7	100.	58.	12.476	17.327	12.729	17.323	12.743	17.788	12.500	17.799
8	102.	58.	12.228	17.347	12.476	17.327	12.501	17.791	12.269	17.806
9	104.	58.	11.988	17.370	12.228	17.347	12.268	17.807	12.033	17.826
10	106.	58.	11.747	17.401	11.988	17.370	12.037	17.828	11.803	17.859
11	108.	58.	11.505	17.433	11.747	17.401	11.807	17.855	11.580	17.887
12	74.	56.	15.830	17.315	16.083	17.404	15.918	17.852	15.681	17.764
13	76.	56.	15.572	17.233	15.830	17.315	15.682	17.764	15.436	17.689
14	78.	56.	15.314	17.164	15.572	17.233	15.437	17.688	15.196	17.620
15	80.	56.	15.060	17.100	15.314	17.164	15.192	17.620	14.950	17.555
16	82.	56.	14.802	17.045	15.060	17.100	14.948	17.554	14.702	17.504
17	84.	56.	14.539	16.997	14.802	17.045	14.703	17.499	14.455	17.457
18	86.	56.	14.281	16.956	14.539	16.997	14.455	17.456	14.213	17.419
19	88.	56.	14.021	16.922	14.281	16.956	14.213	17.419	13.966	17.383
20	90.	56.	13.764	16.896	14.021	16.922	13.966	17.383	13.721	17.360
21	92.	56.	13.505	16.877	13.764	16.896	13.721	17.360	13.476	17.339
22	94.	56.	13.242	16.869	13.505	16.877	13.476	17.339	13.228	17.325
23	96.	56.	12.982	16.868	13.242	16.869	13.228	17.325	12.984	17.321
24	98.	56.	12.718	16.866	12.982	16.868	12.984	17.321	12.729	17.323
25	100.	56.	12.451	16.872	12.718	16.866	12.729	17.323	12.476	17.327
26	102.	56.	12.194	16.891	12.451	16.872	12.476	17.327	12.228	17.347
27	104.	56.	11.939	16.913	12.194	16.891	12.228	17.347	11.988	17.370
28	106.	56.	11.683	16.943	11.939	16.913	11.988	17.370	11.747	17.401
29	108.	56.	11.427	16.981	11.683	16.943	11.747	17.401	11.505	17.433
30	110.	56.	11.172	17.027	11.427	16.981	11.505	17.433	11.262	17.477
31	112.	56.	10.919	17.081	11.172	17.027	11.262	17.477	11.021	17.530
32	114.	56.	10.665	17.143	10.919	17.081	11.021	17.530	10.783	17.589
33	116.	56.	10.414	17.209	10.665	17.143	10.783	17.589	10.543	17.656
34	58.	54.	18.108	17.785	18.407	17.906	18.122	18.367	17.866	18.231
35	60.	54.	17.844	17.636	18.108	17.785	17.866	18.231	17.610	18.082
36	62.	54.	17.579	17.502	17.844	17.636	17.610	18.082	17.354	17.954
37	64.	54.	17.315	17.372	17.579	17.502	17.354	17.954	17.099	17.828
38	66.	54.	17.049	17.253	17.315	17.372	17.098	17.818	16.842	17.706
39	68.	54.	16.783	17.142	17.049	17.253	16.842	17.706	16.590	17.593
40	70.	54.	16.515	17.038	16.783	17.142	16.590	17.594	16.335	17.493
41	72.	54.	16.247	16.944	16.515	17.038	16.337	17.494	16.083	17.404
42	74.	54.	15.978	16.858	16.247	16.944	16.083	17.404	15.830	17.315
43	76.	54.	15.707	16.776	15.978	16.858	15.830	17.315	15.572	17.233
44	78.	54.	15.436	16.705	15.707	16.776	15.572	17.233	15.314	17.164
45	80.	54.	15.166	16.640	15.436	16.705	15.314	17.164	15.060	17.100
46	82.	54.	14.891	16.585	15.166	16.640	15.060	17.100	14.802	17.045
47	84.	54.	14.621	16.535	14.891	16.585	14.802	17.045	14.539	16.997
48	86.	54.	14.348	16.496	14.621	16.535	14.539	16.997	14.281	16.956
49	88.	54.	14.074	16.462	14.348	16.496	14.281	16.956	14.021	16.922
50	90.	54.	13.800	16.437	14.074	16.462	14.021	16.922	13.764	16.896
51	92.	54.	13.530	16.423	13.800	16.437	13.764	16.896	13.505	16.877
52	94.	54.	13.256	16.412	13.530	16.423	13.505	16.877	13.242	16.869

53	96.	54.	12.983	16.405	13.256	16.412	13.242	16.869	12.982	16.868
54	98.	54.	12.707	16.407	12.983	16.405	12.982	16.868	12.718	16.866
55	100.	54.	12.428	16.413	12.707	16.407	12.718	16.866	12.451	16.872
56	102.	54.	12.154	16.433	12.428	16.413	12.451	16.872	12.194	16.891
57	104.	54.	11.887	16.458	12.154	16.433	12.194	16.891	11.939	16.913
58	106.	54.	11.620	16.491	11.887	16.458	11.939	16.913	11.683	16.943
59	108.	54.	11.351	16.531	11.620	16.491	11.683	16.943	11.427	16.981
60	110.	54.	11.081	16.580	11.351	16.531	11.427	16.981	11.172	17.027
61	112.	54.	10.815	16.633	11.081	16.580	11.172	17.027	10.919	17.081
62	114.	54.	10.553	16.695	10.815	16.633	10.919	17.081	10.665	17.143
63	116.	54.	10.288	16.768	10.553	16.695	10.665	17.143	10.414	17.209
64	54.	52.	18.924	17.665	19.207	17.843	19.000	18.230	18.733	18.081
65	56.	52.	18.648	17.492	18.924	17.665	18.733	18.081	18.407	17.906
66	58.	52.	18.369	17.335	18.648	17.492	18.407	17.906	18.108	17.785
67	60.	52.	18.087	17.182	18.369	17.335	18.108	17.785	17.844	17.636
68	62.	52.	17.808	17.044	18.087	17.182	17.844	17.636	17.579	17.502
69	64.	52.	17.529	16.917	17.808	17.044	17.579	17.502	17.315	17.372
70	66.	52.	17.246	16.797	17.529	16.917	17.315	17.372	17.049	17.253
71	68.	52.	16.965	16.684	17.246	16.797	17.049	17.253	16.783	17.142
72	70.	52.	16.681	16.581	16.965	16.684	16.783	17.142	16.515	17.038
73	72.	52.	16.400	16.490	16.681	16.581	16.515	17.038	16.247	16.944
74	74.	52.	16.118	16.401	16.400	16.490	16.247	16.944	15.978	16.858
75	76.	52.	15.831	16.320	16.118	16.401	15.978	16.858	15.707	16.776
76	78.	52.	15.553	16.248	15.831	16.320	15.707	16.776	15.436	16.705
77	80.	52.	15.268	16.182	15.553	16.248	15.436	16.705	15.166	16.640
78	82.	52.	14.982	16.126	15.268	16.182	15.166	16.640	14.891	16.585
79	84.	52.	14.695	16.076	14.982	16.126	14.891	16.585	14.621	16.535
80	86.	52.	14.411	16.036	14.695	16.076	14.621	16.535	14.348	16.496
81	88.	52.	14.127	16.000	14.411	16.036	14.348	16.496	14.074	16.462
82	90.	52.	13.843	15.974	14.127	16.000	14.074	16.462	13.800	16.437
83	92.	52.	13.557	15.959	13.843	15.974	13.800	16.437	13.530	16.423
84	94.	52.	13.269	15.949	13.557	15.959	13.530	16.423	13.256	16.412
85	96.	52.	12.983	15.946	13.269	15.949	13.256	16.412	12.983	16.405
86	98.	52.	12.696	15.949	12.983	15.946	12.983	16.405	12.707	16.407
87	100.	52.	12.408	15.955	12.696	15.949	12.707	16.407	12.428	16.413
88	102.	52.	12.126	15.974	12.408	15.955	12.428	16.413	12.154	16.433
89	104.	52.	11.839	16.005	12.126	15.974	12.154	16.433	11.887	16.458
90	106.	52.	11.556	16.034	11.839	16.005	11.887	16.458	11.620	16.491
91	108.	52.	11.274	16.077	11.556	16.034	11.620	16.491	11.351	16.531
92	110.	52.	10.990	16.130	11.274	16.077	11.351	16.531	11.081	16.580
93	112.	52.	10.713	16.185	10.990	16.130	11.081	16.580	10.815	16.633
94	114.	52.	10.435	16.253	10.713	16.185	10.815	16.633	10.553	16.695
95	116.	52.	10.161	16.324	10.435	16.253	10.553	16.695	10.288	16.768
96	52.	50.	19.503	17.386	19.796	17.591	19.579	17.851	19.207	17.843
97	54.	50.	19.208	17.207	19.503	17.386	19.207	17.843	18.924	17.665
98	56.	50.	18.908	17.036	19.208	17.207	18.924	17.665	18.648	17.492
99	58.	50.	18.617	16.878	18.908	17.036	18.648	17.492	18.369	17.335
100	60.	50.	18.320	16.729	18.617	16.878	18.369	17.335	18.087	17.182
101	62.	50.	18.027	16.594	18.320	16.729	18.087	17.182	17.808	17.044
102	64.	50.	17.731	16.459	18.027	16.594	17.808	17.044	17.529	16.917
103	66.	50.	17.438	16.338	17.731	16.459	17.529	16.917	17.246	16.797
104	68.	50.	17.141	16.229	17.438	16.338	17.246	16.797	16.965	16.684

105	70.	50.	16.845	16.124	17.141	16.229	16.965	16.684	16.681	16.581
106	72.	50.	16.554	16.031	16.845	16.124	16.681	16.581	16.400	16.490
107	74.	50.	16.253	15.940	16.554	16.031	16.400	16.490	16.118	16.401
108	76.	50.	15.961	15.861	16.253	15.940	16.118	16.401	15.831	16.320
109	78.	50.	15.664	15.787	15.961	15.861	15.831	16.320	15.553	16.248
110	80.	50.	15.368	15.722	15.664	15.787	15.553	16.248	15.268	16.182
111	82.	50.	15.067	15.665	15.368	15.722	15.268	16.182	14.982	16.126
112	84.	50.	14.772	15.617	15.067	15.665	14.982	16.126	14.695	16.076
113	86.	50.	14.469	15.576	14.772	15.617	14.695	16.076	14.411	16.036
114	88.	50.	14.173	15.542	14.469	15.576	14.411	16.036	14.127	16.000
115	90.	50.	13.877	15.515	14.173	15.542	14.127	16.000	13.843	15.974
116	92.	50.	13.582	15.498	13.877	15.515	13.843	15.974	13.557	15.959
117	94.	50.	13.280	15.490	13.582	15.498	13.557	15.959	13.269	15.949
118	96.	50.	12.982	15.486	13.280	15.490	13.269	15.949	12.983	15.946
119	98.	50.	12.686	15.489	12.982	15.486	12.983	15.946	12.696	15.949
120	100.	50.	12.383	15.498	12.686	15.489	12.696	15.949	12.408	15.955
121	102.	50.	12.083	15.520	12.383	15.498	12.408	15.955	12.126	15.974
122	104.	50.	11.788	15.548	12.083	15.520	12.126	15.974	11.839	16.005
123	106.	50.	11.492	15.579	11.788	15.548	11.839	16.005	11.556	16.034
124	108.	50.	11.200	15.622	11.492	15.579	11.556	16.034	11.274	16.077
125	110.	50.	10.901	15.677	11.200	15.622	11.274	16.077	10.990	16.130
126	112.	50.	10.611	15.735	10.901	15.677	10.990	16.130	10.713	16.185
127	114.	50.	10.320	15.803	10.611	15.735	10.713	16.185	10.435	16.253
128	116.	50.	10.026	15.881	10.320	15.803	10.435	16.253	10.161	16.324
129	52.	48.	19.790	16.920	19.815	16.935	19.796	17.591	19.503	17.386
130	54.	48.	19.475	16.745	19.790	16.920	19.503	17.386	19.208	17.207
131	56.	48.	19.159	16.574	19.475	16.745	19.208	17.207	18.908	17.036
132	58.	48.	18.854	16.413	19.159	16.574	18.908	17.036	18.617	16.878
133	60.	48.	18.545	16.270	18.854	16.413	18.617	16.878	18.320	16.729
134	62.	48.	18.234	16.130	18.545	16.270	18.320	16.729	18.027	16.594
135	64.	48.	17.925	15.998	18.234	16.130	18.027	16.594	17.731	16.459
136	66.	48.	17.620	15.879	17.925	15.998	17.731	16.459	17.438	16.338
137	68.	48.	17.306	15.767	17.620	15.879	17.438	16.338	17.141	16.229
138	70.	48.	17.001	15.661	17.306	15.767	17.141	16.229	16.845	16.124
139	72.	48.	16.694	15.565	17.001	15.661	16.845	16.124	16.554	16.031
140	74.	48.	16.386	15.479	16.694	15.565	16.554	16.031	16.253	15.940
141	76.	48.	16.078	15.397	16.386	15.479	16.253	15.940	15.961	15.861
142	78.	48.	15.768	15.327	16.078	15.397	15.961	15.861	15.664	15.787
143	80.	48.	15.460	15.261	15.768	15.327	15.664	15.787	15.368	15.722
144	82.	48.	15.151	15.205	15.460	15.261	15.368	15.722	15.067	15.665
145	84.	48.	14.840	15.155	15.151	15.205	15.067	15.665	14.772	15.617
146	86.	48.	14.533	15.113	14.840	15.155	14.772	15.617	14.469	15.576
147	88.	48.	14.224	15.079	14.533	15.113	14.469	15.576	14.173	15.542
148	90.	48.	13.916	15.057	14.224	15.079	14.173	15.542	13.877	15.515
149	92.	48.	13.608	15.037	13.916	15.057	13.877	15.515	13.582	15.498
150	94.	48.	13.296	15.030	13.608	15.037	13.582	15.498	13.280	15.490
151	96.	48.	12.986	15.028	13.296	15.030	13.280	15.490	12.982	15.486
152	98.	48.	12.675	15.031	12.986	15.028	12.982	15.486	12.686	15.489
153	100.	48.	12.359	15.038	12.675	15.031	12.686	15.489	12.383	15.498
154	102.	48.	12.047	15.057	12.359	15.038	12.383	15.498	12.083	15.520
155	104.	48.	11.739	15.087	12.047	15.057	12.083	15.520	11.788	15.548
156	106.	48.	11.430	15.120	11.739	15.087	11.788	15.548	11.492	15.579

