NRDC Information Product
Installation/Tutorial Manual

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NRDC Information Product Installation/Tutorial Manual

1. Introduction

This manual describes the installation process for the NRDC information product and presents a brief tutorial that will give the user a quick look at a small portion of the data and provide an initial feel for the database layout and data display software. It is strongly recommended that the *NRDC Information Product Technical Reference Manual* be read before these data are used in any serious research efforts. Detailed descriptions of the stations, the data processing, the database layout, the software and the quality control measures that were used are contained in this technical reference manual.

2. Information Product Installation

The JSPC NRDC Information Product Tape contains over a gigabyte of compressed data (two gigabytes uncompressed) and associated tables, documentation, and software. The installation process facilitates unloading smallish portions of this information in order to not overwhelm local disk space.

The tape itself was originally created on a Sun workstation. Consequently, the installation procedure as well as the data format on the tape is oriented toward Sun workstations running UNIX. While it should be possible to extract the software and data on other architectures, you may find it necessary to

a) modify the installation process somewhat

b) possibly deal with byte ordering problems for the raw data and floating point format for the processed data.

c) compile the software for a different architecture.

2.1 Installation on a Sun workstation

You should be able to install from this tape using the standard SUN utility /usr/etc/extract_unbundled. The procedure is

1) run **/usr/etc/extract_unbundled**, and answer the questions about what tape drive and machine the tape is mounted on. The extract_unbundled script then reads in the second file from the tape and runs the script install_unbundled (from the tape).
(This step may fail if a previous run of extract_unbundled has left a copy of install_unbundled in /usr/tmp/unbundled*. If so, you need to remove or rename the old copy of* /usr/tmp/unbundled *-- try* **mv /usr/tmp/unbundled /usr/tmp/unbundled.old**. *You may need root permission to remove the old files, since extract_unbundled is often run as root).*

2) The install_unbundled script first asks what directory you wish to install into. As mentioned above, the entire tape would require about 1 Gbyte of free space; you will need about 50 Mbytes to extract the documentation, software, and a small sample of the data.

3) The script then presents several options; each option results in some things being read from the tape into the directory selected in step 2. You will be presented with this set of options multiple times until you select quit.

```
Options:
  0) Extract documentation  *** Do this first! ***
     (Description of contents, installation instructions, etc)

  1) Extract software
     (documentation, source code and Sun4 programs to manipulate data)

  2) Extract CSS tables
     required for some software above
     (wfdisc, sensor, instrument, sitechan, ...)
```

3) Extract (subset of) processed data
(wfdisc files and waveform files in sac format)
* REQUIRES CSS tables (step 2)

4) Extract (subset of) raw data
(wfdisc files and waveform files in raw format)
* REQUIRES CSS tables (step 2)

5) Extract everything

q) Quit

As the first step, you should extract the more detailed documentation (option 0) and read it. Then we recommend that you extract the software (option 1) and the database tables (option 2), and some subset of the processed data (option 3). The script will ask if you want to extract the Sun binaries also; respond yes to this.

When you select option 3 or 4 to extract some of the data, you may elect to load only certain days, stations, and channels. In the example below (for the processed data), the choices select some representative data and are a good choice for initial explorations.

Your choice: **3<cr>**

Select a subset of the data by specifying a day, a station and a channel.

At each prompt below, you may enter

a) a single day, station, or channel
b) <cr> to select all days, stations or channels
c) for days, a range: 1987078 1987122
d) for channels, a regular expression: ...Z
(selects all z-component channels)

Possible (Julian) Days:

	1987113	1987132	1987143	1987159	1987178	1987239
1987078	1987114	1987133	1987144	1987160	1987183	1987240
1987079	1987115	1987134	1987145	1987161	1987230	1987241
1987080	1987116	1987135	1987146	1987162	1987231	1987242
1987083	1987117	1987136	1987147	1987163	1987232	1987243
1987099	1987118	1987137	1987148	1987164	1987233	1987244
1987100	1987119	1987138	1987149	1987165	1987234	1987245
1987101	1987120	1987139	1987150	1987166	1987235	1987246
1987102	1987121	1987140	1987151	1987175	1987236	1987247
1987103	1987122	1987141	1987152	1987176	1987237	1987248
1987111	1987123	1987142	1987153	1987177	1987238	
1987112	1987124					

