NUREG/CR-6147
Vol. 4

Characterization of Class A Low-Level Radioactive Waste 1986–1990

Appendices A–E

Prepared by
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Eastern Research Group, Inc.

Prepared for
U.S. Nuclear Regulatory Commission

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NUREG/CR-6147
Vol. 4

Characterization of Class A Low-Level Radioactive Waste 1986–1990

Appendices A–E

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Washington, DC 20555–0001
NRC FIN D2053

FOREWORD

This report characterizes Class A Low Level waste shipped for disposal from 1986 through 1990. It was developed as part of a Nuclear Regulatory Commission (NRC) sponsored study to develop a technical information base useful to persons and organizations involved in the management and disposal of Low-Level radioactive waste and in the regulation of these activities.

This NUREG report is not a substitute for NRC regulations, and compliance is not required. The approaches and/or methods described in this NUREG are provided for information only. Publication of this report does not necessarily constitute NRC approval or agreement with the information contained herein.

Donald A. Cool

Donald A. Cool, Chief
Radiation Protection and Health
Effects Branch
Division of Regulatory Applications
Office of Nuclear Regulatory Research

ABSTRACT

Under contract to the U.S. Nuclear Regulatory Commission, Office of Nuclear Regulatory Research, the firms of S. Cohen & Associates, Inc. (SC&A) and Eastern Research Group (ERG) have compiled a report that describes the physical, chemical, and radiological properties of Class-A low-level radioactive waste. The report also presents information characterizing various methods and facilities used to treat and dispose non-radioactive waste

The characterization of Class-A low-level waste is based primarily on information contained in the Manifest Information Management System (MIMS), an electronic database compiled by the National Low-Level Waste Management Program. The Program is managed by EG&G Idaho, Inc. for the Department of Energy. Supplementary sources of information include reports and studies conducted under the auspices of the Nuclear Regulatory Commission, Department of Energy, regional low-level waste Compacts and unaffiliated States, and trade organizations. The database characterizes low-level waste shipped for disposal from 1986 to 1990.

A database management program was developed for use in accessing, sorting, analyzing, and displaying the electronic data provided by EG&G. The program was used to present and aggregate data characterizing the radiological, physical, and chemical properties of the waste from descriptions contained in shipping manifests. The data thus retrieved are summarized in tables, histograms, and cumulative distribution curves presenting radionuclide concentration distributions in Class-A waste as a function of waste streams, by category of waste generators, and regions of the United States.

The report also provides information characterizing methods and facilities used to treat and dispose non-radioactive waste, including industrial, municipal, and hazardous waste regulated under Subparts C and D of the Resource Conservation and Recovery Act (RCRA). The information includes a list of disposal options, the geographical locations of the processing and disposal facilities, and a description of the characteristics of such processing and disposal facilities.

Volume 1 contains the Executive Summary, Volume 2 presents the Class-A waste database, Volume 3 presents the information characterizing non-radioactive waste management practices and facilities, and Volumes 4 to 7 contain Appendices A to P with supporting information.

VOLUME 4 APPENDICES

Appendices A through E present additional information for the executive Summary (Vol. 1) and Main Report (Vol. 2 and 3).

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Volume 6:

G Location of Major Waste Generators and Compact Regions and States Population Distributions
H Fuel Fabrication Facilities - Shipment-level Analyses for Selected Radionuclides and States: Aggregate Practices from 1986 to 1990
I Utility Waste Forms and Radionuclide Concentrations - Container-level Analyses for Selected Waste Forms: Beatty and Richland 1988 to 1990
J Utility Waste Radionuclide Concentrations - Shipment Level Analyses: 1989 Barnwell and Richland

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O Municipal Solid Waste Landfills - 1992 Listing
P Cross-Reference List of Geographical Locations for Treatment and Disposal Facilities

