COMMUNITY NOISE ASSESSMENT MANUAL

ACOUSTICAL SURVEY/COMPUTERIZED

DATA REDUCTION PROCEDURES

July 1981

U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Noise Abatement and Control
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16. ABSTRACT

This report was prepared by EPA, Office of Noise Abatement and Control, in support of its function to provide technical assistance to communities. It is one of nine which comprises the Community Noise Assessment Manual. The Manual provides a comprehensive and computerized system for assessing the noise problems of a community and then planning a noise control strategy for its abatement. This report provides the computerized procedures for running an acoustical survey for a community as described in the report: "Acoustical Survey for a Community." This computer program is written in FORTRAN IV and requires approximately 54,000 decimal words of core to operate. The program is designed for a UNIVAC 1108.

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1.0 INTRODUCTION

This manual is a User's Guide to the computerized data reduction package described in the Community Noise Assessment Acoustical Survey Manual.[1] The purpose of this computer program is to provide an automatic procedure for the reduction and analysis of the data acquired through the acoustical survey.

Additional input to this computer program can be the attitudinal data corresponding to the noise sources identified in the acoustical survey. This attitudinal data is obtained from conducting the social survey described in the Community Noise Assessment Social Survey Workbook.[2] If this attitudinal data is supplied to the computer program, it will produce additional data required by the Community Noise Assessment Strategy Guidelines procedures.[3]

The computer program is written in FORTRAN IV and requires approximately 54,000 decimal words of core to operate. The large core size is required to process the volume of input data that is expected from the acoustical survey.

Section 2 of this manual describes the input data format for the program. Section 3 describes the output listings that are provided. Appendix A is a listing of the computer program.

It is recommended that the reader of this manual be familiar with References 1, 2 and 3 because many of the data elements and computational procedures are introduced and explained therein.

2.0 INPUT DATA SPECIFICATION

The basic structure of an input data deck to the computer program is as follows:

1. One card containing output option indicators.
2. Coded data from the acoustical survey measurement data sheets.
3. A blank card.
4. Attitudinal data specification.
5. A blank card.

2.1 Output Option Indicators

The first card in the input data deck contains information regarding the quantity of desired output from the computer program.

Five types of output are produced by the computer program. Each of these may be optionally selected or deleted. These five types of output are as follows:

1. A formatted presentation of each measurement data sheet that was coded (see Section 3.1).
2. A noise zone* by noise zone summary for each measurement site in each zone followed by a summary for the entire zone (see Sections 3.2 and 3.3).
3. Aggregate noise level histograms and statistical levels for each noise zone (see Section 3.4).
4. Description and Evaluation Summary and Noise Source Identification Percentages (see Sections 3.5 and 3.6).
5. Individual noise source equivalent impact levels and attitudinal adjustment factors (see Sections 3.7 and 3.8).

*A noise zone is the basic unit for dividing a community into manageable noise measurement areas. See References 1 through 3 for a detailed description.

The format of the card to select these types of output is 5I5. A nonzero numeric value in the respective field indicates a positive selection of that type of output.

2.2 Coded Data from Acoustical Survey Measurement Sheets

Following the option indicator card comes the bulk of the input data – the coded measurement data sheets. A sample data sheet is shown in Figure 2-1.

The general instructions for transferring information from these data sheets is shown in Figure 2-2. Figure 2-3 is an example of coding the information shown in the data sheet of Figure 2-1. All the data sheets should be coded in this fashion. A blank card should follow at the end to signal the end of this kind of input.

The maximum number of coded data sheets that may be input to the computer program is dependent upon the nature of the noise level data coded on each sheet. In the worst case condition, a maximum of 150 coded data sheets can be input. On the average, however, with typical data, approximately 300 data sheets can be accommodated. In the event that an attempt is made to input an excess of data, a suitable informative message will be printed by the program.

There are some additional restrictions with respect to the nature of the data that may be input. Figure 2-4 illustrates the usage of measurement sites for the acoustical survey. If the computer program described in this manual is to be used, the site usage described in the figure must be strictly adhered to. The program assumes site usage as shown in Figure 2-4 and the output results may be erroneous if this chart is not followed.

Table 2-1 lists the noise zones and the associated prefix codes which the program will recognize. Use of other prefix codes is allowed; however, if the output of the computer program pertaining to the Strategy Guidelines[3] procedure is required, use of these codes is mandatory.

COMMUNITY NOISE MEASUREMENT DATA SHEET

SITE No. A-14 PACKET No. 21 Cluster 6 Area 3

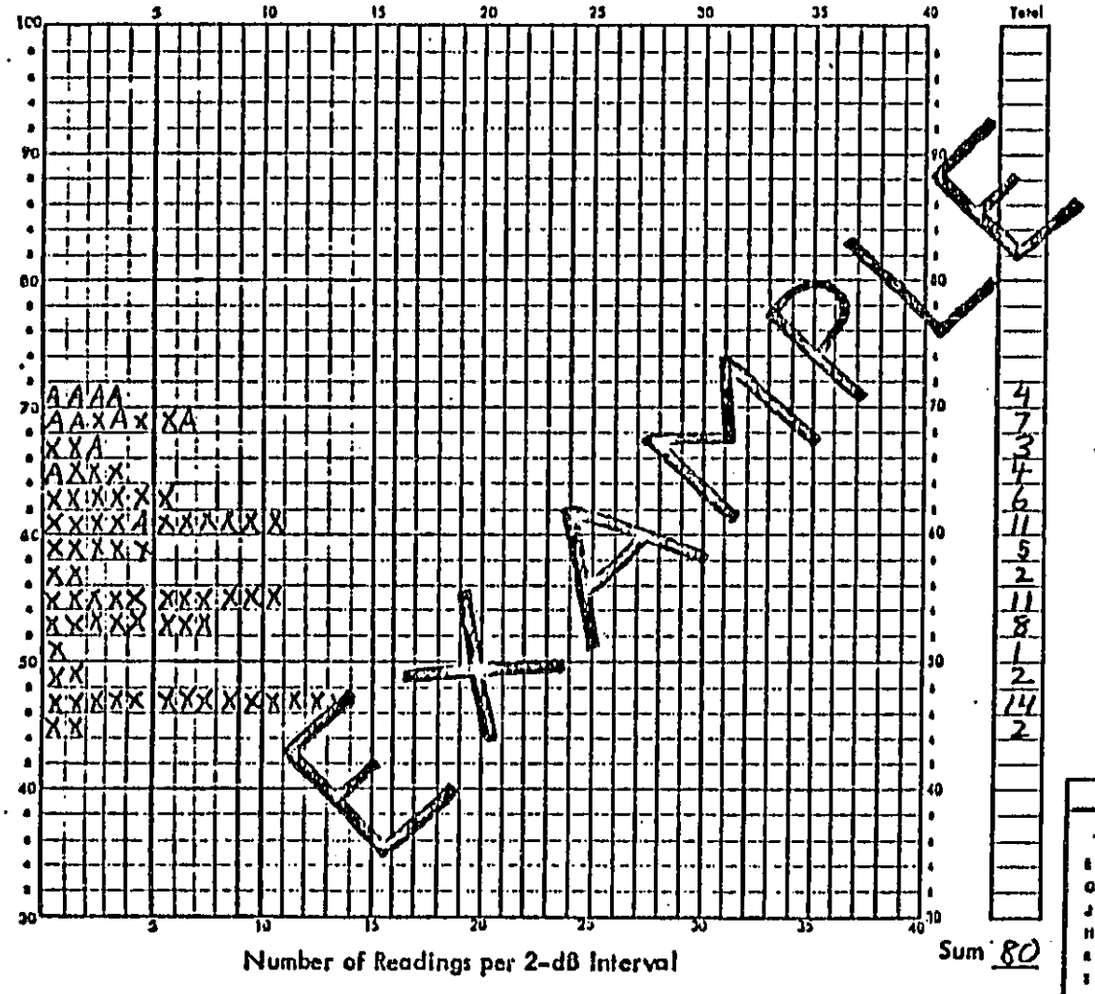

Figure 2-1. Example Noise Measurement Data Sheet

Location 1214 BISHOP ST
Operator SMITH / JONES
Date 5/10/78 Day M (Tu) W Th F Sa S
Time 10:05 (A.M.)/P.M. To 10:25 (A.M.)/P.M.
Wind Speed _____ km/h (3-5 mph)
Air Temperature _____ °C (72 °F)

Meter Check (✓)
Battery: OK ✓ Replaced _____
Settings: A ✓ Slow ✓
Calibration: Set to 94 dB. End 94.4 dB

Miscellaneous (After Data Collection)
Background Noise Sources TRAFFIC, CHILDREN
Unusual Situations or Interferences _____
AUTO HORN
Comments A FEW LOUD AUTOS

Description	Evaluation
___ V. QUIET	___ V. ACCEPT.
___ QUIET	X ACCEPTABLE
X NOISY	___ UNACCEPTABLE
___ V. NOISY	___ V. UNACCEPTABLE

CODE FOR IDENTIFIABLE SINGLE NOISE SOURCES

TRANSPORTATION		MACHINERY	
E	EMER. VEH.	C	CONSTRUCTION EQUIP.
G	GEN. AVIA.	Y	YARD MAINT. EQUIP.
J	JET	F	FACTORY EQUIP.
H	HELICOPTER	O	HOUSEHOLD EQUIP.
R	RAILROAD		
T	TRUCK	OTHER	
A	AUTO	D	DOG
B	BUS	P	PEOPLE NOISE
M	MOTORCYCLE	X	UNIDENTIFIABLE
S	SERVICE VEH.		
V	OFF RD. VEH.		

Card Number	Column Number(s)	Data Item
1	1	Card Number: '1'
	2-4	Site Identifier, i.e., 'R 14' 2 positions for zone, max. 2 positions for site, max.
	5	blank
	6-11	Date in the form MMDDYY
	12	Day of Week: 1-7, i.e, Mon = 1, Sun = 7
	13-16	Starting Time in the form HHMM
	17-20	Finish Time in the form HHMM
	21-22	'AM' or 'PM' for finish time
	23-24	Wind speed, mph
	25-48	Principal Noise Sources
	49-72	Unusual Situations or Interferences
2	1	Card Number: '2'
	2-4	Site Identifier
	5	blank
	6	Description Code: 1-4, i.e., 1 = V.Quiet, 4 = V.Noisy
	7	Evaluation Code: 1-4, i.e., 1 = V.Accept, 4 = V.Unacceptable
	8-79	Comments and/or runovers from Principal Noise Sources
3 to as necessary	1	Card Number: '3' - '9' then use letters 'A' - 'Z'
	2-4	Site Identifier
	5	blank
	6 to 80	Noise Level, Source Code, '(', number of marks for that level and code, ')'
		Next Code (number of marks)
		.
		.
		.

Figure 2-2. General Instructions for Coding of Noise Measurement Data Sheets

Card Number	Column Number(s)	Data Item
3 to as necessary	6 to 80	Next Level, Code (number of marks) • • • Note: • Use level at the center of the bin – always an odd number. • The last card of this type should be numbered as 'Z' to signal the end of a data sheet. • Start with the larger decibel values, i.e., top to bottom. • Information for a noise level must be complete on each card. Each card must start with a new noise level. • Only levels with data entries need be included. Example: 45T(5) A(3) X(2) 43J(12) M(6) A(2) etc.

Figure 2-2 (Continued)

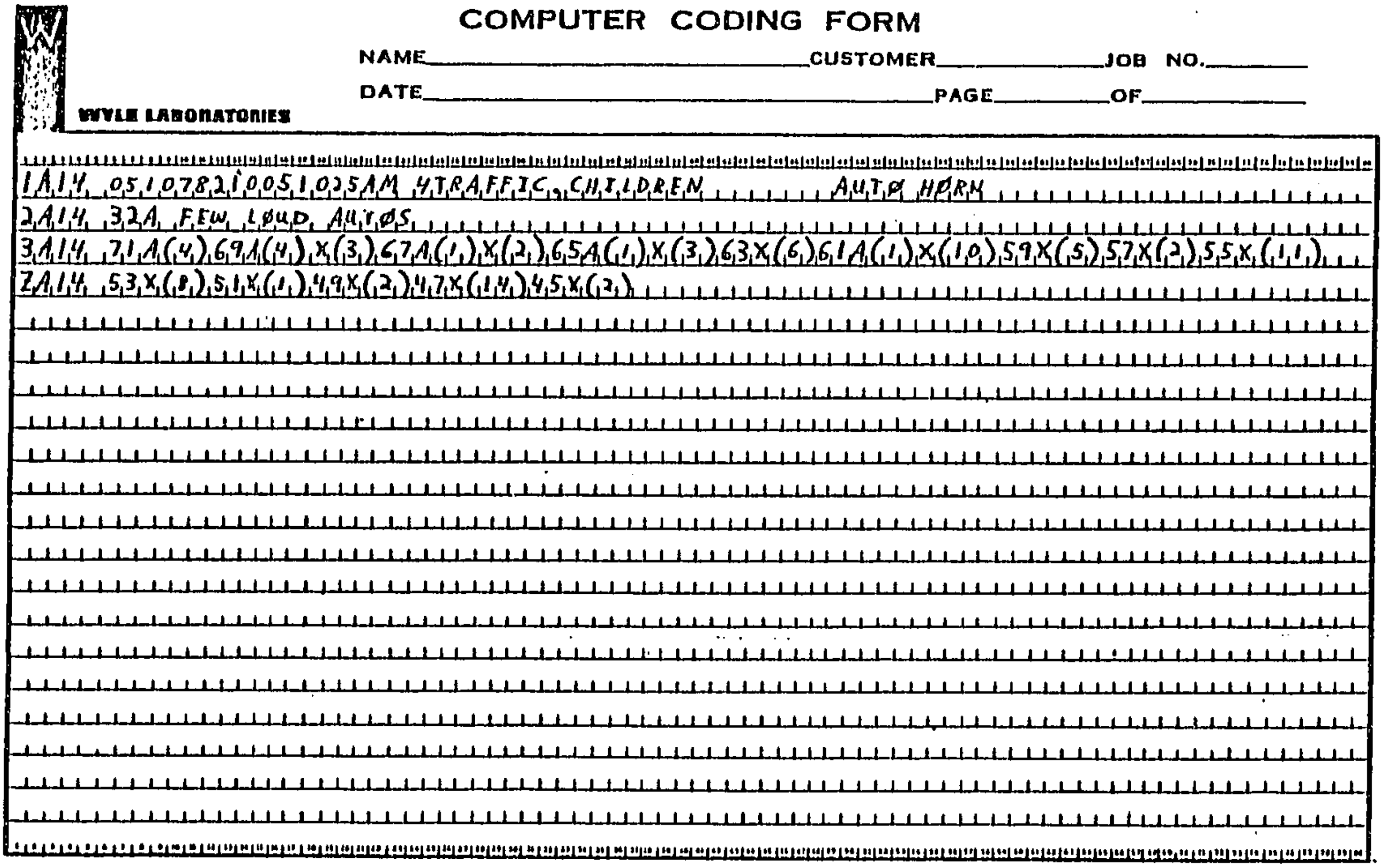

Figure 2-3. Example Data Coding Using Hypothetical Data of Figure 2-1

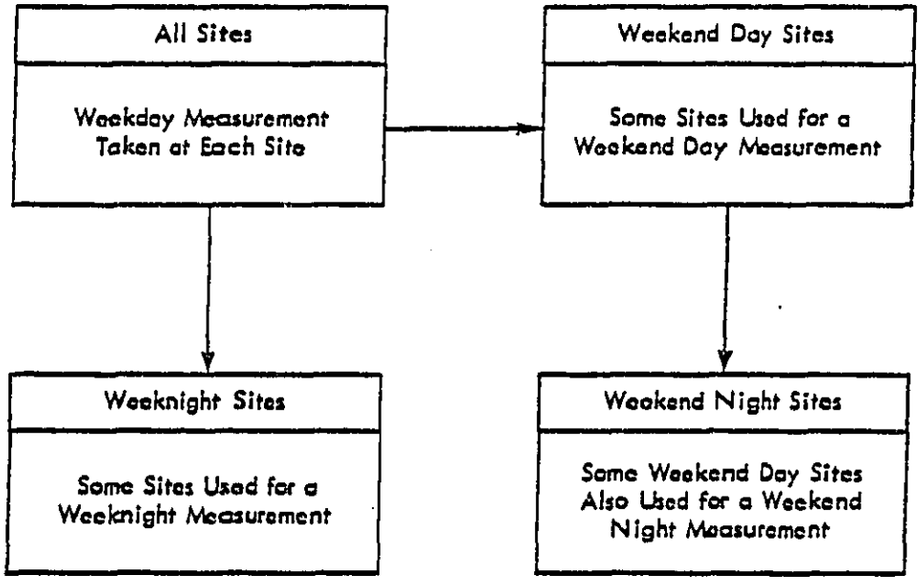

Figure 2-4. Measurement Site Usage in the Acoustical Survey

Table 2-1

Noise Zones and Prefix Codes
(see Reference 1 or 2 for a detailed description)

Noise Zone Type	Prefix Code
Residential	R
Residential Low Density	RL
Residential Medium Density	RM
Residential High Density	RH
Residential Very High Density	RV
Highway	H
Major Roadway Type A	A
Major Roadway Type B	B
Minor Roadway	M
Minor Roadway High Volume	MH
Minor Roadway Low Volume	ML
Commercial/Industrial	CI
Commercial	C
Industrial	I
Central Business District	CB
Stationary Source	S"X"*
Railroad	RR

*SA, SB, etc., if more than one zone.

