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RAILYARD NOISE EXPOSURE MODEL SOURCE SUBMODEL (RYNEM-S)

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VOLUME 2 RYNEM-S USER MANUAL

January 1982

U.S. Environmental Protection Agency Washington, D.C. 20460

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Office of Noise Abatement and Control U.S. Environmental Protection Agency Washington, D.C. 20460

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0.0 PRELIMINARIES

0.1 Scope of These Manuals

The present set of manuals, volumes 1-3, is meant to describe the Railyard Noise Exposure Model (RYNEM) in some detail. In the following, a brief description of each volume and its intended audience is presented.

Volume 1: General Description of the Model

This volume presents an overview of the model. The basic philosophy of the model is discussed and the relevant equations used in the computations are presented. This volume is written for those who need to know what the model is like. It does not go into detail of how each computation is done in the program, nor does it teach the user how to run the model. It presupposes some familiarity with the EPA noise terminology, as is covered by the "EPA Levels" document [1]. The reader is advised to peruse the Railroad Background document [2] for other terminology used without explanation.

Volume 2: User Manual

This volume presents a cookbook approach to the execution of the model. Its intended audience is those who will exercise the model. It assumes familiarity with volume 1, i.e., the user knows the quantities he inputs, and he knows the quantities printed out. For obvious reasons, the explanations incorporated in volume 1 are not repeated. While it does not presume expertise with the EPA IBM computer system, it does assume the user can follow the instructions

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presented in this volume to the letter. This point cannot be emphasized often enough. Contrary to popular opinion, a computer cannot think. It can only carry out the instructions given it exactly. As far as is known, the present program is bug-free. If an error occurs, the source most likely is in the input data or the job card.) Though the manual presents a short description of relevant commands in the appendix, the user is reminded that EPA changes its computer systems every so often, so that the instructions presented may be obsolete. The user is strongly advised to obtain a copy of the latest computer user guide and learn the necessary commands to make runs.

Volume 3: Programmer Manual

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This volume describes all the nuts and bolts in the program code. It is not meant to teach the reader how to run the program. That is the job of volume 2. It assumes the reader has digested the contents of volume 1. No attempt has been provided to educate the reader as to what Ldn or LWP is. The intended audience is the programmer who needs to maintain the program and make changes in the code. A strong knowledge of standard IBM FORTRAN IV language is assumed.

The correct sequence of reading for a rank novice with no knowledge whatsoever of the EPA noise model methodology is as follows:

- EPA Levels document in which the terminology is introduced.
- Railroad Background document which describes what a railyard is, the noise sources inside, etc.

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- 3. Volume 1 what the model attempts to do.
- 4. Volume 2 how to make the program grind out numbers.
- 5. Volume 3 how the code achieves the aims of volume 1.

Volumes 2 and 3 are not necessary for the person who only wants to understand what RYNEM is about. Volume 2 is not necessary for the person who only wants to exercise the model. For the programmer who maintains the code and to whom job failures will be reported, an intimate knowledge of all three volumes is necessary.

References

1

- Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety, 550/9-74-004, U.S. EPA, Washington, D.C., March 1974.
- Background Document for Proposed Revision to Rail Carrier Noise Emissions Regulation, 550/9-78-207, U.S. EPA, Washington, D.C., February 1979.

0.2 General Introduction to the Model

The Railyard Noise Exposure Model (RYNEM) is a computer program designed to quantify the health/welfare impact due to railyard-generated noise on the general population. In this model, a railyard contains two causes of noise sources: stationary and moving. Some examples of stationary sources are master retarders (MR), inert retarders (IR), crane trucks (CT), goat trucks (GT), idling locomotives (IL), refrigerator cars (RC) and load tests (LT). Moving sources consist of switch engines (SE) and inbound (IB) and outbound (OB) trains. Each of these noise sources generates a noise level which can be measured at the railyard boundary (property line). Together, they combine to produce a higher noise level than each can produce on its own. Taking into account the hours of the day during which the noise sources are used, an averaged noise level, Ldn (for day-night weighting) can be computed at the railyard property line using the standard EPA methodology. Based on this Ldn value the general adverse response level weighted population (LWP), or equivalent number impacted (ENI) can be computed.

So far, this is standard practice of the EPA noise models. Whereas formerly, the EPA noise models would use some kind of "average" parameters to construct a model of an "average" yard and then scale up the LWP from this "average" yard to the total population of yards for the national impact, RYNEM does the scaling in a slightly different way. RYNEM considers that the LWP for the national population of railyards form a distribution with mean μ and variance σ^2 . When random samples are taken from this distribution and their mean, $\hat{\mu}$, computed, the Weak Law of Large Numbers implies that the sample mean approaches the true mean of the population when the sample size is large, i.e., the sample mean μ is a good approximation of the true

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mean u. If we scale up the sample mean LWP by the total number of yards in the population, we will obtain a good approximation to the total LWP due to all the yards, when our sample size is large enough. In this sense, RYNEM is a "statistical" model.

An estimate of the error involved in $\widehat{\mu}$ can be obtained as follows:

The true variance of the population, σ^2 , can be approximated by the sample variance: $n (xi - \hat{\mu})^2$

 $s^{2} = \sum_{i=1}^{n} \frac{(x_{i} - \hat{\mu})^{2}}{n-1}$

where xi are the individual LWP's n is the sample size.

Let xi $f(\mu,\sigma^2)$ i = 1, . . . , n Then for

$$z = \frac{Xit \dots tXn}{n}$$

 $E(2) = \mu$

$$var(Z) = \frac{var(xi)}{n} = \frac{\sigma^2}{n}$$

Thus, the standard error of Z is $\frac{\sigma}{\sqrt{n}}$ or approximately $\frac{S}{\sqrt{n}}$.

Therefore, the error of the total LWP is approximately $\frac{SN}{\sqrt{n}}$ where N is the total number of railyards in the population.

In order to compute the effect of imposing noise standards on selected noise sources, the standard RYNEM program has to be altered. If source standards are imposed on switch engines by using mufflers, resulting in a reduction of XdB in noise level, this can be incorporated into RYNEM very simply by subtracting XdB from the switch engines in the input data. Thus, e.g., the SEL at 100 ft for hump switches is lowered from 95dB to 95-XdB at its Lmax from 90dB to 90-XdB. This process is repeated for all the switchers.

If noise source standards are imposed on idling locomotives (IL) or refrigerator cars (RC), the changes are much more complicated. The guieting mechanism is a local wall around the source, so a wall has to be built, its height and its associated cost computed. The present program, RYNEM-S (S for source) has been designed with this in mind.

The user can run RYNEM-S with either idling locomotives or refrigerator cars. The standard to be met is as follows: if a trigger level (to be selected by the user) is met at the property line (i.e. Leq of IL or RC is less than the trigger level), then no quieting needs to be done. If it is above, then the program computes the Leq at 100 ft and compares it with the source standard, which is 60dB for IL and 63dB for RC. If the Leq is below the source standard, then no quieting needs to be done. It it is above, the program will compute the attenuation due to a wall such that either the noise source standard is met, or the trigger is disabled, whichever requires less attenuation. The cost of a wall is then computed.

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The length of the wall is assumed to be the same as the length of the cars put end to end, as a worst case estimate.

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To make the transition as easy as possible for the user who is already familiar with the old RYNEM program, the input and output format for RYNEM-S is virtually the same as that for RYNEM. The few exceptions are pointed out in a later section in Volume 2.

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1.0 INTRODUCTION

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This manual is meant to be a cookbook on running RYNEM. While it does not presuppose much technical knowledge of the EPA computer system, it does assume that the reader has gone through volume 1, the general description of the model. For that reason, the standard terminology is used throughout without explicit definition. For the same reason, no extra explanation is provided in the input and output sections, as these are adequately covered in volume 1.

An appendix on some relevant commands is included in this volume. It is not meant to be a substitute for the official publication of NCC. It is provided so that those readers who are unwilling to invest the time in learning about the computer system can still make runs. The reader who plans to maintain and modify the program is advised to acquire the following manuals: "NCC User Guide," "NCC WYLBUR Guide." They can be obtained from NCC through your EPA project officer or directly from the computer itself.

The program was written in standard IBM FORTRAN IV language for the EPA IBM 370/168 computer at NCC. In the following, it is assumed that the IBM 370/168 system is the host system and the WYLBUR system is used for file manipulation. As the EPA changes its computer systems from time to time, it is best to find out what the current system is from your EPA project officer before proceeding. The programs and the input database reside on the IBM 370/168. Due to anticipated disuse, they will be archived and transferred to tape. For this reason they have not been protected, as it is much easier to dearchive unprotected files. The naming convention used is standard for the WYLBUR system. If the files cannot be found, it is most likely that they have been archived. To dearchive them, the user should contact the NCC user support team for help.

The user is assumed to have access to a computer terminal which can be connected to the NCC IBM system via telephone line. The appropriate telephone numbers to use can be found in "NCC User Guide." This manual is divided into four parts to be covered in sections 2-5:

2.0 Gaining Access to the NCC IBM WYLBUR System

3.0 Running the RYNEM Program

4.0 Inputting the Data

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5.0 Interpreting the Output

2.0 GAINING ACCESS TO THE NCC IBM WYLBUR SYSTEM

Accessing the system consists of two steps:

 getting through the telecommunications network to WYLBUR

2. logging on to WYLBUR

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Configuration of the computer terminal necessary to gain access is:

Main power switch: ON Modem power switch (if separate): ON Mode: HALF DUPLEX Baud rate: 300 Terminal mode: LINE

With the configurations of the terminal set as above, dial the appropriate telephone number (found in "NCC IBM User Guide"). If the telephone answer is a high frequency tone, couple the receiver to the modem, making sure that the position of the receiver is correct. If the telephone is not answered, the system is probably busy You can try calling a different number or calling back in a few minutes.

After you have connected the telephone receiver to the modem wait for the correct light to go on.

System prompts: "please type your terminal identifier" Respond with: <u>A</u> (CR) System prompts: "please log in" Respond with: (CTRLH) <u>IBMEPA1;NCC</u> (CR) CTRLH is achieved by pressing the control key (CTRL) and H simultaneously. System prompts: "IBM IS ON LINE"

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Respond with: WYL (CR) System prompts: "enter LOGON for tso or wylbur terminal type" Respond with: (CR) System prompts: "MODEL 37/38 TELETYPE "WYLBUR AT EPA NCC-IBM - - -"USERID?" You have established contact with the WYLBUR system An example of logging on is shown in Figure 1. ъ. The second step is to log on to WYLBUR. System prompts: "USERID?" Respond with: EPAiii (CR) where EPAiii is your userid ("iii" is 3 letters that designate your userid. System prompts: "ACCOUNT?" Respond with: xxxx (CR) where "xxxx" is your account code System prompts: "PASSWORD?" Respond with · PPPPPPPP (CR) where "PPPPPPPP" is your password of 3 to 8 characters. Your userid, account, and password can be obtained from your EPA project officer. "SPECIFY GLOBAL FORMAT FOR SAVE COMMANDS System prompts: "REPLY - DEFAULT, EDIT TSO, CARD OR PRINT "FORMAT?" Respond with: CARD (CR) System prompts: "COMMAND?" You have logged into WYLBUR and can start manipulating the files and make runs.