157	108.	48.	11.124	15.166	11.4[illegible]	15.120	11.492	15.579	11.200	15.622
158	110.	48.	10.816	15.219	11.124	15.166	11.200	15.622	10.901	15.677
159	112.	48.	10.511	15.279	10.816	15.219	10.901	15.677	10.611	15.735
160	114.	48.	10.206	15.350	10.511	15.279	10.611	15.735	10.320	15.803
161	116.	48.	9.907	15.429	10.206	15.350	10.320	15.803	10.026	15.881
162	54.	46.	19.730	16.278	19.828	16.327	19.790	16.920	19.475	16.745
163	56.	46.	19.401	16.114	19.730	16.278	19.475	16.745	19.159	16.574
164	58.	46.	19.080	15.955	19.401	16.114	19.159	16.574	18.854	16.413
165	60.	46.	18.753	15.806	19.080	15.955	18.854	16.413	18.545	16.270
166	62.	46.	18.436	15.668	18.753	15.806	18.545	16.270	18.234	16.130
167	64.	46.	18.115	15.534	18.436	15.668	18.234	16.130	17.925	15.998
168	66.	46.	17.792	15.415	18.115	15.534	17.925	15.998	17.620	15.879
169	68.	46.	17.467	15.303	17.792	15.415	17.620	15.879	17.306	15.767
170	70.	46.	17.151	15.197	17.4[illegible]7	15.303	17.306	15.767	17.001	15.661
171	72.	46.	16.835	15.113	17.[illegible]	15.197	17.001	15.661	16.694	15.565
172	74.	46.	16.517	15.027	16.[illegible]	15.113	16.694	15.565	16.386	15.479
173	76.	46.	16.198	14.944	16.[illegible]7	15.027	16.386	15.479	16.078	15.397
174	78.	46.	15.878	14.875	16.198	14.944	16.078	15.397	15.768	15.327
175	80.	46.	15.555	14.809	15.878	14.875	15.768	15.327	15.460	15.261
176	82.	46.	15.236	14.751	15.555	14.809	15.460	15.261	15.151	15.205
177	84.	46.	14.915	14.702	15.236	14.751	15.151	15.205	14.840	15.155
178	86.	46.	14.594	14.659	14.915	14.702	14.840	15.155	14.533	15.113
179	88.	46.	14.272	14.627	14.594	14.659	14.533	15.113	14.224	15.079
180	90.	46.	13.952	14.599	14.272	14.627	14.224	15.079	13.916	15.057
181	92.	46.	13.630	14.581	13.952	14.599	13.916	15.057	13.608	15.037
182	94.	46.	13.310	14.570	13.630	14.581	13.608	15.037	13.296	15.030
183	96.	46.	12.988	14.569	13.310	14.570	13.296	15.030	12.986	15.028
184	98.	46.	12.664	14.575	12.988	14.569	12.986	15.028	12.675	15.031
185	100.	46.	12.335	14.588	12.664	14.575	12.675	15.031	12.359	15.038
186	102.	46.	12.012	14.606	12.335	14.588	12.359	15.038	12.047	15.057
187	104.	46.	11.695	14.635	12.012	14.606	12.047	15.057	11.739	15.087
188	106.	46.	11.373	14.673	11.695	14.635	11.739	15.087	11.430	15.120
189	108.	46.	11.053	14.719	11.373	14.673	11.430	15.120	11.124	15.166
190	110.	46.	10.732	14.776	11.053	14.719	11.124	15.166	10.816	15.219
191	112.	46.	10.413	14.838	10.732	14.776	10.816	15.219	10.511	15.279
192	114.	46.	10.097	14.907	10.413	14.838	10.511	15.279	10.206	15.350
193	54.	44.	19.831	16.076	19.830	16.216	19.828	16.327	19.730	16.278
194	56.	44.	19.637	15.642	19.841	15.743	19.730	16.278	19.401	16.114
195	58.	44.	19.299	15.487	19.637	15.642	19.401	16.114	19.080	15.955
196	60.	44.	18.962	15.341	19.299	15.487	19.080	15.955	18.753	15.806
197	62.	44.	18.635	15.200	18.962	15.341	18.753	15.806	18.436	15.668
198	64.	44.	18.299	15.082	18.635	15.200	18.436	15.668	18.115	15.534
199	66.	44.	17.964	14.962	18.299	15.082	18.115	15.534	17.792	15.415
200	68.	44.	17.630	14.850	17.964	14.962	17.792	15.415	17.467	15.303
201	70.	44.	17.300	14.747	17.630	14.850	17.467	15.303	17.151	15.197
202	72.	44.	16.970	14.652	17.300	14.747	17.151	15.197	16.835	15.113
203	74.	44.	16.639	14.564	16.970	14.652	16.835	15.113	16.517	15.027
204	76.	44.	16.308	14.483	16.639	14.564	16.517	15.027	16.198	14.944
205	78.	44.	15.977	14.414	16.308	14.483	16.198	14.944	15.878	14.875
206	80.	44.	15.645	14.348	15.977	14.414	15.878	14.875	15.555	14.809
207	82.	44.	15.313	14.292	15.645	14.348	15.555	14.809	15.236	14.751
208	84.	44.	14.981	14.242	15.313	14.292	15.236	14.751	14.915	14.702

209	86.	44.	14.647	14.202	14.981	14.242	14.915	14.702	14.594	14.659
210	88.	44.	14.315	14.166	14.647	14.202	14.594	14.659	14.272	14.627
211	90.	44.	13.985	14.140	14.315	14.166	14.272	14.627	13.952	14.599
212	92.	44.	13.652	14.120	13.985	14.140	13.952	14.599	13.630	14.581
213	94.	44.	13.321	14.108	13.652	14.120	13.630	14.581	13.310	14.570
214	96.	44.	12.991	14.107	13.321	14.108	13.310	14.570	12.988	14.569
215	98.	44.	12.655	14.114	12.991	14.107	12.988	14.569	12.664	14.575
216	100.	44.	12.313	14.122	12.655	14.114	12.664	14.575	12.335	14.588
217	102.	44.	11.978	14.143	12.313	14.122	12.335	14.588	12.012	14.606
218	104.	44.	11.646	14.174	11.978	14.143	12.012	14.606	11.695	14.635
219	106.	44.	11.314	14.214	11.646	14.174	11.695	14.635	11.373	14.673
220	108.	44.	10.981	14.257	11.314	14.214	11.373	14.673	11.053	14.719
221	110.	44.	10.648	14.316	10.981	14.257	11.053	14.719	10.732	14.776
222	112.	44.	10.319	14.384	10.648	14.316	10.732	14.776	10.413	14.838
223	114.	44.	9.987	14.461	10.319	14.384	10.413	14.838	10.097	14.907
224	58.	42.	19.513	15.024	19.859	15.175	19.637	15.642	19.299	15.487
225	60.	42.	19.165	14.883	19.513	15.024	19.299	15.487	18.962	15.341
226	62.	42.	18.816	14.745	19.165	14.883	18.962	15.341	18.635	15.200
227	64.	42.	18.471	14.617	18.816	14.745	18.635	15.200	18.299	15.082
228	66.	42.	18.130	14.498	18.471	14.617	18.299	15.082	17.964	14.962
229	68.	42.	17.789	14.387	18.130	14.498	17.964	14.962	17.630	14.850
230	70.	42.	17.441	14.287	17.789	14.387	17.630	14.850	17.300	14.747
231	72.	42.	17.100	14.190	17.441	14.287	17.300	14.747	16.970	14.652
232	74.	42.	16.758	14.108	17.100	14.190	16.970	14.652	16.639	14.564
233	76.	42.	16.415	14.029	16.758	14.108	16.639	14.564	16.308	14.483
234	78.	42.	16.072	13.956	16.415	14.029	16.308	14.483	15.977	14.414
235	80.	42.	15.728	13.892	16.072	13.956	15.977	14.414	15.645	14.348
236	82.	42.	15.390	13.832	15.728	13.892	15.645	14.348	15.313	14.292
237	84.	42.	15.047	13.783	15.390	13.832	15.313	14.292	14.981	14.242
238	86.	42.	14.705	13.740	15.047	13.783	14.981	14.242	14.647	14.202
239	88.	42.	14.360	13.705	14.705	13.740	14.647	14.202	14.315	14.166
240	90.	42.	14.019	13.678	14.360	13.705	14.315	14.166	13.985	14.140
241	92.	42.	13.677	13.658	14.019	13.678	13.985	14.140	13.652	14.120
242	94.	42.	13.332	13.646	13.677	13.658	13.652	14.120	13.321	14.108
243	96.	42.	12.989	13.645	13.332	13.646	13.321	14.108	12.991	14.107
244	98.	42.	12.644	13.652	12.989	13.645	12.991	14.107	12.655	14.114
245	100.	42.	12.291	13.663	12.644	13.652	12.655	14.114	12.313	14.122
246	102.	42.	11.947	13.685	12.291	13.663	12.313	14.122	11.978	14.143
247	104.	42.	11.600	13.716	11.947	13.685	11.978	14.143	11.646	14.174
248	106.	42.	11.257	13.754	11.600	13.716	11.646	14.174	11.314	14.214
249	108.	42.	10.912	13.801	11.257	13.754	11.314	14.214	10.981	14.257
250	110.	42.	10.570	13.856	10.912	13.801	10.981	14.257	10.648	14.316
251	112.	42.	10.223	13.922	10.570	13.856	10.648	14.316	10.319	14.384
252	60.	40.	19.350	14.412	19.706	14.560	19.513	15.024	19.165	14.883
253	62.	40.	18.992	14.279	19.350	14.412	19.165	14.883	18.816	14.745
254	64.	40.	18.635	14.154	18.992	14.279	18.816	14.745	18.471	14.617
255	66.	40.	18.282	14.039	18.635	14.154	18.471	14.617	18.130	14.498
256	68.	40.	17.928	13.932	18.282	14.039	18.130	14.498	17.789	14.387
257	70.	40.	17.576	13.831	17.928	13.932	17.789	14.387	17.441	14.287
258	72.	40.	17.223	13.734	17.576	13.831	17.441	14.287	17.100	14.190
259	74.	40.	16.872	13.651	17.223	13.734	17.100	14.190	16.758	14.108
260	76.	40.	16.522	13.570	16.872	13.651	16.758	14.108	16.415	14.029

261	78.	40.	16.170	13.498	16.522	13.570	16.415	14.029	16.072	13.95
262	80.	40.	15.814	13.434	16.170	13.498	16.072	13.956	15.728	13.89
263	82.	40.	15.463	13.375	15.814	13.434	15.728	13.892	15.390	13.83
264	84.	40.	15.111	13.326	15.463	13.375	15.390	13.832	15.047	13.78
265	86.	40.	14.760	13.282	15.111	13.326	15.047	13.783	14.705	13.74
266	88.	40.	14.405	13.244	14.760	13.282	14.705	13.740	14.360	13.70
267	90.	40.	14.054	13.217	14.405	13.244	14.360	13.705	14.019	13.67
268	92.	40.	13.703	13.196	14.054	13.217	14.019	13.678	13.677	13.65
269	94.	40.	13.347	13.188	13.703	13.196	13.677	13.658	13.332	13.64
270	96.	40.	12.992	13.185	13.347	13.188	13.332	13.646	12.989	13.64
271	98.	40.	12.635	13.190	12.992	13.185	12.989	13.645	12.644	13.65
272	100.	40.	12.271	13.202	12.635	13.190	12.644	13.652	12.291	13.66
273	102.	40.	11.912	13.220	12.271	13.202	12.291	13.663	11.947	13.68
274	104.	40.	11.555	13.251	11.912	13.220	11.947	13.685	11.600	13.71
275	106.	40.	11.200	13.292	11.555	13.251	11.600	13.716	11.257	13.75
276	108.	40.	10.861	13.454	11.200	13.292	11.257	13.754	10.912	13.80
277	110.	40.	10.483	13.397	10.861	13.454	10.912	13.801	10.570	13.85
278	112.	40.	10.125	13.465	10.483	13.397	10.570	13.856	10.223	13.92
279	62.	38.	19.154	13.826	19.522	13.957	19.350	14.412	18.992	14.27
280	64.	38.	18.791	13.703	19.154	13.826	18.992	14.279	18.635	14.15
281	66.	38.	18.433	13.586	18.791	13.703	18.635	14.154	18.282	14.03
282	68.	38.	18.069	13.471	18.433	13.586	18.282	14.039	17.928	13.93
283	70.	38.	17.707	13.370	18.069	13.471	17.928	13.932	17.576	13.83
284	72.	38.	17.346	13.276	17.707	13.370	17.576	13.831	17.223	13.73
285	74.	38.	16.984	13.190	17.346	13.276	17.223	13.734	16.872	13.65
286	76.	38.	16.623	13.111	16.984	13.190	16.872	13.651	16.522	13.57
287	78.	38.	16.261	13.038	16.623	13.111	16.522	13.570	16.170	13.49
288	80.	38.	15.901	12.972	16.261	13.038	16.170	13.498	15.814	13.43
289	82.	38.	15.537	12.917	15.901	12.972	15.814	13.434	15.463	13.37
290	84.	38.	15.176	12.866	15.537	12.917	15.463	13.375	15.111	13.32
291	86.	38.	14.814	12.823	15.176	12.866	15.111	13.326	14.760	13.28
292	88.	38.	14.449	12.786	14.814	12.823	14.760	13.282	14.405	13.24
293	90.	38.	14.087	12.756	14.449	12.786	14.405	13.244	14.054	13.21
294	92.	38.	13.726	12.736	14.087	12.756	14.054	13.217	13.703	13.19
295	94.	38.	13.360	12.724	13.726	12.736	13.703	13.196	13.347	13.18
296	96.	38.	12.996	12.722	13.360	12.724	13.347	13.188	12.992	13.18
297	98.	38.	12.626	12.729	12.996	12.722	12.992	13.185	12.635	13.19
298	100.	38.	12.249	12.736	12.626	12.729	12.635	13.190	12.271	13.20
299	102.	38.	11.884	12.757	12.249	12.736	12.271	13.202	11.912	13.22
300	104.	38.	11.513	12.791	11.884	12.757	11.912	13.220	11.555	13.25
301	106.	38.	11.148	12.825	11.513	12.791	11.555	13.251	11.200	13.29
302	108.	38.	10.780	12.875	11.148	12.825	11.200	13.292	10.861	13.45
303	110.	38.	10.411	12.931	10.780	12.875	10.861	13.454	10.483	13.39
304	112.	38.	10.042	12.996	10.411	12.931	10.483	13.397	10.125	13.46
305	62.	36.	19.313	13.356	19.693	13.489	19.522	13.957	19.154	13.82
306	64.	36.	18.943	13.237	19.313	13.358	19.154	13.826	18.791	13.70
307	66.	36.	18.576	13.125	18.943	13.235	18.791	13.703	18.433	13.58
308	68.	36.	18.200	13.010	18.576	13.125	18.433	13.586	18.069	13.47
309	70.	36.	17.831	12.911	18.200	13.010	18.069	13.471	17.707	13.37
310	72.	36.	17.463	12.819	17.831	12.911	17.707	13.370	17.346	13.27
311	74.	36.	17.092	12.731	17.463	12.819	17.346	13.276	16.984	13.19
312	76.	36.	16.723	12.651	17.092	12.731	16.984	13.190	16.623	13.11