2.3 Input of Attitudinal Data

If the Attitudinal Adjustment Factors for use in the strategy analysis[3] are desired, attitudinal data must be supplied to the computer program. This attitudinal data is in the form of the percent of the people who reported being highly or tremendously annoyed by each noise source in each noise zone (see Reference 3, Section 2.3).

The punched cards containing this data are placed after the blank card which signals the end of input for the coded data sheets. The format for input is as follows.

For each noise zone, a minimum of two cards is required. Columns 1 and 2 on the first card contain the left-adjusted noise zone prefix for which the attitudinal data on the following card applies. A list of noise zone prefixes for each noise zone appears in Table 2-1. The following card just mentioned contains the attitudinal data (percent highly annoyed) for each source. The format of this card is 20F4.0. Note that only 17 numbers are needed since there are only 17 specific noise sources defined (see Figure 2-1, bottom right corner).

In the event that acoustic and attitudinal data for additional noise zones not included as a regular part of the acoustical survey are available, a capability is included in the computer program to consider these in the computation of the attitudinal adjustment factors. An example of such a noise zone would be the Airport noise zone. The airport noise zone is not included as a regular part of the acoustical survey and source-specific noise level data must be obtained through other means (see Reference 3, Section 2.4). However, attitudinal data for the airport noise zone will be collected as a matter of course in the attitudinal survey[2]. Therefore, to include the aforementioned data in the calculation of the attitudinal adjustment factors, the following procedure should be used.

Specify the noise zone prefix in the normal manner; however, this prefix should not match any shown in Table 2-1. The second card contains the attitudinal data as mentioned above. A third card now follows — format 20F4.0 — containing

the noise level data for each noise source in the same order as the noise sources for the regular noise zones. These sources are listed below in Table 2-2 for convenience.

Table 2-2

Noise Sources Used in the Acoustical Survey

1. Emergency Vehicles
2. General Aviation
3. Jet Aircraft
4. Helicopters
5. Railroad
6. Trucks
7. Automobiles
8. Buses
9. Motorcycles
10. Service Vehicles (e.g., garbage trucks)
11. Off-Road Vehicles
12. Construction Equipment
13. Yard Maintenance Equipment
14. Factory Equipment
15. Household Equipment
16. Dogs
17. People Noises

A blank card should be used at the very end of the data deck to terminate attitudinal data input.

3.0 DESCRIPTION OF OUTPUT

The computer program produces several types of output. This section will describe each of these outputs in the order in which they are produced by the program. The specific computational procedures used to formulate these results are described in detail in References 1 and 3.

3.1 Formatted Measurement Data Sheets

Each measurement data sheet that was coded and input to the program is given a separate one-page formatted output. An example of this printout is shown in Figure 3-1. In addition to the total number of counts at each noise level, the source-specific information is also presented. The one-letter source codes correspond to those of the bot right-hand corner of Figure 2-1. Statistical levels for the 20-minute measurement periods are listed below the levels histogram.

3.2 Summary Site Statistics

For each noise zone, a summary listing of pertinent acoustical data at each site is given. An example is illustrated in Figure 3-2. Note that each site can have up to four corresponding measurements (see Figure 2-4). The statistics given are a weighted average of the measurements that were taken at any one location. Reference 1 explains the procedure for computing these averages.

3.3 Summary Values for Each Noise Zone

Figure 3-3 is an example of the summary computed values for each noise zone. These values are spatial numerical average values for all the measurement sites in the noise zone. The "Spatial Standard Deviation" is the standard deviation of the distribution of Day-Night Sound Levels (L_{dn}'s) measured in the noise zone. The "STD. DEV." is the numerical average temporal standard deviation over all measurement sites.

SITE NUMBER: M 1 DATE: 12/03/77 DAY: SAT TIME: 12:30 TO 12:50 PM WIND SPEED: 5 MPH

PRINCIPAL NOISE SOURCES: AUTOS
UNUSUAL SITUATIONS OR INTERMITTENCIES:
COMMENTS:

DESCRIPTION: V. NOISY EVALUATION: UNACCEPTABLE

LEVEL	FREQUENCY	SOURCE CONTRIBUTION																	
		E	G	J	M	N	T	A	B	M	S	V - C	Y	F	B	D	P	X
98 - 100	0.																		
96 - 98	0.																		
94 - 96	0.																		
92 - 94	0.																		
90 - 92	0.																		
88 - 90	1.	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
86 - 88	1.	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
84 - 86	0.																		
82 - 84	2.	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0
80 - 82	5.	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0
78 - 80	11.	0	0	0	0	0	0	11	0	0	0	0	0	0	0	0	0	0	0
76 - 78	11.	0	0	0	0	0	0	11	0	0	0	0	0	0	0	0	0	0	0
74 - 76	11.	0	0	0	0	0	0	11	0	0	0	0	0	0	0	0	0	0	0
72 - 74	12.	0	0	0	0	0	0	12	0	0	0	0	0	0	0	0	0	0	0
70 - 72	15.	0	0	0	0	0	0	15	0	0	0	0	0	0	0	0	0	0	0
68 - 70	10.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
66 - 68	0.																		
64 - 66	2.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
62 - 64	1.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
60 - 62	0.																		
58 - 60	0.																		
56 - 58	0.																		
54 - 56	0.																		
52 - 54	0.																		
50 - 52	0.																		
48 - 50	0.																		
46 - 48	0.																		
44 - 46	0.																		
42 - 44	0.																		
40 - 42	0.																		
38 - 40	0.																		
36 - 38	0.																		
34 - 36	0.																		
32 - 34	0.																		
30 - 32	0.																		
TOTAL:	80.																		

L1	88.4
L10	80.4
L50	78.4
L90	69.0
L99	63.0
LEQ	77.8
STANDARD DEVIATION	4.8

Figure 3-1. Example Illustration of Formatted Acoustical Measurement Data Sheet

NOISE ZONE: 4

7-DAY SITE STATISTICS

SITE	L0N	LEW	L1	L10	L50	L90	L9N	STD. DEV.	L1-L0N	L1-LEW
1	75.0	70.0	65.4	60.0	71.5	59.6	57.7	8.3	9.7	9.4
2	81.2	78.8	68.5	81.3	74.1	67.5	56.2	7.8	10.4	9.7
4	75.5	74.1	61.7	78.0	71.7	62.7	58.4	5.0	8.3	7.6
7	73.4	73.1	66.4	77.5	69.4	50.7	37.8	10.8	7.3	7.3
9	70.8	68.9	76.1	69.7	62.1	52.2	45.5	8.3	5.9	7.2
11	77.9	78.8	65.5	80.1	75.4	69.8	66.1	12.0	9.1	9.0
12	76.0	74.0	62.9	78.5	71.0	66.4	65.0	12.5	7.0	8.9
14	69.8	69.3	77.2	72.7	66.5	47.1	43.8	11.0	7.6	7.9
16	74.8	69.8	78.2	73.9	66.5	56.1	56.5	6.0	8.7	8.8
3	71.8	76.1	81.4	77.4	62.3	60.4	60.0	7.0	9.7	9.1
5	74.8	74.2	66.7	78.0	67.9	66.2	66.2	12.3	9.9	10.5
6	78.0	78.5	66.1	81.9	78.8	76.8	61.9	6.4	8.1	7.6
8	73.5	74.1	79.6	77.5	73.0	65.9	62.3	6.4	6.1	5.6
10	70.3	70.9	75.9	74.5	69.7	63.4	62.1	6.0	5.5	5.0
13	75.8	71.6	79.6	76.5	66.7	59.8	66.2	10.8	3.9	7.8
15	70.6	71.3	74.6	76.4	69.2	61.9	60.2	6.5	6.8	8.2
17	66.1	63.9	71.6	67.3	58.9	48.9	38.3	10.4	7.7	7.9
18	69.6	69.1	77.5	72.1	66.7	42.9	39.2	12.1	8.8	8.5
19	69.1	67.9	77.5	74.2	68.6	66.6	64.2	9.2	8.4	9.6
20	76.8	78.2	74.4	78.8	63.3	45.1	42.8	11.8	8.8	9.2

Figure 3-2. Presentation of Summary Statistics for Each Site Within a Noise Zone

NOISE ZONE =

24-HOUR ZONE-WIDE SPATIAL AVERAGES

	WEEK	WEEKEND	COMPOSITE
LUN	73.2	69.1	72.3
LEV	72.7	69.1	71.7
L1	80.6	79.3	80.2
L10	76.9	72.8	75.7
L50	69.2	66.8	67.9
L90	55.1	48.9	52.7
L99	51.3	44.7	49.4
STD. DEV.	8.6	10.4	9.1
L1-LUN	7.4	10.2	8.2
L1-LEV	7.9	10.2	8.6
NUMBER OF SITES	28	9	

SPATIAL STD. DEV. = 3.98

HOURLY SPATIAL AVERAGES (WEEK ONLY)

HOUR	LEV	L1	L10	L50	L90	L99	STD. DEV.	SITE NUMBERS
12A - 1A	56.1	67.2	61.9	48.5	43.0	40.6	6.7	28
1A - 2A	56.4	70.4	60.6	47.1	43.0	41.4	7.3	11 18 19
2A - 3A	64.6	75.9	70.1	49.1	46.7	45.9	9.8	5 12 13
3A - 4A	58.8	81.8	51.0	46.9	42.4	40.6	6.3	7 9 17
4A - 5A	51.1	53.9	51.4	51.0	46.6	44.3	2.5	14
5A - 6A	.0	.0	.0	.0	.0	.0	.0	0
6A - 7A	.0	.0	.0	.0	.0	.0	.0	0
7A - 8A	.0	.0	.0	.0	.0	.0	.0	0
8A - 9A	.0	.0	.0	.0	.0	.0	.0	0
9A - 10A	74.6	82.5	74.1	71.5	68.7	57.4	6.1	5 13
10A - 11A	74.4	82.8	77.4	72.6	66.6	61.7	6.1	10 11 12 18 20
11A - 12N	72.1	79.6	76.7	69.1	61.6	59.5	5.9	5 8 19
12N - 1P	75.4	83.5	79.4	73.8	65.9	59.9	5.5	2 6 15 16
1P - 2P	71.5	79.4	74.9	69.5	61.3	60.5	4.1	1 7 9 17
2P - 3P	70.6	75.8	72.7	69.9	66.3	63.0	1.6	18
3P - 4P	70.5	80.1	81.9	76.8	72.6	61.9	4.6	6
4P - 5P	.0	.0	.0	.0	.0	.0	.0	0
5P - 6P	.0	.0	.0	.0	.0	.0	.0	0
6P - 7P	.0	.0	.0	.0	.0	.0	.0	0
7P - 8P	.0	.0	.0	.0	.0	.0	.0	0
8P - 9P	.0	.0	.0	.0	.0	.0	.0	0
9P - 10P	.0	.0	.0	.0	.0	.0	.0	0
10P - 11P	.0	.0	.0	.0	.0	.0	.0	0
11P - 12A	.0	.0	.0	.0	.0	.0	.0	0

Figure 3-3. Computer Output for Zone-Wide Data Summary

The hourly spatial averages are a breakdown of the zone-wide spatial averages by the hour of the day in which each of the 20-minute measurements were taken. For this summary, no weekend measurements are included.

3.4 Aggregate Statistics

The aggregate statistics are derived from histograms constructed from all noise level counts, regardless of the site in the noise zone from which they were taken.

Separate histograms are constructed for day and night for both week and weekend. In addition, composite weighted 24-hour histograms are constructed for both week and weekend. Figures 3-4 and 3-5 are examples of this output. Figure 3-6 illustrates a weighted composite of Figures 3-4 and 3-5 to produce 7-day aggregate statistics.

Note that the purpose for construction of these histograms is to compute the aggregate statistical levels for each time period. Hence, the actual total number of counts in each histogram is unimportant; only the relative number of counts between noise level bins is of consequence.

3.5 Description and Evaluation Summary

Each measurement data sheet (see Figure 2-1) has a place for the observer to record his subjective description and evaluation of the noise environment at the site into one of four categories. For each noise zone, a summary of these responses is presented. An example is given in Figure 3-7. The total shown is the sum of all coded entries for description and for evaluation.

NOISE ZONE: A

WEEK AGGREGATE STATISTICS

DAY		NIGHT		COMPOSITE	
LEVEL	FREQUENCY	LEVEL	FREQUENCY	LEVEL	FREQUENCY
98 - 100	.0	98 - 100	.0	98 - 100	.0
96 - 98	.0	96 - 98	.0	96 - 98	.0
94 - 96	.0	94 - 96	.0	94 - 96	.0
92 - 94	.0	92 - 94	.0	92 - 94	.0
90 - 92	5.0	90 - 92	.0	90 - 92	5.0
88 - 90	.0	88 - 90	.0	88 - 90	.0
86 - 88	3.0	86 - 88	.0	86 - 88	3.0
84 - 86	20.0	84 - 86	.0	84 - 86	20.0
82 - 84	44.0	82 - 84	.0	82 - 84	44.0
80 - 82	88.0	80 - 82	.0	80 - 82	88.0
78 - 80	110.0	78 - 80	.0	78 - 80	110.0
76 - 78	160.0	76 - 78	3.0	76 - 78	163.0
74 - 76	140.0	74 - 76	18.0	74 - 76	158.0
72 - 74	153.0	72 - 74	9.0	72 - 74	183.0
70 - 72	249.0	70 - 72	16.0	70 - 72	265.0
68 - 70	188.0	68 - 70	12.0	68 - 70	199.7
66 - 68	139.0	66 - 68	19.0	66 - 68	158.7
64 - 66	98.0	64 - 66	21.0	64 - 66	122.0
62 - 64	118.0	62 - 64	18.0	62 - 64	134.3
60 - 62	111.0	60 - 62	4.0	60 - 62	115.6
58 - 60	31.0	58 - 60	13.0	58 - 60	45.9
56 - 58	9.0	56 - 58	27.0	56 - 58	34.9
54 - 56	17.0	54 - 56	23.0	54 - 56	43.3
52 - 54	8.0	52 - 54	55.0	52 - 54	60.9
50 - 52	.0	50 - 52	108.0	50 - 52	121.2
48 - 50	.0	48 - 50	128.0	48 - 50	141.8
46 - 48	.0	46 - 48	121.0	46 - 48	138.4
44 - 46	.0	44 - 46	111.0	44 - 46	128.9
42 - 44	.0	42 - 44	64.0	42 - 44	73.2
40 - 42	.0	40 - 42	69.0	40 - 42	78.9
38 - 40	.0	38 - 40	54.0	38 - 40	61.7
36 - 38	.0	36 - 38	.0	36 - 38	.0
34 - 36	.0	34 - 36	.0	34 - 36	.0
32 - 34	.0	32 - 34	.0	32 - 34	.0
30 - 32	.0	30 - 32	.0	30 - 32	.0
TOTAL:	1679.0	TOTAL:	881.0	TOTAL:	2086.4
LDN	75.8	LDN	82.0	LDN	74.7
L1	83.1	L1	75.3	L1	73.9
L10	74.8	L10	80.8	L10	84.1
L50	71.0	L50	66.3	L50	78.0
L90	61.9	L90	61.0	L90	66.4
L99	55.1	L99	38.3	L99	44.9
STD. DEV.	8.7	STD. DEV.	6.5	STD. DEV.	38.9
L10-LDN	8.0	L10-LDN	2.8	L10-LDN	12.8
L1-LDN	7.3	L1-LDN	13.3	L1-LDN	10.2

