HWNOISE
PROGRAM USERS' GUIDE

**NOISE MEASUREMENT AND
ASSESSMENT FACILITY**

FEBRUARY 1992

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U.S. DEPARTMENT OF TRANSPORTATION
4444444444444444444444444444   4U
RESEARCH AND SPECIAL PROGRAMS ADMINISTRATION
VOLPE NATIONAL TRANSPORTATION SYSTEMS CENTER
KENDALL SQUARE ! CAMBRIDGE MA 02142
4444444444444444444444444444444444444444444U
PREPARED FOR FEDERAL HIGHWAY ADMINISTRATION
OFFICE OF ENGINEERING AND HIGHWAY OPERATIONS RESEARCH
AND DEVELOPMENT AND OFFICE OF TECHNOLOGY APPLICATIONS
6300 GEORGETOWN PIKE ! MCLEAN VA 22101-2296
44444444444444444444444444444444444444444444

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<u>GLOSSARY OF TERMS</u>

<u>AWT (A-weight)</u> - A series of weighting coefficients that are applied
to a measured sound level to alter the sensitivity of that level as a
function of frequency. The weighting coefficients are based upon the

sensitivity of the human ear.

IVAWT (Ivie A-weight) – A-weighted data obtained directly from the Ivies sound level meter which has been internally weighted to conform with A-weight characteristics.

Derived A-weight – A-weighted data derived from the Ivies' 1/3 octave levels by applying the appropriate weighting coefficients to the measured 1/3 octave levels and summing together the weighted levels in each frequency band on an energy basis.

ANSI S1.11-1986 Format – All 1/3 octave level data in this document are displayed in ANSI S1.11-1986 format, i.e. 1/3 octave frequency band 14 corresponds to 25 Hz., 1/3 octave frequency band 15 corresponds to 31.5 Hz., etc.

Calibration – The process of adjusting measured noise levels based upon a known reference level.

Calibration Level – A known reference level used to adjust measured levels. For the purposes of this document, the calibration level is 114 dB, re. 20 micropascal.

Cetec Ivie IE-30A Measuring System (IVIE) – A portable real time 1/3 octave spectrum analyzer/precision sound level meter. The FHWA measuring system is capable of simultaneously collecting noise data from up to eight of these units.

Data File – A file which contains measured noise level data in mean square pressure format, unadjusted for system calibration.

Header Information – A user-inputted unique identification used to distinguish one data file from the next.

Interval – The user-selected averaging period. Data is sampled eight times per second and stored over the interval selected.

IVLEQ – The average sound level calculated using the IVAWT data over the time period selected.

IVSEL – The sound exposure level calculated using the IVAWT data over the time period selected.

LEQ – The average sound level calculated using the 1/3 octave derived A-weight data over the time period selected.

Measured Levels – The raw noise levels stored away in a data file in mean square pressure format, unadjusted for system calibration.

Measurement Period - The user-defined time period for an entire noise event.

OASPL - The overall sound pressure level with **no** weighting coefficients added.

1/3 Octave Level - The processed noise level data for a particular 1/3 octave frequency band (14-43).

Processed Data - The noise level obtained after the measured level has been adjusted for calibration and gain factors and converted to decibel values.

SEL - The sound exposure level calculated using the 1/3 octave derived A-weight data over the time period selected.

SPL - The sound pressure level (SPL) calculated using processed noise level data. SPL is defined as 10 times the logarithm, base 10, of the mean square pressure, re. 20 micropascals.

Spectrum - A noise level versus frequency description of a measured sound. For the purposes of this Users' Guide frequency is displayed in ANSI S1.11-1986 format.

HWNOISE
PROGRAM USERS' GUIDE

1.0 BACKGROUND

HWNOISE is a VNTSC-developed user friendly program written in
Microsoft Fortran version 4.01 for the IBM PC/AT and
compatibles to analyze acoustic data. This program is an
integral part of the Federal Highway Administration's Mobile
Noise Data Gathering and Analysis Laboratory and is used to
process acoustic data collected from up to eight Cetec Ivie IE-
30A measuring systems utilizing the companion program, HWINPUT.
Processed data, including selected noise level indices can be
displayed in both tabular and graphical form.

> **NOTE:** In the following, it is assumed that:
>
> **!** All operator entries are followed by striking
> 'ENTER'.
> **!** All operator entries are boldfaced and
> underlined.
> **!** All computer responses are in boldface caps.
> **!** When prompted for a data or calibration
> filename the user may obtain a directory of
> the selected disk drive by typing **dir**.

2.0 STARTUP

REQUIREMENTS: 1.) data files collected with program, HWINPUT,
including calibration file(s); 2.) an IBM PC/AT or compatible
with HWNOISE Program, Version 04/01/91, 0800 Hours, resident on
the "C" drive.

With the "C" drive prompt displayed on the monitor, type
HWNOISE to invoke the program.

o   **C:>**   **HWNOISE**

The computer responds with the current version (date and time) of the HWNOISE software along with questions pertaining to hardware and the location of the data and calibration file(s). Note, insure files are resident on the appropriate disk drive.


```
****************************************************************

o        HWNOISE PROGRAM VERSION 04/01/91   0800 HOURS

****************************************************************

        DATE = 01/16/92   TIME = 12:47:13

        WHICH DISPLAY FOR CURVE PLOTS -
        EGA/VGA=0, CGA=1: _____0_____


        WHICH PRINTER MODEL FOR CURVE PLOTS -
        FX(100)=0, PROPRINTER=1, LASERJET=2: _____0_____


        WHICH DRIVE CONTAINS THE DATA (A-Z): _____A_____
```


3.0   CALIBRATION

The computer prompts the user to input the number of calibration file(s) to be used and their filename(s). In most cases, the initial and final calibration files for a specific measurement period should be selected. Header information is read from the file(s) and displayed.


```
o        HOW MANY CALIBRATION FILES (1,2,3,4): _____2_____

        FIRST CALIBRATION FILE: 1CAL0801
        INITIAL CALIBRATION, SYSTEMS 1 - 4

        SECOND CALIBRATION FILE: 2CAL0801
        FINAL CALIBRATION, SYSTEMS 5 - 8
```


Up to four calibration files can be selected. The program processes the data from the files selected and displays average calibration differences (differences between the calibration level and the measured level) on the monitor for both the IVAWT and the 1/3 octave level data (1/3 OCT).