Possible Stations:
BAY KKL KSU UNR1 UNR2 UNR3 UNR4 UNR5

Possible Processed Data Channels:
HBIE HBIN HBIZ HSIE HSIN HSIZ
HSSE HSSN HSSZ LBIE LBIN LBIZ
LSIE LSIN LSIZ LSSE LSSN LSSZ

First Letter: High or Low gain

Second Letter: Surface or Borehole
Third Letter: Short period or Intermediate period
Fourth Letter: North, East, or Z orientation

Enter a day (1987145) or a day range (1987078 1987135): **1987141<cr>**
Enter a station: **<cr>**
Enter a channel (HBIE) or regular expression (...Z) : **<cr>**

selecting files ...
New Selections: 2.1 Mbytes in 70 files
Total Selections: 2.1 Mbytes in 70 files

Do you want to select more files? **n<cr>**

You have selected 2.1 Mbytes in 70 files.
Extract these files? **y<cr>**
Extracting files from tape; this will take some time...

Selecting option 4 to extract some of the raw data presents a similar set of options about days and stations. However, in this case, the channels have only numeric codes.

2.2 Installation on a non-SPARC workstation

If you are not using a Sun or SPARC compatible workstation, you will need to load the installation scripts by hand. The tape is organized as follows:

Tape Table of Contents

File#	Approx Size	Format	Contents
0	1 kb	dd	Descriptive file
1	2 Mb	tar	Installation Scripts
2	10 Mb	tar	Documentation
3	15 Mb	tar	Software source, man pages, and binaries
4	8 Mb	tar	CSS tables
5	400 Mb	tar	Processed Data (compressed format) (920 Mbytes uncompressed)
6	482 Mb	tar	Raw Data (compressed format) (1.3 Gbytes uncompressed)

The second file on the tape (file 1 above) contains the installation scripts and tables of contents for all the file on the tape.

Move to the directory where you wish to put the data, and use mt and tar to extract the installation scripts:

% **mt -f <tape-device> fsf 1**
% **tar xvf <tape-device>**

This will unload the following files into your directory:

README	descriptive file
Extract	script to extract data from the tape
install_unbundled	actual installation script (run by extract_unbundled on suns, or by Extract)
tapefile1.contents	list of contents of file1 on tape
tapefile2.contents	list of contents of file2 on tape
tapefile3.contents	list of contents of file3 on tape
tapefile4.contents	list of contents of file4 on tape
tapefile5.contents	list of contents of file5 on tape
tapefile6.contents	list of contents of file6 on tape

You can at this point use **mt** and **tar** to extract files by hand, or alternatively you can use the **install_unbundled** script as described above. The script uses the following programs:

sh	tar	dirname
mt	/bin/echo	/usr/ucb/more
sed	true	mkdir
uncompress	rsh	dd
cat	mv	

On some machines, you may need to edit **install_unbundled** to

a) replace the first line with "#!/usr/bin/ksh" or "#!/bin/sh5" instead of "#!/bin/sh". (The sh on DEC machines does not recognize subroutines.)

b) set the DEC flag to indicate a different syntax for an inclusion flag for tar.

You can run install_unbundled like:

% **./install_unbundled -t<tape-device>**

where tape-device is the non-rewind tape device on which the tape is mounted (eg, */dev/nrst0*). Then follow the instructions above as if you were on a Sun workstation. You will probably not want to extract the Sun binaries, and you may have to deal with byte ordering problems in the data.

Once you have extracted the source code from the tape, you may wish to generate the executables. This can be done by

1) moving to the sw directory (nrdc/sw)

2) run the script Config. This will ask you for the location of X11 and open windows libraries, and set up an include file for the Makefiles

3) Set the environment variable JSPCMAKE as indicated by the Config script.

4) Move to the src directory (nrdc/sw/src) and type **make install**.

2.3 After Installation

After you have extracted the documentation, the programs and some of the data from the tape, you will need to set some environment variables in order to use the programs. Specifically, you must set

a) path, so that the JSPC programs are on your execution path.

b) JSPC_DBPATH, so that the JSPC programs can find all the tables.

c) MANPATH, so that man can find the man pages for the JSPC software.

