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**Guide to TRANSNET Communications and Operations**

**Revised December, 1995  
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## Introduction

TRANSNET is a compilation of risk, systems analysis, routing and cost models as well as related data pertaining to radioactive materials transportation. This system of codes and associated data resides on a dedicated MicroVAX 3800. After obtaining a username and password, users may access TRANSNET with a personal computer and modem.

This guide explains the computing functions associated with the use of TRANSNET, making a call with a modem or a connection on the INTERNET, logging on and off, and the available utilities on TRANSNET. Hardcopies of representative screens are included to convey the feeling of a session on TRANSNET.

The goal of the TRANSNET system is to transfer technology and data to qualified users by permitting access to the most comprehensive and up-to-date transportation risk and systems analysis codes, and associated databases. Any agency or organization requiring access to TRANSNET should write to:

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TRANSNET development and operations are sponsored by the United States Department of Energy Office of Environment Restoration and Waste Management Transportation Management Division.

Assistance/Comments on the TRANSNET system or it's components may be transmitted as follows:

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## Section 1. Models, Data Bases, and Utilities

### RADTRAN 4 - Risk Assessment Model

RADTRAN 4 evaluates radiological consequences of incident-free transportation as well as risks from vehicular accidents occurring during transportation. Sandia National Laboratories developed the original RADTRAN code in 1977 in conjunction with the preparation of NUREG-0170, "Final Environmental Impact Statement on the Transportation of Radioactive Material by Air and Other Modes." The analytical capabilities of the code have been expanded and refined in later versions.

### TICLD - Transportation Individual Centerline Dose

TICLD uses coding identical to that in RADTRAN 4 to determine doses to individuals located at specific downwind distances from a hypothetical accident release site. Threshold values may be entered as well. For example, the user may determine at what distance the downwind dose becomes less than the Negligible Individual Dose (1 mrem). Downwind distances are given for meteorological data sets commonly used in RADTRAN, but user-defined meteorological data may be entered.

### TRANSAT - Atmospheric Dispersion Model

The TRANSAT atmospheric dispersion model was developed by P. Pages and F. Rancillac for use with the International Atomic Energy Agency's INTERTRAN code which is based upon RADTRAN. In addition to supplying an input to RADTRAN, running TRANSAT gives further information on the consequences of an atmospheric release and help in complementary (e.g., sensitivity) analyses.

### HIGHWAY Routing Model

The HIGHWAY routing model was established at Oak Ridge National Laboratory to determine highway transportation routes and population densities along those routes. This model allows for the choices of commercial, quickest, and shortest route, and is based on a proprietary comprehensive highway network under license from Rand McNally Corporation.

### INTERLINE Rail Routing Model

INTERLINE is an interactive computer program, developed at Oak Ridge National Laboratory, that finds likely routes for shipments over the U.S. railroad system. It uses a shortest-path algorithm that has been modified both to reflect the nature of railroad-company operations and to accommodate a large transportation network.

### INTERSTAT Highway Routing Model

INTERSTAT was developed at Sandia National Laboratories to find optimal routes on the Interstate Highway System. Optimization is based on

user-defined weights of distance, population, and/or truck accident rate. Some input data required by RADTRAN can be supplied from INTERSTAT.

### StateGEN/StateNET Local Routing Model

This model was developed at Sandia National Laboratories to assist state and other agencies in performing local routing analysis. The code builds a network from user input and finds routes on the network based on user-defined weights of user-defined data categories. The code offers full compatibility with the U.S. Department of Transportation guidelines for selection of preferred routes for highway quantity route controlled shipments of radioactive materials. RAMPOST Postnotification Shipment Data Base RAMPOST is a compilation of the highway route controlled quantity shipments that have been made since 1987. Data includes shipment date, specific highway route, carrier, shipper, and consignee. Radionuclides and total curies/terabecquerels shipped are usually listed. Foreign origin or destination is indicated where applicable.

### RMIR - Radioactive Materials Incident Reporting Data Base

The Radioactive Materials Incident Reporting (RMIR) data base contains information on transportation-related accidents and incidents involving radioactive materials from 1971 to the present. RMIR is continually being updated, with new incidents and additions to the existing records of older incidents, at Sandia National Laboratories.