The user has the opportunity and is prompted to adjust any or all averages, as appropriate. An adjustment to the calibration data should only be made if properly justified. In most cases an adjustment is not necessary. The 1/3 octave and IVAWT noise level data is corrected using their respective average "CAL. DIFF." values. In the following example two calibration files are processed:

o   LEVEL 1
         CAL. DIFF. (IVAWT) FOR IVIE NUMBER(S)
IVIE #   1   2   3   4   5   6   7   8
FILE 1   .1   .6   .7   .6   999.0   999.0   999.0   999.0
FILE 2 999.0   999.0   999.0   999.0   .5   .7   .9   .9
   AVG   .1   .6   .7   .6   .5   .7   .9   .9

CHANGE ANY AVERAGES (Y/N)? _____ N _____

                          LEVEL 1
         CAL. DIFF. (1/3 OCT) FOR IVIE NUMBER(S)
IVIE #   1   2   3   4   5   6   7   8
FILE 1   -.1   .6   .1   .6   999.0   999.0   999.0   999.0
FILE 2 999.0   999.0   999.0   999.0   .1   -.1   .4   0
   AVG   -.1   .6   .1   .6   .1   -.1   .4   0

CHANGE ANY AVERAGES (Y/N)? _____ N _____

                          LEVEL 1
         CAL. DIFF. (IVAWT) FOR IVIE NUMBER(S)
IVIE #   1   2   3   4   5   6   7   8
   AVG   .1   .6   .7   .6   .5   .7   .9   .9

                          LEVEL 1
         CAL. DIFF. (1/3 OCT) FOR IVIE NUMBER(S)
IVIE #   1   2   3   4   5   6   7   8
   AVG   -.1   .6   .1   .6   .1   -.1   .4   0
HIT ENTER TO CONTINUE

3

4.0 DATA PROCESSING

The computer prompts the user for a data filename. The header information read from the file is displayed on the monitor, while the noise data is corrected for calibration differences and read into computer memory.

o   **DATA FILE: 1A0801**
          READING DATA, PLEASE WAIT ...

          TRUCK A - .25 SEC. AVG. - NORTH TO SOUTH RUN

To speed up the processing and allow for a quick look at only the A-weight SPL data (IVAWT), the user is prompted to process only Ivie A-weight SPL data, i.e., no 1/3 octave level data is processed.

o   **WANT TO PROCESS ONLY IVIE AWT (Y/N)?**

Note: Upon typing **Y** the abbreviated main menu and procedure of Section 4.1 should be followed. Upon typing **N** the main menu and procedure of Section 4.2 should be followed.

The filename, number of intervals, and seconds per interval is read from the file and displayed on the monitor. The user has the opportunity to select any range of intervals between one and the number of intervals displayed.

o   **FILE: 1A0801 NUMBER OF INTERVALS: 120 .250 SEC(S)/INT**
       START INTERVAL: 1
       END INTERVAL: 120

       PROCESSING, PLEASE WAIT...

4.1   PROCESS ONLY IVIE AWT SPL DATA

If the user selects to process only the Ivie A-weight SPL data
(IVAWT), the following abbreviated main menu is displayed along
with the range of data the user selected to process.


```
FILE: 1A0801  NUMBER OF INTERVALS:  120  .250 SEC(S)/INT
START INTERVAL:  1  END INTERVAL:    120
** PRINTER OFF **

 0 - SELECT NEW INTERVALS FOR EXISTING DATA FILE
 2 - SUMMARY OF AWT, SEL, LEQ -- BY INTERVAL, FOR ALL IVIES
 7 - SUMMARY OF AWT, SEL, LEQ FOR IVIE PAIR DIFFERENCES

 8 - PRINTER ON/OFF TOGGLE
 9 - PLOT MENU
10 - PROCESS NEW DATA FILE WITH EXISTING CAL FILE
11 - PROCESS NEW DATA FILE WITH NEW CAL FILE
12 - DIRECTORY OF SELECTED DISK DRIVE
13 - OVERLOAD INFORMATION
99 - EXIT PROGRAM

ENTER SELECTION:
```


Typing **0**, **2**, **7**, **9**, **10** or **11** invokes the selection of
interest explained in Sections 4.1.1 through 4.1.6.

Typing **8** toggles the printer on and off, as required.

Typing **12** allows the user to view a directory of the selected disk
drive.

Typing **99** allows the user to exit the program.

Note, selection **13** has no function in the abbreviated main menu.

4.1.1 0 - SELECT NEW INTERVALS FOR EXISTING DATA FILE

Typing **0** gives the user the opportunity to change the desired
interval range of data to process. The user is prompted for a new
start and end interval.

  o   **ENTER SELECTION:** ____0____

The computer repeats the procedure described in Section 4.0, Data
Processing.

4.1.2 <u>2 - SUMMARY OF AWT, SEL, LEQ -- BY INTERVAL, FOR ALL IVIES</u>

With the abbreviated main menu displayed, type **2** to obtain a
summary tabulation of the A-weight SPL (IVAWT), IVSEL, and IVLEQ
indices. Also displayed for each Ivie is the maximum A-weight
level and the interval at which maximum occurs.

  o   **ENTER SELECTION:** ____2____

An example table is shown in Appendix A, Table A4.1.2.

4.1.3 <u>7 - SUMMARY OF AWT, SEL, LEQ FOR IVIE PAIR DIFFERENCES</u>

With the abbreviated main menu displayed, type **7** to obtain a
summary tabulation of level differences between specific Ivie
pairs for the maximum A-weight, the Ivie A-weight, the IVSEL and
the IVLEQ indices.

  o   **ENTER SELECTION:** ____7____

The computer responds by listing those Ivies for which data
exists. The user can select up to 8 Ivie pairs, as appropriate.

o   **VALID IVIES: 1 2 3 4 5 6 7 8**
           HOW MANY IVIE PAIRS (8 MAX)? ____4____
           PAIR NUMBERS (IVx-IVy):
             __5-1____
             __6-2____
             __7-3____
             __8-4____

An example table is shown in Appendix A, Table A4.1.3.

4.1.4 <u>9 - PLOT MENU</u>

If a graphical presentation of the Ivie A-weight SPL (IVAWT) table
is desired, type **9** to obtain the following plot menu:

o   **PLOT MENU**

          0 - (IVIE) AWT LEVEL VS INTERVAL

          9 - EXIT PLOT MENU

          ENTER SELECTION:

With the plot menu displayed, select **0** to view the Ivie A-weight
SPL versus interval graph.

o   **ENTER SELECTION:** ____0____

The computer responds by listing those Ivies for which data
exists. The user is prompted to select up to 8 plots to a single
display.

o   **IVIE(S) 1 2 3 4 5 6 7 8 EXIST.**

          HOW MANY IVIE(S) TO PLOT? _____8_____
          READY TO DISPLAY DRAWING
          Strike any key to continue

With the above plot displayed on the screen, strike any key to obtain a prompt for a hardcopy. Upon typing **Y** or **N**, as appropriate, the plot menu is again displayed.

o   **WANT A HARDCOPY PLOT (Y/N)? _____Y_____**

An example plot is shown in Appendix C, Plot C4.1.4.