PREFACE

Section 10 of the Low-Level Radioactive Waste Policy Amendments Act (LLRWPAA) of 1985 directed the Commission to develop criteria and procedures to act upon petitions "to exempt specific radioactive waste streams from regulations ... due to the presence of radionuclides ... in sufficiently low concentrations or quantities as to be below regulatory concern." The Commission responded to this statutory provision by issuing a policy statement on August 29, 1986 (51 FR 30839) that contained criteria for evaluating such petitions. On December 2, 1986 (51 FR 43367), the Commission published an advance notice of proposed rulemaking (ANPR) entitled "Radioactive Waste Below Regulatory Concern: Generic Rulemaking " (RIN 3150-AC35). In July 1990, the Commission issued a second policy statement addressing the below regulatory concern issue, "General Statement of Policy on Below Regulatory Concern," July 3, 1990 (55 FR 27522).

In July 1988, the NRC's Office of Nuclear Regulatory Research contracted S. Cohen & Associates (SC&A) to develop technical information concerning Class A low-level radioactive waste which could be used to support NRC technical evaluations of petitions for exempt waste streams. In May 1990, the contract was modified to include the development of information which could be used in establishing a basis for a generic NRC rule governing the disposal of radioactive waste determined to be Below Regulatory Concern (BRC).

In October 1992, the Congress enacted the Energy Policy Act of 1992. Section 2901 of the Act revoked the Commission's 1986 and 1990 BRC Policy Statements, and in August 1993, the Commission formally withdrew the two BRC Policy Statements. The Commission also terminated the rulemaking action that was initiated to implement the 1986 BRC Policy and withdrew the December 2, 1986 ANPR.

Although it effectively revoked the 1986 BRC Policy Statement, Section 2901 of the Energy Policy Act did not either (1) explicitly remove the Commission's obligation under Section 10 of the Low-Level Radioactive Waste Policy Amendments Act of 1985 to develop criteria and procedures for evaluating exemption requests for specific radioactive waste streams on an expedited basis, or (2) revoke the Commission's authority under the Atomic Energy Act to exempt classes of materials from licensing.

By early 1993, SC&A had already accumulated a substantial amount of information concerning Class A low-level waste. Since the information contained in this report should be useful to the NRC staff and others involved in the regulation or disposal of low-level radioactive waste, the NRC, in July 1993, authorized SC&A to compile and present this information in a NUREG/CR report.

ACKNOWLEDGEMENTS

S. Cohen & Associates, Inc. would like to take this opportunity to acknowledge the efforts and participation of the Nuclear Regulatory Commission staff, namely Messrs. Robert Meck, James Malaro, Paul Kovach, and Steve Klementowicz.

In addition, we would like to thank Mr. Ronald Fuchs and Ms. Miriam Muneta of EG&G Idaho, Inc. for their assistance in generating the low-level waste database for this project.

APPENDIX A

Sample Shipping Manifest Forms

USE THIS NO. ON ALL CONTINUATION PAGES ➔ 132123

REV. 4/85

RADIOACTIVE WASTE SHIPMENT & DISPOSAL MANIFEST

USEcology Nuclear US Ecology, Inc. an American Ecology company

EXECUTIVE OFFICE: (502) 426-7160
P.O. BOX 7246 • LOUISVILLE, KENTUCKY 40207

1
2
3
4
5
6

GENERATOR NUMBER ____-____-____-____

(1) GENERATOR NAME ____
ADDRESS ____
CITY ____ STATE ____ ZIP ____
CONTACT ____ PHONE ____
USER PERMIT # ____ SHIPMENT # ____

(2) BILL DISPOSAL CHARGES TO ____
NAME ____ PURCHASE ORDER # ____
ADDRESS ____
CITY ____ STATE ____ ZIP ____

(3) AGENT/BROKER ____
BROKER'S US ECOLOGY # ____-____-____-____
ADDRESS ____
CITY ____ STATE ____ ZIP ____
CONTACT ____ PHONE ____
BROKER SHIPMENT # ____ BROKER USER PERMIT # ____
Broker's Authorized Signature Acknowledging Waste Receipt ____ Date