313	78.	36.	16.351	12.581	16.723	12.651	16.623	13.111	16.261	13.038
314	80.	36.	15.980	12.514	16.351	12.581	16.261	13.038	15.901	12.972
315	82.	36.	15.608	12.458	15.980	12.514	15.901	12.972	15.537	12.917
316	84.	36.	15.237	12.409	15.608	12.458	15.537	12.917	15.176	12.866
317	86.	36.	14.868	12.367	15.237	12.409	15.176	12.866	14.814	12.823
318	88.	36.	14.496	12.329	14.868	12.367	14.814	12.823	14.449	12.786
319	90.	36.	14.122	12.297	14.496	12.329	14.449	12.786	14.087	12.756
320	92.	36.	13.748	12.274	14.122	12.297	14.087	12.756	13.726	12.736
321	94.	36.	13.373	12.263	13.748	12.274	13.726	12.736	13.360	12.724
322	96.	36.	12.998	12.259	13.373	12.263	13.360	12.724	12.996	12.722
323	98.	36.	12.619	12.263	12.998	12.259	12.996	12.722	12.626	12.729
324	100.	36.	12.232	12.272	12.619	12.263	12.626	12.729	12.249	12.736
325	102.	36.	11.853	12.291	12.232	12.272	12.249	12.736	11.884	12.757
326	104.	36.	11.474	12.322	11.853	12.291	11.884	12.757	11.513	12.791
327	106.	36.	11.098	12.360	11.474	12.322	11.513	12.791	11.148	12.825
328	108.	36.	10.717	12.405	11.098	12.360	11.148	12.825	10.780	12.875
329	110.	36.	10.338	12.465	10.717	12.405	10.780	12.875	10.411	12.931
330	112.	36.	9.954	12.531	10.338	12.465	10.411	12.931	10.042	12.996
331	68.	34.	18.326	12.556	18.707	12.658	18.576	13.125	18.200	13.010
332	70.	34.	17.951	12.453	18.326	12.556	18.200	13.010	17.831	12.911
333	72.	34.	17.572	12.360	17.951	12.453	17.831	12.911	17.463	12.819
334	74.	34.	17.196	12.274	17.572	12.360	17.463	12.819	17.092	12.731
335	76.	34.	16.817	12.192	17.196	12.274	17.092	12.731	16.723	12.651
336	78.	34.	16.437	12.122	16.817	12.192	16.723	12.651	16.351	12.581
337	80.	34.	16.058	12.054	16.437	12.122	16.351	12.581	15.980	12.514
338	82.	34.	15.679	11.999	16.058	12.054	15.980	12.514	15.608	12.458
339	84.	34.	15.300	11.948	15.679	11.999	15.608	12.458	15.237	12.409
340	86.	34.	14.919	11.904	15.300	11.948	15.237	12.409	14.868	12.367
341	88.	34.	14.537	11.866	14.919	11.904	14.868	12.367	14.496	12.329
342	90.	34.	14.152	11.838	14.537	11.866	14.496	12.329	14.122	12.297
343	92.	34.	13.769	11.815	14.152	11.838	14.122	12.297	13.748	12.274
344	94.	34.	13.385	11.802	13.769	11.815	13.748	12.274	13.373	12.263
345	96.	34.	13.000	11.797	13.385	11.802	13.373	12.263	12.998	12.259
346	98.	34.	12.611	11.797	13.000	11.797	12.998	12.259	12.619	12.263
347	100.	34.	12.214	11.808	12.611	11.797	12.619	12.263	12.232	12.272
348	102.	34.	11.826	11.825	12.214	11.808	12.232	12.272	11.853	12.291
349	104.	34.	11.437	11.853	11.826	11.825	11.853	12.291	11.474	12.322
350	106.	34.	11.049	11.892	11.437	11.853	11.474	12.322	11.098	12.360
351	108.	34.	10.656	11.936	11.049	11.892	11.098	12.360	10.717	12.405
352	110.	34.	10.264	11.993	10.656	11.936	10.717	12.405	10.338	12.465
353	68.	32.	18.455	12.091	18.845	12.197	18.707	12.658	18.326	12.556
354	70.	32.	18.069	11.992	18.455	12.091	18.326	12.556	17.951	12.453
355	72.	32.	17.683	11.903	18.069	11.992	17.951	12.453	17.572	12.360
356	74.	32.	17.301	11.817	17.683	11.903	17.572	12.360	17.196	12.274
357	76.	32.	16.910	11.738	17.301	11.817	17.196	12.274	16.817	12.192
358	78.	32.	16.523	11.666	16.910	11.738	16.817	12.192	16.437	12.122
359	80.	32.	16.133	11.598	16.523	11.666	16.437	12.122	16.058	12.054
360	82.	32.	15.747	11.540	16.133	11.598	16.058	12.054	15.679	11.999
361	84.	32.	15.358	11.490	15.747	11.540	15.679	11.999	15.300	11.948
362	86.	32.	14.970	11.441	15.358	11.490	15.300	11.948	14.919	11.904
363	88.	32.	14.579	11.409	14.970	11.441	14.919	11.904	14.537	11.866
364	90.	32.	14.188	11.376	14.579	11.409	14.537	11.866	14.152	11.838

365	92.	32.	13.794	11.352	14.188	11.376	14.152	11.838	13.769	11.815
366	94.	32.	13.402	11.335	13.794	11.352	13.769	11.815	13.385	11.802
367	96.	32.	13.008	11.329	13.402	11.335	13.385	11.802	13.000	11.797
368	98.	32.	12.609	11.328	13.008	11.329	13.000	11.797	12.611	11.797
369	100.	32.	12.202	11.337	12.609	11.328	12.611	11.797	12.214	11.808
370	102.	32.	11.805	11.357	12.202	11.337	12.214	11.808	11.826	11.825
371	104.	32.	11.405	11.383	11.805	11.357	11.826	11.825	11.437	11.853
372	106.	32.	11.001	11.413	11.405	11.383	11.437	11.853	11.049	11.892
373	108.	32.	10.597	11.463	11.001	11.413	11.049	11.892	10.656	11.936
374	110.	32.	10.196	11.522	10.597	11.463	10.656	11.936	10.264	11.993
375	68.	30.	18.576	11.637	18.976	11.745	18.845	12.197	18.455	12.091
376	70.	30.	18.182	11.536	18.578	11.637	18.455	12.091	18.069	11.992
377	72.	30.	17.789	11.451	18.182	11.536	18.069	11.992	17.683	11.903
378	74.	30.	17.398	11.365	17.789	11.451	17.683	11.903	17.301	11.817
379	76.	30.	17.003	11.284	17.398	11.365	17.301	11.817	16.910	11.738
380	78.	30.	16.607	11.210	17.003	11.284	16.910	11.738	16.523	11.666
381	80.	30.	16.212	11.143	16.607	11.210	16.523	11.666	16.133	11.598
382	82.	30.	15.816	11.083	16.212	11.143	16.133	11.598	15.747	11.540
383	84.	30.	15.419	11.031	15.816	11.083	15.747	11.540	15.358	11.490
384	86.	30.	15.024	10.986	15.419	11.031	15.358	11.490	14.970	11.441
385	88.	30.	14.622	10.946	15.024	10.986	14.970	11.441	14.579	11.409
386	90.	30.	14.224	10.911	14.622	10.946	14.579	11.409	14.188	11.376
387	92.	30.	13.821	10.887	14.224	10.911	14.188	11.376	13.794	11.352
388	94.	30.	13.419	10.871	13.821	10.887	13.794	11.352	13.402	11.335
389	96.	30.	13.014	10.864	13.419	10.871	13.402	11.335	13.008	11.329
390	98.	30.	12.607	10.861	13.014	10.864	13.008	11.329	12.609	11.328
391	100.	30.	12.191	10.869	12.607	10.861	12.609	11.328	12.202	11.337
392	102.	30.	11.782	10.887	12.191	10.869	12.202	11.337	11.805	11.357
393	104.	30.	11.372	10.914	11.782	10.887	11.805	11.357	11.405	11.383
394	106.	30.	10.960	10.947	11.372	10.914	11.405	11.383	11.001	11.413
395	108.	30.	10.547	10.992	10.960	10.947	11.001	11.413	10.597	11.463
396	110.	30.	10.130	11.047	10.547	10.992	10.597	11.463	10.196	11.522
397	72.	28.	17.891	10.997	18.290	11.092	18.182	11.536	17.789	11.451
398	74.	28.	17.494	10.909	17.891	10.997	17.789	11.451	17.398	11.365
399	76.	28.	17.095	10.830	17.494	10.909	17.398	11.365	17.003	11.284
400	78.	28.	16.691	10.758	17.095	10.830	17.003	11.284	16.607	11.210
401	80.	28.	16.289	10.687	16.691	10.758	16.607	11.210	16.212	11.143
402	82.	28.	15.884	10.626	16.289	10.687	16.212	11.143	15.816	11.083
403	84.	28.	15.480	10.571	15.884	10.626	15.816	11.083	15.419	11.031
404	86.	28.	15.075	10.527	15.480	10.571	15.419	11.031	15.024	10.986
405	88.	28.	14.667	10.486	15.075	10.527	15.024	10.986	14.622	10.946
406	90.	28.	14.257	10.451	14.667	10.486	14.622	10.946	14.224	10.911
407	92.	28.	13.849	10.426	14.257	10.451	14.224	10.911	13.821	10.887
408	94.	28.	13.437	10.404	13.849	10.426	13.821	10.887	13.419	10.871
409	96.	28.	13.024	10.397	13.437	10.404	13.419	10.871	13.014	10.864
410	98.	28.	12.608	10.394	13.024	10.397	13.014	10.864	12.607	10.861
411	100.	28.	12.183	10.397	12.608	10.394	12.607	10.861	12.191	10.869
412	102.	28.	11.766	10.415	12.183	10.397	12.191	10.869	11.782	10.887
413	104.	28.	11.341	10.441	11.766	10.415	11.782	10.887	11.372	10.914
414	106.	28.	10.921	10.472	11.341	10.441	11.372	10.914	10.960	10.947
415	108.	28.	10.494	10.514	10.921	10.472	10.960	10.947	10.547	10.992
416	110.	28.	10.068	10.567	10.494	10.514	10.547	10.992	10.130	11.047

417	72.	26.	17.994	10.547	18.400	10.639	18.290	11.092	17.891	10.997
418	74.	26.	17.589	10.458	17.994	10.547	17.891	10.997	17.494	10.909
419	76.	26.	17.183	10.376	17.589	10.458	17.494	10.909	17.095	10.830
420	78.	26.	16.773	10.299	17.183	10.376	17.095	10.830	16.691	10.758
421	80.	26.	16.363	10.232	16.773	10.299	16.691	10.758	16.289	10.687
422	82.	26.	15.956	10.170	16.363	10.232	16.289	10.687	15.884	10.626
423	84.	26.	15.544	10.115	15.956	10.170	15.884	10.626	15.480	10.571
424	86.	26.	15.130	10.069	15.544	10.115	15.480	10.571	15.075	10.527
425	88.	26.	14.714	10.024	15.130	10.069	15.075	10.527	14.667	10.486
426	90.	26.	14.298	9.988	14.714	10.024	14.667	10.486	14.257	10.451
427	92.	26.	13.879	9.959	14.298	9.988	14.257	10.451	13.849	10.426
428	94.	26.	13.457	9.937	13.879	9.959	13.849	10.426	13.437	10.404
429	96.	26.	13.036	9.929	13.457	9.937	13.437	10.404	13.024	10.397
430	98.	26.	12.610	9.923	13.036	9.929	13.024	10.397	12.608	10.394
431	100.	26.	12.178	9.930	12.610	9.923	12.608	10.394	12.183	10.397
432	102.	26.	11.749	9.942	12.178	9.930	12.183	10.397	11.766	10.415
433	104.	26.	11.319	9.964	11.749	9.942	11.766	10.415	11.341	10.441
434	106.	26.	10.887	9.995	11.319	9.964	11.341	10.441	10.921	10.472
435	108.	26.	10.448	10.034	10.887	9.995	10.921	10.472	10.494	10.514
436	110.	26.	10.012	10.085	10.448	10.034	10.494	10.514	10.068	10.567
437	72.	24.	18.091	10.094	18.502	10.191	18.400	10.639	17.994	10.547
438	74.	24.	17.680	10.011	18.093	10.095	17.994	10.547	17.589	10.458
439	76.	24.	17.272	9.926	17.680	10.012	17.589	10.458	17.183	10.376
440	78.	24.	16.857	9.849	17.268	9.925	17.183	10.376	16.773	10.299
441	80.	24.	16.440	9.779	16.856	9.850	16.773	10.299	16.363	10.232
442	82.	24.	16.019	9.740	16.439	9.779	16.363	10.232	15.956	10.170
443	84.	24.	15.591	9.751	16.017	9.734	15.956	10.170	15.544	10.115
444	86.	24.	15.168	9.743	15.590	9.747	15.544	10.115	15.130	10.069
445	88.	24.	14.738	9.746	15.167	9.751	15.130	10.069	14.714	10.024
446	90.	24.	14.314	9.741	14.740	9.743	14.714	10.024	14.298	9.988
447	92.	24.	13.892	9.737	14.314	9.743	14.298	9.988	13.879	9.959
448	94.	24.	13.469	9.736	13.892	9.739	13.879	9.959	13.457	9.937
449	96.	24.	13.039	9.740	13.467	9.738	13.457	9.937	13.036	9.929
450	98.	24.	12.606	9.742	13.041	9.736	13.036	9.929	12.610	9.923
451	100.	24.	12.177	9.751	12.609	9.739	12.610	9.923	12.178	9.930
452	102.	24.	11.742	9.750	12.177	9.750	12.178	9.930	11.749	9.942
453	104.	24.	11.306	9.746	11.742	9.739	11.749	9.942	11.319	9.964
454	106.	24.	10.868	9.742	11.305	9.740	11.319	9.964	10.887	9.995
455	108.	24.	10.421	9.739	10.868	9.744	10.887	9.995	10.448	10.034
456	110.	24.	9.973	9.747	10.421	9.740	10.448	10.034	10.012	10.085

NEW FILE: ELTXYLG

1	88.	58.	13.836	17.397	14.213	17.419	14.140	17.879	13.907	17.851
2	90.	58.	13.571	17.364	13.836	17.397	13.904	17.857	13.674	17.820
3	92.	58.	13.304	17.339	13.571	17.364	13.674	17.820	13.445	17.805
4	94.	58.	13.037	17.323	13.304	17.339	13.443	17.805	13.209	17.796
5	96.	58.	12.770	17.315	13.037	17.323	13.210	17.797	12.983	17.796
6	98.	58.	12.502	17.315	12.770	17.315	12.981	17.790	12.740	17.788
7	100.	58.	12.235	17.323	12.502	17.315	12.743	17.788	12.500	17.799
8	102.	58.	11.967	17.339	12.235	17.323	12.501	17.791	12.269	17.806
9	104.	58.	11.701	17.364	11.967	17.339	12.268	17.807	12.033	17.826
10	106.	58.	11.435	17.397	11.701	17.364	12.037	17.828	11.803	17.859
11	108.	58.	11.171	17.438	11.435	17.397	11.807	17.855	11.580	17.887
12	110.	58.	10.908	17.487	11.171	17.438	11.256	17.935	11.008	17.981
13	112.	58.	10.646	17.544	10.908	17.487	11.008	17.981	10.762	18.035
14	114.	58.	10.387	17.609	10.646	17.544	10.762	18.035	10.517	18.096
15	116.	58.	10.129	17.682	10.387	17.609	10.517	18.096	10.275	18.165
16	118.	58.	9.874	17.763	10.129	17.682	10.275	18.165	10.034	18.241
17	120.	58.	9.622	17.852	9.874	17.763	10.034	18.241	9.796	18.325
18	122.	58.	9.372	17.948	9.622	17.852	9.796	18.325	9.561	18.416
19	124.	58.	9.125	18.052	9.372	17.948	9.561	18.416	9.329	18.514
20	126.	58.	8.882	18.164	9.125	18.052	9.329	18.514	9.100	18.619
21	128.	58.	8.643	18.283	8.882	18.164	9.100	18.619	8.874	18.731
22	130.	58.	8.407	18.409	8.643	18.283	8.874	18.731	8.652	18.850
23	74.	56.	15.825	17.378	16.083	17.404	15.918	17.852	15.681	17.764
24	76.	56.	15.558	17.285	15.825	17.378	15.682	17.764	15.436	17.689
25	78.	56.	15.288	17.199	15.558	17.285	15.437	17.688	15.196	17.620
26	80.	56.	15.015	17.122	15.288	17.199	15.192	17.620	14.950	17.555
27	82.	56.	14.741	17.053	15.015	17.122	14.948	17.554	14.702	17.504
28	84.	56.	14.464	16.992	14.741	17.053	14.703	17.499	14.455	17.457
29	86.	56.	14.186	16.940	14.464	16.992	14.455	17.456	14.213	17.419
30	88.	56.	13.906	16.897	14.186	16.940	14.213	17.419	13.836	17.397
31	90.	56.	13.625	16.862	13.906	16.897	13.836	17.397	13.571	17.364
32	92.	56.	13.343	16.836	13.625	16.862	13.571	17.364	13.304	17.339
33	94.	56.	13.060	16.819	13.343	16.836	13.304	17.339	13.037	17.323
34	96.	56.	12.777	16.810	13.060	16.819	13.037	17.323	12.770	17.315
35	98.	56.	12.494	16.810	12.777	16.810	12.770	17.315	12.502	17.315
36	100.	56.	12.211	16.819	12.494	16.810	12.502	17.315	12.235	17.323
37	102.	56.	11.929	16.836	12.211	16.819	12.235	17.323	11.967	17.339
38	104.	56.	11.647	16.862	11.929	16.836	11.967	17.339	11.701	17.364
39	106.	56.	11.366	16.897	11.647	16.862	11.701	17.364	11.435	17.397
40	108.	56.	11.086	16.940	11.366	16.897	11.435	17.397	11.171	17.438
41	110.	56.	10.808	16.992	11.086	16.940	11.171	17.438	10.908	17.487
42	112.	56.	10.531	17.053	10.808	16.992	10.908	17.487	10.646	17.544
43	114.	56.	10.256	17.122	10.531	17.053	10.646	17.544	10.387	17.609
44	116.	56.	9.984	17.199	10.256	17.122	10.387	17.609	10.129	17.682
45	118.	56.	9.714	17.285	9.984	17.199	10.129	17.682	9.874	17.763
46	120.	56.	9.447	17.378	9.714	17.285	9.874	17.763	9.622	17.852
47	122.	56.	9.183	17.480	9.447	17.378	9.622	17.852	9.372	17.948
48	124.	56.	8.922	17.591	9.183	17.480	9.372	17.948	9.125	18.052
49	126.	56.	8.665	17.709	8.922	17.591	9.125	18.052	8.882	18.164
50	128.	56.	8.411	17.835	8.665	17.709	8.882	18.164	8.643	18.283
51	130.	56.	8.162	17.968	8.411	17.835	8.643	18.283	8.407	18.409
52	58.	54.	18.118	17.996	18.407	17.906	18.122	18.367	17.866	18.231