Type **9** to exit the plot menu and return to the abbreviated main menu.

4.1.5 <u>10 - PROCESS NEW DATA FILE WITH EXISTING CAL FILE</u>

With the abbreviated main menu displayed, type **10** to process a new data file using the existing calibration file(s) stored in memory.

o   **ENTER SELECTION: _____10_____**

The computer repeats the procedure described in Section 4.0, Data Processing.

4.1.6 <u>11 - PROCESS NEW DATA FILE WITH NEW CAL FILE</u>

With the abbreviated main menu displayed, type **11** to begin analysis using a new data file and a new calibration file(s).

o   **ENTER SELECTION:**   **11**

The computer repeats the procedure described in Sections 3.0, Calibration, and 4.0, Data Processing.

4.2   PROCESS IVIE AWT SPL AND l/3 OCTAVE LEVEL DATA

If the user selects to process both Ivie A-weight SPL (IVAWT) and 1/3 octave level data, the following main menu is displayed along with the range of data selected to process.

```
FILE: 1A0801  NUMBER OF INTERVALS:   120  .250 SEC(S)/INT
START INTERVAL:  1    END INTERVAL:    120
** PRINTER OFF **

 0 - SELECT NEW INTERVAL FOR EXISTING DATA FILE

 1 - 1/3 OCT LEVELS -- BY INTERVAL, FOR ALL IVIES
 2 - SUMMARY OF AWT, SEL, LEQ -- BY INTERVAL, FOR ALL IVIES
 3 - 1/3 OCT LEVELS -- BY IVIE, FOR ALL INTERVALS
 4 - SUMMARY OF 1/3 OCT SEL, LEQ -- FOR SELECTED RANGE OF
     INTERVALS

 5 - 1/3 OCT LEVEL DIFFERENCES FOR EACH INTERVAL - BETWEEN
     IVIE PAIRS
 6 - 1/3 OCT LEQ DIFFERENCES OVER SELECTED INTERVALS -
     BETWEEN IVIE PAIRS
 7 - SUMMARY OF AWT, SEL, LEQ FOR IVIE PAIR DIFFERENCES

 8 - PRINTER ON/OFF TOGGLE
 9 - PLOT MENU
10 - PROCESS NEW DATA FILE WITH EXISTING CAL FILE
11 - PROCESS NEW DATA FILE WITH NEW CAL FILE
12 - DIRECTORY OF SELECTED DISK DRIVE
13 - OVERLOAD INFORMATION
99 - EXIT PROGRAM

ENTER SELECTION:
```

Typing **0-7**, **9-11** invokes the selection of interest explained in Sections 4.2.1 through 4.2.11.

Typing **8** toggles the printer on and off, as required.

Typing **12** allows the user to view a directory of the selected disk drive.

Typing **13** allows the user to view 1/3 octave level overload information.

Typing **99** allows the user to exit the program.

4.2.1 <u>0 - SELECT NEW INTERVAL FOR EXISTING DATA FILE</u>

Typing **0** gives the user the opportunity to change the desired interval range of data to process. The user is prompted for a new start and end interval.

o   **ENTER SELECTION:**   **0**

The computer repeats the procedure described in Section 4.0, Data Processing.

4.2.2 <u>1 - 1/3 OCT LEVELS -- BY INTERVAL, FOR ALL IVIES</u>

With the main menu displayed, type **<u>1</u>** to obtain 1/3 octave level data for each interval for all the Ivies. All 1/3 octave level data is displayed in ANSI S1.11-1986 format, i.e., band 14 corresponds to 25 Hz., band 15 corresponds to 31.5 Hz., etc.

o   **ENTER SELECTION:**   **1**

Also displayed is the 1/3 octave derived A-weight SPL and OASPL, along with the IVAWT. A summary of the SEL, LEQ, IVSEL, and IVLEQ, averaged over the interval range selected, are also provided.

An example table is shown in Appendix B, Table B4.2.2.

4.2.3 <u>2 - SUMMARY OF AWT, SEL, LEQ -- BY INTERVAL, FOR ALL IVIES</u>

With the main menu displayed, type **<u>2</u>** to obtain a summary tabulation of the A-weight SPL, SEL, and LEQ indices directly from the Ivie(s) and the same indices derived from the 1/3 octave level data. Also displayed for each Ivie is the maximum A-weight level (1/3 octave derived and directly from Ivie(s)) and the interval at which maximum occurs.

o   **ENTER SELECTION:**   **2**

An example table is shown in Appendix B, Table B4.2.3.

4.2.4 <u>3 - 1/3 OCT LEVELS -- BY IVIE, FOR ALL INTERVALS</u>

With the main menu displayed, type **<u>3</u>** to obtain 1/3 octave levels by Ivie for all intervals. Also included are the 1/3 octave derived A-weight level, OASPL, and the IVAWT level for each interval.

o   **ENTER SELECTION:** _____3_____

An example table is shown in Appendix B, Table B4.2.4.

4.2.5 <u>4 - SUMMARY OF 1/3 OCT SEL, LEQ -- FOR SELECTED RANGE OF
      INTERVALS</u>

With the main menu displayed, select **4** to obtain a summary of LEQ
and SEL for each 1/3 octave band, by Ivie, over the selected range
of intervals.

o   **ENTER SELECTION:** _____4_____

An example table is shown in Appendix B, Table B4.2.5.

4.2.6 <u>5 - 1/3 OCT LEVEL DIFFERENCES FOR EACH INTERVAL -- BETWEEN
      IVIE PAIRS</u>

With the main menu displayed, select **5** to obtain differences in
1/3 octave levels for each interval between Ivie pairs.

o   **ENTER SELECTION:** _____5_____

The computer responds by listing those Ivies for which data
exists. The user can select up to 8 Ivie pairs, as appropriate.

o   **VALID IVIES: 1 2 3 4 5 6 7 8**
           HOW MANY IVIE PAIRS (8 MAX)? _____4_____
           PAIR NUMBERS (IVx-IVy):
               _____5-1_____
               _____6-2_____
               _____7-3_____
               _____8-4_____

For each Ivie pair chosen, the computer displays the 1/3 octave level differences for each 1/3 octave frequency band (14-43), the 1/3 octave derived A-weight level and OASPL differences, and the Ivie A-weight SPL differences. Also displayed are the SEL and LEQ differences averaged over the range of intervals selected.

An example table is shown in Appendix B, Table B4.2.6.