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(3) User selects TYMNET terminal identifier. -1615-080-(a) please log in:IBMEPAl;NCC P 2 (b) User keys in CTRL H immediately followed by (c) IBM IS ON LINE WYL (c) User selects WYLbur. (c) User selects WYLbur. (c) User selects WYLbur. (c) User selects WYLBUR terminal type. (c) User selects WYLBUR terminal type. (session continues)

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FIGURE 1

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3.0 RUNNING THE RYNEM PROGRAM

A word about notation used in this manual concerning interaction with the computer:

- The computer system's prompts are always enclosed in double quotes.
- (2) User responses are in upper case and underlined. Do not type in the underlines!
- (3) Additional comments by the author regarding commands (not to be typed in by the user) are in lower case and enclosed in parentheses.
- (4) Required arguments to be entered by the user are in lower case, enclosed in single quotes. Do not type in the quotes!
- (5) (CR) means type in a carriage return.
- (6) (BREAK) means type the break key.

An example of how this works is as follows

"COMMAND?" RUN_UNN (CR)

The computer system prompts "COMMAND?" The user responds with RUN UNN (not underlined when typed in) and hits the carriage return key.

3.1 Editing the RYNEM Program

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The RYNEM code and its data base are stored on the NCC WYLBUR system. For the user desiring merely to run the standard RYNEM program with the current data base, the process is straightforward and outlined in Section 3.2

If the user wants to change parameters or alter the code in any way, he/she must access the main code edit the

-13-

code, and then run the new version. The "NCC User Guide" and "NCC WYLBUR Guide" contain the necessary explanations of how this can be done.

The following is a list of relevant files:

FilenameDescriptionCN.EPABRM.S2KC.RMB0N6Latest version of the source
code of RYNEM-S

CN.EPABRM.S2KC.RYNEMSD

Complete data base for RM80N6 (includes all 183 railyards) set up for IL, trigger level 65dB

Section 4.0 of this manual describes the data base and its format.

3.2 Making Runs

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After logging onto the WYLBUR system, the system prompts and user responses are:

COMMAND? SET TERSE (CR) 1

? JOB BOX 'rrrr' (CR)

where 'rrrr' is the user box code. This box code indicates to the system how the user will receive his/her output from the lineprinter. For more information, see "NCC User Guide."

? EDI FIRST (CR)²

¹See WYLBUR manual for explanation of comments.

 2 EDI FIRST is used only if the user must alter the JOB card. For more information, see "NCC User Guide." If editing is not needed, the user should type <u>C</u> instead of EDI FIRST.

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0.001//EPALAM JOB (S2KC, ALAM, 10, 10, 10) 'GENERATED JOB CARD'

The user may need to edit the number of lines to be printed, the priority and the computer time requested. Actual output and user edits are shown in Figure 2.

The second '10' in the JOB card refers to the estimated limit of the total number of lines to be printed in thousands of lines.

If you run RYNEM on output level III (to be explained in the next section), the total number of lines is about 40,000 for the complete data base. Therefore, the second 10 must be changed to a 40 as is done in Figure 2. Other edits shown are:

- 'LAM' is the programmer name. Insert your own name inside the quotes.
- <u>PRTY=1</u> We want to run the job in priority 1, the lowest priority level (overnight turnaround). This is the cheapest rate. If you want faster turnaround, you can run up to priority 5.
- <u>TIME=1</u> The maximum amount of computer time requested is one minute. This is ample for the complete database of 183_railyards.

The user concludes with a (CR). The system responds with a printout of the line complete with edits and offers the user an opportunity for further edits.

At the completion of the editing, the user need only hit a (CR) and then a \underline{C} (CR) in response to the ? prompt, i.e.:

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Job box alam 7 edi first JDB (S2KC, ALAM, 10, 10, 10), ' GENERATED JOB CARD ' **0.001** //EPALAN EDITS ? 4 lam',prty=1;time=1! t 0.001 //EPALAH JOB (S2KC, ALAM, 10, 40, 10), 'LAM', FRTY=1, TIME=1 EDITS ? 7 0 ? //joblib dd dsn=cn.epabrm.s2kc.lm;disp=shr 1. ? // exec rsm=rynem ? //so.ft05f001 dd dsn=cn.epabrm.s2kc.rm80n3d,disp=shr 2. ٩ 3. ? //so.ft06f001 dd sysout=a 4. 5. ? *** ? save example on user80 card *EXAMPLE* ALREADY EXISTS ON USERBO REPLACE? Ses 'Example' Replaced on Userbo ? exa*** ? run unn 2609 IS YOUR JOB NUMBER. ? losoff clr END OF SESSION HONDAY 11/17/80 3:14:33 P.H. EPALAM/52KC OFF WYLBUR 11/17/80 AT 15:14:33, 0.22 WUU 0.05 CONNECT HRS., 0:00.06 TCB, 0 PAGE-SECONDS EXCPS: 1 DA, 0 MT, 20 TERM, 0 DTHER, 21 TOTAL CHARGES: \$0.00 CONNECT, \$0.12 WUU, \$0.12 TOTAL Figure 2. A sample production job run , , 4. 1.

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EDITS ? (CR)

?<u>C</u> (CR)

This puts the system into the COLLECT mode.

To run the standard RYNEM program, insert the following JCL statements after the JOB card in response to the system prompts:

1. ?// EXEC FTG1CLG (CR)

2. ?//FORT.SYSTN DD_DSN=CN.EPABRM.S2KC.RM80N6,DISP=SHR (CR)

3. ?//GO.FT05F001 DD DSN=CN.EPABRM.S2KC.RYNEMSD,DISP=SHR (CR)

4. ?//GO.FT06F001 DD SYSOUT=A (CR)

5. ?(BREAK)

B . .

This completes creation of the JCL file.

(BREAK) appears as *** on the terminal and causes the user to exit from COLLECT mode.

To execute the program, after the prompt type

COMMAND? RUN UNN (CR)

'XXXX' IS YOUR JOB NUMBER.

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'<u>RUN UNN</u>' submits your job in batch mode. It will be printed off the lineprinter at NCC when the job has finished execution. How you will receive your printout depends on how you specified your BOX code.

Sometimes you may want to examine your output on line (e.g., when you are debugging your program). Then you can type in

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COMMAND? RUN UNN HOLD (CR) 'XXXX' IS YOUR JOB NUMBER.

What 'HOLD' does is to store your output in the system after it has been executed so that you can retrieve it. Depending on priority assigned, you may wish to log off until the job is completed.

To make sure your job has finished, log on and type

COMMAND? LOC 'XXXX' (CR)

where 'XXXX' is the number assigned to your job by the system. You know that your job has finished execution when, in response to a LOCATE command, the system responds with

JOB XXXX EPAIII IN OUTPUT HOLD You can now FETCH your output as follows: COMMAND? <u>FET XXXX CLR(CR)</u>

You can now look at your output by issuing a LIST command.

4.0 INPUTTING THE DATA

4.1 Data Format and Structure

The current database for RYNEM-S, consisting of 183 out of a total of 3,693 railyards in the United States, is stored in the dataset CN.EPABRM.S2KC.RYNEMSD. You may run RYNEM-S with the current database or some subset of the database (by doing your own editing). For example, you may want to run RYNEM-S using yards in a certain population density range only, or you may create your own database. If you want to use your own input dataset, substitute your filename for 'CN.EPABRM.S2KC.RYNEMSD' in the GO.FT05F001 DD card. Note that RYNEMSD is set up for running IL with a trigger level of 65dB at the property line.

A copy of the dataset can be obtained by printing it off the lineprinter as follows:

? USE CN.EPABRM.S2KC.RYNEMSD CLR (CR) ? L OFF BOX "xxxx" (CR)

The last command lists the file <u>off</u>line. "xxxx" is your box code for receiving output. Consult the "NCC User Guide" for the appropriate code to use.

In the following, the format listed is of the form mTn

where

m is the number of times the format is repeated in a line.

T is the format type (FORTRAN notation)

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A is character string (i.e., any alphanumeric character and certain special characters)

I is integer (must be right justified)

F is floating point (decimal point must be located properly)

n is the number of columns (or spaces) the data occupies.

For example: 4A4 is 4 strings of alphanumeric data of length at most 4 characters.

3F4 is 3 numbers in floating point of length at most 4, with 1 space reserved for the decimal point (i.e., 3 significant digits).

The format of the definition and control input data to RYNEM is shown in Table 1, and is described below.

$\overline{}$	Line No.	<u>Name of</u> Variable	Format	Description	
	1	ISCE	Il	Source to be l for IL 2 for RC	selected
	2	TRIG	F4	trigger level	. at property line
	3-10	YDTYPE	4A4	names of the	8 yard types
	11	DBB	10F3	lower limits bands	of the 10 dB
-	12-21	RDBB	2A4	range of the (description)	dB bands
	22	LREG(1), LREG(7)	2A4	LREG(1) = 'BL LREG(7) = 'MW height wall)	' (baseline) ' (maximum
	23	(LREG(I), I=2,6)	513	5 regulation selected by t	levels to be he user.
				<u>Caution</u> : exa different lev ing order, ea or equal to 5 input. If yo look at fewer say, only 3, first two reg	ctly <u>five</u> els, in decreas- ch greater than 5 dB, have to be u only want to than 5 levels use 99 as the ulation levels.
	24	IP	13	Output print	switch
				level I: IP=1	Only grand totals of all yards printed
				level II: - IP=2	Grand totals plus yard totals for each yard
				level III: IP=3	Grand totals, yard totals plus area totals

The above input is necessary and must be in the specified order. In particular, lines 3-22 must be typed in exactly as shown in Table 1 for the program to work properly. The data following are the yard-by-yard data. The data of each yard form independent, separate units. Each yard contains one or more residential or commercial areas

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2.	65.
3.	LOW VOL HUMP
4,	HEDIUM VOL HUNP
5	HIGH VOL HUMP
6.	LOW VOL FLAT
7.	HEDIUH VOL FLAT
Θ.	HIGH VOL FLAT
9.	INDUSTRIAL
10.	SHALL INTRUSTRIAL
11.	55,58,61,64,67,70,73,76,79,82,
12.	55-50
13.	58-61
14.	61-64
15.	64-67
16.	67-70
17.	70-73
18.	73-76
17.	76-79
20.	79-82
21 .	>82
22.	PL MW
23.	99 9 9 99 99 99
24.	3

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(if all the residential and commercial areas are so far from the railyard boundary as to be considered to be unaffected by the noise, enter 0 in the number of areas column in the YARD card and go to the next yard). Each residential and commercial area contains one or more noise sources. There is a limit of ten moving sources and ten fixed sources per area, and the moving sources are <u>always</u> to be input before the fixed sources. Thus for one yard, the arrangement of the data is as follows:

YARD card

2

AREA Card 1 MOVING SOURCE card 1 MOVING SOURCE card 2 : MOVING SOURCE card 1 FIXED SOURCE card 1 FIXED SOURCE card 2 : FIXED SOURCE card j AREA card 2

SOURCE cards

AREA card 3

AREA card k

SOURCE CARDS

The structure of the input data is shown in Figure 3.