Figure 3-4. Presentation of Week Aggregate Statistics

NOISE ZONE: *

WEEKEND AGGREGATE STATISTICS

DAY		NIGHT		COMPOSITE	
LEVEL	FREQUENCY	LEVEL	FREQUENCY	LEVEL	FREQUENCY
98 - 100	.0	98 - 100	.0	98 - 100	.0
96 - 98	.0	96 - 98	.0	96 - 98	.0
94 - 96	.0	94 - 96	.0	94 - 96	.0
92 - 94	.0	92 - 94	.0	92 - 94	.0
90 - 92	.0	90 - 92	.0	90 - 92	.0
88 - 90	1.0	88 - 90	.0	88 - 90	1.0
86 - 88	1.0	86 - 88	.0	86 - 88	1.0
84 - 86	1.0	84 - 86	.0	84 - 86	1.0
82 - 84	1.0	82 - 84	.0	82 - 84	1.0
80 - 82	8.0	80 - 82	.0	80 - 82	8.0
78 - 80	28.0	78 - 80	.0	78 - 80	28.0
76 - 78	28.0	76 - 78	1.0	76 - 78	29.4
74 - 76	68.0	74 - 76	2.0	74 - 76	68.3
72 - 74	71.0	72 - 74	3.0	72 - 74	74.4
70 - 72	111.0	70 - 72	1.0	70 - 72	112.1
68 - 70	107.0	68 - 70	8.0	68 - 70	116.1
66 - 68	29.0	66 - 68	6.0	66 - 68	35.8
64 - 66	47.0	64 - 66	3.0	64 - 66	50.4
62 - 64	78.0	62 - 64	4.0	62 - 64	82.5
60 - 62	35.0	60 - 62	.0	60 - 62	35.0
58 - 60	31.0	58 - 60	.0	58 - 60	31.0
56 - 58	28.0	56 - 58	.0	56 - 58	28.0
54 - 56	18.0	54 - 56	5.0	54 - 56	23.7
52 - 54	14.0	52 - 54	4.0	52 - 54	18.5
50 - 52	13.0	50 - 52	6.0	50 - 52	19.5
48 - 50	22.0	48 - 50	1.0	48 - 50	23.1
46 - 48	8.0	46 - 48	1.0	46 - 48	9.1
44 - 46	5.0	44 - 46	66.0	44 - 46	80.0
42 - 44	2.0	42 - 44	98.0	42 - 44	113.4
40 - 42	1.0	40 - 42	61.0	40 - 42	70.3
38 - 40	.0	38 - 40	61.0	38 - 40	71.6
36 - 38	.0	36 - 38	64.0	36 - 38	72.7
34 - 36	.0	34 - 36	.0	34 - 36	.0
32 - 34	.0	32 - 34	.0	32 - 34	.0
30 - 32	.0	30 - 32	.0	30 - 32	.0
TOTAL:	758.0	TOTAL:	397.0	TOTAL:	1203.2
				LDN	71.6
LEN	72.1	LEQ	68.1	LEQ	70.4
L1	81.0	L1	75.0	L1	80.5
L10	75.7	L10	51.0	L10	74.5
L50	68.0	L50	42.2	L50	62.2
L90	54.9	L90	37.2	L90	39.3
L99	45.0	L99	36.1	L99	36.3
STD. DEV.	8.2	STD. DEV.	8.1	STD. DEV.	13.8
L10-LEN	3.4	L10-LEQ	-8.6	L10-LEQ	4.1
L1-LEN	9.3	L1-LEN	14.9	L1-LEN	10.0

Figure 3-5. Presentation of Weekend Aggregate Statistics

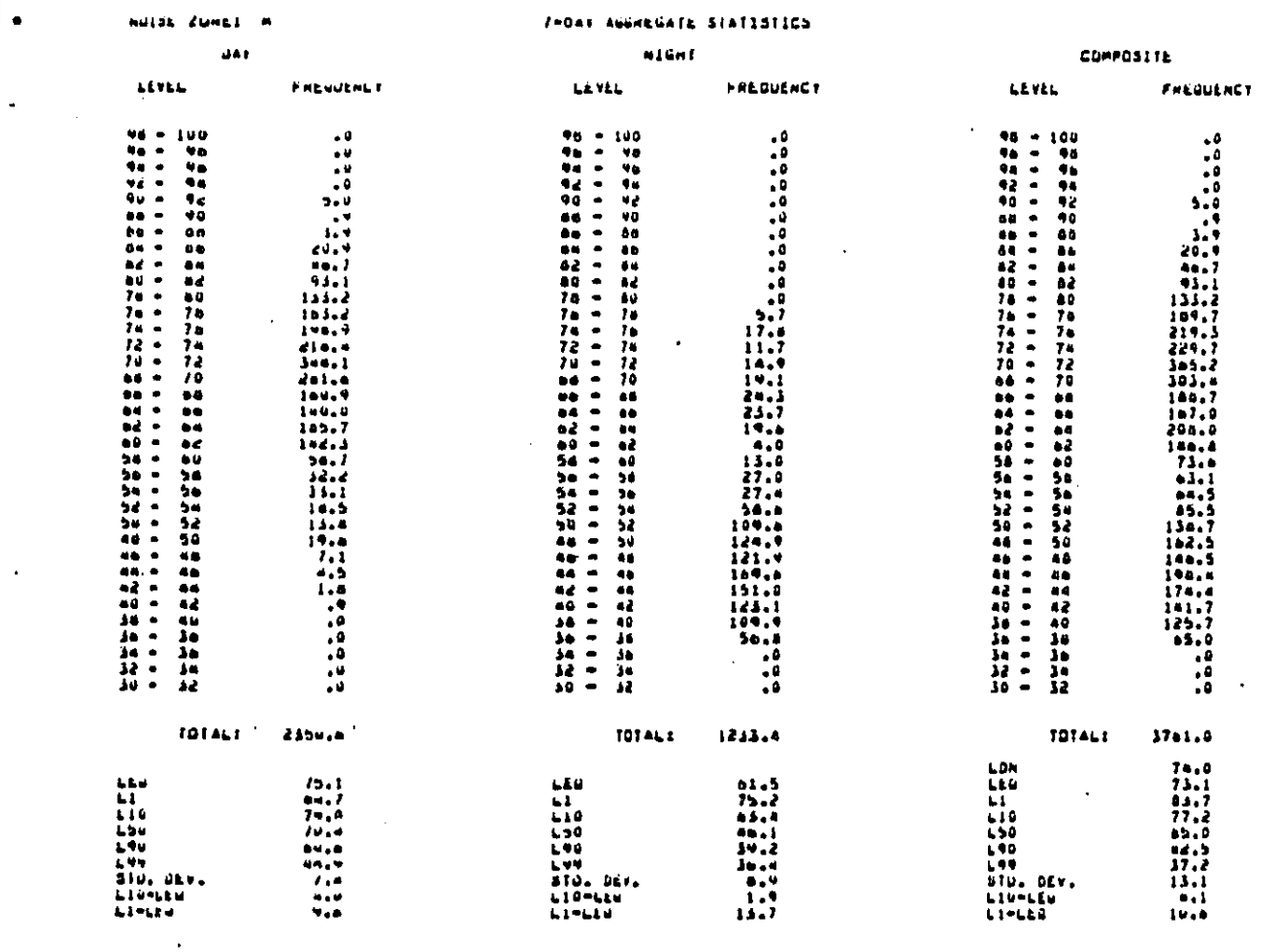

Figure 3-6. Presentation of 7-day Aggregate Statistics

NOISE ZONE: M DESCRIPTION AND EVALUATION

DESCRIPTION	PERCENT OF TOTAL
V. QUIET	21.2
QUIET	45.5
NOISY	24.2
V. NOISY	9.1
TOTAL:	33

EVALUATION	PERCENT OF TOTAL
V. ACCEPT.	27.3
ACCEPTABLE	54.5
UNACCEPTABLE	18.2
V. UNACCEPTABLE	.0
TOTAL:	33

Figure 3-7. Description and Evaluation Summary

3.6 Source Identification Percentages

For each noise zone, a summary output page is included which contains a percentage breakdown by identified intrusive noise sources. This breakdown is made independent of the noise levels associated with each source identification. In addition, a total number value is given which is the sum of all recorded counts attributable to an identified source. Figure 3-8 is an example of this type of output.

NOISE ZONE: # SOURCE IDENTIFICATION

SOURCE	PERCENT OF TOTAL IDENTIFIED
EMER. VEH.	.0
GEN. AVIA.	.0
JET	.1
HELICOPTER	.1
RAILROAD	.0
TRUCK	15.1
AUTO	76.3
BUS	.7
MOTORCYCLE	.1
SERVICE VEHICLES	.6
OFF. RD. VEH.	.3
CONST. EQUIP.	.0
YARD MAINT. EQ.	.0
FACTORY EQUIP.	.1
HOUSEHOLD EQUIP.	.3
DOG	.0
PEOPLE NOISE	4.4

TOTAL NUMBER: 1047.0

Figure 3-8. Source Identification Percentages

3.7 Component Source Equivalent Impact Levels

Noise source equivalent levels for use by the Strategy Analysis[3] are also produced for each noise zone. These noise level values are strictly for use by the Strategy Analysis and are not to be interpreted as equivalent levels (L_{eq}) that would actually be measured in the community. A detailed description of the calculation procedure for obtaining these noise levels is included in Reference 3, Section 2.4.

For purposes of information, Table 3-1 lists the zero impact criterion levels for each noise zone type. The purpose and use of these levels is, again, described in Reference 3, Sections 1.2 and 2.4.

Figure 3-9 is an example of the presentation of this information. The fractional impact value given is based on the spatial average L_{dn} value for the zone listed above (same value as in Figure 3-3) using the fractional impact weighting function given in Reference 1, Section 4.6.

Table 3-1

Zero Impact Criterion Levels for Each Noise Zone
(see Reference 3)

Noise Zone Type	Zero Impact Level, dB	
	Day	Night
Residential	54	46
Residential Low Density	54	46
Residential Medium Density	54	46
Residential High Density	59	46
Residential Very High Density	59	46
Highway	54	46
Major Roadway Type A	54	46
Major Roadway Type B	54	46
Minor Roadway	54	46
Minor Roadway High Volume	54	46
Minor Roadway Low Volume	54	46
Commercial/Industrial	59	59
Commercial	59	59
Industrial	59	59
Central Business District	59	59
Stationary Source	54	46
Railroad	54	46

NOISE ZONE: P

LDN: 72.3

FRACTIONAL IMPACT: .0113

COMPONENT SOURCE EQUIVALENT IMPACT LEVELS

SOURCE	LD	LN	LDN
EMER. VEH.	.0	.0	.0
GEN. AVIA.	.0	.0	.0
JET	55.0	.0	53.0
HELICOPTER	53.7	.0	51.8
RAILROAD	.0	.0	.0
TRUCK	64.5	49.2	63.1
AUTO	65.9	54.3	65.0
BUS	55.7	.0	53.8
MOTORCYCLE	54.8	.0	52.7
SERVICE VEHICLES	55.2	47.0	54.0
OFF. NO. VEH.	54.3	.0	52.3
CONST. EQUIP.	.0	.0	.0
YARD MAINT. EQ.	.0	.0	.0
FACTORY EQUIP.	53.8	.0	51.8
HOUSEHOLD EQUIP.	54.1	.0	52.1
DOG	.0	.0	.0
PEOPLE NOISE	55.3	.0	53.3
UNIDENTIFIABLE	57.6	50.7	54.0

Figure 3-9. Component Source Equivalent Impact Levels

3.8 Attitudinal Adjustment Factors

Additional data required by the strategy analysis, presented in the computer output, are the attitudinal adjustment factors.

Section 3.3.3 of Reference 3 presents a very detailed explanation of the calculation procedures and interpretation of the computer output. Figures 3-10 and 3-11 are taken from Reference 3 and serve as an example of the computer output that is generated.

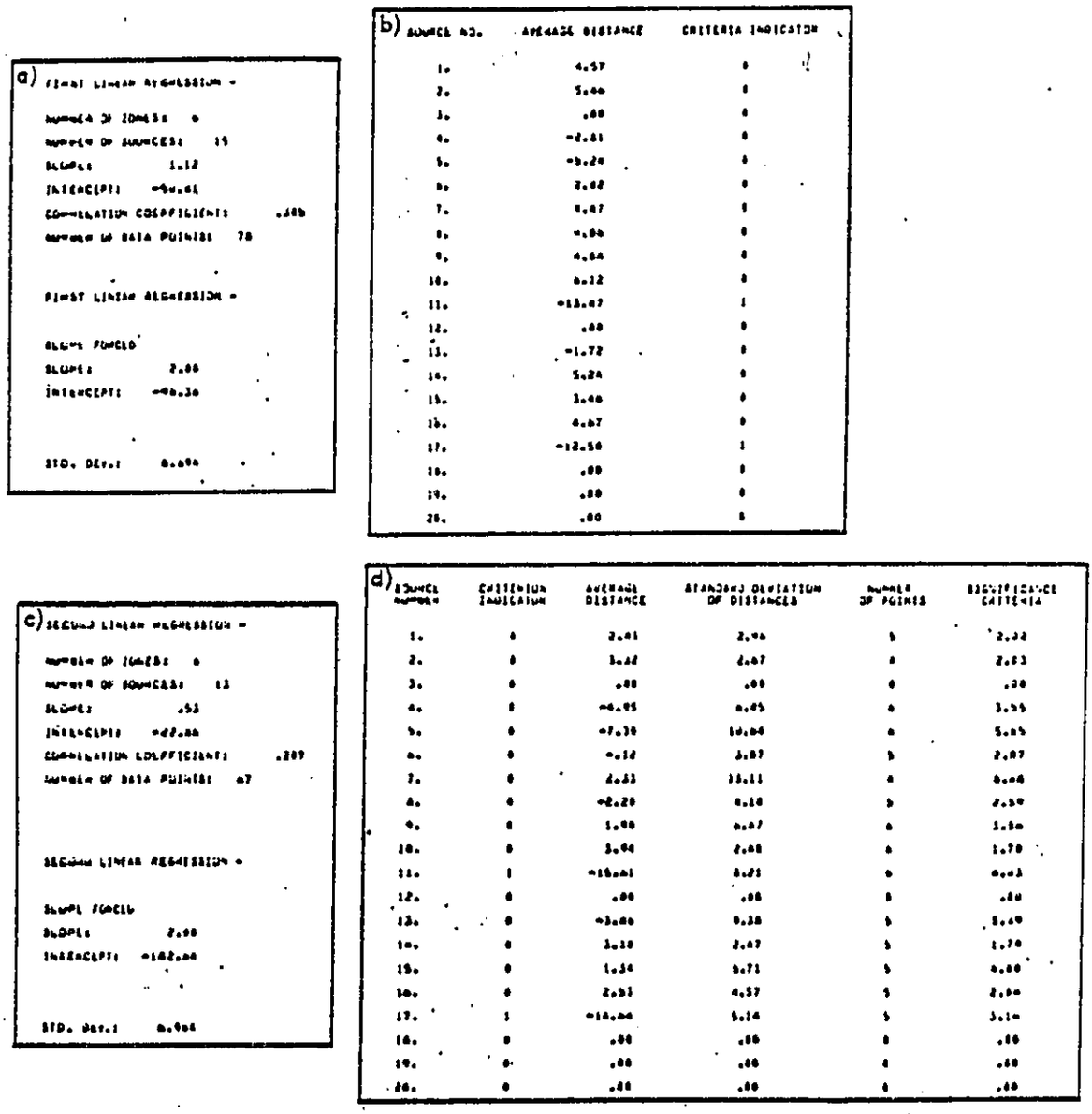

Figure 3–10. - Example Flow of Computer Output for Calculating Attitudinal Adjustment Factors (a) Results of initial linear regression, b) Tabulation of distances to regression line for each source, c) Results of second linear regression using qualifying sources, d) Tabulation of parameters used in the final computation of the factors.) See Figure 3–11 for a list of the final attitudinal adjustment factors for this example.