53	60.	54.	17.869	17.832	18.118	17.996	17.866	18.231	17.610	18.082
54	62.	54.	17.615	17.675	17.869	17.832	17.610	18.082	17.354	17.954
55	64.	54.	17.356	17.526	17.615	17.675	17.354	17.954	17.099	17.828
56	66.	54.	17.093	17.385	17.356	17.526	17.098	17.818	16.842	17.706
57	68.	54.	16.825	17.252	17.093	17.385	16.842	17.706	16.590	17.593
58	70.	54.	16.554	17.127	16.825	17.252	16.590	17.594	16.335	17.493
59	72.	54.	16.278	17.011	16.554	17.127	16.337	17.494	16.083	17.404
60	74.	54.	16.000	16.904	16.278	17.011	16.083	17.404	15.825	17.378
61	76.	54.	15.718	16.805	16.000	16.904	15.825	17.378	15.558	17.285
62	78.	54.	15.433	16.714	15.718	16.805	15.558	17.285	15.288	17.199
63	80.	54.	15.146	16.633	15.433	16.714	15.288	17.199	15.015	17.122
64	82.	54.	14.856	16.560	15.146	16.633	15.015	17.122	14.741	17.053
65	84.	54.	14.565	16.496	14.856	16.560	14.741	17.053	14.464	16.992
66	86.	54.	14.271	16.441	14.565	16.496	14.464	16.992	14.186	16.940
67	88.	54.	13.976	16.396	14.271	16.441	14.186	16.940	13.906	16.897
68	90.	54.	13.679	16.359	13.976	16.396	13.906	16.897	13.625	16.862
69	92.	54.	13.382	16.332	13.679	16.359	13.625	16.862	13.343	16.836
70	94.	54.	13.084	16.313	13.382	16.332	13.343	16.836	13.060	16.819
71	96.	54.	12.785	16.304	13.084	16.313	13.060	16.819	12.777	16.810
72	98.	54.	12.487	16.304	12.785	16.304	12.777	16.810	12.494	16.810
73	100.	54.	12.188	16.313	12.487	16.304	12.494	16.810	12.211	16.819
74	102.	54.	11.890	16.332	12.188	16.313	12.211	16.819	11.929	16.836
75	104.	54.	11.592	16.359	11.890	16.332	11.929	16.836	11.647	16.862
76	106.	54.	11.296	16.396	11.592	16.359	11.647	16.862	11.366	16.897
77	108.	54.	11.001	16.441	11.296	16.396	11.366	16.897	11.086	16.940
78	110.	54.	10.707	16.496	11.001	16.441	11.086	16.940	10.808	16.992
79	112.	54.	10.415	16.560	10.707	16.496	10.808	16.992	10.531	17.053
80	114.	54.	10.126	16.633	10.415	16.560	10.531	17.053	10.256	17.122
81	116.	54.	9.838	16.714	10.126	16.633	10.256	17.122	9.984	17.199
82	118.	54.	9.554	16.805	9.838	16.714	9.984	17.199	9.714	17.285
83	120.	54.	9.272	16.904	9.554	16.805	9.714	17.285	9.447	17.378
84	122.	54.	8.993	17.011	9.272	16.904	9.447	17.378	9.183	17.480
85	124.	54.	8.718	17.127	8.993	17.011	9.183	17.480	8.922	17.591
86	126.	54.	8.447	17.252	8.718	17.127	8.922	17.591	8.665	17.709
87	128.	54.	8.179	17.385	8.447	17.252	8.665	17.709	8.411	17.835
88	130.	54.	7.916	17.526	8.179	17.385	8.411	17.835	8.162	17.968
89	54.	52.	18.914	17.947	19.207	17.843	19.000	18.230	18.733	18.081
90	56.	52.	18.661	17.758	18.914	17.947	18.733	18.081	18.407	17.906
91	58.	52.	18.405	17.577	18.661	17.758	18.407	17.906	18.118	17.996
92	60.	52.	18.142	17.404	18.405	17.577	18.118	17.996	17.869	17.832
93	62.	52.	17.875	17.238	18.142	17.404	17.869	17.832	17.615	17.675
94	64.	52.	17.603	17.082	17.875	17.238	17.615	17.675	17.356	17.526
95	66.	52.	17.326	16.933	17.603	17.082	17.356	17.526	17.093	17.385
96	68.	52.	17.044	16.793	17.326	16.933	17.093	17.385	16.825	17.252
97	70.	52.	16.758	16.662	17.044	16.793	16.825	17.252	16.554	17.127
98	72.	52.	16.469	16.540	16.758	16.662	16.554	17.127	16.278	17.011
99	74.	52.	16.176	16.427	16.469	16.540	16.278	17.011	16.000	16.904
100	76.	52.	15.879	16.323	16.176	16.427	16.000	16.904	15.718	16.805
101	78.	52.	15.580	16.228	15.879	16.323	15.718	16.805	15.433	16.714
102	80.	52.	15.277	16.142	15.580	16.228	15.433	16.714	15.146	16.633
103	82.	52.	14.972	16.065	15.277	16.142	15.146	16.633	14.856	16.560
104	84.	52.	14.665	15.998	14.972	16.065	14.856	16.560	14.565	16.496

105	86.	52.	14.356	15.941	14.665	15.998	14.565	16.496	14.271	16.441
106	88.	52.	14.046	15.893	14.356	15.941	14.271	16.441	13.976	16.396
107	90.	52.	13.734	15.854	14.046	15.893	13.976	16.396	13.679	16.359
108	92.	52.	13.421	15.825	13.734	15.854	13.679	16.359	13.382	16.332
109	94.	52.	13.107	15.806	13.421	15.825	13.382	16.332	13.084	16.313
110	96.	52.	12.793	15.796	13.107	15.806	13.084	16.313	12.785	16.304
111	98.	52.	12.479	15.796	12.793	15.796	12.785	16.304	12.487	16.304
112	100.	52.	12.165	15.806	12.479	15.796	12.487	16.304	12.188	16.313
113	102.	52.	11.851	15.825	12.165	15.806	12.188	16.313	11.890	16.332
114	104.	52.	11.538	15.854	11.851	15.825	11.890	16.332	11.592	16.359
115	106.	52.	11.226	15.893	11.538	15.854	11.592	16.359	11.296	16.396
116	108.	52.	10.915	15.941	11.226	15.893	11.296	16.396	11.001	16.441
117	110.	52.	10.606	15.998	10.915	15.941	11.001	16.441	10.707	16.496
118	112.	52.	10.299	16.065	10.606	15.998	10.707	16.496	10.415	16.560
119	114.	52.	9.995	16.142	10.299	16.065	10.415	16.560	10.126	16.633
120	116.	52.	9.692	16.228	9.995	16.142	10.126	16.633	9.838	16.714
121	118.	52.	9.393	16.323	9.692	16.228	9.838	16.714	9.554	16.805
122	120.	52.	9.096	16.427	9.393	16.323	9.554	16.805	9.272	16.904
123	122.	52.	8.803	16.540	9.096	16.427	9.272	16.904	8.993	17.011
124	124.	52.	8.513	16.662	8.803	16.540	8.993	17.011	8.718	17.127
125	126.	52.	8.228	16.793	8.513	16.662	8.718	17.127	8.447	17.252
126	128.	52.	7.946	16.933	8.228	16.793	8.447	17.252	8.179	17.385
127	130.	52.	7.669	17.082	7.946	16.933	8.179	17.385	7.916	17.526
128	52.	50.	19.483	17.750	19.796	17.591	19.579	17.851	19.207	17.843
129	54.	50.	19.226	17.544	19.483	17.750	19.207	17.843	18.914	17.947
130	56.	50.	18.962	17.345	19.226	17.544	18.914	17.947	18.661	17.758
131	58.	50.	18.693	17.155	18.962	17.345	18.661	17.758	18.405	17.577
132	60.	50.	18.417	16.973	18.693	17.155	18.405	17.577	18.142	17.404
133	62.	50.	18.136	16.800	18.417	16.973	18.142	17.404	17.875	17.238
134	64.	50.	17.850	16.635	18.136	16.800	17.875	17.238	17.603	17.082
135	66.	50.	17.560	16.480	17.850	16.635	17.603	17.082	17.326	16.933
136	68.	50.	17.264	16.333	17.560	16.480	17.326	16.933	17.044	16.793
137	70.	50.	16.964	16.195	17.264	16.333	17.044	16.793	16.758	16.662
138	72.	50.	16.660	16.067	16.964	16.195	16.758	16.662	16.469	16.540
139	74.	50.	16.352	15.948	16.660	16.067	16.469	16.540	16.176	16.427
140	76.	50.	16.041	15.839	16.352	15.948	16.176	16.427	15.879	16.323
141	78.	50.	15.726	15.739	16.041	15.839	15.879	16.323	15.580	16.228
142	80.	50.	15.409	15.649	15.726	15.739	15.580	16.228	15.277	16.142
143	82.	50.	15.089	15.568	15.409	15.649	15.277	16.142	14.972	16.065
144	84.	50.	14.767	15.498	15.089	15.568	14.972	16.065	14.665	15.998
145	86.	50.	14.442	15.437	14.767	15.498	14.665	15.998	14.356	15.941
146	88.	50.	14.116	15.387	14.442	15.437	14.356	15.941	14.046	15.893
147	90.	50.	13.789	15.346	14.116	15.387	14.046	15.893	13.734	15.854
148	92.	50.	13.460	15.316	13.789	15.346	13.734	15.854	13.421	15.825
149	94.	50.	13.131	15.296	13.460	15.316	13.421	15.825	13.107	15.806
150	96.	50.	12.801	15.286	13.131	15.296	13.107	15.806	12.793	15.796
151	98.	50.	12.471	15.286	12.801	15.286	12.793	15.796	12.479	15.796
152	100.	50.	12.141	15.296	12.471	15.286	12.479	15.796	12.165	15.806
153	102.	50.	11.812	15.316	12.141	15.296	12.165	15.806	11.851	15.825
154	104.	50.	11.483	15.346	11.812	15.316	11.851	15.825	11.538	15.854
155	106.	50.	11.156	15.387	11.483	15.346	11.538	15.854	11.226	15.893
156	108.	50.	10.830	15.437	11.156	15.387	11.226	15.893	10.915	15.941

157	110.	50.	10.505	15.498	10.830	15.437	10.915	15.941	10.606	15.998
158	112.	50.	10.183	15.568	10.505	15.498	10.606	15.998	10.299	16.065
159	114.	50.	9.863	15.649	10.183	15.568	10.299	16.065	9.995	16.142
160	116.	50.	9.545	15.739	9.863	15.649	9.995	16.142	9.692	16.228
161	118.	50.	9.231	15.839	9.545	15.739	9.692	16.228	9.393	16.323
162	120.	50.	8.919	15.948	9.231	15.839	9.393	16.323	9.096	16.427
163	122.	50.	8.612	16.067	8.919	15.948	9.096	16.427	8.803	16.540
164	124.	50.	8.308	16.195	8.612	16.067	8.803	16.540	8.513	16.662
165	126.	50.	8.008	16.333	8.308	16.195	8.513	16.662	8.228	16.793
166	128.	50.	7.712	16.480	8.008	16.333	8.228	16.793	7.946	16.933
167	130.	50.	7.421	16.635	7.712	16.480	7.946	16.933	7.669	17.082
168	52.	48.	19.813	17.355	19.815	16.935	19.796	17.591	19.483	17.750
169	54.	48.	19.541	17.138	19.813	17.355	19.483	17.750	19.226	17.544
170	56.	48.	19.265	16.930	19.541	17.138	19.226	17.544	18.962	17.345
171	58.	48.	18.982	16.731	19.265	16.930	18.962	17.345	18.693	17.155
172	60.	48.	18.694	16.541	18.982	16.731	18.693	17.155	18.417	16.973
173	62.	48.	18.399	16.359	18.694	16.541	18.417	16.973	18.136	16.800
174	64.	48.	18.100	16.186	18.399	16.359	18.136	16.800	17.850	16.635
175	66.	48.	17.795	16.023	18.100	16.186	17.850	16.635	17.560	16.480
176	68.	48.	17.485	15.869	17.795	16.023	17.560	16.480	17.264	16.333
177	70.	48.	17.171	15.725	17.485	15.869	17.264	16.333	16.964	16.195
178	72.	48.	16.853	15.591	17.171	15.725	16.964	16.195	16.660	16.067
179	74.	48.	16.530	15.466	16.853	15.591	16.660	16.067	16.352	15.948
180	76.	48.	16.204	15.351	16.530	15.466	16.352	15.948	16.041	15.839
181	78.	48.	15.874	15.247	16.204	15.351	16.041	15.839	15.726	15.739
182	80.	48.	15.542	15.153	15.874	15.247	15.726	15.739	15.409	15.649
183	82.	48.	15.206	15.068	15.542	15.153	15.409	15.649	15.089	15.568
184	84.	48.	14.868	14.995	15.206	15.068	15.089	15.568	14.767	15.498
185	86.	48.	14.529	14.931	14.868	14.995	14.767	15.498	14.442	15.437
186	88.	48.	14.187	14.878	14.529	14.931	14.442	15.437	14.116	15.387
187	90.	48.	13.844	14.836	14.187	14.878	14.116	15.387	13.789	15.346
188	92.	48.	13.499	14.804	13.844	14.836	13.789	15.346	13.460	15.316
189	94.	48.	13.154	14.783	13.499	14.804	13.460	15.316	13.131	15.296
190	96.	48.	12.809	14.772	13.154	14.783	13.131	15.296	12.801	15.286
191	98.	48.	12.463	14.772	12.809	14.772	12.801	15.286	12.471	15.286
192	100.	48.	12.117	14.783	12.463	14.772	12.471	15.286	12.141	15.296
193	102.	48.	11.772	14.804	12.117	14.783	12.141	15.296	11.812	15.316
194	104.	48.	11.428	14.836	11.772	14.804	11.812	15.316	11.483	15.346
195	106.	48.	11.085	14.878	11.428	14.836	11.483	15.346	11.156	15.387
196	108.	48.	10.743	14.931	11.085	14.878	11.156	15.387	10.830	15.437
197	110.	48.	10.403	14.995	10.743	14.931	10.830	15.437	10.505	15.498
198	112.	48.	10.066	15.068	10.403	14.995	10.505	15.498	10.183	15.568
199	114.	48.	9.730	15.153	10.066	15.068	10.183	15.568	9.863	15.649
200	116.	48.	9.397	15.247	9.730	15.153	9.863	15.649	9.545	15.739
201	118.	48.	9.068	15.351	9.397	15.247	9.545	15.739	9.231	15.839
202	120.	48.	8.742	15.466	9.068	15.351	9.231	15.839	8.919	15.948
203	122.	48.	8.419	15.591	8.742	15.466	8.919	15.948	8.612	16.067
204	124.	48.	8.101	15.725	8.419	15.591	8.612	16.067	8.308	16.195
205	126.	48.	7.786	15.869	8.101	15.725	8.308	16.195	8.008	16.333
206	128.	48.	7.477	16.023	7.786	15.869	8.008	16.333	7.712	16.480
207	130.	48.	7.172	16.186	7.477	16.023	7.712	16.480	7.421	16.635
208	54.	46.	19.858	16.730	19.828	16.327	19.813	17.355	19.541	17.138