4.2.7 <u>6 - 1/3 OCT LEQ DIFFERENCES OVER SELECTED INTERVALS -
      BETWEEN IVIE PAIRS</u>

With the main menu displayed, select **6** to obtain LEQ differences for each 1/3 octave band over the selected range of intervals.

o   **ENTER SELECTION:** <u>   6   </u>

The computer responds by listing those Ivies for which data exists. The user can select up to 8 Ivie pairs, as appropriate.

o   **VALID IVIES: 1 2 3 4 5 6 7 8**
         HOW MANY IVIE PAIRS (8 MAX)? <u>   4   </u>
         PAIR NUMBERS (IVx-IVy):
             <u>   5-1   </u>
             <u>   6-2   </u>
             <u>   7-3   </u>
             <u>   8-4   </u>

An example table is shown in Appendix B, Table B4.2.7.

4.2.8 <u>7 - SUMMARY OF AWT, SEL, LEQ FOR IVIE PAIR DIFFERENCES</u>

With the main menu displayed, type **7** and follow the procedures of Section 4.2.7 to obtain a summary of the 1/3 octave derived A-weight level differences over the selected range of intervals for each Ivie pair. Also included are the SEL, LEQ, IVSEL, IVLEQ, and the maximum level differences (1/3 octave derived and directly from Ivie(s)) over the selected range of intervals.

o   **ENTER SELECTION:** <u>   7   </u>

An example table is shown in Appendix B, Table B4.2.8.

4.2.9 <u>9 - PLOT MENU</u>

If a graphical presentation of the tables in Appendices A and B are desired, type **9** to obtain the following plot menu:


```
o          PLOT MENU
           0 - (IVIE) AWT LEVEL VS INTERVAL
           1 - (1/3 OCT DERIVED) AWT LEVEL VS INTERVAL
           2 - (1/3 OCT DERIVED) OASPL LEVEL VS INTERVAL
           3 - LEVEL VS INTERVAL (BY FREQ BAND)
           4 - LEVEL VS FREQUENCY (BY INTERVAL)
           5 - LEQ VS FREQUENCY (AVG OVER RANGE SELECTED)
           6 - 3D SPECTRUM PLOT

           9 - EXIT PLOT MENU

           ENTER SELECTION:
```


Note: With the above plots displayed on the screen, strike any key to obtain a prompt for a hardcopy. Upon typing **Y** or **N**, as appropriate, the plot menu is again displayed.

4.2.9a <u>0 - (IVIE) AWT LEVEL VS INTERVAL</u>

Follow the procedure of Section 4.1.4 to obtain a plot of up to eight graphs per display of the Ivie A-weight SPL versus interval.

An example plot is shown in Appendix D, Plot D4.2.9a.

4.2.9b <u>1 - (1/3 OCT DERIVED) AWT LEVEL VS INTERVAL</u>

With the plot menu displayed, type **1** to view the 1/3 octave derived A-weight level versus interval graph.

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o   **ENTER SELECTION:**   1

Follow the procedure of Section 4.1.4.

An example plot is shown in Appendix D, Plot D4.2.9b.

4.2.9c 2 - (1/3 OCT DERIVED) OASPL VS INTERVAL

With the plot menu displayed, type **2** to view the 1/3 octave
derived OASPL versus interval graph.

o   **ENTER SELECTION:**   2

Follow the procedure of Section 4.1.4.

An example plot is shown in Appendix D, Plot D4.2.9c.

4.2.9d 3 - LEVEL VS INTERVAL (BY FREQ BAND)

With the plot menu displayed, type **3** to view the level versus
interval graph for a specific frequency band.

o   **ENTER SELECTION:**   3

The computer responds by listing those Ivies for which data
exists. The user is prompted to select up to 8 graphs to a single
display. The computer responds by listing those frequency bands
that exist and prompts for a frequency band to be plotted.

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o   **IVIE(S) 1 2 3 4 5 6 7 8 EXIST**

                  HOW MANY IVIE(S) TO PLOT?   2
                  WHICH IVIE(S) TO PLOT?
                      1
                      5

                  BAND(S) 14 - 43 EXIST

                  WHICH BAND?   30
                  READY TO DISPLAY DRAWING.
                  Strike any key to continue.

An example plot is shown in Appendix D, Plot D4.2.9d.

4.2.9e <u>4 - LEVEL VS FREQUENCY (BY INTERVAL)</u>

With the plot menu displayed, type **4** to view the level versus frequency graph for a selected interval.

o   **ENTER SELECTION:**   4

The computer responds by listing those Ivies for which data exists. The user is prompted to select up to 8 graphs to a single display. The computer responds with a listing of those intervals that exist and prompts for an interval to be plotted.

o   **IVIE(S) 1 2 3 4 5 6 7 8 EXIST.**

                  HOW MANY IVIE(S) TO PLOT?   2
                  WHICH IVIE(S) TO PLOT?
                      1
                      5

                  INTERVAL(S)   1 - 120 EXIST.

                  WHICH INTERVAL?   50
                  READY TO DISPLAY DRAWING.

Strike any key to continue.

An example plot is shown in Appendix D, Plot D4.2.9e.

4.2.9f <u>5 - LEQ VS FREQUENCY (AVG. OVER RANGE SELECTED)</u>

With the plot menu displayed, type **5** to view the LEQ versus frequency graph averaged over the interval range selected.

o   **ENTER SELECTION: 5**

The computer responds by listing those Ivies for which data exists. The user is prompted to select up to 8 graphs to a single display.

o   **IVIE(S) 1 2 3 4 5 6 7 8 EXIST.**

        HOW MANY IVIE(S) TO PLOT?   2
        WHICH IVIE(S) TO PLOT?
           1
           5

        INTERVAL(S) 1 - 120 EXIST.

        READY TO DISPLAY DRAWINGS.
        Strike any key to continue.

An example plot is shown in Appendix D, Plot D4.2.9f.

4.2.9g <u>6 - 3D SPECTRUM PLOT</u>

   If a three dimensional (3D) spectrum plot is desired, type **6** with
   the plot menu displayed to obtain the following 3D plot menu:

   o   **3D PLOTS MENU**

         1 - 3D PLOT OF SPECTRUM (ROTAT=100, ELEV=45)

         2 - 3D PLOT OF SPECTRUM (SELECT THE VIEW)

         9 - EXIT 3D PLOTS

         ENTER SELECTION:

4.2.9g(i) <u>1 - 3D PLOT OF SPECTRUM (ROTAT=100, ELEV=45)</u>

   With the 3D plot menu displayed, type **1** to view the 3D spectrum
   plot for a specific Ivie.

   o   **ENTER SELECTION:** _____1_____

   The computer responds by listing those Ivies for which data
   exists. The user is prompted to select an Ivie to plot. The
   computer responds with those intervals that exist and prompts for
   an interval range to plot. The computer responds with a valid
   range of interval increments and prompts for a desired interval
   increment. An interval increment of 1 allows the user to view all
   the data for the Ivie selected.

o   IVIE(S) 1 2 3 4 5 6 7 8

         WHICH IVIE TO PLOT? ____2____

         INTERVAL(S)   1 - 120 EXIST.