If you've installed the contents of the tape in <*IDIR*>, then the following c-shell commands would set up your environment correctly:

set path=(<*IDIR*>/nrdc/sw/<*arch*>/bin $path)
setenv JSPC_DBPATH <*IDIR*>/nrdc/data/tables/nrdc
setenv MANPATH <*IDIR*>/nrdc/sw/man:$MANPATH

where <*arch*> is sun4 if you're on a Sun SPARC machine, and is whatever you chose when running Config if you're on some different architecture. These commands also presume that you already have a MANPATH environment variable, and that your version of man understands it. If you have a very old version of man, MANPATH may not be supported. In that case you can either install the man pages from nrdc/sw/man into the standard location, or get a more modern replacement for man.

2.4 In Case of Problems

If you have problems extracting data from the tape, please send mail :

IRIS Joint Seismic Program Center
University of Colorado
Physics Department, Campus Box 390
Boulder, CO 80309-0390

or call directly:

303/492-4878 Daniel Quinlan

or send electronic mail to:

problems@jspc.colorado.edu

3. Tutorial

Following is a brief tutorial which will bring up a number of windows where you can look at and play with the data. We assume that you are using csh as your shell.

1. You must first install the information product by following the instructions in section 2 of this manual. Install the processed data for day 1987141, for all stations and for all channels. Also make sure you have installed the software and the CSS tables.

2. Assuming the install directory is /*my_install_dir*, uncompress the waveform data by typing the following.

   cd /*my_install_dir*/nrdc/data/proc/1987141/sac
   uncompress *

   You should have about 4 Mbytes of data in the directory now.

3. Start X-windows (or OpenWindows) if it is not currently running. Change back to your home directory and add the following line to your .Xdefaults file.

   OpenWindows.FocusLenience: True

   If you are using the OpenLook window manager (**olwm**) restart it (you can always do this by exiting OpenWindows and restarting it). Once you have modified your .Xdefaults file you will not have to do this step again.

4. Change directory and set the **JSPC_DBPATH** environment variable by typing the following.

   cd /*my_install_dir*/nrdc/data/proc/1987141
   setenv JSPC_DBPATH .:/*my_install_dir*/nrdc/data/tables/nrdc

5. Run the program **dblook** in the background by typing the following. It is assumed that you have already installed the software and set your program search path appropriately.

   dblook 1987141 &

   A window should appear with a button for each database table along with a Quit button.

6. Click the left mouse button on the wfdisc button. Another window should appear with a display of the **wfdisc** table. You can scroll through this window be clicking on the vertical or horizontal scrollbar widgets. Click the left mouse button on one of the rows in the table, somewhere in the middle of the row. Another window should appear with the waveform segment displayed. Click

on the Done buttons in both the trace display and **wfdisc** display windows.

7. Run the program **dbpick** in the foreground by typing the following.

   dbpick 1987141

   After the prompt, *Do you wish to see it?:* type the following.

   y

   After the prompt, *Do you wish to read the waveform data into memory?* type the following.

   n

   A window will appear with seismic data. In the original window where you started the program, a typein prompt, *dbpick*>, will appear.

8. In the original typein window, after the *dbpick*> prompt, type the following.

   tw 80

   The time window in the display has been changed to 80 seconds. A phase arrival flag at KKL HSSZ should appear now labeled **P 052**. This indicates a P arrival that has been associated with event 052. A trace display window dump is shown in figure 1.

9. Back in the **dblook** button window, click on the origin button. A window will appear displaying the **origin** table. Scroll vertically through the table by clicking on the vertical scroll arrow box until you find **orid** value 52. By scrolling horizontally through the table you can see that this is a PDE event of Mb 4.6 located in seismic region number 211. From the **sregion** table you can identify this as S. of Honshu, Japan. Bring up the **assoc** table and scroll through looking for **orid** 52. From this you can see that KKL is 51.365 degrees away from the event. The station to event azimuth is 83.55 degrees. Remove the new **dblook** windows by clicking on the Done buttons.

10. Place the cursor in the trace display window and press the n key on the keyboard once. The display will jump scroll to the next arrival flag which marks an unassociated event (this is evident because there is no number after the phase code). Notice that all 15 channels are displayed for station KKL. Remember that all channels were processed whenever any one of the high gain channels was clipped, which is the case for this event. A trace display window dump of this unassociated event is shown in figure 2. The display will jump scroll to the next arrival flag every time the n key is pressed. If the p key is pressed then the previous arrival is displayed. The N and P keys behave similarly for waveform segments regardless of whether or not an arrival flag is present.