-23-

Necessary data
YARD card 1
AREA card 1
SOURCE cards
•
•
•
AREA card m
SOURCE cards
YARD card 2
AREA card 1
SOURCE cards
•
•
AREA card n
SOURCE cards
•
•
•
YARD card p
AREA card 1 🔷
SOURCE cards
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•
AREA card q
SOURCE cards

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Figure 3. Input data structure

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4.2 Format of the specific data cards

4.2.1 YARD data card

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The following data are all to be entered in one line (or card).

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	NAME	FORMAT	DESCRIPTION
7	NAMEYD	10A4	Name of yard, city, state, etc.
	IT	15	Yard type (1-8) (see necessary data lines 1-8)
	POP	F10	Population density of yard vicinity (people/sq.mi)
	PU	FlO	Fraction of residential and commercial usage of the region around the yard
	NAREAS	15	Number of residential and commercial areas (or the number of AREA cards to follow)

4.2.2 AREA data card

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The following data are to be entered in 1 line (or card). All length dimensions are in feet.

	NAME	FORMAT	DESCRIPTION
	NAMEA	Al, A4	Name of area (R1, R2, C1, C2, etc.)
	ALENG	F10	Length of residential or commercial area
4	WIDTH	F10	Width of residential or commercial area (i.e., how far does it extend away from the yard)
	DB	F10	Distance from nearest boundary of residential or commercial area (property line) to the place where the noise attenuating barrier is to be built
	ATTIND	F5	Excess noise attenuation due to indus- trial region between the yard and the residential or commercial region
	ATTRES	F5	Excess noise attenuation due to the residential or commercial area itself
	DNMOV	F10	Distance from the moving sources to the property line
	DNFIX	F10	Distance from the fixed sources to the property line.
	NMOV	15	Number of moving sources to follow in SOURCE data cards (0 < NMOV < 10)
	NFIX .	15	Number of fixed sources to follow in SOURCE data cards ($0 \le NMOV \le 10$)

Figure 4 shows the relationship of these various parameters.



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4.2.3 SOURCE data card

Each source is to be entered in a separate line (or card). Each line is of the following format. (Note that the moving sources' SOURCE cards have to be placed before the fixed sources' SOURCE cards. The moving sources have been numbered 1-7, the fixed sources 8-15 to assure that the order is correct when the SOURCE cards are put in ascending order).

NAME FORMAT DESCRIPTION

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Noise source number

	ISM	ABBREVIATION	NOISÉ SOURCE	
1	1	HS	hump switcher	
	2	MS	make-up switcher	
	3	IS	industrial switcher	
	4	CS	classification switcher	
	5	IB	inbound train	
	6	081	outbound train (roadhaul)	
	7	OB2	outbound train (local)	
	8	CI	car inpact	
	9	MR	master retarder	
	10	IR	inert retarder	
	11	CT	crane truck	
	12	GT	goat truck	
	13	ĨĹ	idling locomotive	
	14	RC	refrigerator car	
	15	LT	load test	
F7	Number	of sources o	r events daytime	
F7	Number	of sources o	r events nighttime)	

	н1	F7 ·	Number of hours source operating first shift	
	Н2	F7	Number of hours source operating second shift	
	H3	F7	Number of hours source operating third shift	For sources 13-15
	01	F7	Number of sources operating first shift.	
÷	U2	F7	Number of sources operating second shift.	-
	U3	F7	Number of sources operating third) shift.	

A listing of a sample data set is contained in Figure 5.