Note: A full description of these parameters is included in Reference 3.

ATTITUDINAL ADJUSTMENT FACTORS

(TO BE SUBTRACTED FROM SOURCE LEVELS)

SOURCE NO.	ADJUSTMENT, DB
1.	2.4
2.	3.3
3.	.0
4.	-4.9
5.	-7.4
6.	.0
7.	.0
8.	.0
9.	.0
10.	4.0
11.	-10.0
12.	.0
13.	.0
14.	3.1
15.	.0
16.	.0
17.	-10.0
18.	.0
19.	.0
20.	.0

Figure 3-11. Example Computer Output Presenting the Final Attitudinal Adjustment Factors.

REFERENCES

1. Wyle Laboratories, "Community Noise Assessment Manual – Acoustical Survey," Wyle Research Report WR 77-17 for the U.S. Environmental Protection Agency.

2. Wyle Laboratories, "Community Noise Assessment Manual – Social Survey Workbook," Wyle Research Report WR 77-4 for the U.S. Environmental Protection Agency, July 1978.

3. Burke, R.E. and Glenn, P.K., "Community Noise Assessment Manual – Strategy Guidelines," Wyle Research Report WR 78-1 for the U.S. Environmental Protection Agency.

APPENDIX A

Computer Program Listing

```
      DIMENSION HEAD1(35),HEAD2(35),ZONE(300),ISITE(300),
     1KEY(300,2),IHR(300),DAY(8),DESC(2,5),IF(35),NP(24),
     2EVAL(4,5),NUMH(9),PAS(6),US(6),NP(24),
     3LM(10),IHOP(35,10),ZL(45),MARK(300)
      DIMENSION ZIP(35,4,10),IDAY(300),DIFF(2),IR(2),NH(35,4)
      DIMENSION HLONT(3),HLEU(24),SDT(24),HL1(24),HL10(24),HL50(24),
     1HL90(24),HL99(24),V1(3),V2(3),IP(3),JP(4),C(3,2)
      DIMENSION NSI(15,24),IH(2,4),HL(3),AK(2,3),TOT(4)
      DIMENSION ICA(2),Z(10,4),CL(4,2),B(4,10),IDC(300),IEC(300)
      DIMENSION IOPT(5)
      INTEGER DATA(31500),TEXT(75),CODE(18)
      COMMON /PUNCH/ ENERGY(35),B
      COMMON /AREA/ ZLH(45),XNSE(20,50)
C
C         CRITERION LEVELS FOR STRATEGY LEVELS
      DATA CL/3*54.,2*59.,6*54.,4*59.,20*54.,
     1        11*46.,4*59.,20*46./
C
C         STORED HEADERS
      DATA AR/4H    A,4HEEK ,4HWEEK,4HEND ,4H  ?-,4HDAY /
      DATA SI/4HEMER,4H. VE,4HH.   ,4H    ,4HGEN.,4H AVI,4HA.  ,4H    ,
     1        4HJET ,4H    ,4H    ,4H    ,4HHELI,4HCOPT,4HER  ,4H    ,
     2        4HRAIL,4HROAD,4H    ,4H    ,4HTRUC,4HK   ,4H    ,4H    ,
     3        4HAUTO,4H    ,4H    ,4H    ,4HBUS ,4H    ,4H    ,4H    ,
     4        4HAUTO,4HCYC,4HLE  ,4H    ,4HSERV,4HICE ,4HVENT,4HCLES,
     5        4HOFF.,4H RO,,4H VEH,4H.   ,4HCONS,4HT. E,4HQUIP,4H.   ,
     5        4HTAND,4H MAI,4HNT. ,4HEW. ,4HFACT,4HORY ,4HEQUI,4HP.  ,
     7        4HHOUS,4HEHOL,4HD EQ,4HUIP.,4HDOG ,4H    ,4H    ,4H    ,
     8        4HPEOP,4HLE N,4HOISE,4H    ,4HUNID,4HENTI,4HFIAB,4HLE  /
      DATA HL/2H12,2H 1,2H 2,2H 3,2H 4,2H 5,2H 6,2H 7,2H 8,2H 9,
     1        2H10,2H11,2H12/
      DATA HEAD1/2H98,2H96,2H94,2H92,2H90,2H88,
     12H86,2H84,2H82,2H80,2H78,2H76,2H74,2H72,
     22H70,2H68,2H66,2H64,2H62,2H60,2H58,2H56,
     32H54,2H52,2H50,2H48,2H46,2H44,2H42,2H40,
     42H38,2H36,2H34,2H32,2H30/
      DATA HEAD2/3H100,3H 98,3H 96,3H 94,3H 92,
     13H 90,3H 88,3H 86,3H 84,3H 82,3H 80,
     23H 78,3H 76,3H 74,3H 72,3H 70,3H 68,
     33H 66,3H 64,3H 62,3H 60,3H 58,3H 56,
     43H 54,3H 52,3H 50,3H 48,3H 46,3H 44,
     53H 42,3H 40,3H 38,3H 36,3H 34,3H 32/
C
C
C         MISCELLANEOUS INITIALIZATION
      DATA NUMB/1H1,1H2,1H3,1H4,1H5,1H6,1H7,1H8,1H9/
      DATA AM/2HAM/,ICY/1H1/,E/1HE/,IHLNA/1H /,ZL/45*2H  /
      DATA BLNK/2H  /
      DATA HI/0./,DU/0./,HLLU/0./,I/0/,NU/0/
C
C         MORE STORED VARIABLES
      DATA CODE/1H1,1H6,1HJ,1HM,1HH,1HT,1HA,1H8,1HM,1H8,
     11H9,1HL,1HT,1HF,1HG,1HD,1HP,1HA/
      DATA DAY/3HMON,3HTUE,3HWED,3HTHU,3HFRI,3HSAT,3HSUN,3H   /
      DATA DESC/4HV. Q,4HQUIET,4HQUIE,4HT   ,
     14HQUIS,4HT   ,4HV. N,4HOIST,4H    ,4H    /
      DATA EVAL/4HV. A,4HCCEP,4HT.  ,4H    ,
     14HACCE,4HPTAB,4HLE  ,4H    ,
```

```
     3HHONAC,4HLEPT,4HABLE,4H    ,
     4HHY, U,4HHALL,4HEPTA,4HBLE ,
     54H    ,4H    ,4H    ,4H    /
C
C          READ OPTION ARRAY FOR OUTPUTS PRODUCED
      READ(5,5) (IOPT(I),I=1,5)
    5 FORMAT(5I5)
C
C          STORED ENERGY FOR THE DECIBEL LEVELS ASSOCIATED WITH EACH BIN
      DO 1 J=1,35
    1 ENERGY(J)=10.**((35.-J)*.2+3.1)
C
C          READ CARD TYPE 1
   10 I=I+1
      READ(5,1000) ZONE(I),ISITE(I),IMI,IDI,IYR,IDAY(I),
     1ISH,ISM,IFH,IFM,II,WS,(PNS(J),J=1,6),(US(J),J=1,6)
 1000 FORMAT(1X,A2,I2,3A2,I1,4A2,2A2,12A4)
      IF(ZONE(I).EQ.BLNK) GO TO 500
      READ(5,1001) IDC(I),IEC(I),(CMT(J),J=1,18)
 1001 FORMAT(5X,2I1,18A4)
C
C          NO RESPONSE PRINTS A BLANK
      IF(IDC(I).EQ.0) IDC(I)=5
      IF(IEC(I).EQ.0) IEC(I)=5
C
C          USE INPUT AS SUBSCRIPT FOR TITLE ARRAY
      IID=IDC(I)
      IIE=IEC(I)
C
C          NO RESPONSE IS A BLANK
      IF(IDAY(I).EQ.0) IDAY(I)=8
      ID=IDAY(I)
C
C          OUTPUT HEADERS AND TITLES
      IF(IOPT(1).EQ.0) GO TO 25
      WRITE(6,2000) ZONE(I),ISITE(I),IMI,IDI,IYR,DAY(ID)   ,ISH,ISM,
     1IFH,IFM,II,WS,(PNS(J),J=1,6),(US(J),J=1,6),(CMT(J),J=1,18),
     1(DESC(J,IID),J=1,2),
     2(EVAL(J,IIE),J=1,4),(CODE(J),J=1,18)
 2000 FORMAT(1H1,12HSITE NUMBER=,1X,A2,I2,5X,5HDATE=,1X,
     12(A2,1H/),A2,5X,4HDAY=,1X,A3,5X,5HTIME=,
     21X,A2,1H:,A2,1X,2HTO,1X,A2,1H:,A2,1X,A2,5X,
     311HWIND SPEED=,1X,A2,1X,3HMPH,//,13X,
     424HPRINCIPAL NOISE SOURCES=,5X,6A4,/,1X,
     535HUNUSUAL SITUATIONS OR INTERFERENCES=,5X,6A4,/,20X,
     69HCOMMENTS=,5X,18A4,//,1X,12HDESCRIPTION=,5X,
     72A4,10X,11HEVALUATION=,5X,4A4,//,2X,
     85HLEVEL,6X,9HFREQUENCY,12X,19HSOURCE CONTRIBUTION,
     9//,24X,18(A1,3X),/)
   25 CONTINUE
C
C          CONVERT CHARACTER HOURS AND MINUTES TO NUMBERS
      IHS=NUM(ISH)
      IMS=NUM(ISM)
      IHF=NUM(IFH)
      IMF=NUM(IFM)
C
C          CONVERT TO TOTAL MINUTES IN 12 HOUR TIME
      IF(IHS.EQ.12) IHS=0
      IF(IHF.EQ.12) IHF=0
```

```
      MINS=IHS*60+IMS
      MINF=IHF*60+IMF
C
C        FIND HOUR OF THE DAY IN 24 HOUR TIME FOR THIS DATA SHEET
      IF(MINS.LT.MINF) GO TO 35
      IF(II.EQ.AM) GO TO 30
      IH=(MINS+MINF+720)/2
      GO TO 50
   30 IH=MOD((MINS+MINF+2160)/2,1440)
      GO TO 50
   35 IF(II.EQ.AM) GO TO 40
      IH=(MINS+MINF+1440)/2
      GO TO 50
   40 IH=(MINS+MINF)/2
   50 IH=IH/60+1
      IHR(I)=IH
C
C        ZERO IBUF - HISTOGRAM FOR 18 SOURCES FOR EACH OF 35 BINS
   52 DO 60 J=1,35
      DO 60 K=1,18
   60 IBUF(J,K)=0
C
C        READ THE LEVELS CARD INTO TEXT
   70 READ(5,1002) CH,(TEXT(J),J=1,75)
 1002 FORMAT(A1,4X,75A1)
C
C        CONVERT THE TEXT INTO NUMERICAL INFORMATION
      J=1
   65 IDX=TEXT(J)
      LV=NUM(IDX)
      J=J+1
C
C        CHECK FOR END OF DATA ON CARD
      IF(J.GT.75.OR.TEXT(J).EQ.IBLNK) GO TO 90
      IDX=TEXT(J)
C
C        TWO DIGIT NUMBER - CONVERT TENS PLACE
      LV=10*LV+NUM(IDX)
C
C        CONVERT DECIBEL LEVEL TO A BIN NUMBER
      LOC=35-((LV-31)/2)
      J=J+1
      IF(J.GT.75.OR.TEXT(J).EQ.IBLNK) GO TO 90
C
C        CHECK FOR SOURCE CODE TO FIND PROPER LOCATION FOR STORAGE
   68 DO 69 K=1,18
      KK=K
      IF(TEXT(J).EQ.CODE(KK)) GO TO 75
   69 CONTINUE
C
C        SKIP OPEN PARENTHESIS
   75 J=J+2
      IF(J.GT.75.OR.TEXT(J).EQ.IBLNK) GO TO 90
      IDX=TEXT(J)
      N=NUM(IDX)
      J=J+1
      IF(J.GT.75.OR.TEXT(J).EQ.IBLNK) GO TO 90
C
C        CHECK FOR CLOSE PARENTHESIS - ONE OR TWO DIGIT NUMBER
      IF(TEXT(J).EQ.ICP) GO TO 80
```

```
      ICHARTEXT(J)
      NS=NS+IUFNUM(JON)
C
C         STORE NUMBER OF COUNTS FOR THIS SOURCE AT THIS LEVEL
   80 IBUF(LOC,KK)=NS
C
C         NEXT CHARACTER
      J=J+1
      IF(TEXT(J).EQ.ILP) J=J+1
      IF(J.GT.75.OR.TEXT(J).EQ.IBLNK) GO TO 90
C
C         NEXT LEVEL OR MORE SOURCES
      DO 85 K=1,9
      IF(TEXT(J).EQ.NUMB(K)) GO TO 65
   85 CONTINUE
C
C         MORE SOURCES
      GO TO 60
C
C         CHECK FOR LAST CARD OF THIS DATA SHEET
   90 IF(CN.NE.2) GO TO 70
C
C         ZERO ARRAY USED FOR COMBINING SOURCES AT EACH LEVEL
      DO 92 J=1,35
   92 HF(J)=0.
C
C         COMBINE SOURCES AT EACH LEVEL
      DO 95 J=1,35
      DO 95 K=1,10
   95 HF(J)=HF(J)+IBUF(J,K)
C
C         CALCULATE STATISTICS
      CALL STAT(HF,HL1,HL10,HL50,HL90,HL99,HLEQ,SD,NN)
C
C         PRINT HISTOGRAM
      IF(IOPT(1).EQ.0) GO TO 99
      DO 100 J=1,35
      IF(HF(J).EQ.0.) GO TO 96
      WRITE(6,201) HEAD1(J),HEAD2(J),HF(J),(IBUF(J,K),K=1,10)
      GO TO 100
   96 WRITE(6,201) HEAD1(J),HEAD2(J),HF(J)
  201 FORMAT(1X,A2,1X,1H-,1X,A3,5X,F5.0,7X,10I4)
  100 CONTINUE
C
C         PRINT STATISTICS
      WRITE(6,202) NN,HL1,HL10,HL50,HL90,HL99,HLEQ,SD
  202 FORMAT(//,1X,6HTOTAL=,2X,F4.0,//,1X,2HL1,13X,F5.1,/,
     11X,3HL10,10X,F5.1,/,1X,3HL50,10X,F5.1,/,1X,3HL90,10X,F5.1,
     2/,1X,3HL99,10X,F5.1,//,1X,3HLEQ,10X,F5.1,/,1X,
     318HSTANDARD DEVIATION,F6.1)
   99 CONTINUE
C
C         FIND UPPER AND LOWER BINS SPANNING NONZERO COUNTS
      DO 101 J=1,35
      K=36-J
      IF(HF(K).NE.0.) GO TO 102
  101 CONTINUE
  102 DO 110 J=1,35
      JJ=J
      IF(HF(JJ).NE.0.) GO TO 112
```

```
  110 CONTINUE
C
C         STORE UPPER BIN NUMBER FOR THIS SHEET
  112 KEY(I,2)=JJ
C
C         STORE LOCATION IN DATA ARRAY AT WHICH DATA FOR THIS SHEET BEGINS
      KEY(I,1)=ND+1
C
C         FILL DATA
      DO 120 J=JJ,K
C
C         CHECK FOR DATA OVERFLOW
      IF(ND.GT.31494) GO TO 999
      ND=ND+1
C
C         PACK SOURCE LEVEL COUNTS -
C         SIX LOCATIONS FOR EACH NOISE LEVEL - 18 POSSIBLE SOURCES
      DATA(ND)=10000*IBUF(J,1)+100*IBUF(J,2)+IBUF(J,3)
      DATA(ND+1)=10000*IBUF(J,4)+100*IBUF(J,5)+IBUF(J,6)
      DATA(ND+2)=10000*IBUF(J,7)+100*IBUF(J,8)+IBUF(J,9)
      DATA(ND+3)=10000*IBUF(J,10)+100*IBUF(J,11)+IBUF(J,12)
      DATA(ND+4)=10000*IBUF(J,13)+100*IBUF(J,14)+IBUF(J,15)
      DATA(ND+5)=10000*IBUF(J,16)+100*IBUF(J,17)+IBUF(J,18)
      ND=ND+5
  120 CONTINUE
      GO TO 10
C
C
C
C
  500 NZL=0
C
C         I WAS STEPPED BEFORE INPUT
      I=I-1
C
C         LAST DATA SHEET MUST HAVE FINAL LOCATION IN DATA SAVED SINCE
C         THERE IS NO NEXT DATA SHEET
      KEY(I+1,1)=ND+1
C
C         CREATE A UNIQUE LIST OF ZONE ID AND COUNT NUMBER OF ZONES
      DO 320 J=1,I
      ZL(NZL+1)=ZONE(J)
      IF(NZL.EQ.0) GO TO 310
      DO 305 K=1,NZL
      IF(ZL(K).EQ.ZL(NZL+1)) GO TO 320
  305 CONTINUE
  310 NZL=NZL+1
  320 CONTINUE
C
C
C
C
C         MAIN PROCESSING LOOP - PROCEED THROUGH ZONES