11. Place the cursor in the **dbpick** waveform display window and jump scroll until event 53 is displayed. Note that both BAY and KKL have associated arrivals. This event is a quarry blast as can be seen in the **origin** table. A trace display window dump of this associated event is shown in figure 3. Place the cursor in the **dbpick** waveform display window, press and hold down the middle mouse button and drag the display left and right along the time axis. When the button is released, the display is redrawn. Note that the amplitude scaling is automatic for each trace. To force automatic amplitude scaling on the first trace only with the other traces using the same scale, press and hold the left mouse button on the upper button labeled **AMP: A** which will display a pull-down menu. While holding the left mouse button move down the menu to **Auto1** and then release the button.

12. Go back to the original typein window (by moving your cursor to that window) and type quit. Quit the **dblook** button window by clicking on Quit.

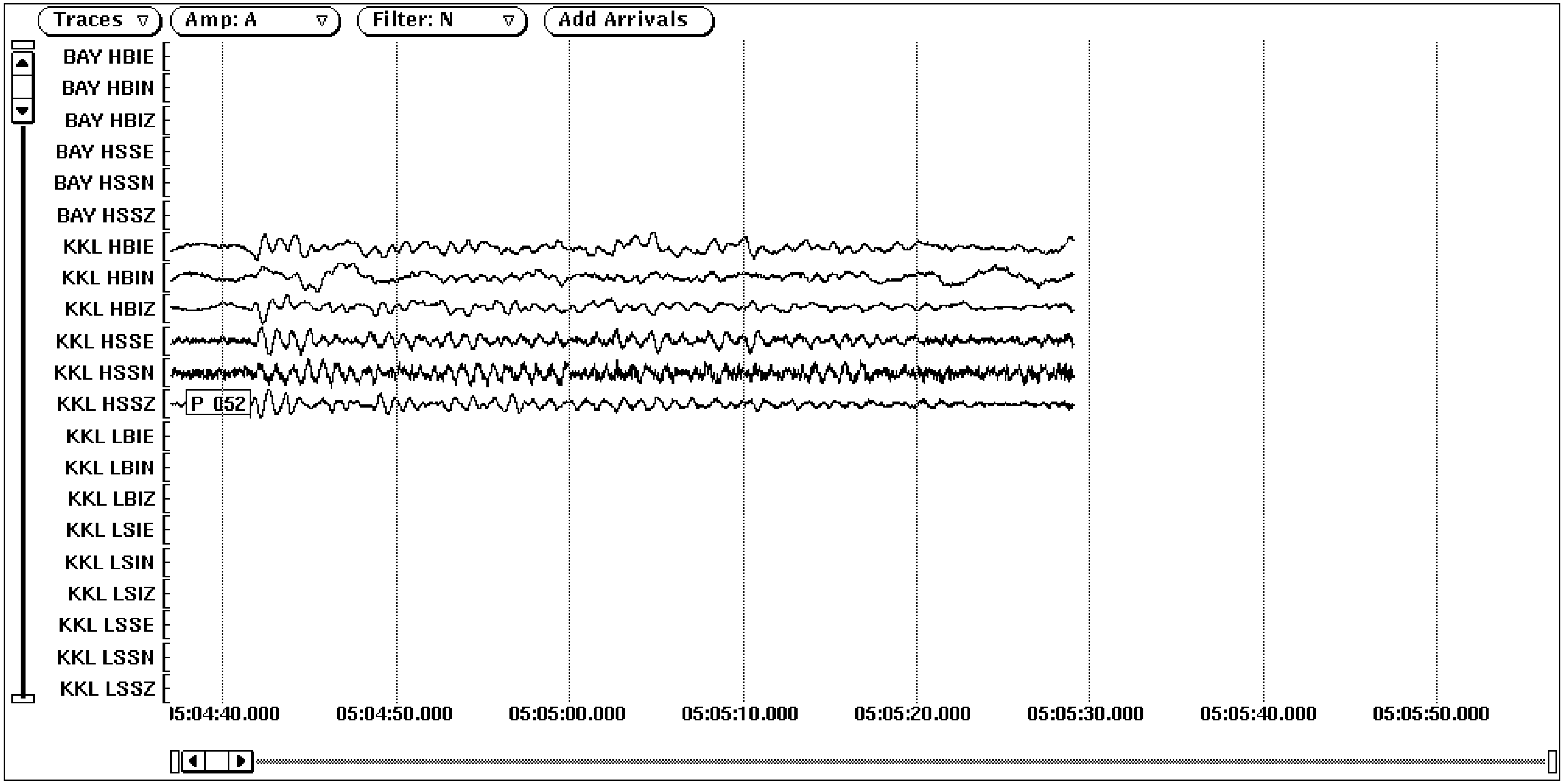

Figure 1. Window dump of program **dbpick** for event 52 on date 1987141.

