

The Arizona Border Study

*An Extension of the
Arizona National Human Exposure Assessment Survey (NHEXAS) Study
Sponsored by the Environmental Health Workgroup of the Border XXI Program*

Quality Systems and Implementation Plan for Human Exposure Assessment

The University of Arizona
Tucson, Arizona 85721

Cooperative Agreement CR 824719

Standard Operating Procedure

SOP-IIT-A-1.0

Title: Operation and Maintenance of Related Computer Equipment for
IIT NHEXAS

Source: The University of Arizona

U.S. Environmental Protection Agency
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**Operation and Maintenance of Related Computer Equipment
for
IIT/NHEXAS**

1.0 Purpose and Applicability

The purpose of this SOP is to describe procedures for using and maintaining the related microcomputer equipment at the IIT/NHEXAS Site.

These methods will be used for all data operations and maintenance routines.

2.0 Definitions

Backup = (v) The process of creating a duplicate of a file, directory or drive to protect against data loss during a hardware or software failure. (n) The duplicate copy created during this process.

BMDP (Bio-Medical Data Processing) = A statistical package.

CHKDSK = A utility program, included with DOS, that checks for any corruption on a computers hard disk drive.

Client = A computer connected to a fileserver that depends on that fileserver for resources.

Data Packet = A small unit (usually a low number of bytes) of data transferred electronically from one machine to another.

Diskette (or Floppy Disk) = A small data storage media used for storing or transferring small amounts of data. Diskettes used in this project, are usually available in 2 sizes: 3 1/2 inch (1.44MB) and 5 1/4 inch (1.2MB).

DOS (Disk Operating System) = The standard operating system on IBM and compatible microcomputers. DOS provides tools and utilities for the management of data on microcomputers.

E-mail (Electronic Mail) = An electronic messaging system available on most networks.

Fileserver (or server) = SGI-Challenge-6, a powerful machine that contains resources (data, programs, devices) for access by client machines.

Hardwire = A direct data connection from one location to another.

LAN (Local Area Network) = Any physical network technology that operates at high speed over short distances.

Network = A group of machines connected together so they can transmit information to one another.

Node = A computer that is attached to a network; also called a host.
PC (Personal Computer) = Microcomputers based on the Intel 8088/8086 instruction set. Developed by IBM, the PC has grown to become the most popular microcomputer standard in the world.

Platform = A class of machine, usually characterized by the operating system or operating system (i.e. A DOS platform, A RISC platform, etc.).

SAS = (Statistical Analysis System) A statistical package.

SPSS = (Statistical Package for the Social Sciences). Known for its ease of use, SPSS has become the most used of any statistical package.

SPSS/PC = A statistical package for PC standard microcomputers. SPSS/PC contains a subset of the commands and capabilities available in SPSS.

Systat = A statistical package developed for the PC.

VMS (Virtual Memory System) = An operating system created by Digital Equipment Company for their VAX systems.

3.0 References

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- (a) "Advanced Topics."
- (b) "dBASE IV Change Summary."
- (c) "Getting Started with dBASE IV."
- (d) "Introduction to the Dot Prompt."
- (e) "Guide to dBASE IV."
- (f) "Language Reference."
- (g) "Learning dBASE IV."
- (h) "Network Installation."
- (i) "Support and Services Guide."
- (j) "TechNotes/dBASE IV."
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- (l) "Using the Menu System."

"Harvard Graphics 3.0." Software Publishing Corp. 1991. Associated Documentation Includes:

- (a) "Harvard Graphics 3.0: Network Administrator's Manual."
- (b) "Harvard Graphics 3.0: Setup Manual."
- (c) "Harvard Graphics 3.0: Symbols and Palettes."
- (d) "Harvard Graphics 3.0: Upgrader's Handbook."
- (e) "Harvard Graphics 3.0: User's Manual."
- (f) "Harvard Graphics User's Guide."

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- (a) "PC Tools Deluxe: Fast Hard Disk Back-Up, Data Recovery, Disk Management." Central Point Software, Inc.
- (b) "PC Tools Deluxe Version 5 Addendum." Central Point Software, Inc.
- (c) "PC Tools Desktop Version 5.5." Central Point Software, Inc. 1989.

"SPSS." SPSS, Inc. 1990. Associated Documentation Includes:

- (a) "SPSS Advanced Statistics User's Guide."
- (b) "SPSS Base System User's Guide."
- (c) "SPSS For UNIX: Operations Guide."
- (d) "SPSS Reference Guide."