         WHAT INTERVAL RANGE (I1,I2)? __1,120__

         VALID INTERVAL INCREMENTS ARE 1 - 119

         WHAT INTERVAL INCREMENT? ____1____
         READY TO DISPLAY DRAWING.
         Strike any key to continue.

An example plot is shown in Appendix D, Plot D4.2.9g(i).

4.2.9g(ii) <u>2 - 3D PLOT OF SPECTRUM (SELECT THE VIEW)</u>

With the 3D plot menu displayed, type **2** to view the 3D spectrum plot of a specific Ivie for a user-selected viewing angle and range of frequency bands.

o   ENTER SELECTION: ____2____

The computer prompts the user for Ivie and interval information as described in Section 4.2.9g (i). In addition, the user is prompted to select a range of frequency bands to plot. The computer then prompts the user to enter the desired rotation angle, about the z-axis, and the desired view angle, above the x-y plane.

o   IVIE(S) 1 2 3 4 5 6 7 8

         WHICH IVIE TO PLOT? ____2____

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INTERVAL(S) 1 - 120 EXIST.

        WHAT INTERVAL RANGE (I1,I1)?   1,120

        VALID INTERVAL INCREMENTS ARE 1 - 119

        WHAT INTERVAL INCREMENT?   1

        BANDS 14 - 43 EXIST.

        WHAT BAND RANGE (B1,B2)?   14,43

        ENTER ROTATION ANGLE AROUND Z-AXIS
        (0<ANGLE<180)?   120

        ENTER VIEW ANGLE ABOVE X-Y PLANE
        (0<ANGLE<90)?   45

        READY TO DISPLAY DRAWING.
        Strike any key to continue.

    An example plot is shown in Appendix D, Plot D4.2.9g(ii).

    Type **9** to exit the 3D plot menu and return to the main plot menu.
    Type **9** again to exit the main plot menu and return to the main
    menu.

4.2.10 <u>10 - PROCESS NEW DATA FILE WITH EXISTING CAL FILE</u>

    With the main menu displayed, type **10** to process a new data file
    using the existing calibration file(s) stored in memory.

    o   ENTER SELECTION: 10

    The computer repeats the procedure described in Section 4.0, Data
    Processing.

4.2.11 <u>11 - PROCESS NEW DATA FILE WITH NEW CAL FILE</u>

    With the main menu displayed, type **11** to begin analysis using a

new data file and a new calibration file(s).

o   **ENTER SELECTION:**   **11**

The computer repeats the procedure described in Sections 3.0, Calibration, and 4.0, Data Processing.

APPENDIX A

TABLE A4.1.2:   **SUMMARY OF AWT, SEL, LEQ - BY INTERVAL, FOR ALL IVIES**

```
FILE:  1A0801
       .250 SEC(S)/INT.  FOR INTERVAL:  1  THRU INTERVAL:  120

       MAX IVIE AWT LEVELS AND INT# FOR EACH IVIE:
```

INT	90	90	89	85	62	61	62	64
MaxA	80.0	77.5	73.3	60.3	78.7	76.3	76.6	74.6

```
       AWEIGHTED SPL (DB) DIRECTLY FROM IVIE(S)
```

IVIE#	1	2	3	4	5	6	7	8
INT#								
1	49.9	50.2	50.8	49.7	51.7	53.9	53.3	54.3
2	48.3	48.5	49.3	48.7	58.3	56.9	55.7	56.6
3	48.8	48.8	49.0	48.7	58.3	60.4	59.0	59.8
4	51.9	52.5	52.5	51.8	59.4	62.3	60.4	61.5
5	53.7	54.7	54.3	53.1	59.2	61.3	60.0	60.8
6	53.9	54.4	53.6	52.8	57.2	59.1	58.0	58.9
7	52.9	53.2	52.7	51.7	57.3	58.6	58.5	59.6
8	52.3	52.1	52.2	51.0	57.4	59.9	58.5	59.6
9	53.0	52.5	53.1	51.2	54.4	56.9	55.6	56.6
10	51.8	51.1	51.4	50.2	52.6	55.0	53.7	55.0

```
11   50.4      49.0      49.6      49.2      54.0      56.3      55.2      56.1
12   50.7      49.7      49.6      49.2      56.5      59.0      57.1      58.9
13   52.4      51.2      50.9      51.2      57.0      60.1      58.3      60.0
14   53.3      52.2      52.0      52.3      58.5      61.0      58.9      60.5
15   54.2      52.8      52.6      52.9      59.4      62.1      60.0      61.2
16   54.5      54.3      53.2      53.4      60.6      62.8      61.1      62.6
17   55.2      55.1      54.0      53.6      61.2      64.2      61.6      63.8
18   55.9      55.9      54.4      53.7      61.4      64.2      61.6      64.1
19   56.0      56.2      54.5      53.6      60.2      62.7      60.3      62.7
20   55.3      55.1      53.7      52.8      58.1      60.7      58.7      61.5
21   54.1      53.6      53.0      52.0      57.7      60.0      58.7      61.7
22   54.3      52.9      52.1      52.6      58.4      60.8      59.2      62.5
23   55.4      52.8      53.3      52.3      57.9      60.6      58.7      61.7
24   55.0      53.5      53.7      52.3      55.1      57.1      56.0      58.1
25   53.1      51.7      51.9      51.1      54.9      56.7      55.8      57.4
```

NOTE: SIMILAR DATA ARE PROVIDED FOR INTERVALS 26-120, AS REQUIRED.

A2

**TABLE A4.1.3:   SUMMARY OF AWT, SEL, LEQ FOR IVIE PAIR
                DIFFERENCES**

```
FILE:  1A0801
       .250 SEC(S)/INT.  FOR INTERVAL:  1  THRU INTERVAL:  120

         DEL MAX IVIE AWT LEVELS FOR SELECTED IVIE PAIR:
IVIE PR  5-1       6-2       7-3       8-4
DELMAX  -1.7      -1.6       2.9      14.0

                  LEVEL DIFFERENCES (DB)
           AWEIGHTED LEVELS (DB) DIRECTLY FROM IVIE(S)
IVIE PR  5-1       6-2       7-3       8-4
INT #
    1    1.7       3.7       2.5       4.6
    2    6.4       8.4       6.4       7.9
    3    9.6      11.6      10.0      11.1
    4    7.5       9.8       8.0       9.7
    5    5.5       6.6       5.7       7.7
    6    3.2       4.8       4.4       6.1
    7    4.4       5.4       5.0       7.1
    8    5.2       7.8       6.3       8.6
    9    1.4       4.4       2.5       5.4
   10     .8       3.9       2.2       4.8
```

```
11    3.6      7.4      5.5      9.6
12    5.8      9.3      7.5      9.7
13    4.6      8.9      7.4      8.8
14    5.2      8.8      6.8      8.1
15    5.2      9.2      7.4      8.3
16    6.1      8.5      7.9      9.1
17    6.0      9.0      7.7     10.1
18    5.6      8.3      7.1     10.4
19    4.3      6.5      5.9      9.1
20    2.8      5.7      5.0      8.7
21    3.6      6.4      5.7      9.7
22    4.1      7.9      6.6     10.4
23    2.5      7.8      5.4      9.3
24     .1      3.6      2.3      5.8
25    1.8      4.9      3.9      6.3
```

NOTE: SIMILAR DATA ARE PROVIDED FOR INTERVALS 26-120, AS REQUIRED.