209	56.	46.	19.569	16.513	19.858	16.730	19.541	17.138	19.265	16.930
210	58.	46.	19.274	16.304	19.569	16.513	19.265	16.930	18.982	16.731
211	60.	46.	18.972	16.105	19.274	16.304	18.982	16.731	18.694	16.541
212	62.	46.	18.664	15.915	18.972	16.105	18.694	16.541	18.399	16.359
213	64.	46.	18.351	15.734	18.664	15.915	18.399	16.359	18.100	16.186
214	66.	46.	18.032	15.564	18.351	15.734	18.100	16.186	17.795	16.023
215	68.	46.	17.708	15.403	18.032	15.564	17.795	16.023	17.485	15.869
216	70.	46.	17.379	15.252	17.708	15.403	17.485	15.869	17.171	15.725
217	72.	46.	17.046	15.111	17.379	15.252	17.171	15.725	16.853	15.591
218	74.	46.	16.709	14.981	17.046	15.111	16.853	15.591	16.530	15.466
219	76.	46.	16.368	14.861	16.709	14.981	16.530	15.466	16.204	15.351
220	78.	46.	16.023	14.752	16.368	14.861	16.204	15.351	15.874	15.247
221	80.	46.	15.675	14.653	16.023	14.752	15.874	15.247	15.542	15.153
222	82.	46.	15.324	14.565	15.675	14.653	15.542	15.153	15.206	15.068
223	84.	46.	14.971	14.488	15.324	14.565	15.206	15.068	14.868	14.995
224	86.	46.	14.616	14.422	14.971	14.488	14.868	14.995	14.529	14.931
225	88.	46.	14.258	14.366	14.616	14.422	14.529	14.931	14.187	14.878
226	90.	46.	13.899	14.322	14.258	14.366	14.187	14.878	13.844	14.836
227	92.	46.	13.539	14.289	13.899	14.322	13.844	14.836	13.499	14.804
228	94.	46.	13.178	14.266	13.539	14.289	13.499	14.804	13.154	14.783
229	96.	46.	12.817	14.255	13.178	14.266	13.154	14.783	12.809	14.772
230	98.	46.	12.455	14.255	12.817	14.255	12.809	14.772	12.463	14.772
231	100.	46.	12.094	14.266	12.455	14.255	12.463	14.772	12.117	14.783
232	102.	46.	11.733	14.289	12.094	14.266	12.117	14.783	11.772	14.804
233	104.	46.	11.373	14.322	11.733	14.289	11.772	14.804	11.428	14.836
234	106.	46.	11.014	14.366	11.373	14.322	11.428	14.836	11.085	14.878
235	108.	46.	10.656	14.422	11.014	14.366	11.085	14.878	10.743	14.931
236	110.	46.	10.301	14.488	10.656	14.422	10.743	14.931	10.403	14.995
237	112.	46.	9.947	14.565	10.301	14.488	10.403	14.995	10.066	15.068
238	114.	46.	9.597	14.653	9.947	14.565	10.066	15.068	9.730	15.153
239	116.	46.	9.249	14.752	9.597	14.653	9.730	15.153	9.397	15.247
240	118.	46.	8.904	14.861	9.249	14.752	9.397	15.247	9.068	15.351
241	120.	46.	8.563	14.981	8.904	14.861	9.068	15.351	8.742	15.466
242	122.	46.	8.225	15.111	8.563	14.981	8.742	15.466	8.419	15.591
243	124.	46.	7.892	15.252	8.225	15.111	8.419	15.591	8.101	15.725
244	126.	46.	7.564	15.403	7.892	15.252	8.101	15.725	7.786	15.869
245	128.	46.	7.240	15.564	7.564	15.403	7.786	15.869	7.477	16.023
246	130.	46.	6.921	15.734	7.240	15.564	7.477	16.023	7.172	16.186
247	54.	44.	20.176	16.319	19.830	16.216	19.828	16.327	19.858	16.730
248	56.	44.	19.876	16.092	20.176	16.319	19.858	16.730	19.569	16.513
249	58.	44.	19.568	15.874	19.876	16.092	19.569	16.513	19.274	16.304
250	60.	44.	19.252	15.666	19.568	15.874	19.274	16.304	18.972	16.105
251	62.	44.	18.931	15.467	19.252	15.666	18.972	16.105	18.664	15.915
252	64.	44.	18.604	15.279	18.931	15.467	18.664	15.915	18.351	15.734
253	66.	44.	18.271	15.101	18.604	15.279	18.351	15.734	18.032	15.564
254	68.	44.	17.933	14.933	18.271	15.101	18.032	15.564	17.708	15.403
255	70.	44.	17.589	14.775	17.933	14.933	17.708	15.403	17.379	15.252
256	72.	44.	17.241	14.628	17.589	14.775	17.379	15.252	17.046	15.111
257	74.	44.	16.889	14.492	17.241	14.628	17.046	15.111	16.709	14.981
258	76.	44.	16.533	14.367	16.889	14.492	16.709	14.981	16.368	14.861
259	78.	44.	16.173	14.253	16.533	14.367	16.368	14.861	16.023	14.752
260	80.	44.	15.810	14.150	16.173	14.253	16.023	14.752	15.675	14.653

261	82.	44.	15.443	14.058	15.810	14.150	15.675	14.653	15.324	14.565
262	84.	44.	15.074	13.977	15.443	14.058	15.324	14.565	14.971	14.488
263	86.	44.	14.703	13.908	15.074	13.977	14.971	14.488	14.616	14.422
264	88.	44.	14.330	13.850	14.703	13.908	14.616	14.422	14.258	14.366
265	90.	44.	13.955	13.804	14.330	13.850	14.258	14.366	13.899	14.322
266	92.	44.	13.579	13.769	13.955	13.804	13.899	14.322	13.539	14.289
267	94.	44.	13.202	13.746	13.579	13.769	13.539	14.289	13.178	14.266
268	96.	44.	12.825	13.734	13.202	13.746	13.178	14.266	12.817	14.255
269	98.	44.	12.447	13.734	12.825	13.734	12.817	14.255	12.455	14.255
270	100.	44.	12.070	13.746	12.447	13.734	12.455	14.255	12.094	14.266
271	102.	44.	11.693	13.769	12.070	13.746	12.094	14.266	11.733	14.289
272	104.	44.	11.317	13.804	11.693	13.769	11.733	14.289	11.373	14.322
273	106.	44.	10.942	13.850	11.317	13.804	11.373	14.322	11.014	14.366
274	108.	44.	10.569	13.908	10.942	13.850	11.014	14.366	10.656	14.422
275	110.	44.	10.197	13.977	10.569	13.908	10.656	14.422	10.301	14.488
276	112.	44.	9.828	14.058	10.197	13.977	10.301	14.488	9.947	14.565
277	114.	44.	9.462	14.150	9.828	14.058	9.947	14.565	9.597	14.653
278	116.	44.	9.099	14.253	9.462	14.150	9.597	14.653	9.249	14.752
279	118.	44.	8.739	14.367	9.099	14.253	9.249	14.752	8.904	14.861
280	120.	44.	8.383	14.492	8.739	14.367	8.904	14.861	8.563	14.981
281	122.	44.	8.030	14.628	8.383	14.492	8.563	14.981	8.225	15.111
282	124.	44.	7.682	14.775	8.030	14.628	8.225	15.111	7.892	15.252
283	126.	44.	7.339	14.933	7.682	14.775	7.892	15.252	7.564	15.403
284	128.	44.	7.001	15.101	7.339	14.933	7.564	15.403	7.240	15.564
285	130.	44.	6.668	15.279	7.001	15.101	7.240	15.564	6.921	15.734
286	58.	42.	19.864	15.440	19.859	15.175	19.876	16.092	19.568	15.874
287	60.	42.	19.535	15.223	19.864	15.440	19.568	15.874	19.252	15.666
288	62.	42.	19.200	15.016	19.535	15.223	19.252	15.666	18.931	15.467
289	64.	42.	18.859	14.819	19.200	15.016	18.931	15.467	18.604	15.279
290	66.	42.	18.512	14.634	18.859	14.819	18.604	15.279	18.271	15.101
291	68.	42.	18.159	14.458	18.512	14.634	18.271	15.101	17.933	14.933
292	70.	42.	17.801	14.294	18.159	14.458	17.933	14.933	17.589	14.775
293	72.	42.	17.438	14.141	17.801	14.294	17.589	14.775	17.241	14.628
294	74.	42.	17.071	13.999	17.438	14.141	17.241	14.628	16.889	14.492
295	76.	42.	16.700	13.869	17.071	13.999	16.889	14.492	16.533	14.367
296	78.	42.	16.324	13.749	16.700	13.869	16.533	14.367	16.173	14.253
297	80.	42.	15.945	13.642	16.324	13.749	16.173	14.253	15.810	14.150
298	82.	42.	15.563	13.546	15.945	13.642	15.810	14.150	15.443	14.058
299	84.	42.	15.179	13.462	15.563	13.546	15.443	14.058	15.074	13.977
300	86.	42.	14.792	13.390	15.179	13.462	15.074	13.977	14.703	13.908
301	88.	42.	14.402	13.330	14.792	13.390	14.703	13.908	14.330	13.850
302	90.	42.	14.012	13.281	14.402	13.330	14.330	13.850	13.955	13.804
303	92.	42.	13.619	13.245	14.012	13.281	13.955	13.804	13.579	13.769
304	94.	42.	13.226	13.221	13.619	13.245	13.579	13.769	13.202	13.746
305	96.	42.	12.833	13.209	13.226	13.221	13.202	13.746	12.825	13.734
306	98.	42.	12.439	13.209	12.833	13.209	12.825	13.734	12.447	13.734
307	100.	42.	12.045	13.221	12.439	13.209	12.447	13.734	12.070	13.746
308	102.	42.	11.652	13.245	12.045	13.221	12.070	13.746	11.693	13.769
309	104.	42.	11.260	13.281	11.652	13.245	11.693	13.769	11.317	13.804
310	106.	42.	10.869	13.330	11.260	13.281	11.317	13.804	10.942	13.850
311	108.	42.	10.480	13.390	10.869	13.330	10.942	13.850	10.569	13.908
312	110.	42.	10.093	13.462	10.480	13.390	10.569	13.908	10.197	13.977

313	112.	42.	9.708	13.546	10.093	13.462	10.197	13.977	9.828	14.058
314	114.	42.	9.326	13.642	9.708	13.546	9.828	14.058	9.462	14.150
315	116.	42.	8.948	13.749	9.326	13.642	9.462	14.150	9.099	14.253
316	118.	42.	8.572	13.869	8.948	13.749	9.099	14.253	8.739	14.367
317	120.	42.	8.201	13.999	8.572	13.869	8.739	14.367	8.383	14.492
318	122.	42.	7.833	14.141	8.201	13.999	8.383	14.492	8.030	14.628
319	124.	42.	7.471	14.294	7.833	14.141	8.030	14.628	7.682	14.775
320	126.	42.	7.113	14.458	7.471	14.294	7.682	14.775	7.339	14.933
321	128.	42.	6.760	14.634	7.113	14.458	7.339	14.933	7.001	15.101
322	130.	42.	6.413	14.819	6.760	14.634	7.001	15.101	6.668	15.279
323	60.	40.	19.821	14.776	19.706	14.560	19.864	15.440	19.535	15.223
324	62.	40.	19.472	14.560	19.821	14.776	19.535	15.223	19.200	15.016
325	64.	40.	19.117	14.356	19.472	14.560	19.200	15.016	18.859	14.819
326	66.	40.	18.755	14.162	19.117	14.356	18.859	14.819	18.512	14.634
327	68.	40.	18.388	13.980	18.755	14.162	18.512	14.634	18.159	14.458
328	70.	40.	18.015	13.809	18.388	13.980	18.159	14.458	17.801	14.294
329	72.	40.	17.637	13.649	18.015	13.809	17.801	14.294	17.438	14.141
330	74.	40.	17.255	13.501	17.637	13.649	17.438	14.141	17.071	13.999
331	76.	40.	16.868	13.365	17.255	13.501	17.071	13.999	16.700	13.869
332	78.	40.	16.477	13.241	16.868	13.365	16.700	13.869	16.324	13.749
333	80.	40.	16.082	13.129	16.477	13.241	16.324	13.749	15.945	13.642
334	82.	40.	15.685	13.030	16.082	13.129	15.945	13.642	15.563	13.546
335	84.	40.	15.284	12.942	15.685	13.030	15.563	13.546	15.179	13.462
336	86.	40.	14.881	12.867	15.284	12.942	15.179	13.462	14.792	13.390
337	88.	40.	14.476	12.804	14.881	12.867	14.792	13.390	14.402	13.330
338	90.	40.	14.069	12.754	14.476	12.804	14.402	13.330	14.012	13.281
339	92.	40.	13.660	12.716	14.069	12.754	14.012	13.281	13.619	13.245
340	94.	40.	13.251	12.691	13.660	12.716	13.619	13.245	13.226	13.221
341	96.	40.	12.841	12.678	13.251	12.691	13.226	13.221	12.833	13.209
342	98.	40.	12.431	12.678	12.841	12.678	12.833	13.209	12.439	13.209
343	100.	40.	12.021	12.691	12.431	12.678	12.439	13.209	12.045	13.221
344	102.	40.	11.612	12.716	12.021	12.691	12.045	13.221	11.652	13.245
345	104.	40.	11.203	12.754	11.612	12.716	11.652	13.245	11.260	13.281
346	106.	40.	10.796	12.804	11.203	12.754	11.260	13.281	10.869	13.330
347	108.	40.	10.391	12.867	10.796	12.804	10.869	13.330	10.480	13.390
348	110.	40.	9.988	12.942	10.391	12.867	10.480	13.390	10.093	13.462
349	112.	40.	9.587	13.030	9.988	12.942	10.093	13.462	9.708	13.546
350	114.	40.	9.189	13.129	9.587	13.030	9.708	13.546	9.326	13.642
351	116.	40.	8.795	13.241	9.189	13.129	9.326	13.642	8.948	13.749
352	118.	40.	8.404	13.365	8.795	13.241	8.948	13.749	8.572	13.869
353	120.	40.	8.017	13.501	8.404	13.365	8.572	13.869	8.201	13.999
354	122.	40.	7.635	13.649	8.017	13.501	8.201	13.999	7.833	14.141
355	124.	40.	7.257	13.809	7.635	13.649	7.833	14.141	7.471	14.294
356	126.	40.	6.884	13.980	7.257	13.809	7.471	14.294	7.113	14.458
357	128.	40.	6.517	14.162	6.884	13.980	7.113	14.458	6.760	14.634
358	130.	40.	6.155	14.356	6.517	14.162	6.760	14.634	6.413	14.819
359	62.	38.	19.747	14.100	19.522	13.957	19.821	14.776	19.472	14.560
360	64.	38.	19.377	13.887	19.747	14.100	19.472	14.560	19.117	14.356
361	66.	38.	19.001	13.686	19.377	13.887	19.117	14.356	18.755	14.162
362	68.	38.	18.619	13.496	19.001	13.686	18.755	14.162	18.388	13.980
363	70.	38.	18.231	13.318	18.619	13.496	18.388	13.980	18.015	13.809
364	72.	38.	17.838	13.152	18.231	13.318	18.015	13.809	17.637	13.649