### RAMPOST - Radioactive Materials Postnotification Data Base

The Radioactive Materials Post-notification (RAMPOST) data base is a compilation of the highway route controlled quantity shipments that have been made since 1987. Data includes shipment date, carrier, shipper, consignee, and highway route segments. Radionuclides and total curies shipped are usually listed.

### Utilities

transfer	Files are transferred via KERMIT for modem access and via FTP for INTERNET access.
edit	TRANSNET uses the DEC editor EDT.
list	Lists file(s) in current directory.
rename	Renames file(s) in current directory.
copy	Copies file(s) in current directory.
purge	Deletes all versions of files in current directory except for the most current (directory flusher).
delete	Delete file(s) in current directory.
	list directory Lists current directories' contents.
guide	Lists specific formats for input files to TRANSNET codes.
mail	Allows users to communicate with other TRANSNET users and the System Administrator.

## Section 2. Getting Started

### Hardware and Software Requirements for Telephone Line Access

1. Any computer (PC, workstation, main frame) with a printer.  
(Most computers, from PCs to main frames, allow for the use of modems through a serial port.)
2. A telephone line
3. Communications hardware

A Hayes or compatible modem starting at a minimum of 2400 baud (2400 bits per second) is necessary for the minimal hardware setup. We also suggest a modem with error correct and noise filtering.

- .. However, we recommend the Hayes V-series 9600-baud Smartmodem since it allows for a comfortable working speed while preventing line noise and errors in data transmission.

4. Communications software

We recommend the use of CROSSTALK due to its ease of use, a script generating utility, VT100/VT200 terminal emulation, and KERMIT file transfer protocol. Window accessory TERMINAL and COTERM are also recommended.

### Hardware and Software Requirements for INTERNET (network) Access

1. Any computer (PC, workstation, main frame) with a printer  
Most computers, PCs to main frames, allow for the use of networks. However, PCs usually do not include the necessary equipment. To access a network, a computer requires an ethernet card, network software, and X terminal emulation software. Most computers, except PCs, meet these requirements. However, because PCs do not, you will need the following: 1) 3 Com ethernet card; 2) TCP/IP network software (usually included with ethernet card); and 3) Hummingbird or other X terminal emulation software.

2. INTERNET access

If the INTERNET is not available, the best resource for accessing the INTERNET is through COMPUServe. Most areas have access to COMPUServe and can reach them by a telephone call (800) 848-8199. Also, reference the book "Connecting to the INTERNET" by O'Rielly and Associates (Nutshell Publishers).

3. Communications hardware

Most computers are equipped with network or ethernet boards or cards. If your computer (especially PCs) does not have one, you will have to obtain one. For PCs, the 3 Com board is recommended, while cards for workstations and other computers should consult their respective computer hardware vendors.

## 4. Communications software

TCP/IP or Transmission Control Protocol/Internet Protocol is the communications software required for all network file transfers, while FTP or File Transfer Protocol, is the mechanism for transferring files over the network.

## Settings for Modem Communications with TRANSNET

Port	1-4, depending on your PCs configuration.
Speed	Bits per second transmitted: 1200, 2400, 4800, 9600, or 14400 depending on the speed of your modem.
Databits	Number of data bits: 8
Parity	Parity check: None
Stopbits	Number of stop bits: 1
Local	Local connection: Off
Echo	Control of screen appearance: Off, Full duplex
Terminal	Terminal emulator: DEC VT100 or VT200
Protocol	File transfer protocol: Kermit

These parameters will be required by the communications software that you elect to use. Most of the settings are quite common and may represent the defaults on your software. If not, see your manual for help in changing default.