A3

APPENDIX B

Ivie A-weight SPL and 1/3 Octave Level Tables

B1

TABLE B4.2.2: 1/3 OCT LEVELS - BY INTERVAL, FOR ALL IVIES

FILE: 1A0801
       .250 SEC(S)/INT. FOR INTERVAL: 1 THRU INTERVAL: 120

INTERVAL # 1

BAND #	1/3 OCT LEVELS (DB) FOR IVIE NUMBER(S)							
	1	2	3	4	5	6	7	8
14	53.0	57.2	54.6	55.6	55.1	57.6	57.2	57.6
15	55.9	59.3	56.0	56.1	62.1	62.3	62.9	63.5
16	56.7	53.8	51.9	54.5	55.3	55.0	56.2	57.1
17	57.9	55.2	53.4	54.2	55.6	59.0	60.2	61.7
18	49.6	56.5	56.5	60.7	62.3	57.1	59.0	59.8
19	50.7	50.5	52.6	64.7	54.7	53.8	55.5	58.6
20	53.0	53.0	51.1	57.9	53.2	52.6	54.8	58.2
21	49.5	41.3	46.0	50.1	52.0	51.3	51.2	55.2
22	48.1	46.6	41.8	49.5	48.8	50.0	48.4	56.0
23	44.3	44.3	40.8	43.1	37.8	44.7	40.8	39.9
24	35.6	39.9	38.1	–	35.9	42.0	37.0	–
25	38.5	44.0	41.5	–	42.2	46.3	43.9	–
26	42.3	44.0	43.8	–	43.5	47.2	43.5	37.7
27	45.5	46.2	49.0	44.3	46.8	47.4	47.1	41.5

```
28   41.6   42.5   45.3   37.9   43.6   46.3   44.0   44.2
29   42.0   41.3   44.0   40.0   45.5   46.6   46.1   45.6
30   39.9     -    37.0   38.1   43.1   43.9   43.5   46.7
31   36.1     -      -      -    41.2   44.9   43.1   46.8
32     -      -    36.5     -    37.7   42.2   36.7   41.4
33     -      -    35.2     -    35.9   44.3   36.7   42.6
34     -      -    36.7     -      -    44.5     -    39.3
35     -    36.4     -      -      -    40.7     -    39.3
36     -      -      -      -      -    35.5     -      -
37     -      -      -      -      -      -      -      -
38     -      -      -      -      -      -      -      -
39     -    36.9     -      -      -      -      -      -
40     -      -      -      -      -      -      -      -
41     -      -      -      -      -      -      -      -
42     -      -      -      -      -      -      -      -
43     -      -      -    44.0     -      -      -      -

AWT    49.1   50.4   51.2   48.7   51.8   55.0   52.4   54.5
OASPL  63.8   64.7   63.2   65.7   67.2   67.0   67.7   69.1
IVAWT  49.9   50.2   50.8   49.7   51.7   53.9   53.3   54.3
```

NOTE: SIMILAR DATA ARE PROVIDED FOR INTERVALS 2-120, AS REQUIRED.

(-) INDICATES MEASURED DATA CONTAMINATED BY SYSTEM NOISE FLOOR.

B2

TABLE B4.2.3:   SUMMARY OF AWT, SEL, LEQ - BY INTERVAL, FOR ALL IVIES

```
FILE:  1A0801
       .250 SEC(S)/INT.  FOR INTERVAL:  1  THRU INTERVAL:  120

       MAX AWT LEVELS (DERIVED) AND INT# FOR EACH IVIE:
IVIE#    1      2      3      4      5      6      7      8
INT     90     90     89     85     62     61     62     64
MaxA  79.0   76.7   72.6   60.3   78.3   75.9   76.2   74.3

       MAX IVIE AWT LEVELS AND INT# FOR EACH IVIE:
IVIE#    1      2      3      4      5      6      7      8
INT     90     90     89     85     62     61     62     64
MaxA  80.0   77.5   73.3   60.3   78.7   76.3   76.6   74.6

       AWEIGHTED LEVELS (DB) DERIVED FROM 1/3 OCT DATA
IVIE#    1      2      3      4      5      6      7      8
INT#
  1   49.1   50.4   51.2   48.7   51.8   55.0   52.4   54.5
  2   48.5   47.3   49.3   48.1   56.3   58.6   56.3   57.7
  3   49.0   49.7   50.4   48.6   59.8   61.8   59.8   61.1
  4   53.4   54.1   53.8   51.9   60.1   63.4   60.8   62.1
  5   55.5   55.9   55.1   53.3   60.5   61.9   60.1   61.1
  6   54.7   55.2   54.3   53.1   56.9   59.8   57.4   58.9
```

7	52.6	53.7	53.3	51.7	57.9	59.6	57.9	59.6
8	54.1	52.7	52.9	51.0	57.7	61.0	58.4	60.1
9	53.6	53.1	54.1	52.0	53.4	56.8	53.5	55.5
10	51.3	50.4	50.7	49.2	51.8	55.5	51.3	54.5
11	49.8	48.1	49.3	48.2	54.9	58.0	54.8	57.4
12	51.7	50.3	51.0	49.6	57.6	60.5	57.8	60.0
13	53.3	51.9	52.5	52.2	58.5	61.1	58.6	60.6
14	54.4	52.7	53.0	53.6	59.5	61.7	59.4	61.2
15	55.0	53.9	54.0	53.1	60.3	62.6	60.3	61.7
16	54.8	55.4	53.9	53.4	61.6	63.7	61.6	63.5
17	56.5	56.1	55.2	54.3	62.0	65.1	62.2	64.5
18	56.8	57.1	55.7	54.8	62.2	64.5	61.9	64.4
19	57.3	57.3	55.7	54.6	60.3	62.8	60.1	62.3
20	56.0	56.0	54.7	53.0	57.7	60.8	58.0	61.6
21	54.2	53.6	52.9	52.9	58.3	61.0	58.7	62.4
22	54.9	53.6	53.0	52.9	59.3	61.8	59.6	63.6
23	55.5	54.1	54.5	53.2	58.0	61.3	58.4	61.2
24	55.2	53.8	54.3	52.9	54.9	57.3	54.5	56.4
25	52.6	51.4	51.8	51.4	55.0	57.3	54.6	57.1

NOTE: SIMILAR DATA ARE PROVIDED FOR INTERVALS 26-120, AS REQUIRED.