C
      DO 900 K=1,NZL
C
C         WRITE SITE HEADER
      IF(IOPT(2).EQ.0) GO TO 221
      WRITE(6,220) ZL(K)
  220 FORMAT(1H1,17X,11HNOISE ZONE ,A4,A2,22X,21H7-DAY SITE STA.,3I1C6//
```

```
     1 ...SITE      LDN     LEQ     L1     L10     L50     L90     L99
     2  STD. DEV.    L1-LDN    L1-LEQ/)
 221 CONTINUE
C
C         IID IS USED TO CONTROL NUMBER OF LINES PRINTED PER PAGE
      IID=0
C
C         DIFF STORES AVERAGE DIFFERENCES BETWEEN LD AND LDN
      DO 505 J=1,2
      DIFF(J)=0.
 505  IN(J)=0
C
C         FOR SPATIAL ST. DEV.
      SSQ=0.
      SUS=0.
      NS=0
C
C         PROCEED THROUGH DATA SHEETS TO FIND THE AVERAGE DIFFERENCE
C         BETWEEN LD AND LDN
      DO 600 J=1,I
C
C         HAS THIS SHEET BEEN PROCESSED AS PART OF AN EARLIER SITE
      IF(MARK(J).EQ.1) GO TO 600
C
C         ONLY THIS ZONE
      IF(ZONE(J).NE.ZL(K)) GO TO 600
C
C         THE SITE FOR THIS DATA SHEET
      IS=ISITE(J)
C
C         SOURCE-INDEPENDENT HISTOGRAM FOR THIS SITE
      DO 510 KK=1,4
      DO 510 JJ=1,35
 510  NH(JJ,KK)=0.
C
C         FIND THE REST OF THE SHEETS AT THIS SITE
      DO 550 KK=J,I
      IF(MARK(KK).EQ.1) GO TO 550
      IF(ZONE(KK).NE.ZL(K)) GO TO 550
C
C         THIS SITE ONLY
      IF(ISITE(KK).NE.IS) GO TO 550
C
C         MARK THIS SHEET AS PROCESSED
      MARK(KK)=1
C
C         ID = 1 WEEKDAY
C         ID = 2 WEEKNIGHT
C         ID = 3 WEEKEND DAY
C         ID = 4 WEEKEND NIGHT
      ID=1
      IF(IDAY(KK).EQ.6.OR.IDAY(KK).EQ.7) ID=ID+2
      IF(IHH(KK).LT.7.OR.IHH(KK).GT.22) ID=ID+1
C
C         STARTING LOCATION OF DATA
      LS=START(KK,1)
C
C         ENDING LOCATION OF DATA
      LE=START(KK+1,1)-1
C
```

```
C       STARTING NOISE LEVEL BIN NUMBER
      LEV=NKEY(NN,2)
C
C       RELATIVE HISTOGRAM
      DO 525 JJ=LNB,LNF
      CALL UNPACK(DATA(JJ),IV,JV,KV)
      NN(LEV,ID)=NN(LEV,ID)+IV+JV+KV
C
C       SIX LOCATIONS PER BIN
      IF(MOD(JJ,6).EQ.0) LEV=LEV+1
  525 CONTINUE
  550 CONTINUE
C
C       LEQ WEEKNIGHT
      XNN=XLEQ(NN(1,2))
C
C       IF NO WEEK NIGHT THAN NO WEEK DAY
      IF(XNN.EQ.0.) GO TO 560
C
C       LEQ WEEKDAY
      XND=XLEQ(NN(1,1))
C
C       DIFFERENCE BETWEEN LD AND LD WEEK
      DIFF(1)=DIFF(1)+10.*ALOG10(.625+.375*10.**((XNN-XND)/10.))
C
C       NUMBER OF VALUES SUMMED
      IN(1)=IN(1)+1
C
C       LEQ WEEKEND NIGHT
  560 XNEN=XLEQ(NN(1,4))
      IF(XNEN.EQ.0.) GO TO 600
      XNED=XLEQ(NN(1,3))
C
C       DIFFERENCE FOR WEEKEND
      DIFF(2)=DIFF(2)+10.*ALOG10(.625+.375*10.**((XNEN-XNED)/10.))
      IN(2)=IN(2)+1
  600 CONTINUE
C
C       FIND THE TWO AVERAGE DIFFERENCES
      DO 620 J=1,2
      IF(IN(J).EQ.0) GO TO 620
      DIFF(J)=DIFF(J)/IN(J)
C
C       IN IS REUSED LATER
  620 IN(J)=0
C
C       CLEAR THE MARK ARRAY
      DO 625 J=1,3
  625 MARK(J)=0
C
C       ZERO ZONE-WIDE CUMULATIVE STATISTICS ARRAY
      DO 630 J=1,3
      HLDN(J)=0.
      HLEQ(J)=0.
      SD(J)=0.
      HL1(J)=0.
      HL10(J)=0.
      HL50(J)=0.
      HL90(J)=0.
      HL99(J)=0.
```

```
C
C         L1 - LDN
      V1(IJ)=0.
C
C         L1 - LLW
      V2(IJ)=0.
  630 CONTINUE
C
C         PROCEED THROUGH DATA SHEETS AS BEFORE BUT THIS TIME WE KNOW
C         DIFFERENCE BETWEEN LD AND LDN FOR THOSE SITES WITH NO
C         NIGHT MEASUREMENTS
      DO 700 J=1,I
      IF(MARK(J).EQ.1) GO TO 700
      IF(ZONE(J).NE.ZL(K)) GO TO 700
      IS=ISITE(J)
      DO 710 KK=1,4
      DO 710 JJ=1,35
  710 HH(JJ,KK)=0.
      DO 750 KK=J,I
      IF(MARK(KK).EQ.1) GO TO 750
      IF(ZONE(KK).NE.ZL(K)) GO TO 750
      IF(ISITE(KK).NE.IS) GO TO 750
      MARK(KK)=1
      ID=1
      IF(IDAY(KK).EQ.6.OR.IDAY(KK).EQ.7) ID=ID+2
      IF(IHR(KK).LT.7.OR.IHR(KK).GT.22) ID=ID+1
      LAS=KEY(KK,1)
      LAF=KEY(KK+1,1)-1
      LEV=KEY(KK,2)
      DO 725 JJ=LAS,LAF
      CALL UNPACK(DATA(JJ),IV,JV,KV)
      HH(LEV,ID)=HH(LEV,ID)+IV+JV+KV
      IF(MOD(JJ,6).EQ.0) LEV=LEV+1
  725 CONTINUE
  750 CONTINUE
      XAD=XLEQ(HH(1,1))
C
C         S = NUMBER OF COUNTS MAKING UP XAD
C         S IS A COMMON VARIABLE
      TOT(1)=S
      XAN=XLEQ(HH(1,2))
      TOT(2)=S
C
C         IF LEW EQUALS ZERO USE DIFF TO COMPUTE LDN
      IF(XAN.NE.0.) GO TO 752
      HLDN=XAD-DIFF(1)
      GO TO 762
C
C         WHEN COMBINING HISTOGRAMS NOTE WEIGHTING BY NUMBER OF COUNTS
C         AND DAY NIGHT TIME FACTOR
  752 IF(TOT(2).EQ.0.) GO TO 761
      F=.6*(TOT(1)/TOT(2))
      DO 760 JJ=1,35
  760 HH(JJ,1)=HH(JJ,1)+HH(JJ,2)*F
  761 CONTINUE
C
C         CALCULATE LDN AND STATISTICS FOR THIS WEEK SITE
      HLDN=10.*ALOG10(.625*10.**(XAD/10.)
     1   +.375*10.**((XAN+10.)/10.))
  762 CALL STAT(HH(1,1),HL1,HL10,HL50,HL90,HL99,HLEQ,SD,HN)
```

```
C
C     STORE PARAMETERS FOR WEEK
      HLDN(1)=HLDN(1)+HLDN
      HLEQ(1)=HLEQ(1)+HLEQ
      SD(1)=SD(1)+SD
      HLI(1)=HLI(1)+HLI
      HL10(1)=HL10(1)+HL10
      HL50(1)=HL50(1)+HL50
      HL90(1)=HL90(1)+HL90
      HL99(1)=HL99(1)+HL99
      V1=HLI-HLDN
      V2=HLI-HLEQ
      V1(1)=V1(1)+V1
      V2(1)=V2(1)+V2
      IN(1)=IN(1)+1
C
C     WEEKEND MEASUREMENTS
      AWED=ALEQ(NM(1,3))
      TU(3)=8
C
C     IF THIS IS TRUE THERE ARE NO WEEKEND MEASUREMENTS AT THIS SITE
      IF(AWED.EQ.0.) GO TO 700
      AWEN=ALEQ(NM(1,4))
      TU(4)=5
      IF(AWEN.NE.0.) GO TO 766
      SLDN=AWED-DIFF(2)
      GO TO 772
  766 IF(TU(4).EQ.0.) GO TO 771
      F=.6*(TU(3)/TU(4))
      DO 770 L=1,35
  770 NM(L,3)=NM(L,3)+NM(L,4)*F
  771 CONTINUE
      SLDN=10.*ALOG10(.625*10.**(AWED/10.)+
     1 .375*10.**((AWEN+10.)/10.))
  772 CALL STAT(NM(1,3),SLI,SL10,SL50,SL90,SL99,SLEQ,SSD,NN)
      HLDN(2)=HLDN(2)+SLDN
      HLEQ(2)=HLEQ(2)+SLEQ
      SD(2)=SD(2)+SSD
      HLI(2)=HLI(2)+SLI
      HL10(2)=HL10(2)+SL10
      HL50(2)=HL50(2)+SL50
      HL90(2)=HL90(2)+SL90
      HL99(2)=HL99(2)+SL99
      SV1=SLI-SLDN
      SV2=SLI-SLEQ
      V1(2)=V1(2)+SV1
      V2(2)=V2(2)+SV2
      IN(2)=IN(2)+1
C
C     WEEK + WEEKEND WEIGHTING
      HLDN=HLDN+10.*ALOG10(.714*(1.+.4*10.**((SLDN-HLDN)/10.)))
      HLEQ=.714*HLEQ+.286*SLEQ
      SD=.714*SD+.286*SSD
      HLI=.714*HLI+.286*SLI
      HL10=.714*HL10+.286*SL10
      HL50=.714*HL50+.286*SL50
      HL90=.714*HL90+.286*SL90
      HL99=.714*HL99+.286*SL99
      V1=.714*V1+.286*SV1
      V2=.714*V2+.286*SV2
```

```
C
C
C           PRINT VALUES
      IF(IOPT(2).EQ.0) GO TO 705
  700 WRITE(6,210) IS,HLDN,HLEQ,HL1,HL10,HL50,HL90,HL99,SD,V1,V2
  210 FORMAT(/,104,I3,F10.1,F8.1,F7.1,F8.1,F8.1,2F8.1,F10.1,F13.1,F12.1)
  705 CONTINUE
      SSQ=SSQ+HLDN*HLDN
      SUS=SUS+HLDN
      NSI=NSI+1
C
C           CHECK FOR PAGE FORMATTING
      IIO=IIO+1
      IF(IIO.GE.25) WRITE(6,220) ZL(K)
      IF(IIO.GE.25) IIO=0
  700 CONTINUE
C
C           CALCULATE ZONE AVERAGES
      DO 715 J=1,2
      IF(IK(J).EQ.0) GO TO 715
      HLDNI(J)=HLDNI(J)/IK(J)
      HLEQI(J)=HLEQI(J)/IK(J)
      SDI(J)=SDI(J)/IK(J)
      HL1I(J)=HL1I(J)/IK(J)
      HL10I(J)=HL10I(J)/IK(J)
      HL50I(J)=HL50I(J)/IK(J)
      HL90I(J)=HL90I(J)/IK(J)
      HL99I(J)=HL99I(J)/IK(J)
      V1I(J)=V1I(J)/IK(J)
      V2I(J)=V2I(J)/IK(J)
  715 CONTINUE
C
C           CALCULATE COMPOSITE VALUES
      F=.714
      D=.286
      IF(IK(2).NE.0) GO TO 720
      F=1.
      D=0.
  720 HLDNI(3)=HLDNI(1)+10.*ALOG10(F*(1.+D.4*10.**((HLDNI(2)-HLDNI(1))
     1  /10.)))
      HLEQI(3)=F*HLEQI(1)+D*HLEQI(2)
      SDI(3)=F*SDI(1)+D*SDI(2)
      HL1I(3)=F*HL1I(1)+D*HL1I(2)
      HL10I(3)=F*HL10I(1)+D*HL10I(2)
      HL50I(3)=F*HL50I(1)+D*HL50I(2)
      HL90I(3)=F*HL90I(1)+D*HL90I(2)
      HL99I(3)=F*HL99I(1)+D*HL99I(2)
      V1I(3)=F*V1I(1)+D*V1I(2)
      V2I(3)=F*V2I(1)+D*V2I(2)
C
C           SPATIAL STANDARD DEVIATION
      IF(NSI.LE.1) GO TO 721
      SSD=SQRT((SSQ-SUS*SUS/NSI)/(NSI-1))
  721 CONTINUE
C
C           WRITE ZONE AVERAGES
      IF(IOPT(2).EQ.0) GO TO 240
      WRITE(6,230) ZL(K),(HLDNI(J),J=1,3),SSD,(HLEQI(J),J=1,3),
     1                   (HL1I(J),J=1,3),(HL10I(J),J=1,3),
     2  (HL50I(J),J=1,3),(HL90I(J),J=1,3),(HL99I(J),J=1,3),
```

```
     $ (SD(J),J=1,3),
     1  (V1(J),J=1,3),(V2(J),J=1,3),(H(J),J=1,2)
 230 FORMAT(1H1,12X,11HNOISE ZONE=,2X,A2,21X,34H24-HOUR ZONE-WIDE SPATI
     1AL AVERAGES,//
     1              60X,4HWEEK,6X,7HWEEKEND,6X,9HCOMPOSITE,//,36X,3HLDN,
     111X,3F14.1,10X,19HSPATIAL STD. DEV. =,1X,F8.2,
     1//,36X,3HLEQ,11X,3F14.1,//,36X,2HL1,12X,3F14.1,//,36X,
     23HL10,11X,3F14.1,//,36X,3HL50,11X,3F14.1,//,36X,3HL90,11X,3F14.1,
     3//,36X,3HL99,11X,3F14.1,//,
     2                    36X,9HSTD. DEV.,5X,3F14.1,//,36X,
     27HL1-LDN ,7X,3F14.1,//,36X,6HL1-LEQ,8X,3F14.1,//,36X,
     2                                                   15HNUMBER OF SITE
     4S,8X,I3,11X,I3)
C
C        WRITE HEADER FOR HOURLY STATISTICS
      WRITE(6,235)
 235 FORMAT(///,49X,35HHOURLY SPATIAL AVERAGES (WEEK ONLY),//,10X,
     14HHOUR,3X,74HLEQ      L1      L10      L50      L90      L99      STD. D
     2EV.      SITE NUMBERS),//)
 240 CONTINUE
C
C        CLEAR ARRAYS
      DO 810 J=1,24
      HLEQ(J)=0.
      HL1(J)=0.
      HL10(J)=0.
      HL50(J)=0.
      HL90(J)=0.
      HL99(J)=0.
      SD(J)=0.
      NP(J)=0
      NP(J)=0
C
C        SITE NUMBERS
      DO 806 JJ=1,10
 806 NSIT(JJ,J)=0
 810 CONTINUE
C
C        PROCEED THROUGH SHEETS
      DO 850 J=1,I
      IF(ZONE(J).NE.ZL(K)) GO TO 850
C
C        WEEK ONLY FOR HOURLY BREAKDOWN
      IF(IDAY(J).EQ.6.OR.IDAY(J).EQ.7) GO TO 850
C
C        HOUR OF DAY
      ITIME=IHR(J)
C
C        QUANTITY OF SITES ALREADY SAVED AT THIS HOUR
      NPP=NP(ITIME)
      IF(NPP.EQ.0) GO TO 822
C
C        MAKE SURE SITE NUMBER IS NOT SAVED MORE THAN ONCE
      DO 820 JJ=1,NPP
      IF(NSIT(JJ,ITIME).EQ.ISITE(J)) GO TO 825
 820 CONTINUE
C
C        ALLOW 15 SITES AT AN HOUR
 822 IF(NP(ITIME).EQ.15) GO TO 825
C
```

```
C        NUMBER OF SITES SAVED
      NP(ITIME)=NP(ITIME)+1
C
C        ACTUAL SITE NUMBERS
      NSIT(NPP+1,ITIME)=ISITE(J)
  825 LAS=KEY(J,1)
      LAF=KEY(J+1,1)-1
      LEV=KEY(J,2)
C
C        CLEAR HISTOGRAM ARRAY
      DO 826 JJ=1,35
  826 HF(JJ)=0.
C
C        RECONSTRUCT HISTOGRAM
      DO 830 JJ=LAS,LAF
      CALL UNPACK(DATA(JJ),IV,JV,KV)