"SPSS/PC+." SPSS, Inc. 1990. Associated Documentation Includes:

- (a) "Data Entry: SPSS/PC+ for the IBM PC/XT/AT and PS/2."
- (b) "SPSS/PC+ Advanced Statistics 4.0 for the IBM PC/XT/AT and PS/2."
- (c) "SPSS/PC+4.0 Base Manual for the IBM PC/XT/AT and PS/2."
- (d) "SPSS/PS+ 4.0 Installation Guide for the IBM PC/XT/AT and PS/2."
- (e) "SPSS/PC+ Graphics V3.1 for the IBM PC/XT/AT and PS/2."
- (f) "SPSS/PC+ Statistics 4.0 for the IBM PC/XT/AT and PS/2."
- (g) "SPSS/PC+ Tables for the IBM PC/XT/AT and PS/2." SPSS Inc. 1990.
- (h) "SPSS/PC+ Trends for the IBM PC/XT/AT and PS/2." SPSS Inc. 1990.

"SYSTAT: The System for Statistics." SYSTAT, Inc. 1985.

"Wordperfect v.6.0 Reference Manual." Wordperfect Corp. 1990.

4.0 Discussion

The microcomputer equipment at the IIT site serves a number of uses vital to the continuing operation of the study. These include storage and analysis of data, word processing, presentation graphics, and communications.

Periodic maintenance and backup is required in order to keep the hardware, software and data in an organized, uncorrupted and secure condition. Replicate backups of data must be kept off-system and off-site at IIT's Academic Computing Center (ACC) as a special service designed for this purpose.

The complexity of the tasks involved and the ever-changing state of the art of both hardware and software necessitate flexibility in the use of tools for the operation, maintenance and administration of the network. It is standard practice to leave the choice of programs to perform specific tasks up to the operator or administrator, unless other factors prohibit this choice.

5.0 Responsibilities

5.1 The Co-Principal Investigator (or his designate) is responsible for:

- (a) development of procedures to protect the security and integrity of the system and the data.
- (b) analysis of data.
- (c) maintenance of system hardware and software.
- (d) research, implementation and evaluation of new hardware and software.

All these activities are coordinated by IIT's ACC.

6.0 Materials and Equipment

6.1 System Hardware

The IIT site system hardware consists of one net frame (dual Pentium processor model 8500) and SGI Challenge class microcomputers. These machines are networked. The IIT LAN is connected to the main IIT VAX through a university owned hardware.

6.2 DOS Software

- (a) Operating System = Microsoft DOS v.5.0
- (b) Communications = Kermit
- (c) Database Management Packages = dBase IV
- (d) Presentation Graphics Packages
 - (i) Harvard Graphics v3.0
 - (ii) Sygraph
- (e) Spreadsheet Packages = Lotus 1-2-3
- (f) Statistical Analysis Packages
 - (i) SAS
 - (ii) SPSS/PC+
 - SPSS/PC+ Base System
 - SPSS/PC+ Advanced Statistics
 - SPSS/PC+ Data Entry
 - SPSS/PC+ Graphics
 - SPSS/PC+ Tables
 - SPSS/PC+ Trends
 - (iii) SYSTAT
- (g) Utilities = PC Tools Deluxe
- (h) Word Processors and Text Editors = WordPerfect

6.3 VAX System Software

- (a) Operating System = VMS
- (b) Communications = Kermit
- (c) Statistical Packages
 - (i) BMDP
 - (ii) SPSS

(Note: Many modern software products perform a number of tasks. These tasks may fall into more than one of the categories listed.)

6.4 Supplies

- (a) 3 1/2" 1.4MB Diskettes
- (b) 5 1/4" 1.2MB Diskettes
- (c) 8 1/2" X 11" Copier/Printer Paper
- (d) 9 1/2" X 11" Continuous Form Tractor Feed Paper
- (e) Tape Backup Cartridges (Hardware to be purchased)
- (i) HP LaserJet Series II Toner Cartridges
- (j) Ribbons for Dot Matrix Printers

6.5 Reagents

Not Applicable

7.0 Procedure

7.1 Preparations

- 7.1.1 Existing literature, descriptions, and other materials should be consulted to familiarize the user with the normal operations of the system.
- 7.1.2 Constant attention should be given to the current state of the network to ensure that it is operating correctly.