PAGE 1 OF ____
(4) CONSIGNED TO: US Ecology, Inc.
☐ P.O. BOX 638, Hanford Reservation, Richland, WA 99352, 509-377-2411
☐ P.O. BOX 578, HWY 95, 12 m. — So. of Beatty, NV 89003, 702-553-2203
☐ OTHER:
CONTACT ____
ADDRESS ____
CITY ____ STATE ____ ZIP ____
PHONE ____

(5) CARRIER ____ SHIPPING DATE ____
CARRIER EPA # (if any) ____-____-____-____
ADDRESS ____
CITY ____ STATE ____ ZIP ____
PHONE ____
CASK TYPE ____ CASK SURFACE EXPOSURE RATE ____ mR/hr

(6)

TOTAL FOR EACH CLASS: # OF PACKAGES	WEIGHT (Pounds)	REPORTABLE QUANTITY NAME (if any)	PROPER SHIPPING NAME & HAZARD CLASS (PER 49 CFR 172.101)	ID NUMBER
[illegible]	[illegible]	[illegible]	Radioactive Material, empty packages — Radioactive Material	UN2908
[illegible]	[illegible]	[illegible]	Radioactive Material, fissile, n.o.s. — Radioactive Material	UN2918
[illegible]	[illegible]	[illegible]	Radioactive Material, low specific activity, n.o.s. — Radioactive Material	UN2912
[illegible]	[illegible]	[illegible]	Radioactive Material, n.o.s. — Radioactive Material	UN2982
[illegible]	[illegible]	[illegible]	Radioactive Material, limited quantity, n.o.s. — Radioactive Material	UN2910
[illegible]	[illegible]	[illegible]	Radioactive Material, special form, n.o.s. — Radioactive Material	UN2974
[illegible]	[illegible]	[illegible]	Radioactive Material, instruments and articles — Radioactive Material	UN2911
[illegible]	[illegible]	[illegible]	Uranyl Acetate (RQ-5000/2270) — Radioactive Material	NA9180
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

(7) SHIPMENT TOTALS (DO NOT WRITE IN SHADED AREAS)

VOLUME (cu ft)	TOTAL # OF PACKAGES	SOURCE MATERIAL (kgs)	SPECIAL NUCLEAR MATERIAL (grams): U-233	U-235	PLUTONIUM	TOTAL
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
ACTIVITY						
ACTIVITY TOTALS ☐ Curies ☐ Millicuries (10CFR20.311)		TRITIUM	C-14	Tc-99	I-129	ALL ISOTOPES
		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

(8) THIS IS TO CERTIFY THAT THE HEREIN-NAMED MATERIALS ARE PROPERLY CLASSIFIED, DESCRIBED, PACKAGED, MARKED AND LABELED, AND ARE IN PROPER CONDITION FOR TRANSPORTATION ACCORDING TO THE APPLICABLE REGULATIONS OF THE DEPARTMENT OF TRANSPORTATION AND ARE IN COMPLIANCE WITH ALL REQUIREMENTS APPLICABLE AT THE DESIGNATED DISPOSAL SITE, AND THAT THE MATERIALS ARE CLASSIFIED AND DESCRIBED IN ACCORDANCE WITH REQUIREMENTS OF 10CFR, PART 61 AND PART 20.311 OR EQUIVALENT STATE REGULATIONS.

Authorized Signature ____ Title ____ Date ____

TERMS AND CONDITIONS

A. TITLE: Upon inspection and acceptance at the disposal site by US Ecology and all appropriate regulatory authorities, title to the Waste which conforms to Company's representations herein shall thereupon transfer from the Customer and be vested in US Ecology.

B. WASTE PRODUCTS: Customer represents and warrants that data set forth in this Radioactive Waste Shipment & Disposal Manifest is true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and the designated facility license.