B3

TABLE B4.2.4: 1/3 OCT LEVELS - BY IVIE, FOR ALL INTERVALS

FILE: 1A0801
       .250 SEC(S)/INT. FOR INTERVAL: 1 THRU INTERVAL: 120

IVIE # 1

BAND #	1/3 OCT LEQ (DB) FOR INTERVAL(S)									
	1	2	3	4	5	6	7	8	9	10
14	53.0	55.3	54.6	57.3	59.5	57.1	52.4	58.0	58.8	54.8
15	55.9	56.0	60.9	56.7	56.7	56.0	58.6	53.2	55.2	58.9
16	56.7	52.5	55.6	53.8	55.7	53.3	54.5	52.6	51.3	59.3
17	57.9	53.6	55.8	49.6	56.9	50.7	53.4	56.1	57.5	60.5
18	49.6	53.8	58.1	67.8	64.6	58.8	57.9	57.6	57.0	55.8
19	50.7	54.6	54.6	56.4	53.4	50.8	50.6	52.4	55.8	55.9
20	53.0	53.9	54.6	52.1	50.9	52.8	57.2	55.2	51.9	51.4
21	49.5	46.6	49.7	46.7	46.1	47.6	50.9	48.4	48.9	48.4
22	48.1	42.8	48.9	56.6	52.2	47.7	48.4	50.0	47.4	49.0
23	44.3	–	43.4	53.0	56.7	57.9	52.8	48.3	48.7	45.1
24	35.6	–	37.7	48.7	51.6	50.7	44.6	42.2	42.6	–
25	38.5	38.4	–	44.5	46.8	51.3	48.7	43.6	45.3	39.6
26	42.3	43.1	37.9	45.1	44.2	43.8	43.5	44.8	45.3	43.0
27	45.5	44.4	44.4	45.2	47.5	44.1	46.7	45.7	43.3	47.0
28	41.6	43.1	42.4	48.9	48.6	44.5	45.7	46.8	43.8	42.7
29	42.0	40.4	42.0	45.0	50.8	50.2	46.2	46.0	50.6	42.8

```
30          39.9  37.2  39.8  45.4  46.5  44.4  43.1  46.5  43.3  43.1
31          36.1  35.8  36.2  38.4  41.7  43.8  40.4  44.5  44.6  40.7
32            -     -     -     -     -   36.2  35.2    -   36.0    -
33            -     -     -     -     -     -     -     -   35.3    -
34            -     -     -     -     -     -     -     -     -     -
35            -     -     -     -     -     -     -     -     -     -
36            -     -     -     -     -     -     -     -     -     -
37            -     -     -     -     -     -     -     -     -     -
38            -     -     -     -     -     -     -     -     -     -
39            -     -     -     -     -     -     -     -     -     -
40            -     -     -     -     -     -     -     -     -     -
41            -     -     -     -     -     -     -     -     -     -
42            -     -     -     -     -     -     -     -     -     -
43            -     -     -     -     -     -     -     -     -     -

AWT         49.1  48.5  49.0  53.4  55.5  54.7  52.6  54.1  53.6  51.3
OASPL       63.8  63.2  65.8  65.5  66.1  65.5  65.2  64.8  65.2  66.4
1VAWT       49.9  48.3  48.8  51.9  53.7  53.9  52.9  52.3  53.0  51.8
```

NOTE: SIMILAR DATA ARE PROVIDED FOR IVIES 2-8, AS REQUIRED.

(-) INDICATES MEASURED DATA CONTAMINATED BY SYSTEM NOISE FLOOR.

B4

TABLE B4.2.5:   **SUMMARY OF 1/3 OCT SEL, LEQ - FOR SELECTED RANGE OF INTERVALS**

```
FILE:  1A0801
       .250 SEC(S)/INT.  FOR INTERVAL:  1  THRU INTERVAL:  120

                    1/3 OCT LEQ LEVELS (DB)
                    FOR IVIE NUMBER(S)

BAND           1/3 OCT LEVELS (DB) FOR IVIE NUMBER(S)
 #       1       2       3       4       5       6       7       8

14     57.6    57.7    56.9    58.4    59.2    59.0    59.5    60.1
15     60.4    59.5    57.8    60.0    61.9    61.2    61.7    62.5
16     58.6    59.0    57.2    58.1    61.0    58.9    60.9    62.0
17     58.0    58.2    57.3    58.3    59.3    58.7    59.7    60.7
18     58.4    58.2    57.4    60.2    59.3    58.5    59.8    61.4
19     59.1    57.6    55.4    57.5    58.5    56.8    58.4    60.4
20     62.2    62.2    55.2    57.8    58.8    58.4    59.6    63.4
21     58.7    50.6    54.8    54.8    58.0    56.8    57.1    60.3
22     64.5    62.4    61.2    57.7    64.2    62.7    64.8    63.1
23     66.5    66.0    61.4    58.6    65.2    64.9    65.8    63.8
24     61.9    61.7    57.2    50.8    62.2    61.2    61.7    58.0
25     59.4    59.1    54.9    49.0    60.0    59.0    59.5    56.3
26     58.8    58.8    53.8    47.4    58.8    57.7    58.3    55.3
27     57.7    57.2    53.0    45.4    57.8    57.1    57.5    54.9
28     61.1    59.9    55.9    45.1    60.4    59.1    59.4    58.5
```

29	59.0	57.7	53.3	45.5	59.9	59.6	58.7	59.5
30	58.9	57.5	52.2	43.2	58.6	57.9	57.6	58.3
31	58.0	57.1	51.4	40.8	57.5	57.0	56.6	56.1
32	58.3	56.7	51.9	40.2	57.3	56.6	56.7	55.6
33	56.8	55.0	51.3	39.2	55.3	55.1	54.2	53.5
34	57.2	55.9	51.3	41.1	55.6	55.6	54.8	52.7
35	55.4	53.4	50.1	38.8	53.3	52.9	52.1	50.9
36	53.3	50.9	49.0	–	51.2	49.5	50.1	47.7
37	51.7	48.0	47.7	–	50.9	47.8	49.0	46.4
38	51.3	47.6	46.7	–	51.3	48.0	49.3	46.7
39	53.9	50.6	49.1	36.5	54.7	53.1	52.3	51.9
40	51.6	49.8	49.3	–	44.6	43.8	42.1	42.5
41	43.2	42.3	39.9	35.7	41.3	40.7	38.5	38.0
42	36.7	37.8	–	–	41.0	37.7	36.4	37.2
43	–	35.7	–	44.1	–	–	–	36.8

NOTE: A SIMILAR TABLE IS PROVIDED FOR THE 1/3 OCTAVE SEL'S.