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1	1 33.2	214		•						
-		2+4								
1	/R 1000.	8000,	0,	ο.	8.	100.	250.	2		
	55.2	2.4						2	1	
	65.2	2+4								
·	9666+	267.								
	/R_1000.	B000+	٥.	٥.	8.	100.	250.	2		
	22.2	2.4				,		2	*	
	00.2	2,4								
	80001	267.					•			
. 4	1000.	8000+	٥.	٥.	8.	100.	250.	2	2	,
	55.2	2+4						-	2	
•	65.2	2+4						•		
	8646.	267.								-
	10170.	70.								
.R3	2000.	8000.	ο.	ο.	8.	100.	٥.			_ '
	28.	3.					••	4		
	311.	4.								
	55.2	2+4								
	71.3	.6								
(DA	NOKE R	DANDKE; VA				34520.	4.4			}
C1	1000.	5000.	300.	0.	4.	1000.	+01	11	_	:
	195.	36.				1000.	700.	1	2	:
•	13	8.	8.	8.	12.	10	10			
	15	Β.	8.	8.	4.	1.	12+			1
C2/	R 1000.	5000.	200.	O.	4.	500	1000	_		
()	353.	20.		•••	••	5001	1000.	2	1	
	75.8	1.3								
	92182.	818.				•				
:3/	R 1000.	5000.	٥.	٥.	A .	200 '		_		
	353.	20.			4.	200.	/00.	2	1	
	75.8	1.3								í
	82182.	818.								
31	1000.	8000.	200.	0.	٨	100				
	531.2	6.7		••		100.	400.	2	1	
	628.9	6.2								
	82182.	818.								:
C4/F	3 1000.	8000.	ο.	0		20.0	-			
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	75.8	1.3	•			•				
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	531.2	6.7		٧.	-+ •	100+	400,	2	1	ļ
	628.9	6.2								
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C6/r	2000.	6000.	٥.	^						}
		~~~~	<b>v</b> •	U.	4.	200.	0.	2		
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Figure 5. Yard data listing for sample run

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#### 4.3 Constraints and Limitations

Certain constraints are placed on the input data which may not have been explicitly stated. In the input, lines 3-22 are to be put in exactly as shown in the example in section 4.1. They are <u>not</u> to be altered in any way. Strictly speaking, these are not input data, but they form an integral part of the model. They are relegated here instead of in the program itself because it is too laborious to define all the terms in the program; for instance, defining the yard types or the dB bands in the program would have involved a great deal of typing.

Line 23: LREG - the 5 regulation levels. Exactly 5 levels have to be input. They are all integers (right justified), I3 format. For RYNEM-S, set all levels to 99.

Line 24: IP print switch. Must be valued 1, 2 or 3. For RYNEM-S, IP=1 will only print the grand total results, showing the number of yards that require local walls. IP=3 will print the wall height. IP=2 serves no useful function.

Yard card:

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IT, the yard type, must be between 1 and 8.

NAREAS: must be the same as the number of area cards to follow.

Area card:

ملاسلية والمانية والمالية أبدالكن بالمؤرث أبوار والمراجعة فأوجا وحاورته والمدا

All length dimensions are in feet.

As explained in volume 1, only one distance is used for all the moving sources (DNMOV) and one distance for all the fixed sources (DNFIX).

Number of moving sources (NMOV) is less than or equal to 10.

Number of fixed sources (NFIX) is less than or equal to 10.

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Source card:

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The source number used must be one of those listed in section 4.2.3, i.e.,  $1 \leq ISM \leq 15$ .

The moving sources cards must be placed before all the source cards, i.e., placing the source cards in increasing order (in ISM) is the correct order. _

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Other assumptions made in the model, as described in volume 1, are:

- The areas are all rectangular.
- There are 7 moving and 8 fixed sources.
- The background Ldn is less than or equal to 54dB.
- The maximum height wall that can be built is 30 ft.
   The minimum height wall is 5 ft.

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5.0 INTERPRETING THE OUTPUT

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5.1 Structure and Level of Detail

There are three levels of detail for the output, defined by the output switch IP.

Level I (IP=1): Only grand totals of each yard type and their projection to the total number of yards for each yard type in the U.S. The number of yards which do not require local walls, those which can meet the source standard with walls, and those which cannot meet the standard are all printed.

Level II (IP=2): Level I and totals for each yard. This level gives no more information than Level 1.

Level III (IP=3): Level II and totals for each residential area. This is the finest level of detail. The wall heights of the local wall and their costs are printed.

<u>Warning</u>: Using Level III and the complete data base of 183 yards will generate about 40,000 lines of output (approximately 600 pages). If you do not want - or do not need - to go through pages and pages of numbers, do <u>not</u> use Level III.

The following description refers to the sample output listing at the end of the section which will run on the sample input data presented in the previous section. Note that this listing was obtained from the terminal and the carriage controls are different from those used with the lineprinter.

The structure of the output is presented in Figure 6. Note: property line refers to the nearest line of residential property to the railyard.

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Yard	Name	
	Yard	data
1	Area	
		Area data
		bands for baseline noise level
1		The baseline Lan, Log, Lmay at property line
		for each source affecting area
		The baseline composite noise level (from all
ļ .		sources and background level) at the property
		line, PE, ENI, DENI, COST, and WALL (if
1		The Land Long Long and the noise level, PE.
		ENI, DENI, COST and WALL information and forma
ľ		is repeated for each of the five regulation
l		noise levels and the noise level attained unde
		the maximum wall height (MW).
	Area	
	•	
	:	
1		
	Total	ls for yard
	Total Pop	ls for yard pulation exposed and ENI within the 3 dB bands fo
	Total Pop	ls for yard pulation exposed and ENI within the 3 dB bands fo baseline level ENI DENI COST pumber of proof which much the
	Total Pop t PE,	ls for yard pulation exposed and ENI within the 3 dB bands fo baseline level , ENI, DENI, COST, number of areas which meet the regulation noise level, and whether the yard is i
	Total Pop t PE,	ls for yard pulation exposed and ENI within the 3 dB bands fo baseline level , ENI, DENI, COST, number of areas which meet the regulation noise level, and whether the yard is i compliance with the respective regulation level
	Total Pop PE, T	ls for yard pulation exposed and ENI within the 3 dB bands fo baseline level , ENI, DENI, COST, number of areas which meet the regulation noise level, and whether the yard is i compliance with the respective regulation level without building walls (1=yes, 0=no)
	Total Pop PE, I	ls for yard pulation exposed and ENI within the 3 dB bands fo baseline level , ENI, DENI, COST, number of areas which meet the regulation noise level, and whether the yard is i compliance with the respective regulation level without building walls (1=yes, 0=no)
Yarđ	Total Pop PE,	ls for yard pulation exposed and ENI within the 3 dB bands for baseline level , ENI, DENI, COST, number of areas which meet the regulation noise level, and whether the yard is i compliance with the respective regulation level without building walls (1=yes, 0=no)
Yard	Total Pop PE, I	ls for yard pulation exposed and ENI within the 3 dB bands fo baseline level , ENI, DENI, COST, number of areas which meet the regulation noise level, and whether the yard is i compliance with the respective regulation level without building walls (1=yes, 0=no)
Yarđ :	Total Pop PE, I	ls for yard pulation exposed and ENI within the 3 dB bands fo paseline level , ENI, DENI, COST, number of areas which meet the regulation noise level, and whether the yard is i compliance with the respective regulation level without building walls (1=yes, 0=no)
Yarđ : Grand	Total Pot PE, I C V	Ls for yard pulation exposed and ENI within the 3 dB bands for baseline level ENI, DENI, COST, number of areas which meet the regulation noise level, and whether the yard is i compliance with the respective regulation level without building walls (1=yes, 0=no)
Yarđ : Granđ	Total Pot PE, I C	Ls for yard pulation exposed and ENI within the 3 dB bands for baseline level , ENI, DENI, COST, number of areas which meet the regulation noise level, and whether the yard is i compliance with the respective regulation level without building walls (1=yes, 0=no)
Yarđ Granđ For e	Total Pop PE, T C V	Is for yard pulation exposed and ENI within the 3 dB bands for paseline level , ENI, DENI, COST, number of areas which meet the regulation noise level, and whether the yard is i compliance with the respective regulation level without building walls (1=yes, 0=no)
Yard Grand For e	Total Pop PE, T C V V	Is for yard pulation exposed and ENI within the 3 dB bands for baseline level ENI, DENI, COST, number of areas which meet the regulation noise level, and whether the yard is i compliance with the respective regulation level without building walls (1=yes, 0=no)
Yard Grand For e Total	Total Pop PE, I tota l tota sach y Numbe	Is for yard pulation exposed and ENI within the 3 dB bands for baseline level ENI, DENI, COST, number of areas which meet the regulation noise level, and whether the yard is i compliance with the respective regulation level without building walls (1=yes, 0=no)
Yard Grand For e Total COST	Total Pop PE, T C V V V V V V V V V V V V V V V V V V	<pre>Is for yard pulation exposed and ENI within the 3 dB bands for paseline level . ENI, DENI, COST, number of areas which meet the regulation noise level, and whether the yard is i compliance with the respective regulation level without building walls (1=yes, 0=no) als rard type, er of yards in sample PE, ENI, DENI, COST per of yards in each type, projected PE, ENI, DEN per of yards in each type, projected PE, ENI, DEN</pre>