      HF(LEV)=HF(LEV)+IV+JV+KV
      IF(MOD(JJ,6).EQ.0) LEV=LEV+1
  830 CONTINUE
C
C        CALCULATE STATISTICS
      CALL STAT(HF,HL1,HL10,HL50,HL90,HL99,HLEQ,SD,HM)
C
C        SUM STATISTICS
      HLEQT(ITIME)=HLEQT(ITIME)+HLEQ
      HL1T(ITIME)=HL1T(ITIME)+HL1
      HL10T(ITIME)=HL10T(ITIME)+HL10
      HL50T(ITIME)=HL50T(ITIME)+HL50
      HL90T(ITIME)=HL90T(ITIME)+HL90
      HL99T(ITIME)=HL99T(ITIME)+HL99
      SDT(ITIME)=SDT(ITIME)+SD
C
C        NUMBER OF ENTRIES
      KP(ITIME)=KP(ITIME)+1
  850 CONTINUE
C
C        CALCULATE AVERAGES
      DO 880 J=1,24
C
C        ZERO PRINT VARIABLES
      HLEQ=0.
      HL1=0.
      HL10=0.
      HL50=0.
      HL90=0.
      HL99=0.
      SD=0.
      IF(KP(J).EQ.0) GO TO 874
      HLEQ=HLEQT(J)/KP(J)
      HL1=HL1T(J)/KP(J)
      HL10=HL10T(J)/KP(J)
      HL50=HL50T(J)/KP(J)
      HL90=HL90T(J)/KP(J)
      HL99=HL99T(J)/KP(J)
      SD=SDT(J)/KP(J)
  874 CONTINUE
      NPP=NP(J)
C
C        PRINTING LOGIC
      JJ=J
```

```
      IF(J.GT.12) JJ=J-12
      IF(IOPT(2).EQ.0) GO TO 870
      WRITE(6,200) HL(JJ),HL(JJ+1),HLEQ,HL1,HL10,HL50,HL90,HL99,SD,
     1  (NS(I,JJ),J),JJ+1,NPP)
  200 FORMAT(13X,A2,4H1 - ,A2,1H),F9.1,F7.1,4F6.1,F10.1,6X,15I3)
  870 CONTINUE
  880 CONTINUE
C
C         AGGREGATE STATISTICS
C         THIS CODE IS PASSED THREE TIMES - WEEK,WEEKEND,OVERALL
      IF(IOPT(3).EQ.0) GO TO 1499
      KI=1
  885 DO 890 KK=1,35
      HM(KK,1)=0.
      HM(KK,2)=0.
  890 CONTINUE
      DO 860 J=1,J
C
C         CHECK FOR PASS NUMBER
      IF(ZONE(J).NE.ZC(K)) GO TO 860
      IF(KI.EQ.1.AND.(IDAY(J).GT.5)) GO TO 860
      IF(KI.EQ.2.AND.(IDAY(J).LT.6)) GO TO 860
      LA=KEY(J,1)
      LAP=KEY(J+1,1)-1
      LEV=KEY(J,2)
      DO 855 JJ=LA,LAP
      CALL UNPACK(DATA(JJ),IV,JV,KV)
      SUM=IV+JV+KV
C
C         DAY OR NIGHT
      IF(IHR(J).LT.7.OR.IHR(J).GT.22) GO TO 815
C
C         PROPER WEIGHTING
      IF(KI.EQ.3.AND.IDAY(J).GT.5) SUM=SUM*C(KI,1)
      HM(LEV,1)=HM(LEV,1)+SUM
      GO TO 816
  815 IF(KI.EQ.3.AND.IDAY(J).GT.5) SUM=SUM*C(KI,2)
      HM(LEV,2)=HM(LEV,2)+SUM
  816 IF(MOD(JJ,6).EQ.0) LEV=LEV+1
  855 CONTINUE
  860 CONTINUE
      CALL STAT(HM(1,1),HL1(1),HL10(1),HL50(1),HL90(1),HL99(1),
     1  HLEQ(1),SD(1),IP(1))
C
C         IF NO DAY THEN NO NIGHT
C         NO DAY MAY HAPPEN ON WEEKENDS
      IF(IP(1).EQ.0.) GO TO 1499
      CALL STAT(HM(1,2),HL1(2),HL10(2),HL50(2),HL90(2),HL99(2),
     1  HLEQ(2),SD(2),IP(2))
C
C         DAY-NIGHT WEIGHTING FACTOR
      F=0.
      IF(IP(2).EQ.0.) GO TO 859
      F=.MAX(IP(1)/IP(2))
  859 CONTINUE
      WRITE(6,204) ZC(K),(AN(JJ,KI),JJ=1,2)
  204 FORMAT(1H1,12X,11HNOISE ZONE ,2X,A2,23X,2A4,    20HAGGREGATE STATIS
     1TICS,//,22X,3HDAY,38X,5HNIGHT,17X,9HCOMPOSITE,
     1//,11X,5HLEVEL,10X,9HFREQUENCY,2(10X,5HLEVEL,10X,9HFREQUENCY),//)
      IF(HLEQ(2).NE.0.) GO TO 836
```

```
      HLD=0.
      GO TO 857
  856 HLON=10.*ALOG10(.625*10.**(HLEQ(NH(1,1))/10.)+
     1 .375*10.**(HLEQ(2)/10.)/10.)
  857 IF(HLEQ(2).NE.0.) GO TO 862
C
C        COMBINE HISTOGRAMS DAY NIGHT, NOTE THERE MAY NOT BE A NIGHT
      DO 861 J=1,35
  861 HH(J,3)=HH(J,1)
      GO TO 866
  862 DO 865 J=1,35
      HH(J,3)=HH(J,1)+HH(J,2)*F
  865 CONTINUE
  866 CALL STAT(HH(1,3),HL1(3),HL10(3),HL50(3),HL90(3),HL99(3),
     1 HLEQ(3),SD(3),IP(3))
      V1(1)=HL10(1)-HLEQ(1)
      V2(1)=HL1(1)-HLEQ(1)
      V1(2)=HL10(2)-HLEQ(2)
      V2(2)=HL1(2)-HLEQ(2)
      V1(3)=HL10(3)-HLEQ(3)
      V2(3)=HL1(3)-HLEQ(3)
      DO 858 J=1,35
      WRITE(6,206) HEAD1(J),HEAD2(J),HH(J,1),HEAD1(J),HEAD2(J),HH(J,2),
     1 HEAD1(J),HEAD2(J),HH(J,3)
  206 FORMAT(1X,3(A2,1X,1H-,1X,A3,4X,F5.1,20X))
  858 CONTINUE
      WRITE(6,207) (IP(J),J=1,3),HLDN,(HLEQ(J),J=1,3),
     1 (HL1(J),J=1,3),(HL10(J),J=1,3),(HL50(J),J=1,3),
     1 (HL90(J),J=1,3),(HL99(J),J=1,3),(SD(J),J=1,3),
     1 (V1(J),J=1,3),(V2(J),J=1,3)
  207 FORMAT(//,19X,6HTOTAL=,F10.1,2(20X,6HTOTAL=,F10.1),//,
     197X,3HLDN,5X,F14.1,/,13X,3HLEQ,5X,F14.1,2(20X,3HLEQ,5X,F14.1),/,
     1                              13X,2HL1,6X,F14.1,2(20X,2HL1,6X,F14.1),/
     113X,3HL10,5X,F14.1,2(20X,3HL10,5X,F14.1),/,13X,3HL50,5X,F14.1,
     12(20X,3HL50,5X,F14.1),/,13X,3HL90,5X,F14.1,2(20X,3HL90,5X,F14.1),/
     113X,3HL99,5X,F14.1,2(20X,3HL99,5X,F13.1),/,13X,9HSTD. DEV.,F13.1,
     12(20X,9HSTD. DEV.,F13.1),/,13X,7HL10-LEQ,F15.1,2(20X,7HL10-LEQ,
     1F15.1),/,13X,6HL1-LEQ,F16.1,2(20X,6HL1-LEQ,F16.1))
      IF(KI.GE.3) GO TO 1499
      IF(KI.EQ.2.AND.IP(1).EQ.0.) GO TO 1499
      C(KI,1)=IP(1)
      C(KI,2)=IP(2)
C
C        WEEK-WEEKEND WEIGHTING FACTOR
      C(3,1)=0.
      C(3,2)=0.
      IF(C(2,1).EQ.0.) GO TO 1497
      IF(KI.EQ.2) C(3,1)=.4*(C(1,1)/C(2,1))
 1497 IF(C(2,2).EQ.0.) GO TO 1498
      IF(KI.EQ.2) C(3,2)=.4*(C(1,2)/C(2,2))
 1498 CONTINUE
C
C        STEP PASS NUMBER
      KI=KI+1
      GO TO 805
C
C        DESCRIPTION AND EVALUATION SUMMARY
 1499 II=0
      JJ=0
      DO 1500 J=1,4
```

```
      IH(1,J)=0.
 1500 IH(2,J)=0.
      IF(IOPT(4).EQ.0) GO TO 1572
C
C         PROCEED THROUGH SHEETS
      DO 1505 J=1,I
      IF(ZONE(J).NE.ZL(K)) GO TO 1505
C
C         DESCRIPTION CODE
      JJ=IDC(J)
C
C         5 IS A NO ANSWER
      IF(JJ.NE.5) IH(1,JJ)=IH(1,JJ)+1.
C
C         EVALUATION CODE
      KK=IEC(J)
      IF(KK.NE.5) IH(2,KK)=IH(2,KK)+1.
 1505 CONTINUE
C
C         COMPUTE TOTAL NUMBER OF ENTRIES
      DO 1510 J=1,4
      ITD=ITD+IH(1,J)
      ITE=ITE+IH(2,J)
 1510 CONTINUE
C
C         COMPUTE PERCENTAGES IN EACH CATEGORY
      DO 1515 JJ=1,4
      IF(ITD.EQ.0) GO TO 1515
      IH(1,JJ)=(IH(1,JJ)/ITD)*100.
      IF(ITE.EQ.0) GO TO 1515
      IH(2,JJ)=(IH(2,JJ)/ITE)*100.
 1515 CONTINUE
C
C         PRINT RESULTS
      WRITE(6,150) ZL(K),((DESC(J,L),J=1,2),IH(1,L),(EVAL(J,L),J=1,4),
     1 IH(2,L),L=1,4),ITD,ITE
  150 FORMAT(1H1,20X,11HNOISE ZONE1,2X,A2,11X,26HDESCRIPTION AND EVALUAT
     1ION,
     1/////,40X,7HPERCENT,42X,7HPERCENT,/,27X,11HDESCRIPTION,10X,
     18HOF TOTAL,18X,10HEVALUATION,13X,8HOF TOTAL,///,
     14(27X,2A4,15X,F5.1,20X,4A4,9X,F5.1,//),/,37X,6HTOTAL1,5X,I4,
     134X,6HTOTAL1,5X,I4)
C
C         SOURCE IDENTIFICATION PERCENTAGES
      DO 1520 J=1,10
 1520 NF(J)=0.
C
C         PROCEED THROUGH SHEETS
      DO 1550 J=1,I
      IF(ZONE(J).NE.ZL(K)) GO TO 1550
      LAS=KEY(J,1)
      LAF=KEY(J+1,1)-1
      DO 1550 JJ=LAS,LAF
      CALL UNPACK(DATA(JJ),I9,J9,K9)
C
C         JJ INCREMENTS BY 1 BUT SOURCES ARE 3 AT A TIME
      IS=MOD(JJ,3)+1
      IF(IS.EQ.0) IS=10
      NF(IS)=NF(IS)+K9
      NF(IS+1)=NF(IS+1)+J9
```

```
      NF(IS-2)=NF(IS-2)+IV
 1530 CONTINUE
 1550 CONTINUE
C
C         COUNT TOTAL SOURCES
      IS=0.
      DO 1560 J=1,17
 1560 IS=IS+NF(J)
C
C         COMPUTE PERCENTS
      DO 1570 J=1,17
      IF(IS.EQ.0.) GO TO 1570
      NF(J)=(NF(J)/IS)*100.
 1570 CONTINUE
C
C         PRINT RESULTS
      WRITE(6,151) ZL(K),((IST(J,L),J=1,4),NF(L),L=1,17),IS
  151 FORMAT(1H1,32X,11HNOISE ZONE ,2A,A2,6X,21HSOURCE IDENTIFICATION,/
     1///1X,10HPERCENT OF,/,52X,6HSOURCE,10X,16HNUMBER IDENTIFIED,///,
     1(/(4/X,4A4,11X,F5.1,//),///,50X,13HTOTAL NUMBER,,F7.1)
C
C         EQUIVALENT IMPACT LEVELS FOR STRATEGY ANALYSIS
 1572 IF(IOPT(5).EQ.0) GO TO 900
      DO 1575 JJ=1,10
      DO 1575 KK=1,4
 1575 Z(JJ,KK)=0.
      DO 1577 J=1,I
 1577 MARK(J)=0
C
C         FIND ZONE ID FOR ZERO IMPACT CRITERION LEVELS
      DO 1610 JJ=1,N2
      K2=JJ
      IF(ZL(K).EQ.ZCN(K2)) GO TO 1595
 1610 CONTINUE
      K2=N3
 1595 DO 1596 J=1,4
 1596 JP(J)=0
C
C         PROCEED THROUGH SHEETS
      DO 1000 J=1,I
      IF(ZONE(J).NE.ZL(K)) GO TO 1000
      IF(MARK(J).EQ.1) GO TO 1000
      IS=ISITE(J)
C
C         ZIP - 35 BINS, 4 TIME PERIODS, 10 SOURCES
      DO 1580 L=1,35
      DO 1580 JJ=1,4
      DO 1580 KK=1,10
 1580 ZIP(L,JJ,KK)=0.
      DO 1581 JJ=1,4
 1581 TOT(JJ)=0.
C
C         FIND ALL THE SHEETS FOR THIS SITE
      DO 1600 KK=J,I
      IF(ZONE(KK).NE.ZL(K)) GO TO 1600
      IF(MARK(KK).EQ.1) GO TO 1600
      IF(ISITE(KK).NE.IS) GO TO 1600
      MARK(KK)=1
      LA=SHEET(KK,1)
      LA=SHEET(KK+1,1)-1
```

```
                  LEV=KLEV(KK,Z)
                  IU=1
                  IF(IDAY(KK).EQ.6.OR.IDAY(KK).EQ.7) IU=IU+2
                  IF(IHH(KK).LT.7.OR.IHH(KK).GT.22) IU=IU+1
            C
            C        JP COUNTS THE NUMBER OF SHEETS IN EACH OF THE FOUR TIME PERIODS
                  JP(IU)=JP(IU)+1
                  DO 1590 JJ=LAB,LAT
                  CALL UNPACK(UA(K,JJ),IV,JV,KV)
                  TU(IU)=TU(IU)+(IV+JV+KV)
                  IHUMUU(JJ,IU)=1
                  IF(IHU.EQ.0) IHU=10
                  ZIPILEV,IU,IHU)=KV
                  ZIPILEV,IU,IHU-1)=JV
                  ZIPILEV,IU,IHU-2)=IV
                  IF(IN).EQ.10) LEV=LEV+1
             1590 CONTINUE
             1600 CONTINUE
            C
            C        FIND LEW FOR EACH SOURCE AT EACH TIME PERIOD WITH CONNECTIONS
            C        FOR THE NUMBER OF COUNTS
                  DO 1630 JJ=1,10
                  AAD=ALEW(ZIP(1,1,JJ))
                  IF(1.EW.0..OR.IU(1).EW.0.) GO TO 1615
                  AAD=10.*ALOG10(1./IU(1))+AAD
             1615 AAN=ALEW(ZIP(1,2,JJ))
                  IF(1.EW.0..OR.IU(2).EW.0.) GO TO 1616
                  AAN=10.*ALOG10(1./IU(2))+AAN
             1616 AAE=ALEW(ZIP(1,3,JJ))
                  IF(1.EW.0..OR.IU(3).EW.0.) GO TO 1617
                  AAE=10.*ALOG10(1./IU(3))+AAE
             1617 AAE=ALEW(ZIP(1,4,JJ))
                  IF(1.EW.0..OR.IU(4).EW.0.) GO TO 1618
                  AAE=10.*ALOG10(1./IU(4))+AAE
             1618 IF(IU(1).EW.0.) GO TO 1619
            C
            C        SUBSTITUTE CRITERION LEVEL FOR ZERO DB
                  IF(AAD.EW.0.) AAD=CL(KZ,1)
             1619 IF(IU(2).EW.0.) GO TO 1620
                  IF(AAN.EW.0.) AAN=CL(KZ,2)
             1620 IF(IU(3).EW.0.) GO TO 1621
                  IF(AAE.EW.0.) AAE=CL(KZ,3)
             1621 IF(IU(4).EW.0.) GO TO 1622
                  IF(AAE.EW.0.) AAE=CL(KZ,3)
            C
            C        ADD TO CUMULATIVE TOTALS
             1622 ZI(JJ,1)=ZI(JJ,1)+AAD
                  ZI(JJ,2)=ZI(JJ,2)+AAN