(-) INDICATES MEASURED DATA CONTAMINATED BY SYSTEM NOISE FLOOR.

B5

<u>TABLE B4.2.6:</u> 1/3 OCT LEVEL DIFFERENCES FOR EACH INTERVAL – BETWEEN IVIE PAIRS

FILE: 1A0801
.250 SEC(S)/INT. FOR INTERVAL: 1 THRU INTERVAL: 120

INTERVAL # 1

BAND   1/3 OCT LEVEL DIFFERENCE (DB) BETWEEN IVIE PAIRS

#	5-1	6-2	7-3	8-4
14	2.1	–	2.6	1.9
15	6.2	3.0	6.9	7.4
16	-1.4	1.2	4.3	2.5
17	-2.3	3.8	6.9	7.4
18	12.7	–	2.4	-.9
19	4.0	3.4	2.9	3.8
20	–	-.3	3.7	–
21	2.5	10.0	5.2	5.1
22	–	3.4	6.5	6.5
23	-6.5	–	–	-3.2
24	–	2.1	-1.1	–
25	3.7	2.2	2.4	–
26	1.3	3.2	-.2	–
27	1.3	1.2	-1.8	-2.8
28	2.0	3.8	-1.3	6.3
29	3.5	5.3	2.1	5.7
30	3.1	–	6.5	8.6

```
31      5.2         -           -           -
32      -           -           -           -
33      -           -           1.5         -
34      -           -           -           -
35      -           4.4         -           -
36      -           -           -           -
37      -           -           -           -
38      -           -           -           -
39      -           -           -           -
40      -           -           -           -
41      -           -           -           -
42      -           -           -           -
43      -           -           -           -


AWT     2.7         4.6         1.1         5.8
OASPL   3.5         2.3         4.4         3.4
IVAWT   1.7         3.7         2.5         4.6
```

NOTE: SIMILAR DATA ARE PROVIDED FOR INTERVALS 2-120, AS REQUIRED.

(-) INDICATES MEASURED DATA CONTAMINATED BY SYSTEM NOISE FLOOR.

TABLE B4.2.7: **1/3 OCT LEQ DIFFERENCES OVER SELECTED INTERVALS - BETWEEN IVIE PAIRS**

```
FILE:  1A0801
       .250 SEC(S)/INT.  FOR INTERVAL:  1  THRU INTERVAL:  120
                            1/3 OCT LEQ DIFFERENCE TABLE
BAND       LEVEL DIFFERENCE (DB) BETWEEN IVIE PAIRS
 #      5-1         6-2         7-3         8-4

 14     1.7         1.3         2.7         1.7
 15     1.6         1.7         3.8         2.5
 16     2.4         -           3.7         4.0
 17     1.3         -           2.4         2.4
 18     -           -           2.4         1.2
 19     -.6         -.8         3.0         2.9
 20     -3.4        -3.7        4.4         5.5
 21     -.8         6.3         2.3         5.5
 22     -.3         -           3.6         5.4
 23     -1.3        -1.1        4.4         5.2
 24     -           -.6         4.5         7.2
 25     -           -           4.6         7.3
 26     -           -1.1        4.5         7.9
 27     -           -.1         4.6         9.5
 28     -.60        -.8         3.5         13.4
 29     1.0         1.8         5.4         14.1
 30     -.3         -           5.4         15.1
 31     -.5         -.1         5.2         15.3
 32     -1.0        -.1         4.8         15.4
 33     -1.6        -.3         3.4         11.5
```

```
34     -1.5        -        2.9    14.3
35     -2.1       -.6       2.0    12.1
36     -2.1      -1.3       1.1      -
37      -.8       -.3       1.3      -
38       -         -        2.6      -
39       -        2.4       3.3    15.4
40     -7.1      -6.0      -7.2      -
41     -1.9      -1.6      -1.4     2.4
42      4.2       -.1        -       -
43       -         -         -     -7.3
```

NOTE: (-) INDICATES MEASURED DATA CONTAMINATED BY SYSTEM NOISE FLOOR.

B7

TABLE B4.2.8: SUMMARY OF AWT, SEL, LEQ FOR IVIE PAIR DIFFERENCES

```
FILE:  1A0801
       .250 SEC(S)/INT.  FOR INTERVAL:  1  THRU INTERVAL:  120


          DEL MAX AWT LEVELS (DERIVED) FOR IVIE PAIR:
IVIE PR  5-1       6-2       7-3      8-4
DELMAX   -.7       -.8       3.6     14.0


          DEL MAX IVIE AWT LEVELS FOR SELECTED IVIE PAIR:
IVIE PR  5-1       6-2       7-3      8-4
DELMAX  -1.3      -1.2       3.3     14.3


                    LEVEL DIFFERENCES (DB)
              AWEIGHTED LEVELS (DB) DERIVED FROM 1/3 OCT DATA
IVIE PR  5-1       6-2       7-3      8-4
INT #
   1      2.7       4.6       1.1     5.8
   2      7.7      11.4       7.0     9.6
   3     10.8      12.1       9.4    12.5
   4      6.7       9.3       7.0    10.3
   5      4.9       6.0       5.0     7.7
   6      2.1       4.6       3.1     5.8
   7      5.2       5.9       4.6     7.9
   8      3.7       8.2       5.5     9.1
   9      -.2       3.6       -.5     3.4
  10       .5       4.9        .6     5.3
  11      5.1       9.8       5.5     9.2
  12      5.9      10.2       6.9    10.4
```

```
13    5.2       9.2       6.0       8.4
14    5.1       9.0       6.4       7.6
15    5.3       8.7       6.3       8.6
16    6.7       8.3       7.7      10.1
17    5.5       9.0       7.0      10.2
18    5.4       7.4       6.2       9.6
19    3.0       5.5       4.5       7.7
20    1.7       4.8       3.3       8.6
21    4.1       7.4       5.8       9.6
22    4.3       8.3       6.6      10.6
23    2.5       7.3       3.9       8.0
24   -.3        3.4        .2       3.5
25    2.4       5.8       2.9       5.7

      AWEIGHTED SEL/LEQ LEVELS (DB) OVER INTERVAL SELECTED
SEL   -.4        .2       4.2      12.1
LEQ   -.4        .2       4.2      12.1
IVSEL -.6       -.3       4.1      12.5
IVLEQ -.6       -.3       4.1      12.5
```

NOTE: SIMILAR DATA ARE PROVIDED FOR INTERVALS 26-120, AS REQUIRED.

B8

APPENDIX C

Ivie A-weight SPL Plot

C1

APPENDIX D

Ivie A-weight SPL and 1/3 Octave Level Plots

D1