Yard Grand For e Total COST Numbe	Total Pop PE, T C V V V V V V V V V V V V V V V V V V	<pre>ls for yard pulation exposed and ENI within the 3 dB bands fo paseline level . ENI, DENI, COST, number of areas which meet the regulation noise level, and whether the yard is i compliance with the respective regulation level without building walls (1=yes, 0=no)</pre>
Yard Grand For e Total COST Numbe level	Total Pop PE, I V V V V V V V V V V V V V V V V V V	Ls for yard pulation exposed and ENI within the 3 dB bands for baseline level . ENI, DENI, COST, number of areas which meet the regulation noise level, and whether the yard is in compliance with the respective regulation level without building walls (l=yes, 0=no) als rard type, er of yards in sample PE, ENI, DENI, COST ber of yards in each type, projected PE, ENI, DEN yards already in compliance with the regulated
Yard Grand For e Total COST Numbe level	Total Pop PE, I V V V V V V V V V V V V V V V V V V	Ls for yard pulation exposed and ENI within the 3 dB bands for baseline level ENI, DENI, COST, number of areas which meet the regulation noise level, and whether the yard is in compliance with the respective regulation level without building walls (1=yes, 0=no)
Yard Grand For e Total COST Numbe level DB ba	Total Pop PE, I tota Numbe numb r of nds f PE an	Ls for yard pulation exposed and ENI within the 3 dB bands for paseline level ENI, DENI, COST, number of areas which meet the regulation noise level, and whether the yard is in compliance with the respective regulation level without building walls (1=yes, 0=no)

Figure 6. Structure of output listing

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5.2 Output Data for Each Yard

For each yard, the following data are listed:

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Yard name and yard type

- POP DEN Population density in the vicinity of the yard (people/sq. mi.)
- USAGE Fraction of land around the railyard which is used for residential and commercial puposes
- EFF POP Effective population density (the population density scaled up to take into account that only a fraction of the area is populated)
- BKGD Background L_{dn} from the regression equation in the "100-site study." Set to 54 dB in the L_{dn} computation if above 54 dB
- # AREAS Number of residential and commercial areas in this yard

For each area, the following data are listed:

AREA Name of area (R1, R2, C1, C2, etc.)

LENGTE Length of area (dimension of area in the direction along the railroad tracks)

- WIDTH Width of area (dimension of area in the direction perpendicular to the railroad tracks)
- DB Distance from property line to the place where the noise attenuating barrier is to be built
- DI Excess noise attenuation due to intervening industrial area
- DR Excess noise attenuation due to the residential or commercial area itself
- DNM Distance from property line to the moving sources

DNF Distance from property line to the fixed sources

NMS Number of moving sources

territed & half and for the foreign of the second descendence of the second state of the

NFS Number of fixed sources

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---35dB bands for baseline

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3 dB increments from 55 dB to >82 dB.

PE Population exposed to noise level within the dB band.

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ENI Equivalent noise impact or level weighted population (LWP) for the dB band. Note that the excess residential attention (DR) has been subtracted from the level, so the composite level for the dB bands is lower than the composite level at the property line.

For baseline, each of the 5 regulated levels and the maximum wall height level (either the noise level with a wall height of 30 ft, or the 5th regulated level, whichever is lower).

listing by noise source

LDN	L _{dn}	
LEQ	L _{eg} (1) a	t property line
LMAX	maximum instantaneous noise level	
LEVEL	composite noise level (L and the background noise	dn of all noise sources )
PE	population exposed	
ENI	LWP	
DENI	ALWP	~
COST	Cost for building a wall height WALL	of length ALENG and
WALL	Minimum wall height need receiving property line	ed to reduce noise at to this regulation level
Totals for dB bands i	r yard For baseline	
re and end	tive dB bands	or each or the respec-

PE, ENI, DENI, COST, NP, IC for baseline, each of the five regulation levels and the maximum wall height level

NA: Number of areas which can meet the regulation level. Note that in Airline, Milwaukee all areas (five) can meet all levels except 55. Note that the failure of all areas to meet the level of 55 requires the maximum wall to be built five times

IC: Whether the yard is in compliance with the regulation level already without building any noise attenuation barrier. Note that the yard meets only the 75 dB regulation level without building walls

A complete set of output data for a sample railyard is shown in Table 2.

5.3 Totals of Output Data For All Yards

Listed for each yard type are the following for the baseline, each of the five regulation levels, and the maximum wall height level:

#### SAMPLE:

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₹ YD:	Number of yards in the dataset of this type
PE:	Total of population exposed summed over yards of this type.
ENI:	Total of LWP summed over yards of this type.
DENI:	Total of $\Delta$ LWP summed over yards of this type.

COST:	Total	costs o	f erecting	barriers	summed	over
	yards	of this	type.			

#### PROJECTED:

1	YD:	Total	number	of	yards	of	this	type	in	the
		United	i States	5						

PE: Projected total of population exposed

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ENI: Projected total of LWP DENI: Projected total of  $\triangle$  LWP COST: Projected total cost #IC: Number of yards which: LEV = 2 i.e., first line, meet standard without wall 3 i.e., second line, meet standard with local wall 4 i.e., third line, cannot meet standard with local wall

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dB bands for baseline

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Total of PE and ENI in each of the dB bands, summed over all yards of the respective types in the dataset and the projected PE and ENI of each dB band.

The set of grand totals for the sample railyards and projected to a national level for all railyards is shown in Table 3.

The reader is referred to volume 3, section 5 for an example of checking whether the output is reasonable.

REDULATED LEVELS ARE 99 99 99 AIRLINE, HILWAUKEE, WI LOW VOL HUMP POP DEN USADE EFF POP DKGD # AREAS 10152.0 0.43 23607.3 62.1 5 AREA LENGTH WIDTH t) D DI DR DNM DNF NHS NES 81 1500. 8000. 100. 0. 8. 250. 0. 3 ٥ DD DANDS FOR BASELINE 55-58 67-70 70-73 73-76 77-82 >82 58-61 61-64 64-67 76-79 1.44E+03 2.68E+02 0.0 7.68E+01 5.30E+01 0.0 0.0 0.0 PE ENI 0.0 0.0 0.0 0.0 0.0 BL SOURCE LON LEO LHAX 85.9 HS 64+0 59.4 IR DD1 60.7 55.4 55.4 90.5 90.5 LEVEL COST WALL ₽E ENI DENI 67.1 1.71E+03 1.32E+02 0.0 0.0 0 MW SOURCE LON LHAX LEQ HS 57.4 85.9 • 64.0 tr opi 60.7 55.4 55.4 90.5 90.5 LEVEL FE ENI COST WALL DENI 67.1 1.71E+03 1.32E+02 0.0 0.0 ο AREA LENGTH WIDTH 0B DI DR DNM UNF NMS NES C1/R 1000. 8000. 0. 0. 8. 250. 100. 2 1 DD DANDS FOR DAGELINE 55-58 58-61 61-64 64-67 67-70 70-73 73-76 76-79 · 79-82 >82 6.51E+02 1.25E+02 4.52E+01 2.87E+01 PE Eni 3.47E-02 0.0 1.04E-02 0.0 0.0 0.0 0.0 0.0 0.0 0.0 **BL** SOURCE LINN LEG LHAX . . .. . ,

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, I.P. the sea com 59. 4.0 HR 65 D 60.9 83.0 LEVEL PE ENI DENI COST WALL 70.2 7.76E+02 7.39E+01 0.0 0.0 0 MW SOURCE LON LEQ LHAX IÐ 65+0 65+0 59.6 59.6 60.9 94.0 **OB1** 94.B 65 B 83.0 HR. LEVEL PΕ ENT WALL DENI COST 70.2 7.76E+02 7.39E+01 0.0 0.0 0 AREA LENGTH WIDTH ₽₿ NES Dİ DRDNM DUNF NHS C2/R 1000. 8000. 0. 0. α. 100. 250. 2 1 DD BANDS FOR PASELINE 55-58 58-61 61-64 64-67 67-70 70-73 73-76 76-79 79-82 >02 6.51E+02 1.25E+02 3.47E-02 0.0 4.33E+01 2.76E+01 1.04E-02 0.0 PE 0.0 0.0 0.0 0.0 0.0 0.0 ENI 0.0 0.0 0.0 0.0 0.0 0.0 DL LEO SOURCE LIN LHAX 59.6 59.6 60.2 11 65.0 94.B 001 65.0 65.1 94.8 90.3 Č1 LEVEL PE ENI DENI COST WALL 69.9 7.76E+02 7.09E+01 0.0 0.0 0 . n₩ SOURCE LIN LEO LHAX 59.6 59.6 60.2 1D 65.0 65.0 94 • B 94.8 OB1 CI 45.1 LEVEL PΕ ENI DENI COST WALL 69.9 7.76E+02 7.09E+01 0.0 0.0 0 AREA LENGTH WIDTH ti B NHS NFS ħ1 ΠR **ZINH** LINE R2 1000. 8000. ٥. ٥. ø. 100. 250. 2 2 DD BANDS FOR BASELINE . 55-58 58-61 61-64 64-67 67-70 70-73 73-76 76-79 79-82 >82 6.51E+02 1.25E+02 3.47E-02 0.0 4.64E+01 2.95E+01 1.04E-02 0.0 PE 0.0 0.0 0.0 0.0 0.0 0.0 ENI 0.0 0.0 0.0 .

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	CONDER	+ 144	1 50	I HAY			$\sim$				
	BUDKEE	CDA	LLU	E I III A			'				
	IB	65.0	59.6	94.0							
	083	45.1	60.2	90.3							
	ĪR	59.8	54.8	83.5						1	
	LEVEL	PE		ENI	DENI	COST	WALL				
	70.3	7.76E+	02 7.	57E+01	0.0	0.0	0				
нм											
	SOURCE	LDN	LEQ	LHAX							
	IB	65.0	59.6	94.0							
	001	65.0	59.6	94,8							
	CI	65.1	60.2 54 U	90.3							
	IK	3710	0440	0313							
	LEVEL	PE		ENI	DENI	COST	WALL				
	70.3	7.76E+	02 7.	59E+01	0+0	0.0	0				
AF	EA LEN	GTH W1.	DTH	0B	DI DR	DNM DNF	NHS NES				
83	20	DD. 20	00.	٥.	0, 8,	100. 0.	4 0				
DB	BANDS	FOR RAS	ELINE								
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	SOURCE	LDN	LEQ	LMAX							
	MS	63.4	58.7	90.0							
	IS	64.7	60.1	90.0							
	IB	65.0	59.6	94.8	•						
	002	54.2	48,D	90.0							
	LEVEL	PE		ENI	0EN1	COST	WALL				
	69.5	PE 1.93E+0	03 1,	ENI 69E+02	0.0	COST 0.0	WALL				