## Connecting to TRANSNET via modem

1. Invoke your communications software. Verify that your computer is set to the parameters in the chart "Settings for Modem Communications with TRANSNET" above.
2. Indicate that you wish to make a call from your communications software. When your PC is waiting for a number to call, type:

ATDT9,1,505,844-2003 (and press <RETURN>)

ATDT must be either all upper case or lower case. There are no spaces between ATDT and the first digit of the telephone number, and you may have to include an out number (such as '9', to get an external line). The actual number will vary among organizations. Each comma represents a pause. Use of pauses is necessary to allow time for switching through the telephone system. The '1' in this number is the same '1' normally used to call any long distance number. The 505 is the area code for New Mexico. The rest is the local telephone number assigned to one of five numbers assigned to the TRANSNET modems. The dash (-) is included for readability and has no effect on how the call is made. From time to time, our modems will not reset properly and will not answer. If this is the case, the other four (4) TRANSNET numbers are:

844-3615, 844-0700, 844-2382, and 844-0698

## Connecting to TRANSNET via modem (continued)

3. Wait for the message 'CONNECT'. This confirms that your modem has established communications with TRANSNET (If your modem is not set as "verbose" you will not see any messages).
4. Press <RETURN> one or more times to establishes a baud rate between our modem and yours. Once the baud rate is established, you will see the message

**Welcome to the TRANSNET computer system**

If, instead of a welcome message, you receive the message

**NO CARRIER**

- .. the connection is lost and you will have to start the call again. Improper modem communications settings can cause this to happen.

Once you have the welcome message, you are ready to log into the TRANSNET computer system. (Please skip down to "Logging onto TRANSNET" now.)

## Connecting to TRANSNET via INTERNET

1. If you have INTERNET access, type the command

RLOGIN 132.175.125.29  
or  
RLOGIN TTD9.TTD.SANDIA.GOV

## Logging onto TRANSNET

1. A successful connection brings up the prompt

**Username:**

Type in your username and press <RETURN>.

2. Even if you have entered the wrong username, you will be prompted with

**Password:**

Type the password given in the cover letter and press <RETURN>. The password will not be echoed, so you will not see what you have typed. If you see the message

**User authorization failure**

press <RETURN> to bring up the username prompt again.

3. Successful entry of your password brings up another "Welcome" message and some introductory information, followed by the TRANSNET message screen.

This completes the communication link and logon to the TRANSNET MicroVAX

computer. If the above procedure fails, wait at least 10 seconds before making another attempt.

#### Disconnecting from TRANSNET

Select "Disconnect from TRANSNET" at the TRANSNET Main Menu to log off TRANSNET.

A warning of impending logoff is sent to users whose processes have been inactive for 30 minutes or more. If no activity is detected after this time, your session will be terminated within 10 minutes. If you receive the warning and do not want to log off, press any key, then press <RETURN>. This is sufficient to avoid automatic logoff.

#### Transferring files via the modem

The Kermit protocol is used to transfer output to any modem connections.

1. If you do not know Kermit commands, consult your manual on KERMIT because it does not have online help.
2. Select 'Utilities' from the main TRANSNET menu or most code menus.
3. Select 'file transfer' from the utilities menu.
4. At the 'Kermit-32>' prompt, type 'SEND <filename.extension>', where filename is the name of the file, and extension is the suffix or '.XXX' of a file.
5. On your computer, type '<ALT-A>' to tell Kermit you wish to communicate with your computer. This should place you in your computer's communication software, where you will type 'RECEIVE'.
6. At this point, you can SEND another file, or type EXIT to quit.
7. After you have logged off TRANSNET, you can print the file typing 'PRINT <filename.extension>'.

#### Transferring files via the INTERNET

The File Transfer Protocol (FTP) is used to transfer output to any host connection and operates in lower case ONLY.

1. If you do not know FTP commands, consult your manual on FTP, or type '4' before entering FTP or 'help' or '?' at the FTP prompt.
2. Select 'Utilities' from the main TRANSNET menu.
3. Select 'file transfer' from the Utilities menu.
4. Select '1' from the TRANSNET/FTP menu.
5. Enter your username and password.

6. At the 'ftp>' prompt, type 'PUT <filename.extension>', where filename is the name of the file, and extension is the suffix or '.XXX' of a file.
7. Type 'ls' at the 'ftp>' prompt to ensure the file was copied.
8. At this point, you can PUT another file, or type 'QUIT' to exit.
9. After you have logged off TRANSNET, you can print the file typing 'PRINT <filename.extension>'.