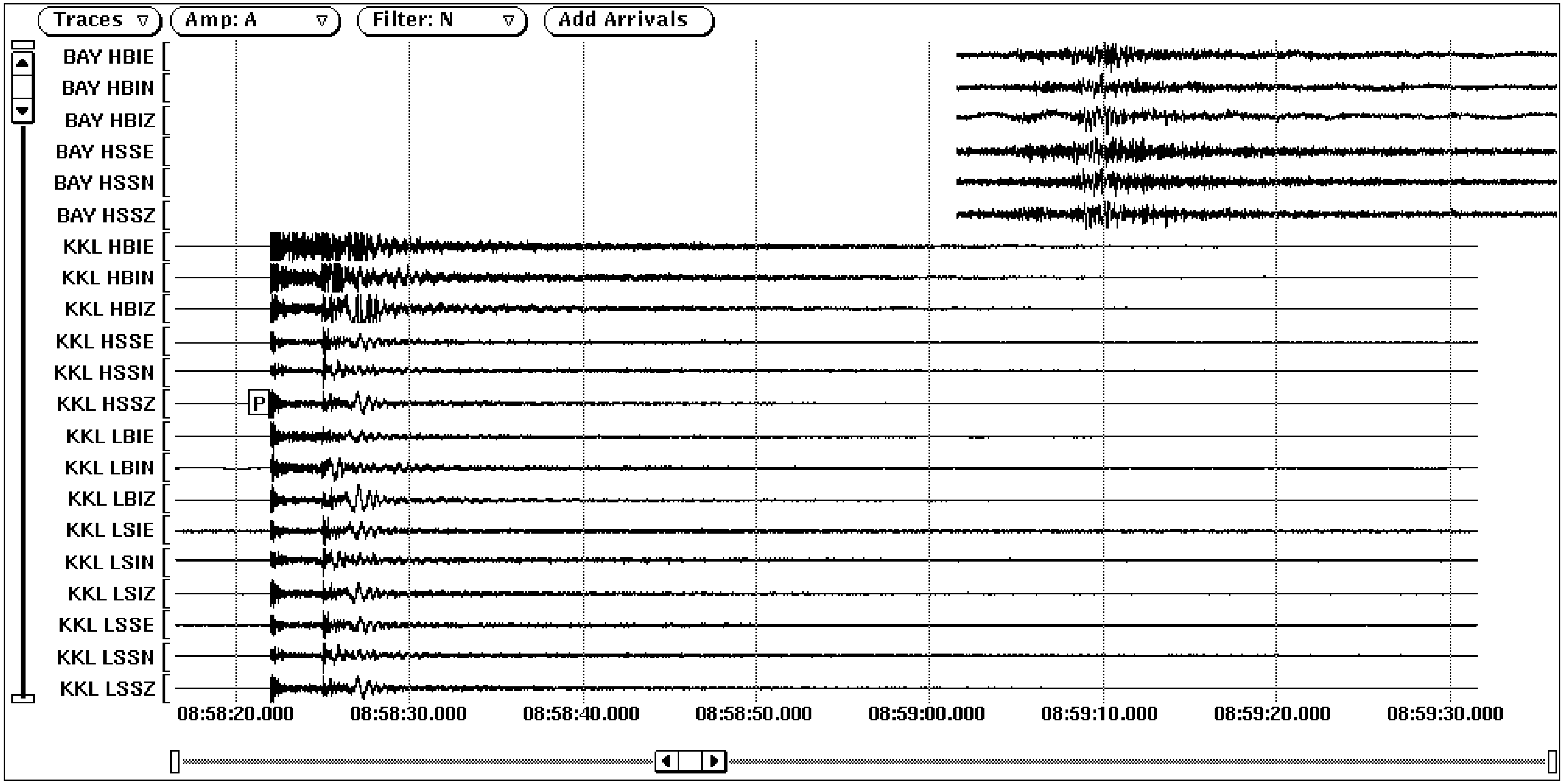

Figure 2. Window dump of program **dbpick** for the first unassociated event on date 1987141.