мы	69.5	PE 1.93E+0	03 1,	ENI 69E+02	0.0	COST 0.0	WALL O				
нч	69.5	PE 1.93E+0	03 1,	ENI 69E+02	0.0	0.0	WALL O				
ИМ	69.5 SOURCE	PE 1.93E+0 LDN	03 1, LEQ	ENI 69E+02 LMAX	0.0	COST 0.0	WALL O				
нч	69.5 SOURCE	PE 1.93E+0 LDN 63.4	03 1, LEQ 58,7	ENI 69E+02 LMAX 90.0	0.0	0.0	WALL O				
ны	69.5 SOURCE HS IS	PE 1.93E+0 LDN 63.4 64.7	03 1, LER 58,7 60,1	ENI 69E+02 LMAX 90.0 90.0	0.0	COST 0.0	WALL O				
MW	69.5 SOURCE HS IS ID	PE 1.93E+0 LDN 63.4 64.7 65.0	58.7 59.6	ENI 69E+02 LMAX 90.0 94.0	0.0	COST 0.0	WALL O				
ЧШ	A9.5 SOURCE HS IS JD OB2	PE 1.93E+0 LDN 63.4 64.7 65.0 54.2	58,7 58,7 60,1 59,6 48,8	ENI 69E+02 LMAX 90.0 90.0 94.8 90.0	0.0	COST 0.0	WALL O				
nu	A9.5 BOURCE HS IS JD OB2 LEVEL	PE 1.93E+0 LDN 63.4 64.7 65.0 54.2 FE	58,7 60,1 59,6 48,0	ENI 69E+02 LMAX 90.0 90.0 94.0 90.0 ENI	0.0 0.0	COST	WALL O WALL				
<b>NW</b>	49.5 80URCE HS 15 11 082 LEVEL 69.5	PE 1.93E+0 LDN 63.4 64.7 65.0 54.2 FE 1.93E+0	58.7 58.7 60.1 59.6 48.8	ENI 69E+02 LMAX 90.0 94.0 90.0 F4.0 90.0 ENI 69E+02	0.0 0.0	COST 0.0 COST 0.0	WALL O WALL O				
NW , totali	69.5 SOURCE HS IS JN OD2 LEVEL 69.5 B FOR Y/	PE 1.93E+0 LDN 63.4 64.7 65.0 54.2 FE 1.93E+0 NRD	58.7 58.7 60.1 59.4 48.8	ENI 69E+02 LMAX 90.0 90.0 94.8 90.0 ENI 69E+02	0.0 נובאז נובאז 0.0	COST 0.0 COST 0.0	WALL O WALL O				

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AR	EA LEN	0TH W	IDTH	DB	01 1	<b>D</b> R	DNM	DN	F	NHS	NFS					
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PE INI	55-: 4.59E 3.28E	58 402 14 401 34	50-61 45E+0 12E+0	6  2 6,7  1 2,4	1-64 7E+01 9E+01	1. 7.	64-6 47E+ 07E+	7 01 ( 00 (	67 0.0 0.0	7-70	70 0.0 0.0	-73	73-76 0.0 0.0	76-79 0:0 0:0	79-82 0.0 0.0	>02 0.0 0.0
PE EN1 BL	55- 4.59E 3.28E	58 +02 14 +01 34	50-61 45E+0 12E+0	- 6)2 6.7 91 2.4	1-64 7E+01 9E+01	1. 7.	64-6 47E+ 07E+	7 01 ( 00 (	67 0.0 0.0	7-70	70 0.0 0.0	-73	73-76 0.0 0.0	76-79 0:0 0:0	79-82 0.0 0,0	>82 0+0 0+0
e Ni BL	55- 4.59E 3.28E SOURCE	58 102 10 101 30	50-61 45E+0 12E+0 LEQ	- 6 2 6.7 21 2.4 LHAX	1-64 7E+01 9E+01	1. 7.	64-6 47E+ 07E+	7 01 ( 00 (	67 0.0 0.0	7-70	70 0.0 0.0	-73	73-76 0,0 0,0	76-79 010 010	79-82 0.0 0.0	982 0+0 0+0
PE ENI BL	55 4.59E 3.20E SOURCE IS OR2 CI	58 +02 1 +01 3 LDN 68-5 55-1 58-8	58-61 45E+0 12E+0 LEQ 63.8 52.1 54.2	- - - - - - - - - - - - - -	1-64 7E+01 9E+01	1. 7.	64-6 49E+ 09E+	7 01 ( 00 (	67 0.0 0.0	7-70	70 0.0 0.0	-73	73-76 0.0 0.0	76-79 0.0 0.0	79-82 0.0 0.0	0+0 0+0
PE INI BL	55- 4.59E 3.28E SOURCE IS OR2 CI LEVEL	58 +02 1. +01 3. LDN 68.5 55.1 58.8 PE	59-61 .45E+0 .12E+0 LEQ 63.8 52.1 54.2	2 6.7 1 2.4 LHAX 86.9 86.8 79.1 ENI	1-64 76+01 96+01	1. 7.	64-6 49E+ 09E+	7 01 ( 00 (	67 0.0 0.0	7-70 UA	70 0.0 0.0	-73	73-76 0.0 0.0	76-79 0.0 0.0	79-82 0.0 0.0	582 0.0 0.0
PE ENI BL	55- 4.59E 3.20E SOURCE IS OR2 CI LEVEL 69.3	58 +02 1. +01 3. LDN 68.5 55.1 59.8 PE 6.846+	50-61 .45E+0 .12E+0 LEQ 63.8 52.1 54.2	2 6.7 2 6.7 1 2.4 LHAX 86.9 86.8 79.1 ENI	1-64 7E+01 9E+01 DE 1 0.0	1. 7.	64-6 47E+ 07E+	7 01 ( 00 ( COS1	67 0.0 0.0	7-70 WA	70 0.0 0.0	9-73	73-76 0.0 0.0	76-79 0.0 0.0	79-82 0.0 0.0	0+0 0+0 0+0
PE BL BL	55- 4.59E 3.20E SOURCE IS OP2 CI LEVEL 49.3	58 +02 1. +01 3. 68.5 55.1 58.8 PE 6.84E+	58-61 .45E+0 .12E+0 LFQ 63.8 52.1 54.2	4 2 6.7 2 6.7 1 2.4 LHAX 86.9 84.8 79.1 ENI .60E+01	1-64 7E+01 9E+01 DE	1. 7.	64-6 49E+ 09E+	7 01 ( 00 ( 00 ( 00 ( 00 ( 00 ( 00 ( 00 (	6; 0.0 0.0	7-70 WA	70 0.0 0.0	9-73	73-76 0.0 0.0	76-79 0.0 0.0	79-82 0.0 0.0	)82 0.0 0.0
PE ENI BL	55- 4.59E 3.20E SOURCE IS OR2 CI LEVEL 69.3	58 +02 1, +01 3, 68,5 55,1 58,8 PE 6,84E+ LIN	50-61 .45E+0 .12E+0 LEQ 63.0 52.1 54.2 02 9 LEQ	LHAX 84.9 84.9 84.9 84.9 84.9 84.9 79.1 ENI .60E+01	1-64 7E+01 9E+01 DE	1. 7.	64-6 49E+ 09E+	7 01 ( 00 ( 0051	67 0.0 0.0	2-70 WA	70 0.0 0.0	9-73	73-76 0.0 0.0	76-79 0.0 0.0	79-82 0.0 0.0	582 0.0 0.0
PE BL BL	55- 4.59E 3.20E SOURCE IS OR2 CI LEVEL 69.3 BOURCE IS	58 +02 1. +01 3. 	58-61 .45E+0 .12E+0 LEQ 63.8 52.1 54.2 02 9 LEQ 63.8	4 12 6.7 12.4 LHAX 86.9 84.8 79.1 ENI .60E+01 LHAX 86.9	1-64 7E+01 9E+01	1. 7.	64-6 47E+ 07E+	7 01 ( 00 ( 00 (	67 0.0 0.0	7-70 WA	70 0.0 0.0	-73	73-76 0.0 0.0	76-79 0.0 0.0	79-82 0.0 0.0	>82 0.0 0.0
NM WM	55- 4.59E 3.20E SOURCE IS OR2 CI LEVEL 69.3 BOURCE IS OD2 CI	58 +02 1. +01 3. 68.5 55.1 58.8 PE 6.84E+ LUN 60.5 55.1 55.1	58-61 .45E+0 .12E+0 .12E+0 63.8 52.1 54.2 02 9 LE0 63.8 52.1 54.2	LHAX B4.9 B4.9 B4.8 79.1 ENI .60E+01 LHAX B4.9 CHAX B4.9 B4.8 79.1	1-64 7E+01 9E+01 DE 1 0.0	1. 7.	64-6 49E+ 09E+	7 01 ( 00 ( 00 ( 0051	67 0.0 0.0	uA	70 0.0 0.0	-73	73-76 0.0 0.0	76-79 0.0 0.0	79-82 0.0 0.0	)82 0.0 0.0
PE ENI RL HW	55- 4.59E 3.20E SOURCE IS OP2 CI LEVEL 69.3 BOURCE IS OP2 CI LEVEL	58 +02 1. +01 3. 68.5 55.1 58.8 FE 6.84E+ L(IN 48.5 55.1 58.0 FE	50-61 .45E+0 .12E+0 LEQ 63.8 52.1 54.2 02 9 LEQ 63.8 52.1 54.2	4 2 6.7 1 2.4 LHAX 86.9 86.9 86.9 86.9 86.9 86.9 CHAX 86.9 CHAX 86.9 10 CHAX 86.9 10 CHAX 86.9 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 10 CHAX 1	1-64 7E+01 9E+01 DE	1. 7.	64-6 49E+ 09E+	7 01 ( 00 ( 00 ( 00 ( 00 ( 00 ( 00 ( 00 (	67	2-70 WA	70 0.0 0.0 NLL 0	-73	73-76 0.0 0.0	76-79 0.0 0.0	79-82 0.0 0.0	582 0.0 0.0

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• PE B BANDS FOR DASELINE 55-58 58-61 61-64 64-67 67-70 70-73 73-76 76-79 79-82 >82 4.95E+02 1.67E+02 8.21E+01 4.25E+01 1.7NE+01 0.0 4.31E+01 4.51E+01 3.12E+01 2.20E+01 1.16E+01 0.0 PE Ent 0.0 0.0 0.0 0.0 1 0.0 0.0 0.0 8L SOURCE LDN LEO LHAX 10 70.3 67.4 94.8 091 CI 70.0 67.1 74.8 LEVEL ſΈ ENI DENT COST WALL 73.8 8.05E+02 1.53E+02 0.0 0.0 0 ны BOURCE LDN LEO LHAX IR OD1 CI 70.3 70,0 65.2 67.4 94.8 67.1 94.8 60.5 85.5 LEVEL PE ENI DENT COST WALL 73.8 8.05E+02 1.53E+02 0.0 0.0 0 AREA LENGTH WIDTH DB 11 ÐR DNM DNF NHS NES C4/R 1000. 8000. ٥. 4. 200. ٥. 2 0 0. DB BANDS FOR BASELINE 55-58 67-70 58-61 61-64 64-67 70-73 73-76 76-79 79-82 >82 4.57E+02 1.45E+02 6.77E+01 1.47E+01 2.66E+01 3.12E+01 2.49E+01 7.09E+00 PE Eni 0.0 0.0 0.0 010 010 0.0 0.0 0.0 ÐL SOURCE LDN LEO LHAX 15 092 60.5 63.8 52.1 86.9 LEVEL PE ENI DENI COST WALL 68.9 6.86E+02 8.98E+01 0.0 0.0 0 н₩ SOURCE LDN LEQ LHAX 19 6B.5 63.8 52.1 86.9 082 55.1 86.B LEVEL FE ENI DENI COST WALL 68.9 6.86E+02 8.98E+01 0.0 0.0 0 ..... - -. . .... . .... ......

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T/R 1000. 6000. 200. 0. 4. 100. 400.  $\mathbf{2}$ 1 DE BANDS FOR BASELINE 67-70 70-73 73-76 76-79 79-82 >82 55-58 58-61 64-67 61-64 4,95E+02 1.67E+02 8.21E+01 4.25E+01 1.78E+01 0.0 4,31E+01 4.51E+01 3.12E+01 2.20E+01 1.16E+01 0.0 0.0 0.0 0.0 0.0 PE Eni 0.0 0.0 DL, SOURCE LDN LEO LHAX 10 001 67.4 67.1 60.5 94.8 94.8 70.3 CI 65.2 85.5 LEVEL ₽E ENI DENI COST WALL 73.8 0.05E+02 1.53E+02 0.0 0 0.0 NW SOURCE LON LEQ LHAX 70.3 70.0 65.2 94.B IB 67.4 67.1 94.8 85.5 001 60.5 C1 LEVEL PΕ ENI DENI COST WALL 73.8 8.05E+02 1.53E+02 0.0 0 0.0 AREA LENGTH WIDTH DB DI DR DNM DNF NMS NFS CA/R 2000. 6000. 0. 0. 4. 200. ٥, 2 0 DB BANDS FOR BASELINE 79-82 55-58 58-61 61-64 64-67 67-70 70-73 73-76 76-79 >82 1.045+03 3.775+02 1.955+02 1.055+02 7.005+00 0.0 6.275+01 8.195+01 7.185+01 5.425+01 4.255+00 0.0 0.0 0.0 0.0 0.0 PE 0.0 0.0 ENI 0.0 8L SOURCE LON LEA LHAX MS 19 67.6 62.8 68.5 63.8 86.9 86.9 LEVEL ΡE ENT DENI COST WALL 71.2 1.746+03 2.756+02 0.0 0.0 0 н₩ SOURCE LON LEQ LHAX ۸S 67.6 62.8 86.9 19 60.5 63.8 86.9 EN1 COST WALL LEVEL FΕ DENI . . . . . . . . . . .. • • ٠

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- B DANUS FOR PASELINE 55-58 67-70 73-76 76-79 79-82 >82 56-61 61-64 64-67 70-73 1.04E+03 3.81E+02 1.98E+02 6.27E+01 0.0 6.31E+01 8.28E+01 7.28E+01 3.04E+01 0.0 0.0 0.0 0.0 0.0 0.0 PE ENI 0+0 0.0 0.0 0.0 . DL. SOURCE LDN LEA LHAX 61.0 62.0 85.0 85.0 M5 19 65.7 66.7 LEVEL FΕ ENI DENI COST WALL 67.3 1.70E+03 2.49E+02 0.0 0.0 0 MW SDURCE LDN LEØ LMAX MS 65.7 61.0 85.0 IS 62.0 85.0 66.7 LEVEL PE EHI DENI COST WALL 67.3 1.70E+03 2.49E+02 0.0 0 0.0 AREA LENGTH WIDTH **D**B DI DR DNH DNF NHS NES C7/R 1000. 6000. 0. 0. 200. 100. 3 4. 1 DB DANDS FOR RASELINE 55-58 58-61 67-70 70-73 73-76 76-79 79-82 >82 61-64 64-67 5.00E+02 1.70E+02 8.39E+01 3.62E+01 0.0 2.98E+01 3.67E+01 3.09E+01 1.82E+01 0.0 0.0 0.0 0.0 0.0 0.0 PE 0.0 0.0 0.0 0.0 0.0 ENI BL SOURCE LDN LEO LHAX ID Odí 64.2 63.9 52.1 62.1 91.6 67+1 66.7 91.6 8.60 082 55.1 GT 60.0 82.0 LEVEL PE ENI DENI COST WALL 70.6 7.89E+02 1.16E+02 0.0 . 0.0 o ны SOURCE LDN LEO LHAX 67+1 66+7 91.6 91.6 18 64.2 63.9 OBI 002 55.1 52.1 84.0 . ..... i

111 MITH MOLE HELM LEVEL WALL PE ENI DENI COST 70.6 7.89E+02 1.16E+02 0.0 0.0 ٥ AREA LENDTH WIDTH DD DI DR DNM DNF NHS NFS , C8/R 3000. 3000. 0, 0, 4. 200. ٥, 3 ٥ DE BANDS FOR BASELINE 73-76 55-58 58-61 67-70 70-73 76-79 77-82 >82 61-64 64-67 1.50E+03 5.09E+02 2.52E+02 1.09E+02 0.0 8.82E+01 1.10E+02 9.26E+01 5.47E+01 0.0 0.0 0.0 0.0 0.0 0.0 PE Eni ÐL, SOURCE LON LEO LMAX IB 67.1 91.6 64.2 OP1 66.7 63.9 91.6 002 52.1 84.8 35.1 ENI LEVEL PE DENT COST WALL 70.2 2,37E+03 3.46E+02 0.0 0.0 ο н₩ SOURCE LON LEG LNAX 67.1 66.7 55.1 64.2 91.6 63.9 91.6 52.1 84.8 IÐ 081 082 LEVEL PE ENI DENI COST WALL 70.2 2.378+03 3.460+02 0.0 0.0 o AREA LENGTH WIDTH DB DI DR DHM DNF NMS NFS C9/R 2000. 4000. 0. 0. 4\ 200. ٥. 3 ٥ DB BANDS FOR DASELINE 55-58 50-61 70-73 61-64 64-67 67-70 73-76 76-79 79-82 >82 9.99E+02 3.39E+02 1.68E+02 7.24E+01 0.0 5.80E+01 7.34E+01 6.17E+01 3.65E+01 0.0 PE Eni 0.0 0.0 0.0 0.0 0+0 0.0 0.0 0.0 0.0 DL. SOURCE LON LEO LHAX 67.1 64.2 66.7 63.9 55.1 52.1 91.6 91.6 IÐ 0D1 86.8 002 LEVEL FE ENI DENI COST WALL 70.2 1.50E+03 2.30E+02 0.0 0.0 Ō ны . . . .

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-	10 6 051 6 052 5	7.1 64.2 6.7 63.9 5.1 52.1	91.6 91.6 86.8			$\frown$				
	LEVEL	PE	ENI D	ENI CO	DST W	NLL .				
	70.2 1.	58E+03 2,	30E+02 0.	0 0.0	<b>)</b>	0			•	
TOTAL	S FOR YARD									
DA	DANDS FOR	BASEL INE								
	55-50	59-61	61-64	64-67	67-70	70-73	73-76	76-79	79-82	>82
PE Ent	B.91E+03 4.15E+02	2,97E+03 7,25E+02	1.39E+03 5.10E+02	5.36E+02 2.71E+02	4.26E+01 2.75E+01	0.0	0.0	0.0	0.0	0.0