### Section 3. TRANSNET Operation

The TRANSNET menus have been redesigned for better flow control, organization, and consistency. All menus have identical behavior in terms of quitting a menu (blank input or 'Q' in upper or lower case), and getting online help ('?' or 'H' in upper or lower case).

Online help and an associated list of contacts exists for all menus on TRANSNET. The user has the ability to navigate through the levels of help or inquire about the responsible developers of a particular code.

These menus will be consistent with the initial UNIX release of TRANSNET and its associated software packages. However, in TRANSNET's second UNIX release, a 'point and click' menuing system will be introduced.

Copies of a few TRANSNET screens are illustrated on the next page in order to familiarize the new user with the style of interaction found on TRANSNET.

```
*****  
*****      TRANSNET Main Menu      *****  
*****  
*  
*          1 - Risk Assessment          *  
*          2 - Routing                  *  
*          3 - Databases                *  
*          4 - Utilities                *  
*          5 - Status                   *  
*          6 - User Group               *  
*          7 - Help                     *  
*          8 - Quit/Logoff              *  
*  
*****  
***** ACCESS: MODEM   1-JUN-1993 07:30:30.32 *****  
*****
```

Enter option:

```
*****  
*****      Risk Assessment Menu      *****  
*****  
*  
*          1 - RADTRAN 4.0.13          *  
*          2 - TICLD 1.0               *  
*          3 - TRANSAT v1.6           *  
*  
*****  
***** ACCESS: MODEM   1-JUN-1993 07:30:45.10 *****  
*****
```

Enter option:

#### Section 4. Future Updates to TRANSNET

Aside from the appearance of TRANSNET, other important developments are instore for TRANSNET.

##### RADTRAN Updates

The RADTRAN transportation risk assessment code undergoes continual refinement as applicable data becomes available or modelling techniques are refined. Following completion of the updates, the latest iteration is made available on TRANSNET.

##### TREP

The Transportation Risk Evaluation Program (TREP) will determine order-of-magnitude risk estimates based upon unit risk factors previously calculated by RADTRAN. TREP will combine shipping and materials characteristics based on user-defined scenarios.

##### Logistics Model

A logistics model platform is currently being tested for future incorporation on the TRANSNET system. This model will permit analysis of commodity flows, aggregate transportation costs, and packaging requirements.

##### HAZCON

Developed by Sandia, the HAZCON model combines existing hazardous materials risk methodologies to assess transportation risks by material category.

##### Multiobjective Routing Model

A multiobjective routing model, used to determine a set of potential transportation routes along with the differences between those routes has been developed by Cornell University and is being modified for access via TRANSNET.

##### RAILSTAT

Similar in concept to the INTERSTAT Interstate Highway System routing model, RAILSTAT will permit the user to assess the impacts of route-specific data on the determination of rail routes. Currently under development by Sandia, RAILSTAT is based on an aggregated railroad network.

##### BARGESTAT

BARGESTAT will permit the user to assess the impacts of route-specific data on the determination of waterborne transportation routes, and is based on an aggregated waterway network.

## Section 5. Future Updates to TRANSNET (continued)

## TERM

The Transportation Emergency Response Management (TERM), under development at Rensselaer Polytechnic Institute (RPI), is an emergency response analysis tool which identifies existing emergency response resources, estimates response times, and determines deficiencies in the existing emergency response system.

## ACCIDENTPROB

ACCIDENTPROB allows the user to determine the probability of a transportation accident on a specified highway link or section using historical accident rates and link-specific physical characteristics.

## TRANSPAC

TRANSPAC is a summary of hazardous materials packaging characteristics of interest in risk and systems analyses. Data of interest in the analyses will directly link to the appropriate input fields through the TRANSNET system.

## GIS Platform

Commercially available geographic information systems (GIS) software packages have been assessed and will be integrated into routing and systems analysis techniques, completely transparent to the user.

## STORM

A database is currently under development at Sandia to support the Survey of Transportation of Radioactive Materials (STORM) project. STORM is jointly funded by US Department of Energy and Transportation, as well as the Nuclear Regulatory Commission, and the Federal Emergency Management Agency.