                  ZI(JJ,3)=ZI(JJ,3)+AAE
                  ZI(JJ,4)=ZI(JJ,4)+AAE
             1630 CONTINUE
             1600 CONTINUE
            C
            C      : COMPUTE AVERAGES
                  DO 1610 JJ=1,10
                  IF(JP(1).EW.0) GO TO 1601
                  ZI(JJ,1)=ZI(JJ,1)/JP(1)
             1601 IF(JP(2).EW.0) GO TO 1602
                  ZI(JJ,2)=ZI(JJ,2)/JP(2)
             1602 IF(JP(3).EW.0) GO TO 1603
```

```
      Z(JJ,3)=Z(JJ,3)/JP(3)
 1003 IF(JP(4).EQ.0) GO TO 1004
      Z(JJ,4)=Z(JJ,4)/JP(4)
 1004 CONTINUE
C
C        REASSIGN A ZERO VALUE IF THE AVERAGE IS THE CRITERION LEVEL
C        NOTE THAT THE CRITERION LEVEL MAY NO LONGER BE EXACT
C        DUE TO INTERNAL COMPUTER INACCURACY
      IF(ABS(Z(JJ,1)-CL(KZ,1)).LE..01) Z(JJ,1)=0.
      IF(ABS(Z(JJ,2)-CL(KZ,2)).LE..01) Z(JJ,2)=0.
      IF(ABS(Z(JJ,3)-CL(KZ,1)).LE..01) Z(JJ,3)=0.
      IF(ABS(Z(JJ,4)-CL(KZ,2)).LE..01) Z(JJ,4)=0.
 1010 CONTINUE
C
C        COMBINE WEEK AND WEEKEND LEVELS
      DO 1017 JJ=1,10
C
C        DO NOT COMBINE IF EITHER IS MISSING
      IF(Z(JJ,1).EQ.0.) GO TO 1013
      IF(Z(JJ,3).EQ.0.) GO TO 1014
      Z(JJ,1)=.714*Z(JJ,1)+.286*Z(JJ,3)
      GO TO 1014
 1013 IF(Z(JJ,3).EQ.0.) GO TO 1014
      Z(JJ,1)=Z(JJ,3)
C
C        NIGHTTIME LEVELS
 1014 IF(Z(JJ,2).EQ.0.) GO TO 1015
      IF(Z(JJ,4).EQ.0.) GO TO 1017
      Z(JJ,2)=.714*Z(JJ,2)+.286*Z(JJ,4)
      GO TO 1017
 1015 IF(Z(JJ,4).EQ.0.) GO TO 1017
      Z(JJ,2)=Z(JJ,4)
 1017 CONTINUE
C
C        COMPUTE TOTAL IDENTIFIED ENERGY
      TEN(1)=0.
      TEN(2)=0.
      DO 1020 JJ=1,10
      DO 1020 KK=1,2
      IF(Z(JJ,KK).EQ.0.) GO TO 1020
      Z(JJ,KK)=10.**(Z(JJ,KK)/10.)
      IF(JJ.EQ.10) GO TO 1020
      TEN(KK)=TEN(KK)+Z(JJ,KK)
 1020 CONTINUE
C
C        DISTRIBUTE UNIDENTIFIED ENERGY INTO IDENTIFIED LEVELS
      DO 1050 JJ=1,10
      DO 1040 KK=1,2
      IF(JJ.EQ.10) GO TO 1042
      IF(TEN(KK).EQ.0.) GO TO 1040
      Z(JJ,KK)=Z(JJ,KK)+(Z(JJ,KK)/TEN(KK))*Z(10,KK)
 1040 CONTINUE
C
C        COMPUTE LDN
 1042 Z(JJ,3)=.625*Z(JJ,1)+3.75*Z(JJ,2)
      DO 1045 KK=1,3
      IF(Z(JJ,KK).EQ.0.) GO TO 1045
      IF(Z(JJ,KK).LE.0.) GO TO 1045
      Z(JJ,KK)=10.*ALOG10(Z(JJ,KK))
 1045 CONTINUE
```

```
 1850 CONTINUE
C
C
C        PLACE LDN VALUES IN ANSE FOR USE BY ADJFAC ROUTINE
      DO 1855 J=1,42
      IF(ZLIN(J).NE.ZLMID(J)) GO TO 1855
      A=0.
      IF(J.EQ.12.OR.J.EQ.13.OR.J.EQ.14) A=10.
      DO 1860 JJ=1,10
 1860 ANSE(JJ,J)=Z(JJ,1)-A
 1855 CONTINUE
C
C        COMPUTE FRACTIONAL IMPACT
      AHLDN(I)
      ALDN=0.0212*A-1.0886E-3*A*A+1.275E-5*A*A*A
      IF(A.LE.45.) ALDN=0.
C
C        PRINT RESULTS
      WRITE(6,300) ZLIN,HLDN(I),ALDN,((SE(L,J),L=1,4),(Z(J,L),L=1,3)
     1  ,J=1,10)
  300 FORMAT(1H1,20X,11HNOISE ZONE:,24,A2,10X,
     1H1HCUMPONENT SOURCE EQUIVALENT IMPACT LEVELS,//,28X,4HLDN=,
     1F6.1,//,47X,8HSOURCE,17X,2HLD,7X,2HLM,8X,3HLDN,///
     1(4X,10HFRACTIONAL IMPACT=,F6.4,
     1/
     1(/(24X,4A4,5X,3F9.1,///),/,42X,4A4,5X,3F9.1,///)
  900 CONTINUE
C
C        ASSIGN ORIGINAL ADJUSTMENT FACTORS
      IF(IOPT(5).NE.0) CALL ADJFAC
      STOP
C
C        ERROR MESSAGE
  999 WRITE(6,3000)
 3000 FORMAT(1H1,19H100 MUCH DATA AFTER,I4,1X,16HDATA SHEET38)
      STOP
      END
```

```
000001            SUBROUTINE ADJFAC
000002      C
000003      C        THIS PROGRAM CALCULATES AIRFIELDINAL ADJUSTMENT FACTORS FOR
000004      C        NOISE SOURCE COMPONENT LEVELS
000005      C
000006            DIMENSION T(20,50),TI(20,50),R1(20,50),ISI(20,50),ADI(20)
000007           1          ,ACUM(20),AS(20),CP(20),TAI(20)
000008            COMMON /AREA/ ZON(50),A(20,50)
000009            COMMON /BLOCK/ IS(20),NZ,NS,NC(20),NUM(20)
000010            DATA ACUM/20A0./,AS/20*0./,CP/20*0./,BLANK/2H  /
000011            DO 5 I=1,20
000012            ISI(I)=0
000013            NC(I)=0
000014          5 CONTINUE
000015            IPLUS=51
000016      C
000017         10 READ(5,1000) CODE
000018       1000 FORMAT(A2)
000019            IF(CODE.EQ.BLANK) GO TO 20
000020            READ(5,1001) (TAI(J),J=1,20)
000021       1001 FORMAT(20F4.0)
000022            DO 15 J=1,42
000023            IF(CODE.NE.ZON(J)) GO TO 15
000024            DO 14 I=1,20
000025         14 T(I,J)=TAI(I)
000026            GO TO 10
000027         15 CONTINUE
000028            READ(5,1001) (R1(J,IPLUS),J=1,20)
000029            DO 16 I=1,20
000030         16 T(I,IPLUS)=TAI(I)
000031            IPLUS=IPLUS+1
000032            IF(IPLUS.LE.50) GO TO 10
000033            WRITE(6,1002)
000034       1002 FORMAT(1H1,32H100 MANY NEW ZONES - RUN ABORTED)
000035            STOP
000036         20 NZ=IPLUS
000037      C
000038      C        NS IS THE NUMBER OF SOURCES
000039            NS=0
000040            DO 40 I=1,20
000041            DO 30 J=1,NZ
000042      C
000043      C        ZERO NOISE LEVELS CAUSE A DATA POINT TO BE DISQUALIFIED
000044            IF(A(I,J).EQ.0.) GO TO 30
000045            NS=NS+1
000046      C
000047      C        IS INDICATES (WITH A 1) THAT A SOURCE IS NOT ALL ZEROES
000048            IS(I)=1
000049            GO TO 40
000050         30 CONTINUE
000051         40 CONTINUE
000052      C
000053      C        PRINT INPUT DATA
000054            WRITE(6,5000)
000055       5000 FORMAT(1H1,57X,17HINPUT DATA POINTS)
000056            DO 45 J=1,NZ
000057            WRITE(6,5001) (A(I,J),I=1,20),(T(I,J),I=1,20)
000058       5001 FORMAT(///,10A,20F5.1,/,18X,20F5.1)
```

```
      IF(MOD(J,10).EQ.0) WRITE(6,5000)
   85 CONTINUE
      WRITE(6,5000)
C
C         NUMBER OF SOURCES MUST BE GREATER THAN FOUR FOR MEANINGFUL RESULTS
      IF(NS.LT.5) GO TO 205
C
C         NP IS THE MAXIMUM POSSIBLE NUMBER OF DATA POINTS
      NP=NZ*20
C
C         PERFORM A LINEAR REGRESSION
      CALL LINREG(X,Y,NP,S,B,CC,SX,SY,JP)
C
C         JP IS THE ACTUAL NUMBER OF DATA POINTS
      IF(JP.EQ.0) GO TO 150
C
C         PRINT RESULTS OF REGRESSION
      WRITE(6,2000)
 2000 FORMAT(1X,25HFIRST LINEAR REGRESSION -)
      WRITE(6,2001) NZ,NS,S,B,CC,JP
 2001 FORMAT(//,1X,16HNUMBER OF ZONES=,I4,//,1X,
     1  18HNUMBER OF SOURCES=,I6,//,1X,6HSLOPE=,F14.2,//,1X,
     1  10HINTERCEPT=,F10.2,//,1X,24HCORRELATION COEFFICIENT=,F10.3,
     1  //,1X,22HNUMBER OF DATA POINTS=I5,/////)
C
C         CHECK IF SLOPE IS WITHIN ALLOWABLE RANGE
      IF(S.GE.2.AND.S.LE.10.) GO TO 50
C
C         FORCE SLOPE TO ALLOWABLE RANGE
      CALL FORCE (S,B,SX,SY,JP)
C
C         PRINT FORCED SLOPE INFORMATION
      WRITE(6,2000)
      WRITE(6,2002) S,B
 2002 FORMAT(///,1X,12HSLOPE FORCED,//,1X,6HSLOPE=,F14.2,//,1X,
     1  10HINTERCEPT=,F10.2,////)
C
C         CALCULATE ARRAY OF DIFFERENCES FROM EACH POINT TO THE REGRESSION LINE
   50 CALL DIFF(X,Y,S,B,DIST)
C
C         COMPUTE STANDARD DEVIATION OF ALL POINTS AROUND REGRESSION LINE
      SD=SIG(DIST,20)
C
C         COMPUTE ARRAY OF AVERAGE DISTANCES FOR EACH SOURCE
      CALL AMEAN(DIST,AD)
      WRITE(6,8008) SD
 8008 FORMAT(//,1X,10HSTD. DEV.=,F10.3,/)
C
C         CRITERIA FOR REMOVING DATA (SOURCES) IS ONE STANDARD DEVIATION
      CRIT=1.*SD
C
C         NCT IS THE TOTAL NUMBER OF SOURCES THROWN OUT
      NCT=0
      DO 80 I=1,20
      IF(IS(I).NE.1) GO TO 80
C
C         NC INDICATES (WITH A 1) IF A SOURCE IS TO BE THROWN OUT
      IF(ABS(AD(I)).GT.CRIT) NC(I)=1
      IF(NC(I).EQ.1) NCT=NCT+1
   80 CONTINUE
```

```
C
C          PRINT INFORMATION
      WRITE(6,3000)
      WRITE(6,2000)
      WRITE(6,2003) (I,AD(I),NC(I),I=1,20)
 2003 FORMAT(///,40X,10HSOURCE NO.,5X,16HAVERAGE DISTANCE,5X,
     1   18HCRITERIA INDICATOR,/,20(//,40X,I5,1H.,9X,F11.2,17X,I2))
C
C          ADDITIONAL CRITERIA FOR COMPUTING CORRECTIONS
      IF(NCI.GE.4) GO TO 210
      IF(NCI.EQ.3.AND.NS.LT.10) GO TO 220
      IF(NCI.EQ.0) GO TO 111
C
C          CREATE ARRAY OF DATA POINTS WITH DATA FOR THROWN OUT SOURCES REMOVED
      DO 100 I=1,20
      IF(IS(I).NE.1) GO TO 100
      IF(NC(I).EQ.1) GO TO 100
      DO 90 J=1,NZ
      XI(I,J)=X(I,J)
      YI(I,J)=Y(I,J)
   90 CONTINUE
  100 CONTINUE
C
C          RECOMPUTE REGRESSION LINE
      CALL LINREG(XI,YI,NP,S,B,CC,SX,SY,JP)
C
C          PRINT RESULTS
      WRITE(6,3000)
 3000 FORMAT(1H1)
      WRITE(6,3001)
 3001 FORMAT(//,1X,26HSECOND LINEAR REGRESSION =)
C
C          ADJUST NUMBER OF SOURCES
      NS=NS-NCI
      WRITE(6,2001) NZ,NS,S,B,CC,JP
C
C          CHECK FOR ODD CASE
      IF(JP.EQ.0) GO TO 150
C
C          CHECK IF SLOPE IS WITHIN ALLOWABLE RANGE
      IF(S.GE.2..AND.S.LE.10.) GO TO 110
C
C          FORCE SLOPE
      CALL FORCE (S,B,SX,SY,JP)
C
C          PRINT INFORMATION
      WRITE(6,3001).
      WRITE(6,2002) S,B
C
C          RECALCULATE DISTANCES AND STANDARD DEVIATION
  110 CALL DIFF (X,Y,S,B,DIST)
      SD=SIG(DIST,20)
      WRITE(6,6004) SD
      CALL SMEAN(DIST,AD)
C
C          PRINT HEADER
      WRITE(6,3000)
      WRITE(6,3001)
      GO TO 112
  111 WRITE(6,3000)
```

```
C
C        E IS A FIXED VALUE IN THE HYPOTHESIS CONFIRMATION EXPRESSION
  112 E=SQRT(2.)
C
C
C        COMPUTE STANDARD DEVIATIONS FOR EACH SOURCE
      DO 115 I=1,20
      IF(IS(I).NE.1) GO TO 115
      AS(I)=AS(I)/IS(I,1)
  115 CONTINUE
C
C        TEST HYPOTHESIS ON STATISTICALLY SIGNIFICANT DEVIATIONS AND
C        CALCULATE ADJUSTMENT FACTORS
  120 DO 130 I=1,20
      IF(IS(I).NE.1) GO TO 130
C
C        EXPRESSION FOR CONFIRMATION
C        1.4N2 REPRESENTS A SIGNIFICANCE LEVEL OF .1
      CH(I)=1.4N2*SQRT((1+AS(I)*AS(I))/NUM(I))
      CP(I)=ACH(I)
      IF(ABS(AU(I)).LT.CH(I)) GO TO 130
C
C        ADJUSTMENT FACTOR BECOMES THE AVERAGE DISTANCE
      ACOR(I)=AU(I)
C
C        LIMIT THE ADJUSTMENT TO +/- 10 DB
      IF(ACOR(I).GT.10.) ALOR(I)=10.
      IF(ACOR(I).LT.-10.) ACOR(I)=-10.
  130 CONTINUE
C
C        PRINT RESULTS
      WRITE(6,9000) (I,ML(I),AU(I),AS(I),NUM(I),CP(I),I=1,20)
 9000 FORMAT(///,23X,8HSOURCE,5X,9HCHI-TENIUM,5X,7HAVERAGE,6X,
     1  14HSTANDARD DEVIATION,6X,8HNUMBER,7X,12HSIGNIFICANCE,//,
     2  23X,8HNUMBER,5X,9HINDICATOR,5X,8HDISTANCE,8X,12HOF DISTANCES,
     3  8X,9HOF POINTS,7X,8HCHI-TENIA,/,20(///,25X,I3,1H.,10X,I2,8X,F12.2,