LEVEL	PE	ENI	DENI	COST	NA	10				
NL 99 99 99 99	1.30E+04 1.30E+04 1.30E+04 1.30E+04 1.30E+04 1.30E+04	2.16E+03 2.16E+03 2.16E+03 2.16E+03 2.16E+03 2.16E+03	0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	11 11 11 11 11	1 1 1 1				
ที่พั	1.386+04	2.16E+03	0.0	0.0	11	*				

					SAMPLE				r:	CUECTED			
			۲Ø	PE	ENI	DENI	COST	<b>♦ Y</b> D	PE	ENI	DENI	COST	(
LOW	VOL	HUMP	,										
	<b>BL</b>		1	5.97E+03	5.226102	0.0	0.0	44	2.63E+05	2.306+04	0.0	0.0	
	99		1	5,97E+03	5.226+02	0.0	0.0	44	2.63E+05	2.306+04	0.0	0.0	
	97		1	5+976+03	5.228+02	0.0	0.0	44	2.63E+05	2,306+04	0.0	0.0	
	99		1	5.97E+03	5.228+02	010	0.0	44	2,636+05	2.306+04	0.0	0.0	
	99		1	5.978+03	5.226102	0.0	0.0	44	2,636405	2.306+04	0.0	0.0	
	77		1	5.97E+03	5.22E+02	0.0	0.0	44	2.63E+05	2.30E+04	0.0	0.0	
	HW		1	5,97E+03	5.22E+02	0.0	0.0	44	2.63E+05	2.30E+04	0.0	0.0	
HEDI	UN N	ю, н	มห	Þ									
	ÐL		0	0.0	0.0	0.0	0.0	51	0.0	0.0	0.0	0.0	
	99		0	0.0	0.0	0.0	0.0	51	0.0	0,0	0.0	0.0	
	99		0	0+0	0.0	0.0	0.0	51	0.0	0.0	0.0	0.0	
	<b>79</b>		0	0.0	0.0	0.0	0.0	51	0.0	0.0	0.0	0.0	
	99		0	0.0	0.0	0.0	0.0	51	0.0	0.0	0.0	0.0	
	99		Ö 🗌	0.0	0.0	0.0	0.0	51	0.0	0.0	0.0	0.0	
	нw		0	0.0	0.0	0.0	0.0	51	0.0	0.0	0.0	0,0	
H10H	VOL	HUH	Р										
	BL.		1	1,386+04	2+16E+03	0.0	0+0	29	3.996105	6.25E104	0.0	0.0	
	99		1	1.386+04	2.16E+03	0.0	0.0	29	3.992+05	6.256104	0.0	0.0	
	99		1	1.386404	2.16E+03	0.0	0.0	29	3.992105	6.25E+04	0.0	0.0	
	77		1	1.306104	2.166103	0.0	0.0	29	3.996105	6+25E104	0.0	0.0	
	99		1	1.306+04	2.166+03	0.0	0+0	29	3.996+05	6.25E104	0,0	0.0	
	99		1	1.3BE+04	2.14E+03	0.0	0.0	22	3.996105	6.25E+04	0.0	0.0	
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GRAND TOTAL FOR ALL YARDS

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LI 🦳	ו אמי	FLAT						$\frown$				
	BL 99 99 99 99 99	0 0 0 0 0 0 0	0.0 0.0 0.0 0.0 0.0 0.0 0.0	0,0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0		476 476 476 476 476 476 476	0.0 0.0 0.0 0.0 0.0 0.0 0.0	0,0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0		00000
NEDI	UH V	0L FL/	т									
	DL 99 99 99 99 99 Mu	0 0 0 0 0 0 0		0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0		346 346 346 346 346 346	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0		000000000000000000000000000000000000000
HIGH	I VOL	FLAT										
	RL 99 99 99 99 99	0000000	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	0:0 0:0 0:0 0:0 0:0 0:0	130 130 130 130 130 130 130	0.0 0.0 0.0 0.0 0.0 0.0 0.0	0,0 0.0 0.0 0.0 0,0 0,0 0,0	0.0 0.0 0.0 0.0 0.0 0.0		0 0 0 0
חעאד	STRI	AL										
	PL 99 99 99 99 99 99 89	0 0 0 0 0 0 0	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0	830 038 838 838 839 838 838	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0	0 0 0 0
SMAL	L INI	OUSTRI	AL									
	DL 99 99 99 99 99 99 99	000000000000000000000000000000000000000	0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0		1779 1779 1779 1779 1779 1779 1779	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	0 0 0 0
HUMP	YARE	95AL	L VOLUMES									
	рі 99 99 99 99 99 Ми	20 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	1.97E+04 1.97E+04 1.97E+04 1.97E+04 1.97E+04 1.97E+04 1.97E+04	2.68E+03 2.68E+03 2.68E+03 2.68E+03 2.68E+03 2.68E+03 2.68E+03 2.68E+03	0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	124 124 124 124 124 124 124	1.22E+04 1.22E+04 1.22E+06 1.22E+06 1.22E+06 1.22E+06 1.22E+06 1.22E+06	1.66E+05 1.66E+05 1.66E+05 1.66E+05 1.66E+05 1.66E+05 1.66E+05	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	20000000
FLAT	YARD	19ALI	L VOLUMES									
	DL 99	0 0	0.0	0.0 0.0	0.0	0.0 0.0	952 952	0.0 0.0	0.0	0.0	0.0	<u> </u>

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	15 U 19 O C 19 O C				0.0 0.0 0.0	952 ( 952 ( 952 0,0	"(U U+0 0+0 0+0	0.0 0.0 0.0	0.0 0.0 0.0		Ü O O	/
DB	DANDS FOR	DASEL INE							,			
	55-50	50-61	61-64	64-67	67-70	70-73	73-76	76-79	79-02	>02		
LOW VO	Л. НИМР											
SANPLE PE EN1 PRD IFF	4.94E103 2.96E+02	9.66E+02 2.07E+02	5.58E+01 1.82E+01	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
PE	2.18E+05 1.30E+04	4+25E+04 9+12E+03	2.46E+03 8.02E+02	0.0	0.0	0.0 0.0	0.0 0.0	0.0	0.0	0.0		•
NEDIU	I VOL HUMP											
SAMPLE PE ENI	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
PE	0.0	0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0	0.0	0.0	0.0		
нтвн у	OL HUMP		4									
SAMPLE PE ENI PRDJEC	0.91E+03 6.15E+02	2.97E+03 7.25E+02	1,39E+03 5,18E+02	5.36E+02 2.71E+02	4.26E+01 2.75E+01	0.0	0.0	0.0 0.0	0.0 0.0	0.0		
PE	2.58E+05 1.78E+04	8.60E+04 2.10E+04	4.02E+04 1.50E+04	1.55E+04 7.85E+03	1.24E+03 7.98E+02	0.0	0.0	0.0	0.0	0.0	•	
LOW VO	IL FLAT											
SAMPLE PE ENI PROJEC	0.0 0.0	0.0	0.0	0+0	0.0 0.0	0.0	0.0	0.0 0.0	0.0	0.0		
PE ENI	0.0	0.0 0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0	0.0 0.0	0.0	0.0		
MEDIUN	VOL FLAT											
SAMPLE PE ENI PROJEC	0.0 0.0 TED	0+0 0+0	0+0 0.0	0.0	0.0 0.0	0.0 0.0	0.0	0.0	0.0	0.0 0.0		
PE Eni	0.0	0.0 0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0	0.0 0.0		
HIDH V	OL FLAT											
SAMPLE PE ENI PRD IEC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
PE ENI	0.0	0.0	0.0	0.0	0.0	0.0	0.0 0.0	0.0	0.0 0.0	0,0		
INDUST	RIAL											

•										
LIVE CONTRACTOR CONTRACT										
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ę.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PROJE	CTED									
PE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENI	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SMALL INDUSTRIAL										
SANPLI	F									
PE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENI	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PROJECTED THE THE THE THE THE THE THE THE THE										
PE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENI	0.0	0.0	0,0	0.0	0.0	0+0	0.0	0.0	0.0	0.0
HUNP YARDSALL VOLUNES										
SANPLE										
PE	1.39E+04	3.93E+03	1.44E+03	5.36E+02	4+26E+01	0.0	0.0	0.0	0.0	0.0
ENI	9.11E+02	9.33E+02	5,36E+02	2.718102	2.75E+01	0.0	0.0	0.0	0.0	0.0
PROJEC	TED								•••	••••
PE	8,598+05	2.442+05	8.942+04	3.32E+04	2.64E+03	0.0	0.0	0.0	0.0	0.0
ENI	5.65E+04	5.78E+04	3.326+04	1+606+04	1.71E+03	0.0	0.0	0.0	0.0	0.0
FLAT YARDSALL VOLUMES										
SANFLE										
PE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENI	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PROJECTED										
FE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENI	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0+0	0.0	0.0

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#### APPENDIX A

Here are brief descriptions on several often used WYLBUR commands. For more detail on these and other commands, the reader is referred to "NCC WYLBUR Guide."

## SET TERSE

WYLBUR prompts the user by printing "COMMAND?". The standard procedure is to abbreviate the prompt to a "?" by issuing the command:

COMMAND? <u>SET TERSE</u>(CR) ?

## CLR TEXT

When you log on to WYLBUR, you are given a workspace. You can write on this workspace and edit what you have written. If you want to wipe this workspace out and start with a clean one, issue this command to clear the text:

? CLR TEXT(CR)

# USE

To bring an existing file named 'filename' into an empty workspace, type:

? USE 'filename'(CR)

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To bring an existing file into a non-empty workspace, type:

? USE 'filename' CLR(CR)

<u>Warning</u>: CLR clears the existing workspace. If you don't want to wipe out your existing workspace, save it with a SAVE command first before issuing the CLR.

#### File Naming Convention in NCC

A file in the NCC IBM system is stored as CN.EPAIII.AAAA.'filename' where

EPAILI is your userid

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AAAA is your account code

'filename' is the name of your file of length 1 to 8 characters long. Each character can be an alphanumeric character or a national character (\$, 0, #). The first character of the file has to be either an alphabetic character or a national character.

To access a file from another user's account on WYLBUR, a '\$' character has to be added to the full filename, e.g., \$CN.EPABRM. S2KC.RM80N3, to let WYLBUR know that this file 'CN.EPABRM.S2KC.RM80N3' does not exist on your account.

If you have a WYLIB, you can refer to your files stored inside the WYLIB by @'filename'. The '@' character tells WYLBUR that the filename which follows is in your WYLIB.

To access a file in another user,'s WYLIB, type USE \$CN.EPAIII.AAAA.WYLIB('filename'). SAVE

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The SAVE command saves your workspace by storing it into a file to be named by you. There are two ways of storing your file, as a member of your WYLIB (if it exists)

? SAVE @'filename'(CR)

The '0' character indicates you want to save 'filename' into your WYLIB.

Or you can save the file as a sequential data set:

? SAVE 'filename' ON 'volume' 'format'(CR)

where 'filename' is the name of the file

'volume' is the disk pack you want to store the file on (usually one of the USER packs).

'format' is the format the file is to be stored under, i.e., CARD, EDIT, DEFAULT, etc.

If you already have a file named 'filename', WYLBUR will ask you whether you want to replace that file. If you do, type <u>YES</u> and WYLBUR will replace the old file with the new file. If you type in anything other than <u>YES</u>, WYLBUR will take no action. Your workspace will not be saved.

<u>Warning</u>: WYLBUR does not keep backup copies of your files (except for the daily backup tape runs). If you deleted your file accidentally, you would not be able to retrieve it.

If you do want to replace your file, you can save WYLBUR the trouble of prompting you by the REPLACE option:

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? SAVE 'filename' 'format' REP(CR)