C. INDEMNIFICATION: Customer agrees to indemnify US Ecology, its officers, employees and agents against all loss and liability whatsoever if such loss or liability results from the failure of the Waste to conform in all material respects to the data supplied on the Radioactive Waste Shipment & Disposal Manifest or this shipment fails to meet the standards prescribed by the Department of Transportation or any other governmental agency having jurisdiction over such matters.

FOR USECOLOGY'S USE ONLY

TYPE OF CONTAINER	CONTAINER VOLUME CU. FT.	# OF PKGS.	CU. FT. PER CONTAINER TYPE
DRUMS	[illegible]	[illegible]	[illegible]
OVERPACK	[illegible]	[illegible]	[illegible]
55	7.50	[illegible]	[illegible]
30	4.01	[illegible]	[illegible]
5	0.87	[illegible]	[illegible]
OTHER	[illegible]	[illegible]	[illegible]
BOXES	[illegible]	[illegible]	[illegible]
1st SIZE	[illegible]	[illegible]	[illegible]
2nd SIZE	[illegible]	[illegible]	[illegible]
3rd SIZE	[illegible]	[illegible]	[illegible]
CASK LINERS	[illegible]	[illegible]	[illegible]
OTHER			
OTHER			
SHIPMENT TOTALS			

LOAD EVALUATION

CHECK ALL THAT APPLY TO THIS LOAD. DESCRIBE INADEQUACIES IN COMMENT SECTION
☐ Manifest Waste Description Inadequate
☐ Contamination or Leakage Detected
☐ Unexpected Exposure Rates Detected
☐ No Violations Detected on this Load
☐ Bracing Inadequate
☐ Labels, Markings, etc. Inadequate
☐ Container Integrity Inadequate
☐ Other

DESCRIBE THE EXTENT OF ANY VIOLATION CHECKED ABOVE AND THE REMEDIAL ACTION TAKEN

☐ CHECK HERE IF A SUPPLEMENTAL REPORT IS ATTACHED

BURIAL DATA

CONTAINER SEPARATION ____, ____, ____
(Circle all that apply to this load)
CODES 8ft Soil (SH6) __1; 4Ft waste (SH6) __2; 10Ft between upright containers (Casks) __3; 10Ft soil (1% Chelates; Solidified Oils) __4; Other __5 No requirement __0

INDICATE MINIMUM BURIAL DEPTH FOR EACH WASTE CATEGORY BURIED FROM THIS MANIFEST

WASTE CATEGORY	HIGH Rm	CLASS A	CLASS B	CLASS C
DEPTH IN FEET				

Date Received ____
Date Disposed ____
Trench No. ____
☐ This material meets licensed limits.
☐ This material was disposed of in accordance with license.
AUTHORIZED INITIALS:

US ECOLOGY INVOICE # ____
US ECOLOGY CUSTOMER # ____ (Must agree with Agent named in Block 3)
US ECOLOGY INVOICE DATE ____ MO DAY YR
DISCREPANCY CODE(S) ____

BATES #
CONSIGNEE ORIGINAL COPY
(MUST ACCOMPANY WASTE IN TRANSIT)

SAMPLE MANIFEST

USEcology Nuclear — US Ecology Inc. an American Ecology Company

CONTINUATION SHEET

GENERATOR NO. CAD 08 - 012 - 9000

GENERATOR NAME: GENENTECH INC

AGENT/BROKER: US ECOLOGY INC

FOR BROKER USE ONLY:
Indicate one category for this page
☐ This page describes PROCESSED waste
☒ This page describes COLLECTED waste