7.2 Standards and Blanks

Not Applicable

7.3 Procedure Description

- 7.3.1 Logging in to the PC LAN.
 - (a) Turn power on.
 - (b) At username prompt, type the <username> [return] given by the system manager.
 - (c) At the password prompt, type <password> [return].

7.3.2 Logging in to the Challenge.

- (a) Log in to the PC as described in 7.3.1.
- (b) Type **KERMIT** [return].
- (c) Press [return] every 3 to 5 seconds until a system prompt appears.
- (d) At the system prompt type **VAX** [return].
- (e) At the login prompt, type <username> [return].
- (f) At the password prompt, type <password> [return].

7.3.3 User Training

- (a) The Co-PI or one of his designees (post-doctoral with relevant experience) will actively observe users while they work to ensure that they are proficient with the hardware and software they use to perform tasks relating to their work. Ask pertinent questions and resolve all questions.
- (b) If, in the course of observation, a user seems to have trouble with a specific task, the Co-PI or his designee will provide assistance to alleviate any ambiguity the user may be having.
- (c) If a number of users are having the same problem, the Co-PI will schedule an in-service workshop or seminar to train a number of users at once.
- (d) Provide literature and visual aids to assist the user.
- (e) Inform the users (using E-mail) when new software is implemented or a change in procedure has been established.
- (f) Place system documentation in a place accessible to all users and inform the users of its location.
- (g) Show patience in explaining procedures and answering questions. Convey a willingness to provide information to users.
- (h) If issues are of a severe nature, they will be documented in the computer log book.

7.3.4 System Security and Integrity

- (a) Remind users to change passwords periodically.
- (b) Kill inactive user accounts promptly after the user leaves.
- (c) Do not allow users to access diskettes or other media originating outside of the project without first checking that media for viruses.

(d) All data must be backed up daily.

7.3.5 Data Analysis

Data Analysis is performed to write scientific papers or for presentation at scientific meetings. This usually involves use of a statistical package like SPSS. Specific applications are determined by the Co-Principal Investigator on a case by case basis.

7.3.6 Maintenance of System Hardware and Software

(a) Periodic System Maintenance will be performed to optimize the ongoing performance of the system. The IIT-ACC maintains Challenge and Netframe, the Co-PI maintains the PC system following manufacturer's recommendations.

(i) Clean all system diskette and tape drives at the first symptom of trouble using commercially available kits.

(ii) Perform system backup daily, it is done automatically on disks, tape system will be installed for a second backup.

(b) System Repair and Troubleshooting by specialist of the University

(i) Pay constant attention to the state of the system, noting any irregularities or malfunctions.

(ii) Locate any warranty information that may exist on the defective device. If the device is still under a parts and labor warranty, contact the vendor and arrange for service. If the warranty is for parts only, ask that a replacement part be shipped as soon as possible. If the replacement of the defective part is not in your area of expertise, consult the System Administrator for further instructions.

7.3.7 Research, Implementation, and Evaluation of New Hardware and Software

(a) Stay familiar with the state of current technologies by reading trade journals, attending seminars, trade shows and symposiums and communicating with colleagues and users.

(b) If a problem arises that causes an undue expenditure of resources, consult the resources mentioned in (a) as to a cost-effective solution.

(c) If a cost effective solution can be determined, consult with the Co-Principal Investigator and the System Administrator regarding the feasibility of implementing the solution.

- (d) If the Co-Principal Investigator and System Administrator approve the expenditure, write a memo to the bookkeeper asking that the new hardware or software be purchased.
- (e) When the new equipment arrives, install it as per the included documentation.
- (f) Check with users to ensure that the new equipment has solved the problem, and should be kept as a permanent component of the network.

7.4 Calculations

Calculations are specific to the database involved. These are recorded in the data generation SOPs.

7.5 QA Checks

- 7.5.1 CHKDSK: The CHKDSK utility is run automatically when any DOS microcomputer is turned on at the IIT Site. The program checks for any hard disk corruption and reports any failure.
- 7.5.2 Detection Limits: Any detection of disk corruption or system error is cause for corrective action.
- 7.5.3 Corrective Action: When a malfunction has occurred, the erroneous file (or files) is (are) deleted from the disk drive, and then restored from backup (in the case of data error) or retrieved from the original diskettes (in the case of software error).

7.6 Tolerance Limits

All computer equipment at the IIT site is designed to operate at between 110 and 120 volts, 60Hz AC. Data and equipment can be destroyed at voltages outside these parameters. Protective devices (surge protectors, UPS) are in place to safeguard the equipment from power fluctuation.