     4  6X,F11.2,12X,I5,9X,F13.2))
  150 WRITE(6,200) (I,ACOR(I),I=1,20)
  200 FORMAT(1H1,50X,30HADDITIONAL ADJUSTMENT FACTORS,///,47X,
     1  37HTO BE SUBTRACTED FROM SOURCE LEVELS),///,51X,
     1  10HSOURCE NO.,6X,14HADJUSTMENT, DB,20(///,50X,I2,1H.,10X,F9.1))
      STOP
C
C        MESSAGES
  205 WRITE(6,300)
  300 FORMAT(//,1X,39HNO ADJUSTMENTS - LESS THAN FIVE SOURCES)
      STOP
  210 WRITE(6,301)
  301 FORMAT(//,1X,59HNO ADJUSTMENTS - FOUR OR MORE SOURCES FAIL INITIAL
     1CHI-TENIA)
      STOP
  220 WRITE(6,302)
  302 FORMAT(//,1X,78HNO ADJUSTMENTS - LESS THAN TEN SOURCES, THREE OR MO
     1RE FAIL INITIAL CHI-TENIA)
      STOP
      END
```

```
000001                BLOCK DATA
000002                COMMON /AREA/ Z(H(43),R(20,43)
000003          C
000004          C         ABBREVIATIONS FOR NOISE ZONES
000005                DATA Z(H/2HH  ,2HHL,2HHM,2HHH,2HHV,2HH  ,2HA  ,
000006               1Z2HB  ,2HM  ,2HMH,2HML,2HCL,2HC  ,2HI  ,
000007               $2HLG,2HBA,2HSB,2HSL,2HSD,2HSE,2HSI,
000008               $2HSU,2HSM,2HSI,2HSJ,2HSA,2HSL,2HSH,
000009               *2HSN,2HSU,2HSP,2HSW,2HSH,2HSS,2HSI,
000010               52HSU,2HSV,2HSM,2HSR,2HST,2HSZ,2HHR,2H  /
000011                END
```

```
000001                SUBROUTINE DIFF (X,Y,S,M,DIST)
000002          C
000003          C        THIS ROUTINE COMPUTES THE DISTANCE FROM EACH DATA POINT TO
000004          C  C     THE REGRESSION LINE
000005          C
000006                COMMON /MEMORY/ IS(20),NZ,NS,NC(20),NU(20)
000007                DIMENSION DIST(20,11),X(20,11),Y(20,11)
000008          C
000009          C        ZERO THE ARRAY
000010                DO 10 I=1,20
000011                DO 10 J=1,NZ
000012             10 DIST(I,J)=0.
000013                DO 20 I=1,20
000014                IF(IS(I).NE.1) GO TO 20
000015                DO 15 J=1,NZ
000016                IF(X(I,J).EQ.0.) GO TO 15
000017          C
000018          C        COMPUTE DISTANCES
000019                DIST(I,J)=A(I,J)-(Y(I,J)-B)/S
000020          C
000021          C        MAKE SURE AN ACTUAL DISTANCE OF ZERO IS NOT STORED,
000022          C        ZERO IS USED AS A CHECK FOR NO DATA LATER ON
000023                IF(DIST(I,J).EQ.0.) DIST(I,J)=1.E-10
000024             15 CONTINUE
000025             20 CONTINUE
000026                RETURN
000027                END
```

```
000001              SUBROUTINE PUNCH (B,N,SR,ST,JP)
000002         C
000003         C        THIS ROUTINE PUNCHES THE SLOPE BU OR Z AND LE IO
000004         C
000005         C
000006         C        USE PERPENDICULAR
000007              IF(S.LT.0.) S=3
000008              IF(S.GT.10.) S=10.
000009              IF(S.LT.2.) S=2.
000010         C
000011         C        COMPUTE NEW Y-INTERCEPT
000012              SR=SR/JP
000013              ST=ST/JP
000014              U=B-S*SR
000015              RETURN
000016              END
```

```
000001                SUBROUTINE LINREG (XAR,YAR,N,SLOPE,BINT,CC,SX,SY,J)
000002          C
000003          C       THIS SUBROUTINE PERFORMS A LINEAR REGRESSION
000004          C
000005                DIMENSION XAR(N),YAR(N)
000006          C
000007          C       ZERO PARAMETERS
000008                SX=0.
000009                SY=0.
000010                SX2=0.
000011                SY2=0.
000012                SXY=0.
000013                J=0
000014                DO 30 I=1,N
000015          C
000016          C       X = Y RESIDUALS ARE POINT
000017                IF(XAR(I).EQ.0.) GO TO 10
000018                J=J+1
000019                SX=SX+XAR(I)
000020                SY=SY+YAR(I)
000021                SX2=SX2+XAR(I)*XAR(I)
000022                SY2=SY2+YAR(I)*YAR(I)
000023                SXY=SXY+XAR(I)*YAR(I)
000024             10 CONTINUE
000025                SRUZ=SX**2
000026                SYZ=SY**2
000027                IF(J.EQ.0) RETURN
000028                TERM=SX2-SRUZ/J
000029          C
000030          C       DO NOT ALLOW INFINITE SLOPE
000031                IF(TERM.EQ.0.) GO TO 20
000032                FAC=SXY-SX*SY/J
000033          C
000034          C       SLOPE, INTERCEPT, CORRELATION COEFFICIENT
000035                SLOPE=FAC/TERM
000036                BINT=SY/J-SLOPE*SX/J
000037                CC=FAC/SQRT(TERM*(SY2-(SYUZ/J)))
000038                RETURN
000039             20 SLOPE=1E.E10
000040                END
```

```
      FUNCTION NUMBER
C
C        THIS ROUTINE CONVERTS ONE OR TWO DIGIT CHARACTERS INTO NUMBERS
C
      DIMENSION IDIGIT(100),IL(100),ISP(100)
      DATA IDIGIT/1H0,1H1,1H2,1H3,1H4,1H5,1H6,1H7,1H8,1H9,2H10,2H11,2H12
     1,2H13,2H14,2H15,2H16,2H17,2H18,2H19,2H20,2H21,2H22,2H23,2H24,2H25,
     22H26,2H27,2H28,2H29,2H30,2H31,2H32,2H33,2H34,2H35,2H36,2H37,2H38,
     32H39,2H40,2H41,2H42,2H43,2H44,2H45,2H46,2H47,2H48,2H49,2H50,2H51,
     42H52,2H53,2H54,2H55,2H56,2H57,2H58,2H59/
      DATA IL/2H00,2H01,2H02,2H03,2H04,2H05,2H06,2H07,2H08,2H09/
      DATA ISP/2H 0,2H 1,2H 2,2H 3,2H 4,2H 5,2H 6,2H 7,2H 8,2H 9/
C
C        NEVER MORE THAN 59 FOR CLOCK TIME
C
      DO 10 I=1,60
      K=I
      IF(IC.EQ.IDIGIT(K)) GO TO 25
   10 CONTINUE
      DO 20 I=1,10
      K=I
      IF(IC.EQ.IL(K)) GO TO 25
   20 CONTINUE
      DO 22 I=1,10
      K=I
      IF(IC.EQ.ISP(K)) GO TO 25
   22 CONTINUE
      WRITE(6,100) IC
  100 FORMAT(///,1X,7HERROR ,A2,24H CHARACTER OUT OF RANGE,///)
      STOP
C
C        NOTE POSITIONAL PROCEDURE
C
   25 K=K-1
      NUMBR
      RETURN
      END
```

```
      00001            FUNCTION SIGI(DIST,JJ)
      00002      C
      00003      C        THIS ROUTINE COMPUTES STANDARD DEVIATION
      00004      C
      00005            COMMON /CLUSA/DIS(20),AZ,NS,NC(20),NUM(20)
      00006            DIMENSION DIS(20,11)
      00007            SSUM=0.
      00008            SWGHT=0.
      00009            JP=0
      00010            DO 65 I=1,JS
      00011      C
      00012      C        JJ = 1 MEANS ONE SOURCE ONLY
      00013            IF(JJ.EQ.1) GO TO 10
      00014            IF(NC(I).EQ.1) GO TO 65
      00015      C
      00016      C        PROCEED THROUGH ZONES
      00017         10 DO 60 J=1,NZ
      00018            IF(DIST(I,J).EQ.0.) GO TO 60
      00019            SSUM=SSUM+DIS(I,J)*DIST(I,J)
      00020            SWG=SWG+DIS(I,J)
      00021            JP=JP+1
      00022         60 CONTINUE
      00023         65 CONTINUE
      00024      C
      00025      C        AVOID FOR ZERO DIVIDE
      00026            IF(JP.LE.2) GO TO 70
      00027            SIGI=SQRT((SSUM-SWG*SWG/JP)/(JP-1))
      00028            RETURN
      00029         70 SIGI=0.
      00030            RETURN
      00031            END
```

```
      SUBROUTINE SMEAN (DIST,AD)
C
C     SMEAN COMPUTES A MEAN DISTANCE TO THE REGRESSION LINE FOR EACH SOURCE
C
      COMMON /BLOCK/ISI(20),NZ,MS,NC(20),NUM(20)
      DIMENSION DIST(20,1),AD(20)
C
C     PROCEED THROUGH SOURCES
      DO 20 I=1,20
      AD(I)=0.
      NUM(I)=0
      IF(ISI(I).NE.1) GO TO 20
      JP=0
C
C     PROCEED THROUGH ZONES
      DO 10 J=1,NZ
      IF(DIST(I,J).LT.0.) GO TO 10
C
C     SUM DISTANCES
      AD(I)=AD(I)+DIST(I,J)
      JP=JP+1
   10 CONTINUE
      IF(JP.EQ.0) GO TO 20
C
C     MEAN DISTANCE
      AD(I)=AD(I)/JP
C
C     NUMBER OF DATA POINTS
      NUM(I)=JP
   20 CONTINUE
      RETURN
      END
```

```
      SUBROUTINE STAT(NLEV,NL1,NL10,NL50,NL90,NL99,NLEQ,SD,NRS)
C
C        THIS SUBROUTINE CALCULATES VARIOUS STATISTICS IN
C        AN INPUT MIDIGRAM
C
      DIMENSION NLEV(35),CUME(35),SLEV(5),IB(5)
C
C        STATISTICAL LEVELS
      DATA SLEV/1.,10.,50.,90.,99./
C
C        FIND TOTAL COUNTS
      NRS=0.
      DO 10 I=1,35
   10 NRS=NRS+NLEV(I)
      IF(NRS.EQ.0) GO TO 99
      CUME(1)=0.
C
C        COMPUTE A CUMULATIVE DISTRIBUTION OF PERCENTS
      DO 20 I=2,36
      NR1=I
   20 CUME(I)=CUME(NR1)+NLEV(NR1)/NRS)*100.
C
C        STATISTICAL LEVELS
      DO 50 I=1,5
      DO 30 J=1,36
      JJ=J
      IF(CUME(JJ).GT.SLEV(I)) GO TO 40
   30 CONTINUE
C
C        LINEAR INTERPOLATION ON DIM NUMBER
   40 IB(I)=(SLEV(I)-CUME(JJ-1))*(JJ-1)+(SLEV(I)-CUME(JJ-1))
     1  *JJ)/(CUME(JJ)-CUME(JJ-1))
   50 CONTINUE
C
C        CONVERT FROM DIM NUMBER TO NOISE LEVEL
      NL1 =(35.-IB(1))*2.+32.
      NL10=(35.-IB(2))*2.+32.
      NL50=(35.-IB(3))*2.+32.
      NL90=(35.-IB(4))*2.+32.
      NL99=(35.-IB(5))*2.+32.
C
C        LEQ
      NLEQ=ALEQ(NLEV)
C
C        STANDARD DEVIATION
      SUM=0.
      SUM=0.
      DO 70 I=1,35
      IF(NLEV(I).EQ.0.) GO TO 70
      FI=I-NLEV(I)
      SUM=SUM+FI
      SUM=SUM+FI
   70 CONTINUE
C
C        MULTIPLY BY 2 SINCE BINS ARE 2 DB WIDE
      SD=2.*SQRT((SUM-SUM*SUM/NRS)/(NRS-1))
      RETURN
C
```

```
00059          C        MISSING DATA ASSIGNMENT
00060             80 HL(1)=0.
00061                HL(2)=0.
00062                HL(3)=0.
00063                HL(4)=0.
00064                HL(5)=0.
00065                HL(6)=0.
00066                SUM=0.
00067                RETURN
00068                END
```

```
0000100      SUBROUTINE UNPACK(IPACK,IV,JV,KV)
0000200C
0000300C        THIS ROUTINE RECOVERS THREE NUMBERS PACKED INTO
0000400C        ONE COMPUTER WORD
0000500C
0000600      IV=IPACK/1000000
0000700      JV=MOD(IPACK/1000,1000)
0000800      KV=MOD(IPACK,1000)
0000900      RETURN
0001000      END
```

```
00001            FUNCTION ALEW(ARR)
00002      C
00003      C        ALEW COMPUTES AN LEW BASED ON THE NUMBER OF COUNTS IN
00004      C        EACH OF 35 NOISE LEVEL BINS OF PRE-TUNED ENERGY
00005      C
00006            COMMON /PUNCH/ ENERGY(35),B
00007            DIMENSION ARR(35)
00008            B=0.
00009            A=0.
00010            DO 10 I=1,35
00011            IF(ARR(I).EQ.0.) GO TO 10
00012      C
00013      C        B IS THE NUMBER OF COUNTS
00014            B=B+ARR(I)
00015            A=A+ARR(I)*ENERGY(I)
00016         10 CONTINUE
00017            IF(I.EQ.0.) GO TO 20
00018            ALEW=1./ALOG10(A/B)
00019            RETURN
00020         20 ALEW=0.
00021            RETURN
00022            END
```