365	74.	38.	17.440	12.998	17.838	13.152	17.637	13.649	17.255	13.501
366	76.	38.	17.038	12.857	17.440	12.998	17.255	13.501	16.868	13.365
367	78.	38.	16.631	12.728	17.038	12.857	16.868	13.365	16.477	13.241
368	80.	38.	16.221	12.611	16.631	12.728	16.477	13.241	16.082	13.129
369	82.	38.	15.807	12.508	16.221	12.611	16.082	13.129	15.685	13.030
370	84.	38.	15.390	12.417	15.807	12.508	15.685	13.030	15.284	12.942
371	86.	38.	14.971	12.338	15.390	12.417	15.284	12.942	14.881	12.867
372	88.	38.	14.549	12.273	14.971	12.338	14.881	12.867	14.476	12.804
373	90.	38.	14.126	12.221	14.549	12.273	14.476	12.804	14.069	12.754
374	92.	38.	13.701	12.182	14.126	12.221	14.069	12.754	13.660	12.716
375	94.	38.	13.276	12.155	13.701	12.182	13.660	12.716	13.251	12.691
376	96.	38.	12.849	12.142	13.276	12.155	13.251	12.691	12.841	12.678
377	98.	38.	12.423	12.142	12.849	12.142	12.841	12.678	12.431	12.678
378	100.	38.	11.996	12.155	12.423	12.142	12.431	12.678	12.021	12.691
379	102.	38.	11.570	12.182	11.996	12.155	12.021	12.691	11.612	12.716
380	104.	38.	11.146	12.221	11.570	12.182	11.612	12.716	11.203	12.754
381	106.	38.	10.722	12.273	11.146	12.221	11.203	12.754	10.796	12.804
382	108.	38.	10.301	12.338	10.722	12.273	10.796	12.804	10.391	12.867
383	110.	38.	9.881	12.417	10.301	12.338	10.391	12.867	9.988	12.942
384	112.	38.	9.465	12.508	9.881	12.417	9.988	12.942	9.587	13.030
385	114.	38.	9.051	12.611	9.465	12.508	9.587	13.030	9.189	13.129
386	116.	38.	8.641	12.728	9.051	12.611	9.189	13.129	8.795	13.241
387	118.	38.	8.234	12.857	8.641	12.728	8.795	13.241	8.404	13.365
388	120.	38.	7.832	12.998	8.234	12.857	8.404	13.365	8.017	13.501
389	122.	38.	7.434	13.152	7.832	12.998	8.017	13.501	7.635	13.649
390	124.	38.	7.041	13.318	7.434	13.152	7.635	13.649	7.257	13.809
391	126.	38.	6.653	13.496	7.041	13.318	7.257	13.809	6.884	13.980
392	128.	38.	6.271	13.686	6.653	13.496	6.884	13.980	6.517	14.162
393	130.	38.	5.895	13.887	6.271	13.686	6.517	14.162	6.155	14.356
394	62.	36.	20.024	13.634	19.693	13.489	19.522	13.957	19.747	14.100
395	64.	36.	19.640	13.413	20.024	13.634	19.747	14.100	19.377	13.887
396	66.	36.	19.249	13.204	19.640	13.413	19.377	13.887	19.001	13.686
397	68.	36.	18.852	13.007	19.249	13.204	19.001	13.686	18.619	13.496
398	70.	36.	18.450	12.822	18.852	13.007	18.619	13.496	18.231	13.318
399	72.	36.	18.041	12.649	18.450	12.822	18.231	13.318	17.838	13.152
400	74.	36.	17.628	12.490	18.041	12.649	17.838	13.152	17.440	12.998
401	76.	36.	17.210	12.343	17.628	12.490	17.440	12.998	17.038	12.857
402	78.	36.	16.787	12.209	17.210	12.343	17.038	12.857	16.631	12.728
403	80.	36.	16.361	12.088	16.787	12.209	16.631	12.728	16.221	12.611
404	82.	36.	15.931	11.980	16.361	12.088	16.221	12.611	15.807	12.508
405	84.	36.	15.498	11.885	15.931	11.980	15.807	12.508	15.390	12.417
406	86.	36.	15.062	11.804	15.498	11.885	15.390	12.417	14.971	12.338
407	88.	36.	14.624	11.736	15.062	11.804	14.971	12.338	14.549	12.273
408	90.	36.	14.184	11.682	14.624	11.736	14.549	12.273	14.126	12.221
409	92.	36.	13.743	11.641	14.184	11.682	14.126	12.221	13.701	12.182
410	94.	36.	13.301	11.614	13.743	11.641	13.701	12.182	13.276	12.155
411	96.	36.	12.858	11.600	13.301	11.614	13.276	12.155	12.849	12.142
412	98.	36.	12.414	11.600	12.858	11.600	12.849	12.142	12.423	12.142
413	100.	36.	11.971	11.614	12.414	11.600	12.423	12.142	11.996	12.155
414	102.	36.	11.529	11.641	11.971	11.614	11.996	12.155	11.570	12.182
415	104.	36.	11.088	11.682	11.529	11.641	11.570	12.182	11.146	12.221
416	106.	36.	10.648	11.736	11.088	11.682	11.146	12.221	10.722	12.273

417	108.	36.	10.210	11.804	10.648	11.736	10.722	12.273	10.301	12.338
418	110.	36.	9.774	11.885	10.210	11.804	10.301	12.338	9.881	12.417
419	112.	36.	9.341	11.980	9.774	11.885	9.881	12.417	9.465	12.508
420	114.	36.	8.911	12.088	9.341	11.980	9.465	12.508	9.051	12.611
421	116.	36.	8.485	12.209	8.911	12.088	9.051	12.611	8.641	12.728
422	118.	36.	8.062	12.343	8.485	12.209	8.641	12.728	8.234	12.857
423	120.	36.	7.644	12.490	8.062	12.343	8.234	12.857	7.832	12.998
424	122.	36.	7.230	12.649	7.644	12.490	7.832	12.998	7.434	13.152
425	124.	36.	6.822	12.822	7.230	12.649	7.434	13.152	7.041	13.318
426	126.	36.	6.419	13.007	6.822	12.822	7.041	13.318	6.653	13.496
427	128.	36.	6.022	13.204	6.419	13.007	6.653	13.496	6.271	13.686
428	130.	36.	5.632	13.413	6.022	13.204	6.271	13.686	5.895	13.887
429	68.	34.	19.089	12.511	18.707	12.658	19.249	13.204	18.852	13.007
430	70.	34.	18.671	12.319	19.089	12.511	18.852	13.007	18.450	12.822
431	72.	34.	18.247	12.140	18.671	12.319	18.450	12.822	18.041	12.649
432	74.	34.	17.818	11.975	18.247	12.140	18.041	12.649	17.628	12.490
433	76.	34.	17.384	11.822	17.818	11.975	17.628	12.490	17.210	12.343
434	78.	34.	16.945	11.683	17.384	11.822	17.210	12.343	16.787	12.209
435	80.	34.	16.503	11.557	16.945	11.683	16.787	12.209	16.361	12.088
436	82.	34.	16.056	11.445	16.503	11.557	16.361	12.088	15.931	11.980
437	84.	34.	15.607	11.347	16.056	11.445	15.931	11.980	15.498	11.885
438	86.	34.	15.154	11.263	15.607	11.347	15.498	11.885	15.062	11.804
439	88.	34.	14.700	11.192	15.154	11.263	15.062	11.804	14.624	11.736
440	90.	34.	14.243	11.136	14.700	11.192	14.624	11.736	14.184	11.682
441	92.	34.	13.785	11.094	14.243	11.136	14.184	11.682	13.743	11.641
442	94.	34.	13.326	11.065	13.785	11.094	13.743	11.641	13.301	11.614
443	96.	34.	12.866	11.051	13.326	11.065	13.301	11.614	12.858	11.600
444	98.	34.	12.406	11.051	12.866	11.051	12.858	11.600	12.414	11.600
445	100.	34.	11.946	11.065	12.406	11.051	12.414	11.600	11.971	11.614
446	102.	34.	11.487	11.094	11.946	11.065	11.971	11.614	11.529	11.641
447	104.	34.	11.029	11.136	11.487	11.094	11.529	11.641	11.088	11.682
448	106.	34.	10.572	11.192	11.029	11.136	11.088	11.682	10.648	11.736
449	108.	34.	10.117	11.263	10.572	11.192	10.648	11.736	10.210	11.804
450	110.	34.	9.665	11.347	10.117	11.263	10.210	11.804	9.774	11.885
451	112.	34.	9.215	11.445	9.665	11.347	9.774	11.885	9.341	11.980
452	114.	34.	8.769	11.557	9.215	11.445	9.341	11.980	8.911	12.088
453	116.	34.	8.327	11.683	8.769	11.557	8.911	12.088	8.485	12.209
454	118.	34.	7.888	11.822	8.327	11.683	8.485	12.209	8.062	12.343
455	120.	34.	7.454	11.975	7.888	11.822	8.062	12.343	7.644	12.490
456	122.	34.	7.025	12.140	7.454	11.975	7.644	12.490	7.230	12.649
457	124.	34.	6.601	12.319	7.025	12.140	7.230	12.649	6.822	12.822
458	126.	34.	6.183	12.511	6.601	12.319	6.822	12.822	6.419	13.007
459	128.	34.	5.771	12.716	6.183	12.511	6.419	13.007	6.022	13.204
460	130.	34.	5.365	12.933	5.771	12.716	6.022	13.204	5.632	13.413
461	68.	32.	19.329	12.009	18.845	12.197	18.707	12.658	19.089	12.511
462	70.	32.	18.895	11.810	19.329	12.009	19.089	12.511	18.671	12.319
463	72.	32.	18.455	11.625	18.895	11.810	18.671	12.319	18.247	12.140
464	74.	32.	18.010	11.453	18.455	11.625	18.247	12.140	17.818	11.975
465	76.	32.	17.560	11.295	18.010	11.453	17.818	11.975	17.384	11.822
466	78.	32.	17.105	11.150	17.560	11.295	17.384	11.822	16.945	11.683
467	80.	32.	16.646	11.020	17.105	11.150	16.945	11.683	16.503	11.557
468	82.	32.	16.183	10.904	16.646	11.020	16.503	11.557	16.056	11.445

469	84.	32.	15.717	10.802	16.183	10.904	16.056	11.445	15.607	11.347
470	86.	32.	15.248	10.715	15.717	10.802	15.607	11.347	15.154	11.263
471	88.	32.	14.776	10.642	15.248	10.715	15.154	11.263	14.700	11.192
472	90.	32.	14.303	10.583	14.776	10.642	14.700	11.192	14.243	11.136
473	92.	32.	13.828	10.539	14.303	10.583	14.243	11.136	13.785	11.094
474	94.	32.	13.351	10.510	13.828	10.539	13.785	11.094	13.326	11.065
475	96.	32.	12.874	10.495	13.351	10.510	13.326	11.065	12.866	11.051
476	98.	32.	12.397	10.495	12.874	10.495	12.866	11.051	12.406	11.051
477	100.	32.	11.920	10.510	12.397	10.495	12.406	11.051	11.946	11.065
478	102.	32.	11.444	10.539	11.920	10.510	11.946	11.065	11.487	11.094
479	104.	32.	10.969	10.583	11.444	10.539	11.487	11.094	11.029	11.136
480	106.	32.	10.495	10.642	10.969	10.583	11.029	11.136	10.572	11.192
481	108.	32.	10.024	10.715	10.495	10.642	10.572	11.192	10.117	11.263
482	110.	32.	9.555	10.802	10.024	10.715	10.117	11.263	9.665	11.347
483	112.	32.	9.088	10.904	9.555	10.802	9.665	11.347	9.215	11.445
484	114.	32.	8.626	11.020	9.088	10.904	9.215	11.445	8.769	11.557
485	116.	32.	8.167	11.150	8.626	11.020	8.769	11.557	8.327	11.683
486	118.	32.	7.712	11.295	8.167	11.150	8.327	11.683	7.888	11.822
487	120.	32.	7.262	11.453	7.712	11.295	7.888	11.822	7.454	11.975
488	122.	32.	6.816	11.625	7.262	11.453	7.454	11.975	7.025	12.140
489	124.	32.	6.377	11.810	6.816	11.625	7.025	12.140	6.601	12.319
490	126.	32.	5.943	12.009	6.377	11.810	6.601	12.319	6.183	12.511
491	128.	32.	5.516	12.222	5.943	12.009	6.183	12.511	5.771	12.716
492	130.	32.	5.095	12.447	5.516	12.222	5.771	12.716	5.365	12.933
493	68.	30.	19.572	11.500	18.976	11.745	18.845	12.197	19.329	12.009
494	70.	30.	19.122	11.294	19.572	11.500	19.329	12.009	18.895	11.810
495	72.	30.	18.667	11.102	19.122	11.294	18.895	11.810	18.455	11.625
496	74.	30.	18.205	10.924	18.667	11.102	18.455	11.625	18.010	11.453
497	76.	30.	17.739	10.760	18.205	10.924	18.010	11.453	17.560	11.295
498	78.	30.	17.268	10.610	17.739	10.760	17.560	11.295	17.105	11.150
499	80.	30.	16.792	10.475	17.268	10.610	17.105	11.150	16.646	11.020
500	82.	30.	16.312	10.355	16.792	10.475	16.646	11.020	16.183	10.904
501	84.	30.	15.829	10.249	16.312	10.355	16.183	10.904	15.717	10.802
502	86.	30.	15.343	10.159	15.829	10.249	15.717	10.802	15.248	10.715
503	88.	30.	14.854	10.083	15.343	10.159	15.248	10.715	14.776	10.642
504	90.	30.	14.363	10.022	14.854	10.083	14.776	10.642	14.303	10.583
505	92.	30.	13.871	9.977	14.363	10.022	14.303	10.583	13.828	10.539
506	94.	30.	13.377	9.946	13.871	9.977	13.828	10.539	13.351	10.510
507	96.	30.	12.883	9.931	13.377	9.946	13.351	10.510	12.874	10.495
508	98.	30.	12.389	9.931	12.883	9.931	12.874	10.495	12.397	10.495
509	100.	30.	11.894	9.946	12.389	9.931	12.397	10.495	11.920	10.510
510	102.	30.	11.401	9.977	11.894	9.946	11.920	10.510	11.444	10.539
511	104.	30.	10.908	10.022	11.401	9.977	11.444	10.539	10.969	10.583
512	106.	30.	10.418	10.083	10.908	10.022	10.969	10.583	10.495	10.642
513	108.	30.	9.929	10.159	10.418	10.083	10.495	10.642	10.024	10.715
514	110.	30.	9.443	10.249	9.929	10.159	10.024	10.715	9.555	10.802
515	112.	30.	8.960	10.355	9.443	10.249	9.555	10.802	9.088	10.904
516	114.	30.	8.480	10.475	8.960	10.355	9.088	10.904	8.626	11.020
517	116.	30.	8.004	10.610	8.480	10.475	8.626	11.020	8.167	11.150
518	118.	30.	7.533	10.760	8.004	10.610	8.167	11.150	7.712	11.295
519	120.	30.	7.066	10.924	7.533	10.760	7.712	11.295	7.262	11.453
520	122.	30.	6.605	11.102	7.066	10.924	7.262	11.453	6.816	11.625