- 7.6.1 Surge Suppressers: Surge Suppressers protect all equipment at the IIT site. No computer equipment is to be operated without a surge suppresser in place.
- 7.6.2 Electrical Storm Policy: All computer equipment not powered through a UPS is unplugged from the wall sockets at the first visual confirmation of lightning strikes. The determination of hazard is the responsibility of the Co-Principal Investigator or his designee.

8.0 Records

8.1 Data Collected by this Procedure

Not Applicable

8.2 Record Forms

IIT-A-1.0 Figure 1. Tape Back Up Log Form

8.3 Location/Placement of Records

- 8.3.1 The current week's backup tape set is stored in the Co-Principal Investigator's office.
- 8.3.2 The current week's tape set is used alternatly with another tape set which is stored off-site.
- 8.3.3 The Tape Back Up Log Notebook is completed when backups are made and tapes exchanged. The notebook resides in the Co-Principal Investigator's office.
- 8.3.4 Computer Equipment Manuals and Documention: Manuals and documentation for computer equipment is stored in the room that contains that equipment.
- 8.3.5 A log of maintenance records for network computers is updated with each equipment repair and resides in the Co-Principal Investigator's office.
- 8.3.6 Each computer user must login and logout of the system on a selected machine. Equipment and user information resides in an electronic file (this file usually resides with the IIT ACC) that can be monitored and dumped at any time. The machine/user/use duration file is backed up along with all system files and will not be lost on system failure.
- 8.3.7 Software Diskettes, Manuals and Documentation program Diskettes, manuals, license agreements and other associated documentation is located Co-Principal Investigator's office.

IIT-A-1.0 Figure 1. Tape Back Up Log Form

TAPE BACK UP LOG

BACK UP	TYPE	TIME PERIOD	TAPE SET	SWAP
By: _____ Date: __/__/__ Comments: _____ _____ _____ _____	<input type="checkbox"/> Full System <input type="checkbox"/> Incremental <input type="checkbox"/> Other: _____ LEVEL: _____	<input type="checkbox"/> Daily <input type="checkbox"/> Monthly <input type="checkbox"/> Quarterly <input type="checkbox"/> Other: _____ _____ _____	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> Other: _____ _____ _____	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
By: _____ Date: __/__/__ Comments: _____ _____ _____ _____	<input type="checkbox"/> Full System <input type="checkbox"/> Incremental <input type="checkbox"/> Other: _____ LEVEL: _____	<input type="checkbox"/> Daily <input type="checkbox"/> Monthly <input type="checkbox"/> Quarterly <input type="checkbox"/> Other: _____ _____ _____	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> Other: _____ _____ _____	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
By: _____ Date: __/__/__ Comments: _____ _____ _____ _____	<input type="checkbox"/> Full System <input type="checkbox"/> Incremental <input type="checkbox"/> Other: _____ LEVEL: _____	<input type="checkbox"/> Daily <input type="checkbox"/> Monthly <input type="checkbox"/> Quarterly <input type="checkbox"/> Other: _____ _____ _____	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> Other: _____ _____ _____	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
By: _____ Date: __/__/__ Comments: _____ _____ _____ _____	<input type="checkbox"/> Full System <input type="checkbox"/> Incremental <input type="checkbox"/> Other: _____ LEVEL: _____	<input type="checkbox"/> Daily <input type="checkbox"/> Monthly <input type="checkbox"/> Quarterly <input type="checkbox"/> Other: _____ _____ _____	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> Other: _____ _____ _____	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
By: _____ Date: __/__/__ Comments: _____ _____ _____ _____	<input type="checkbox"/> Full System <input type="checkbox"/> Incremental <input type="checkbox"/> Other: _____ LEVEL: _____	<input type="checkbox"/> Daily <input type="checkbox"/> Monthly <input type="checkbox"/> Quarterly <input type="checkbox"/> Other: _____ _____ _____	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> Other: _____ _____ _____	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
By: _____ Date: __/__/__ Comments: _____ _____ _____ _____	<input type="checkbox"/> Full System <input type="checkbox"/> Incremental <input type="checkbox"/> Other: _____ LEVEL: _____	<input type="checkbox"/> Daily <input type="checkbox"/> Monthly <input type="checkbox"/> Quarterly <input type="checkbox"/> Other: _____ _____ _____	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> Other: _____ _____ _____	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A