# COLLECT

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The COLLECT command allows you to write onto your workspace.

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You can start from a certain line number by using

? <u>C 'line number'</u>(CR)

To exit from COLLECT mode, type (BREAK) to the "?" prompt.

# LIST

LIST prints out the contents of your workspace on your terminal.

? <u>L</u>(CR)

To LIST all instances where 'string' occurs, use

? L 'string'(CR)

where 'string' is a character string enclosed in single quotes, for example,

? <u>L 'BOOK'</u>(CR)

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will list all occurrences of the character string 'BOOK' in your workspace.

## DELETE

DELETE eliminates lines from your workspace. Typing

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? DEL 'line'(CR)

will delete the line numbered 'line' from your workspace.

# SCRATCH

SCRATCH deletes an unwanted file on the system.

? SCR 'filename'(CR)

will delete 'filename' from the system.

<u>Warning</u>: Once you scratch your file, it cannot be replaced unless a previous version of 'filename' was saved on the backup tapes. In that case, you can restore 'filename' to its latest status as of the most current backup tape.

#### CHANGE

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The CHANGE command allows the user to substitute a string of characters (inside single quotes) by another string of characters (inside single quotes) as follows:

? CHA 'string 1' TO 'string 2' IN 'linerange'(CR)

This operation changes all occurrences of 'string l' in the line range 'linerange' to 'string 2'.

Warning: WYLBUR will change everything that contains 'string l' to 'string 2'. So if you are not sure whether 'string l' occurs in some other places you don't know about, use "LIST 'string l'" to find all occurrences of 'string l' before you use "CHANGE".

EDIT

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The EDIT command allows the user to edit a line that needs to be corrected. When you issue the EDIT command

? EDIT 'line'(CR)

WYLBUR will print out 'line' and prompt for edits.

Type in any of the following characters to make the line right. You can keep doing it until you are satisfied with the contents of the line. Then on the final prompt from WYLBUR, typing a (CR) will put the changes in the line. If you type a (BREAK) before you type the final (CR) the line will not be altered.

Special edit characters:

#### Character Function

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- A replace the character above with a blank. <u>Note</u>: this character varies on different terminals.
  - delete the character above and close the gap.

insert a blank in front of the character above.

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"text" insert the text inside the double quotes in front of the character above the first double quote.

Delete all characters following and including the character above.

Simply typing non-blank characters under the line to be edited will replace the characters above the non-blank characters by the non-blank characters.

After you type in your corrections, hit (CR), WYLBUR will print the edited line and ask for more edits. If you want to continue the edit, continue the previous operation. If not, type (CR) without typing in any other character will exit from EDIT mode.

#### LOGOFF

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This command logs you off the system.

? LOGOFF(CR) WYLBUR will prompt CLEAR OK?

If you type <u>YES</u>(CR) your workspace will be wiped out and you will be logged off the system. Typing a (CR) will save the workspace and log you off the sysem. Any other reply will abort the command. A quick way to dispense with the prompt is:

# ? LOGOFF CLR(CR)

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This clears the workspace and logs you off the system.

Figure 3 illustrates some of the commands mentioned above.

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Figure 7. Example use of some commands

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EADY TO WCC ON EC3

ILLEGAL TERMINAL TYPE

MODEL 37/38 TELETYPE

WYLBUR SYSTEM AT CONNET FORT 60 MONDAY 10/06/80 4:43:53 F.M. - SEE NEWS ALERT 09/23/80: SCHEDULE OF WCC HIGRATION TO NCC-IBM 10/06/80: WCC TO BE UANAVAIL. FOR COLUMBUS DAY HOLIDAY - SEE NEWS ALERT2 USERID ? EPABAM ACCOUNT ? 6888 PASSWORD? BEBASARE SPECIFY GLOBAL FORMAT FOR SAVE COMMANDS REPLY - DEFAULT, EDIT, TSD, CARD, OR PRINT FORMAT? CARD "LOGON" NOT FOUND IN "WYLIR" ON USER58 COMMAND ? SET TERSE ? USE \$FUBLIC.NEWS(ALERT2) ? L UNN The WCC will be unavailable from 2300 Saturday evening 1 Oct. 1980 until 7 A.M. Tuesday 14 Oct. 1980. This closing -is because of the Columbus Day Holiday on Monday 13 Oct. 1980. If there are any problems please contact User Support at (202) 488-5900 or (800) 424-9067. ? USE \$CN.EPABRM.S2KC.RMBON2 CLR ? (L COMMON/B1/DB, DNMOV, DNFIX, ATTIND, ALENG, WIDTH, IWALL 1. 2. COMMON/B2/ATTM(10), ATTF(10), SMDN(7,10), SMEQ(7,10), SMHAX(7,10), 2 SFDN(7,10), SFEQ(7,10), SFMAX(7,10), NMOV, NFIX 3. COMM... 4. ? CLR TEXT ? C ? TEST FILE 1. -? THI IS A TEST TILETO ILLUUSTRATE THE EDIT) (*(^\$^%\$\$\$\$ 2. 3. ? AAABBCCDDDEEE 4. ? *** 5. ? SAVE TEST FORMAT FOR SAVE? CARD VOLUME? USER80 *TEST* SAVED ON USER80 7 EDI 2 í. 2. EDITS ? *2*** *S* EDITS ? THIS IS A TEST TILETO ILLUUSTRATE THE EDIT) (*(^&^%\$\$ 2. EDITS ? THIS IS A TEST FILETO ILLUUSTRATE THE EDIT) (*(~&~%\$\$###&~COM ' 2. EDITS ? 2. EDITS ? 2. -58-EDITS ? COMMAND. ! THIS IS & TEST FUE TO THUSTBATE THE FUET COMMAND. Ο. معمدهم مارعه معادي وسلالية ومدارية والمعرف فالمعالية ومالية المتلافية والمراج المعاد المرجعة فالملكون فالمعادين وأترجح ووردة وود فالمتحافظ والمأخ وأراده والمعاد المعا

1 6 - a - **H** 3. 4. AAABBCCDDDEEE ? CHA 'AAA' TO '*' 3. ***AABBBBBBBBBBBBBBCCCCCCCCCCCCCC *BBCCIDDEEE 4. 'AB' TO '&' CHA ***A&BBBBBBBBBBBBCCCCCCCCCCCCCCC 3. ? CHA 'BC' TO '%"' 3. ***A&BBBBBBBBBBBBBB 4. *B%*CDDDEEE 7 L TEST FILE 1. THIS IS A TEST FILE TO ILLUSTRATE THE EDIT COMMAND. 2. 3. ***A&BBBBBBBBBBRZ*CCCCCCCCCCCCCCC 4. *B% CDDDEEE ? DEL 3 ? L 1. TEST FILE 2. THIS IS A TEST FILE TO ILLUSTRATE THE EDIT COMMAND. *B% CDDDEEE 4. ? DEL 4 ? L TEST FILE 1. THIS IS A TEST FILE TO ILLUSTRATE THE EDIT COMMAND. 2. ? SAVE OPERAND MISSING. ? SAVE TEST FORMAT FOR SAVE? CARD "TEST" ALREADY EXISTS ON USER80 REPLACE? YES TEST REPLACED ON USER80 SCR TEST "TEST" SCRATCHED ON USERBO ? LOGOFF CLEAR DK? YES END OF SESSION MONDAY 10/06/80 4:52:31 P.M. EPALAM/S2KC OFF WYLBUR 10/06/80 AT 16:52:30, 0.86 WUU 0.14 CONNECT HRS., 0:00.18 TCB, 0 PAGE-SECONDS EXCPS: 27 DA, O MT, 72 TERM, O OTHER, 99 TOTAL CHARGES: \$0.00 CONNECT, \$0.48 WUU, \$0.48 TOTAL •; -59an teres of the second stranger with the second section between the second second second second second second s

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#### APPENDIX B

#### DIAGNOSTIC AND ERROR RECOVERY

As far as is known, the program RM80N5 is free of bugs. If errors occur in the run, the cause is most likely in the input. In the following, we discuss some possible sources of error and how to deal with them.

The first type of error is system error. System errors usually occur when the job card is improperly set. When this type of error occurs, there is usually something like "JOB ABENDED, CC = xxxx" printed out in the accounting information boxes in the first few pages. "xxx" is the abend code. Some of the more usual codes are:

- S106: the memory allocated is insufficient. RYNEM can be run on the default amount of core, which is 250K. But if an S106 occurs, try increasing the core requested to 300K or more in the JOB card by specifying <u>REGION = 300K</u>.
- S122: the estimated number of lines is exceeded. This can occur when you run RYNEM with the full database but did not change the estimated number of lines to 40,000. The remedy is to change the estimate as described in section 3.2.
- S322: the job ran out of computer time. Usually, 1 minute of CPU time is sufficient to run RYNEM, even with the full database. You have probably neglected to put in <u>TIME = 1</u> in the JOB card. The default time limit is 30 seconds. If you have set <u>TIME = 1</u> and still get an S322, try setting a higher time limit.

Sometimes you may get a response of "JCL error" if you mistyped the JCL cards. When that occurs, check your JCL cards with the instructions given in section 3.2.

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The second kind of error that can occur is run-time errors. Enumerating them is beyond the scope of the manual. Suffice it to say that they are caused by improperly typed-in data cards.

Some commonly encountered errors are:

divide check:	a number is being divided by zero or a very small number.							
overflow:	a number larger than can be accommodated by the computer is obtained by the previous operation. This can occur when							

illegal character: the computer cannot recognize the character. This can occur when a "," is typed instead of a "."

the noise level input is too large.

It is impossible to list all the possible sources of errors that can occur. The only advice that can be given is to check, double-check, and triple-check the input data <u>before</u> you run the program. Make sure everything conforms to the format as given in section 4.1. Make sure that the fields for each variable are correct. The integer variables have to be right-justified. Each card contains just the right number of items, not more and not less. There are not to be any blank cards between the data.

If all the directions given in section 4.2 are followed to the letter, the run should be successful.

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