521	124.	30.	6.149	11.294	6.605	11.102	6.816	11.625	6.377	11.810
522	126.	30.	5.700	11.500	6.149	11.294	6.377	11.810	5.943	12.009
523	128.	30.	5.257	11.720	5.700	11.500	5.943	12.009	5.516	12.222
524	130.	30.	4.821	11.954	5.257	11.720	5.516	12.222	5.095	12.447
525	72.	28.	18.881	10.571	18.290	11.092	19.122	11.294	18.667	11.102
526	74.	28.	18.404	10.386	18.881	10.571	18.667	11.102	18.205	10.924
527	76.	28.	17.920	10.217	18.404	10.386	18.205	10.924	17.739	10.760
528	78.	28.	17.432	10.062	17.920	10.217	17.739	10.760	17.268	10.610
529	80.	28.	16.940	9.922	17.432	10.062	17.268	10.610	16.792	10.475
530	82.	28.	16.443	9.797	16.940	9.922	16.792	10.475	16.312	10.355
531	84.	28.	15.943	9.688	16.443	9.797	16.312	10.355	15.829	10.249
532	86.	28.	15.439	9.594	15.943	9.688	15.829	10.249	15.343	10.159
533	88.	28.	14.933	9.516	15.439	9.594	15.343	10.159	14.854	10.083
534	90.	28.	14.425	9.453	14.933	9.516	14.854	10.083	14.363	10.022
535	92.	28.	13.915	9.406	14.425	9.453	14.363	10.022	13.871	9.977
536	94.	28.	13.404	9.374	13.915	9.406	13.871	9.977	13.377	9.946
537	96.	28.	12.892	9.359	13.404	9.374	13.377	9.946	12.883	9.931
538	98.	28.	12.380	9.359	12.892	9.359	12.883	9.931	12.389	9.931
539	100.	28.	11.868	9.374	12.380	9.359	12.389	9.931	11.894	9.946
540	102.	28.	11.357	9.406	11.868	9.374	11.894	9.946	11.401	9.977
541	104.	28.	10.847	9.453	11.357	9.406	11.401	9.977	10.908	10.022
542	106.	28.	10.339	9.516	10.847	9.453	10.908	10.022	10.418	10.083
543	108.	28.	9.833	9.594	10.339	9.516	10.418	10.083	9.929	10.159
544	110.	28.	9.329	9.688	9.833	9.594	9.929	10.159	9.443	10.249
545	112.	28.	8.829	9.797	9.329	9.688	9.443	10.249	8.960	10.355
546	114.	28.	8.332	9.922	8.829	9.797	8.960	10.355	8.480	10.475
547	116.	28.	7.839	10.062	8.332	9.922	8.480	10.475	8.004	10.610
548	118.	28.	7.351	10.217	7.839	10.062	8.004	10.610	7.533	10.760
549	120.	28.	6.868	10.386	7.351	10.217	7.533	10.760	7.066	10.924
550	122.	28.	6.391	10.571	6.868	10.386	7.066	10.924	6.605	11.102
551	124.	28.	5.919	10.770	6.391	10.571	6.605	11.102	6.149	11.294
552	126.	28.	5.453	10.984	5.919	10.770	6.149	11.294	5.700	11.500
553	128.	28.	4.995	11.212	5.453	10.984	5.700	11.500	5.257	11.720
554	130.	28.	4.543	11.453	4.995	11.212	5.257	11.720	4.821	11.954
555	72.	26.	19.099	10.032	18.400	10.639	18.290	11.092	18.881	10.571
556	74.	26.	18.605	9.841	19.099	10.032	18.881	10.571	18.404	10.386
557	76.	26.	18.105	9.665	18.605	9.841	18.404	10.386	17.920	10.217
558	78.	26.	17.600	9.505	18.105	9.665	17.920	10.217	17.432	10.062
559	80.	26.	17.090	9.360	17.600	9.505	17.432	10.062	16.940	9.922
560	82.	26.	16.576	9.231	17.090	9.360	16.940	9.922	16.443	9.797
561	84.	26.	16.058	9.118	16.576	9.231	16.443	9.797	15.943	9.688
562	86.	26.	15.537	9.021	16.058	9.118	15.943	9.688	15.439	9.594
563	88.	26.	15.013	8.940	15.537	9.021	15.439	9.594	14.933	9.516
564	90.	26.	14.487	8.875	15.013	8.940	14.933	9.516	14.425	9.453
565	92.	26.	13.960	8.826	14.487	8.875	14.425	9.453	13.915	9.406
566	94.	26.	13.431	8.793	13.960	8.826	13.915	9.406	13.404	9.374
567	96.	26.	12.901	8.777	13.431	8.793	13.404	9.374	12.892	9.359
568	98.	26.	12.371	8.777	12.901	8.777	12.892	9.359	12.380	9.359
569	100.	26.	11.841	8.793	12.371	8.777	12.380	9.359	11.868	9.374
570	102.	26.	11.312	8.826	11.841	8.793	11.868	9.374	11.357	9.406
571	104.	26.	10.784	8.875	11.312	8.826	11.357	9.406	10.847	9.453
572	106.	26.	10.259	8.940	10.784	8.875	10.847	9.453	10.339	9.516

573	108.	26.	9.735	9.021	10.259	8.940	10.339	9.516	9.833	9.594
574	110.	26.	9.214	9.118	9.735	9.021	9.833	9.594	9.329	9.688
575	112.	26.	8.696	9.231	9.214	9.118	9.329	9.688	8.829	9.797
576	114.	26.	8.182	9.360	8.696	9.231	8.829	9.797	8.332	9.922
577	116.	26.	7.672	9.505	8.182	9.360	8.332	9.922	7.839	10.062
578	118.	26.	7.167	9.665	7.672	9.505	7.839	10.062	7.351	10.217
579	120.	26.	6.667	9.841	7.167	9.665	7.351	10.217	6.868	10.386
580	122.	26.	6.173	10.032	6.667	9.841	6.868	10.386	6.391	10.571
581	124.	26.	5.684	10.238	6.173	10.032	6.391	10.571	5.919	10.770
582	126.	26.	5.203	10.459	5.684	10.238	5.919	10.770	5.453	10.984
583	128.	26.	4.728	10.695	5.203	10.459	5.453	10.984	4.995	11.212
584	130.	26.	4.261	10.945	4.728	10.695	4.995	11.212	4.543	11.453
585	72.	24.	19.321	19.483	18.502	10.191	18.400	10.639	19.099	10.032
586	74.	24.	18.809	9.286	19.321	9.483	19.099	10.032	18.605	9.841
587	76.	24.	18.292	9.104	18.809	9.286	18.605	9.841	18.105	9.665
588	78.	24.	17.770	8.938	18.292	9.104	18.105	9.665	17.600	9.505
589	80.	24.	17.243	8.789	17.770	8.938	17.600	9.505	17.090	9.360
590	82.	24.	16.711	8.655	17.243	8.789	17.090	9.360	16.576	9.231
591	84.	24.	16.175	8.538	16.711	8.655	16.576	9.231	16.058	9.118
592	86.	24.	15.637	8.438	16.175	8.538	16.058	9.118	15.537	9.021
593	88.	24.	15.095	8.354	15.637	8.438	15.537	9.021	15.013	8.940
594	90.	24.	14.551	8.287	15.095	8.354	15.013	8.940	14.487	8.875
595	92.	24.	14.005	8.236	14.551	8.287	14.487	8.875	13.960	8.826
596	94.	24.	13.458	8.202	14.005	8.236	13.960	8.826	13.431	8.793
597	96.	24.	12.910	8.186	13.458	8.202	13.431	8.793	12.901	8.777
598	98.	24.	12.362	8.186	12.910	8.186	12.901	8.777	12.371	8.777
599	100.	24.	11.814	8.202	12.362	8.186	12.371	8.777	11.841	8.793
600	102.	24.	11.267	8.236	11.814	8.202	11.841	8.793	11.312	8.826
601	104.	24.	10.721	8.287	11.267	8.236	11.312	8.826	10.784	8.875
602	106.	24.	10.177	8.354	10.721	8.287	10.784	8.875	10.259	8.940
603	108.	24.	9.635	8.438	10.177	8.354	10.259	8.940	9.735	9.021
604	110.	24.	9.096	8.538	9.635	8.438	9.735	9.021	9.214	9.118
605	112.	24.	8.561	8.655	9.096	8.538	9.214	9.118	8.696	9.231
606	114.	24.	8.029	8.789	8.561	8.655	8.696	9.231	8.182	9.360
607	116.	24.	7.502	8.938	8.029	8.789	8.182	9.360	7.672	9.505
608	118.	24.	6.979	9.104	7.502	8.938	7.672	9.505	7.167	9.665
609	120.	24.	6.462	9.286	6.979	9.104	7.167	9.665	6.667	9.841
610	122.	24.	5.951	9.483	6.462	9.286	6.667	9.841	6.173	10.032
611	124.	24.	5.446	9.696	5.951	9.483	6.173	10.032	5.684	10.238
612	126.	24.	4.948	9.925	5.446	9.696	5.684	10.238	5.203	10.459
613	128.	24.	4.457	10.169	4.948	9.925	5.203	10.459	4.728	10.695
614	130.	24.	3.974	10.428	4.457	10.169	4.728	10.695	4.261	10.945

APPENDIX C

PRINTOUTS OF ATTENUATION FUNCTION INPUT FILE

```
final  gm coef file for 75sites  n-h (nut vel) cor for rock 10/13/87
 20  0  11  33   0  33  55
  1**** rv-1a                        -1.838   0.      1.1      8.
1.981      .283    -.00303   0.       .00044   -.286    .0659    -.00365
 3.87      0.      -.00116   0.       0.       -.197    .0703    -.00359
  2 *** rv-2a                        -1.766   .0852   2.1      8.
1.848     .232      -.00312  0.       0.       .00167   .00014   54.3
-14.351    1.259   -0.00435  4.954    .346     -.017    .000532   -.949
  3 *** rv-5a  x3                     0.       0.      4.1
1.700      .115    -.00359   .0364    .00001   -.228    .0514    -.00281
2.79       -.569   -.0022   -1.382    .173     -.00767  .000189   .000264
  4 *** rv-5a  x2                    0.       0.       3.1
-.479      1.0749  -.0241    -.057    .00633   -.00047  -.0705    .00117
.425       1.0823  -.00405  -.0993    0.       0.       -.151    .00418
  5 *** trif-anderson                 15.0     0.       5.1
1.95       .67     -.00074   -.78     0.33

  6 *** se-1a  x2                    0.        0.      6.1
1.38       1.15     -.83     -.0028   0.

  7 *** se-1a  x4                    0.        0.      6.1
1.38       1.15     -.83     -.0028   10.

  8 *** se-2a  x4                    0.        0.      6.1
2.81       0.86     -.83     -.0028   10.

  9 *** se-2a  x1                    0.        0.      6.1
2.81       0.86     -.83     -.0028   8.

 10 *** se-1a  x1                    0.        0.      6.1
1.38       1.15     -.83     -.0028    8.

 11 *** comb-1a                       0.       0.      6.1
2.        1.14     -1.03    -.003      10.

 12*** rv-1sv   1.0s                 -.818    0.      1.       4.6
-4.606     .999     -.0011   .074     -.00933  -.102    .0277    -.00185
-6.361     1.539    -.00087  0.       -.00705  0.       0.       .000628
 13**** rv-1sv   0.4s                -.783    0.      1.1      5.8
-7.204     3.0210   -.002    -.326    .0137    -.0192   0.       .000435
-7.645     2.932   -.00112   -.294    .0102    0.       -.011    .0019
 14****    rv-1sv     0.2s          -.661    0.      1.1      9.4
-3.998     1.93    -.00229  -.208     .00947   -.0929   .0175    -.000591
-3.821     1.405    -.00134  -.0829   0.       -.0874   0.       .00162
 15*****    rv-1sv     0.1s          -.574    0.      1.1      10.3
-1.1056    .765     -.00259 -.0541    .0026    -.166    .0358    -.00175
-1.583     .659     -.00155  0.       -.00316  -.234    .0292    0.
 16*****    rv-1sv     0.04          -1.189   0.      1.1      10.3
```

```
0.157     .256     -.00315   .0079     0.        -.231     .0523     -.00281
0.749     0.       -.00163   .0798     -.00706   -.180     .0289     0.
  17****  rv2sv    1.0s                -.378     -.00465   2.1       4.6
-1.816    -.813    -.000836  .0158     .41       -.0283    0.        23.111
-15.293   2.762    -.00194   1.946     -.0497    0.        .000161   -.353
  18***** rv-2sv   0.4s                0.        -.021     2.1       5.8
-6.262    2.369    -.00112   .00819    -.209     .0077     0.        16.376
-6.052    .77      -.00123   0.        0.        .00145
  19****  rv-2sv   0.2s                -.713     0.        2.1       9.4
-4.234    1.881    -.00141   .00459    -.193     .00918    0.        42.275
-11.897   0.       -.00313   4.182     .346      -.0134    .000257   -.639
  20***** rv-2sv   0.1s                -.853     0.        2.1       10.3
-2.682    1.43     -.00178   0.        -.163     .00921    0.        44.379
-12.60    0.       -.00394   4.938     .405      -.0153    .00038    -.834
  21***** rv-2sv   0.04s               0.        -.0389    2.1       10.3
-.609     .546     -.00237   0.        -.0469    .00405    0.        5.474
2.473     -1.791   -.00302   0.        .441      -.0174    .000312   -.327
  22****  x'3  rv-5sp  1.0s            .0464     0.        8.5       4.6
-2.663    -.00229  .214      -.0141    .000159
-2.565    -.000866 -1.079    .178      -.0116    0.        .0663
  23**** x's  rv-5sp   0.4s            .121      .00797    8.4       5.8
-1.405    -.00381  .137      -.00702   .00029
-1.207    -.00101  -2.24     .174      -.0126    -2.922    .638      -.121
  24****  x'3  rv-5sp  0.2s            .0586     .00116    8.3       9.4
-.587     -.00363  .1        -.00446   .000227   -.0478    .00642
.202      -.00124  -1.084    .124      -.00747   -5.279    .00000037 -.084
  25****  x'3  rv-5sp  0.1s            0.        0.        8.2       10.3
-.215     -.00436  .0822     -.00328   .00029    -.0795    .0126     -.00029
2.578     -.00137  -2.138    .0784     -.00223   -11.56    .000001   .0179
  26****  x's  rv-5sp  0.04            0.        0.        8.1       10.3
.0438     -.00393  .0608     -.00147   .000124   -.177     .0379     -.00188
6.984     -.00176  -3.727    .0743     -.00167   -24.047
  27 *** trif-lee  sv=1.0            *  15.      0.        12.1
 1.0      .369     -1.835    3.2       -.0011    -1.17     1.12      1.
 10.      0.       0.5       -.035
  28 *** trif-lee  sv=0.4            *  15.      0.        12.1
 1.0      .35      -1.772    3.2       -.0011    -1.17     1.217     .982
 10.      0.       0.5       -.006
  29 *** trif-lee  sv=0.2            *  15.      0.        12.1
1.0       .291     -1.577    3.2       -.0011    -1.17     1.203     .99
 10.      0.       0.5       .037
  30 *** trif-lee  sv=0.1            *  15.      0.        12.1
 1.0      .231     -1.571    3.2       -.0011    -1.17     1.197     .989
 10.      0.       0.5       .072
  31 *** trif-lee  sv=0.04           *  15.      0.        12.1
 1.0      .209     -1.903    3.2       -.0011    -1.17     1.177     1.002
 10.      0.       0.5       .08
  32 **** x'2 n-h--sp rv-5a,v  1.0s    1.086     2001.086  9.1       9.1
```

```
-.479     1.0749   -.0241    -.057     .00633   -.00047  -.0705    .00117
.425      1.0823   -.00405   -.0993    0.       0.       -.151     .00418
 33 **** x'2 n-h--sp rv-5a,v  0.4s    2.00     2002.00  9.1       9.1
-.479     1.0749   -.0241    -.057     .00633   -.00047  -.0705    .00117
.425      1.0823   -.00405   -.0993    0.       0.       -.151     .00418
 34 **** x'2 n-h--sp rv-5a,v  0.2s    2.696    2002.696 9.1       9.1
-.479     1.0749   -.0241    -.057     .00633   -.00047  -.0705    .00117
.425      1.0823   -.00405   -.0993    0.       0.       -.151     .00418
 35 **** x'2 n-h--sp rv-5a,v  0.1s    3.507    2003.507 9.1       9.1
-.479     1.0749   -.0241    -.057     .00633   -.00047  -.0705    .00117
.425      1.0823   -.00405   -.0993    0.       0.       -.151     .00418
 36 **** x'2 n-h--sp rv-5a,v  0.04s   4.91     2004.91  9.1       9.1
-.479     1.0749   -.0241    -.057     .00633   -.00047  -.0705    .00117
.425      1.0823   -.00405   -.0993    0.       0.       -.151     .00418
 37****  n-h--sp  se-1a  x2   1.0s    0.       2000.    6.1       6.1
-8.30     2.3      -.83      -.0012    0.
.294      1.15     -.83      -.0028    0.
 38****  n-h--sp  se-1a  x2   0.4s    0.       2000.    6.1       6.1
-8.30     2.3      -.83      -.0012    0.
-.62      1.15     -.83      -.0028    0.
 39****  n-h--sp  se-1a  x2   0.2s    0.       2000.    6.1       6.1
-8.30     2.3      -.83      -.0012    0.
-1.316    1.15     -.83      -.0028    0.
 40****  n-h--sp  se-1a  x2   0.1s    0.       2000.    6.1       6.1
-8.30     2.3      -.83      -.0012    0.
-2.127    1.15     -.83      -.0028    0.
 41****  n-h--sp  se-1a  x2   0.04s   0.       2000.    6.1       6.1
-8.30     2.3      -.83      -.0012    0.
-3.53     1.15     -.83      -.0028    0.
 42**** rv-5sv    x2  1.0s            0.       .173     7.1       -.131
-8.924    2.8      -.00128   -.157     0.       .0000112 0.        0.
-12.484   3.846    -.000474  -.892     -.249    0.       0.        .00613
 43 ***** rv-5sv    x2    0.4s        0.       .0471    7.1       -.0526
-4.267    1.546     -.00455  -.076     .00047
-5.317    1.866    -.000746  -1.061    -.115    0.       0.        .00838
 44****** rv-5sv    x2     0.2s       -.0118            7.1
-2.667    1.159    -.0118    -.0559    .00278   -.000187  -.0242   .000439
-2.806    1.089    -.00157   -1.221    -.0522   .000095  .0578
 45****** rv-5sv    x2    0.1s        -.0356   0.       7.1
-2.104    .993     -.0171    -.0459    .00413   -.000287  -.0318   .000564
-.191     .458     -.00208   -2.333    0.       .0002    .298      -.0211
 46****  rv-5sv     x2     0.04s      -.0297   0.       7.1
-1.892    .91      -.0224    -.0417    .0053    -.000374  -.0398   .000692
4.084     0.       0.        -4.73  0.       0.       .557     -.0242
 47****  n-h--sp  se-1a  x3,x41.0s    0.       2000.    6.1       6.1
-8.30     2.3      -.83      -.0012    8.0
.294      1.15     -.83      -.0028    8.0
 48****  n-h--sp  se-1a  x3,x40.4s    0.       2000.    6.1       6.1
```

```
-8.30      2.3      -.83     -.0012   8.0
-.62       1.15     -.83     -.0028   8.0
  49****  n-h--sp  se-1a  x3,x40.2s    0.      2000.    6.1     6.1
-8.30      2.3      -.83     -.0012   8.0
-1.316     1.15     -.83     -.0028   8.0
  50****  n-h--sp  se-1a  x3,x40.1s    0.      2000.    6.1     6.1
-8.30      2.3      -.83     -.0012   8.0
-2.127     1.15     -.83     -.0028   8.0
  51****  n-h--sp  se-1a  x3,x40.04s    0.      2000.    6.1     6.1
-8.30      2.3      -.83     -.0012   8.0
-3.53      1.15     -.83     -.0028   8.0
  52***  n-h--sp  se-2a,v  x1,x4  1.0s   0.      2000.    6.1     6.1
-5.419     1.73      -.83     -.0012    8.
1.72       .86       -.83     -.0028    8.
  53***  n-h--sp  se-2a,v  x1,x4  0.4s   0.      2000.    6.1     6.1
-5.419     1.73      -.83     -.0012    8.
0.81       .86       -.83     -.0028    8.
  54***  n-h--sp  se-2a,v  x1,x4  0.2s   0.      2000.    6.1     6.1
-5.419     1.73      -.83     -.0012    8.
.114       .86       -.83     -.0028    8.
  55***  n-h--sp  se-2a,v  x1,x4  0.1s   0.      2000.    6.1     6.1
-5.419     1.73      -.83     -.0012    8.
-.697      .86       -.83     -.0028    8.
  56***  n-h--sp  se-2a,v  x1,x4 0.04s   0.      2000.    6.1     6.1
-5.419     1.73      -.83     -.0012    8.
-2.10      .86       -.83     -.0028    8.
  57*** rv-1sv   1.0s                  -.818    0.      1.      8.0
-4.606     .999      -.0011   .074      -.00933  -.102    .0277   -.00185
-6.361     1.539     -.00087  0.        -.00705  0.       0.       .000628
  58**** rv-1sv    0.4s                 -.783    0.      1.1     8.0
-7.204     3.0210    -.002    -.326     .0137    -.0192   0.       .000435
-7.645     2.932     -.00112  -.294     .0102    0.       -.011    .0019
  59****    rv-1sv     0.2s            -.661    0.      1.1     8.0
-3.998     1.93      -.00229  -.208     .00947   -.0929   .0175    -.000591
-3.821     1.405     -.00134  -.0829    0.       -.0874   0.       .00162
  60*****   rv-1sv     0.1s             -.574    0.      1.1     8.0
-1.1056    .765      -.00259  -.0541    .0026    -.166    .0358    -.00175
-1.583     .659      -.00155  0.        -.00316  -.234    .0292    0.
  61*****   rv-1sv     0.04             -1.189   0.      1.1     8.0
0.157      .256      -.00315  .0079     0.       -.231    .0523    -.00281
0.749      0.        -.00163  .0798     -.00706  -.180    .0289    0.
  62****  rv2sv      1.0s               -.378    -.00465  2.1     8.
-1.816     -.813     -.000836 .0158     .41      -.0283   0.       23.111
-15.293    2.762     -.00194  1.946     -.0497   0.       .000161  -.353
  63***** rv-2sv     0.4s              0.       -.021    2.1     8.
-6.262     2.369     -.00112  .00819    -.209    .0077    0.       16.376
-6.052     .77       -.00123  0.        0.       .00145
  64****   rv-2sv    0.2s               -.713    0.       2.1     8.0
```

```
-4.234    1.881    -.00141   .00459   -.193     .00918   0.        42.275
-11.897   0.       -.00313   4.182    .346      -.0134   .000257   -.639
 65*****  rv-2sv    0.1s              -.853     0.       2.1       8.0
-2.682    1.43     -.00178   0.       -.163     .00921   0.        44.379
-12.60    0.       -.00394   4.938    .405      -.0153   .00038    -.834
 66*****  rv-2sv    0.04s             0.        -.0389   2.1       8.0
-.609     .546     -.00237   0.       -.0469    .00405   0.        5.474
2.473     -1.791   -.00302   0.       .441      -.0174   .000312   -.327
```