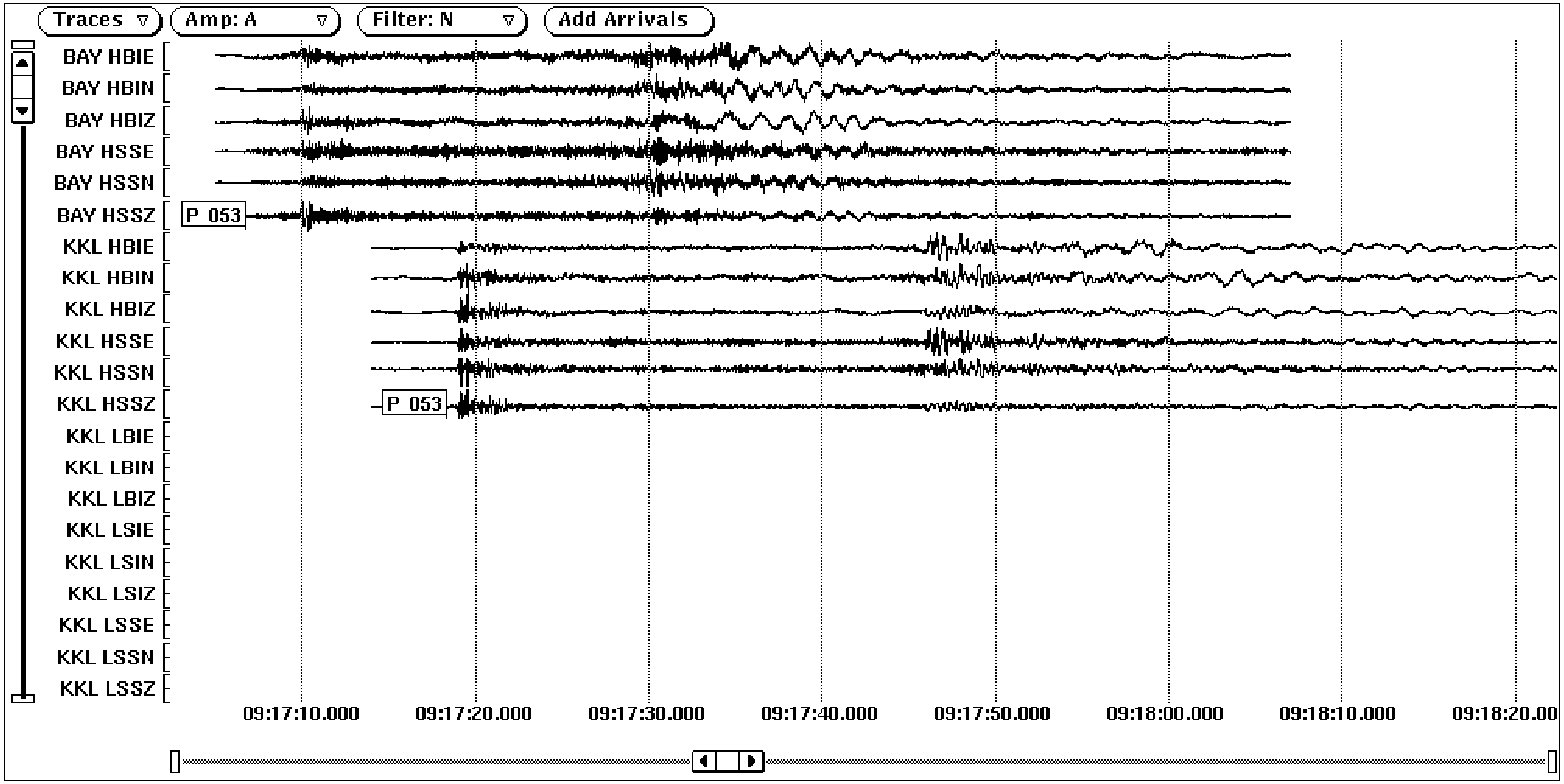

Figure 3. Window dump of program **dbpick** for quarry blast event 53 on date 1987141.