APPENDIX D

PRINTOUTS OF SEISM 1 CODE GENERALIZED ATTENUATION FORMULAE

Coefficients and exponents may be changed to modify these formulae to the preference of each expert or to upgrade the formulae should new data become available. An earlier version of this code contained other attenuation formulae based on Modified Mercalli Intensities (MMI) of earthquake damage. Radically different approaches to determining vibratory ground motion attenuation may require development of other equation types and additional coding to incorporate them.

```
cffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff

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

cffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff

c     model a (model index=1)
c     boore-atkinson rv-model

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

c  IMPLICIT STATEMENT

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

      dimension c(1)

      r=dsqrt(d**2+c(20)**2)
      xlr=dlog10(r)
      xm2=xm**2
      xm3=xm*xm2
      l=0
      if (r.gt.100.) l=10
      v=c(1+l)+c(2+l)*xm+c(3+l)*r+c(4+l)*xm2+c(5+l)*xm3+c(6+l)*xm*xlr
     & +c(7+l)*xm2*xlr+c(8+l)*xm3*xlr
      if (r.gt.100.) go to 50
      v=v-xlr
      go to 60
   50 v=v+c(9)*xlr
   60 amodel=v*2.3026

      return
      end
```

```
c     model b  (model index=2)
c  torro-mcguire rv-model

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


c  IMPLICIT STATEMENT

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

      dimension c(1)

      r=dsqrt(d**2+c(20)**2)
      sr=dsqrt(r)
      xlr=dlog10(r)
      xm2=xm**2
      xm3=xm2*xm
      if (r.gt.100.) go to 100
      v=c(1)+c(2)*xm+c(3)*r-xlr+c(5)*xm2+c(6)*xm3+c(7)*xm*r
     & +c(4)*(xm-4.25)*(xm-8.)*dsin(3.1415926535898*(xm-4.5))
      go to 200
  100 v=c(11)+c(12)*xm+c(13)*r+c(14)*xlr+c(15)*xm2+c(16)*xm3+c(17)*xm*r
     & +c(18)*xm*xlr+(c(8)+c(9)*xm2+c(10)*xm3)/sr
  200 bmodel=v*2.3026

      return
      end
```

```
c     model c (index=3)

c     expert 2's rv-accel model

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


c  IMPLICIT STATEMENT

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

      dimension c(1)

      xm2=xm**2
      xm3=xm2*xm
      l=0
      h=2.5*(xm-1.)
      if (xm.lt.5.) h=5.*(xm-3.)
      r=dsqrt(d**2+h**2)
      xlr=dlog10(r)
      if (r.gt.100.) go to 100
      if (xm.le.4.5) l=10
      v=c(l+1)+c(2+l)*xm+c(3+l)*r-xlr+c(4+l)*xm2+c(5+l)*xm*r
     & +c(6+l)*xm2*r +c(7+l)*xm*xlr+c(8+l)*xm3*xlr
      go to 200
  100 v=2.772+.248*xm-.00119*r-3.432*xlr+.000135*xm*r
     &  +.501*xm*xlr-.0288*xm2*xlr+.00208*dcos(8.378*(xlr-2.))
  200 cmodel=v*2.3026

      return
      end
```

```
c     d model  (index=4)

c     expert 3's rv-5a accel model

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


c  IMPLICIT STATEMENT

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

      dimension c(1)

      xm2=xm**2
      xm3=xm2*xm
      r=dsqrt(d*d+64.)
      xlr=dlog10(r)
      if (r.gt.100.) go to 100
      v=c(1)+c(2)*xm+c(3)*r-xlr+c(4)*xm2+c(5)*xm2*r+c(6)*xm*xlr
     & +c(7)*xm2*xlr+c(8)*xm3*xlr
      go to 200
  100 v=c(11)+c(12)*xm+c(13)*r+c(14)*xlr+c(15)*xm2+c(16)*xm3+c(17)*xm*r
     & +c(18)*xm3*xlr-.0197*dcos(8.378*(xlr-2.))
  200 dmodel=v*2.3026

      return
      end
```

```
c     model e  (model index = 5)
c     *******
c     trifunac-anderson  accel model

      real*8 function emodel (xi,d,ald,c,icat)


c  IMPLICIT STATEMENT

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

      dimension c(1)

      r=d
      if (r.lt.c(9)) r=c(9)
      alr=dlog(r)
      xsit=0.
      if (icat.eq.1) xsit=2.
      if (icat.eq.2.or.icat.eq.3) xsit=1.
      if (icat.eq.6.or.icat.eq.7) xsit=1.
      emodel=c(1)+c(2)*xi+c(3)*r+c(4)*alr+c(5)*xsit

      return
      end
```

```
c     model f (model index = 6)
c     *******

      real*8 function fmodel (xm,d,c,l)


c  IMPLICIT STATEMENT

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

      dimension c(1)

      if (c(5).gt.1.) go to 100
      if (xm.lt.5.) h=5.*(xm-3.)
      if (xm.ge.5.) h=2.5*(xm-1.)
      go to 101
  100 h=c(5)
  101 r=dsqrt(d**2+h**2)
      fmodel=c(1+l)+c(2+l)*xm+c(3+l)*dlog(r)+c(4+l)*r

      return
      end
```

```
c     model g  (model index=7)

c     expert 2's rv spectral model

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


c  IMPLICIT STATEMENT

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

      dimension c(1)

      xm2=xm**2
      xm3=xm*xm2
      h=2.5*(xm-1.)
      r=dsqrt(d*d+h*h)
      xlr=dlog10(r)
      if (r.gt.100.) go to 100
      v=c(1)+c(2)*xm+c(3)*r-xlr+c(4)*xm2+c(5)*xm*r+c(6)*xm2*r +
     & c(7)*xm*xlr+c(8)*xm3*xlr+c(20)*dsin(1.57*(xm-6.5))
      go to 200
  100 v=c(11)+c(12)*xm+c(13)*r+c(14)*xlr+c(15)*xm2+c(16)*xm*r +
     & c(17)*xm*xlr+c(18)*xm2*xlr+c(9)*dcos(8.378*(xlr-2.)) +
     & c(10)*dcos(1.57*(xm-5.))
  200 gmodel=v*2.3026

      return
      end
```

```
c        model   h    (index = 8 )

c      expert 3's rv-5sv model for spectra

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


c  IMPLICIT STATEMENT

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

       dimension c(1)

       xm2=xm**2
       xm3=xm2*xm
       r=dsqrt(d*d+c(20)*c(20))
       xlr=dlog10(r)
       if (r.gt.100.) go to 200
       if (c(19)-8.4) 70,70,71
    70 cs=0.
       cc=1.
       go to 75
    71 cs=1.
       cc=0.
    75 v=c(1)+c(2)*r-xlr+c(3)*xm2+c(4)*xm3 +c(5)*xm*r +
      & (c(6)*xm +c(7)*xm2 + c(8)*xm3)*xlr +
      & c(9)*(cs*dsin(2.098*(xm-5.))+cc*dcos(1.047*(xm-5.)))
       go to 300
   200 sr=1./dsqrt(r)
       v=c(11)+c(12)*r+c(13)*xlr +c(14)*xm2 + c(15)*xm3 + c(16)*sr
       if (c(19).eq.8.1) v=v + .000202*xm*r -.0225*dcos(8.378*(xlr-2.14))
       if (c(19).eq.8.2.or.c(19).eq.8.3)
      &    v=v + c(17)*xm3*r + c(18)*xm*xlr + c(10)*xm3*xlr
       if (c(19).lt.8.4) go to 300
       cs=0.
       if (c(19).eq.8.5) cs=1.
       v= v + (c(17)*xm + c(18)*xm2 +c(10)*xm3)*xlr
      &     - cs*.0337*dcos(3.1415926535898*(xm-5.))
   300 hmodel=v*2.303

       return
       end
```

```
c     model xi  (index = 9 )

c     expert 2's n-h spectral model using his rv-5a, v models

      real*8 function ximod (xm,d,c,l)

c  IMPLICIT STATEMENT

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

      dimension c(1)

      if (l.eq.10) go to 100
      h=2.5*(xm-1.)
      xm2=xm**2
      xm3=xm2*xm

c  vel part
      r=dsqrt(d**2+h**2)
      xlr=dlog10(r)
      if (r.gt.100.) go to 50
      v=-3.169 + 1.024*xm - .0245*r - xlr -.0206*xm2 + .00587*xm*r -
     & .000348*xm2*r -.00087*xm2*xlr -.0162*dsin(1.57*(xm-6.5))
      go to 75
   50 v=-5.398 +1.998*xm-.00026*r -1.663*xlr -.129*xm2 +.0198*xm2*xlr
     & +.0144*dcos(1.57*(xm-5.))

c  note the .22 is the log of the amp fact for n-h velto sv
   75 ximod=(v+.22)*2.303
      return

  100 continue

c   accel part
      v=cmodel(xm,d,c)

c   note v has been converted to log base e in cmodel
      ximod=v-c(9)

      return
      end
```