MANIFEST # 11960

REV. 8/87

(9) Item No.	(10) Container Type	(11) Container Volume (cu. ft.)	(12) Container Weight (pounds)	(13) Physical Form	(14) Waste Description	(15) Sorbent/Solidification/Stabilization Media	(16) Chemical Form/Chelating Agent (10CFR20.311)	Check Below if > 0.1% Chelating Agent by Weight	(17) Radionuclide (10CFR20.311)	(18) Activity (Millicuries)	(19) Special Nuclear Material (Grams)	(20) Source Material (Kilograms)	(21) Waste Class	(22) Stability Class	(23) Radiation Levels mR/HR: Disposal Container Surface	(24) Removal for US Ecology Site Only	(25) Disposal Container at 1 Meter	(26) Transport Index	(27) Fissile Class	(28) D.O.T. Label
832	17H	7.50	300.00	SOLID	30	04	ABSORBED AQUEOUS LIQUID, WATER	I	H-3	1.822	.00000	.00	A	U	.40		.40	N/A	N/A	Radioactive — LSA
									I-125	2.000										Radioactive —
									P-32	7.500										Radioactive —
									S-35	1.500										Radioactive —
																				Radioactive —
841	17H	7.50	300.00	SOLID	30	04	ABSORBED AQUEOUS LIQUID, WATER	I	H-3	5.450	.00000	.00	A	U	.40		.40	N/A	N/A	Radioactive — LSA
									I-125	3.000										Radioactive —
									P-32	.100										Radioactive —
									S-35	.001										Radioactive —
																				Radioactive —
842	17H	7.50	300.00	SOLID	30	04	ABSORBED AQUEOUS LIQUID, WATER	I	H-3	4.789	.00000	.00	A	U	.40		.40	N/A	N/A	Radioactive — LSA
									I-125	3.010										Radioactive —
									S-35	30.000										Radioactive —
																				Radioactive —
843	17H	7.50	300.00	SOLID	34	04	ANIMAL CARCASSES IN ABSORBENT & LIME	I	I-125	1.000	.00000	.00	A	U	.40		.40	N/A	N/A	Radioactive — LSA
																				Radioactive —
																				Radioactive —
844	17H	7.50	300.00	SOLID	34	04	ANIMAL CARCASSES IN ABSORBENT & LIME	I	I-125	1.000	.00000	.00	A	U	.40		.40	N/A	N/A	Radioactive — LSA
																				Radioactive —
																				Radioactive —
845	17H	7.50	200.00	SOLID	32	98	LAB WASTE - PAPER, PLASTIC, GLASS & METAL	I	C-14	.070	.00000	.00	A	U	.40		.40	N/A	N/A	Radioactive — LSA
									CR-51	1.540										Radioactive —
									H-3	1.550										Radioactive —
									I-125	11.100										Radioactive —
									P-32	11.380										Radioactive —
									S-35	11.300										Radioactive —
																				Radioactive —
																				Radioactive —
																				Radioactive —
06		45.00	1,700.00	(8) PAGE TOTALS						98.112	.00000	.00								

NOTE #1 - Waste description Codes: Choose up to THREE. Select those which are predominant by volume. Use the most SPECIFIC Code(s) available. [illegible]

NOTE #2 - Sorption, Solidification, Stabilization Media Codes: CODE 98 = "NONE REQUIRED". Choose up to THREE. Select those which are predominant by volume. See disposal site license for limitations on each media. [illegible]

NOTE #3 - NRC Stability Class Code: S - Stable, U - Unstable

* ANY USE OF "OTHER" AS A DESCRIPTION MUST INCLUDE A WRITTEN AND SIGNED EXPLANATION ATTACHED TO THIS MANIFEST.

CONSIGNEE ORIGINAL COPY
(MUST ACCOMPANY WASTE IN TRANSIT)

BARNWELL WASTE MANAGEMENT FACILITY

Operated by CHEM-NUCLEAR SYSTEMS, INC.
PO Box 726, Barnwell, South Carolina 29812
(803) 259-1781

RADIOACTIVE SHIPMENT MANIFEST FORM

(1) GENERATOR NAME
FACILITY
ADDRESS
CITY STATE ZIP CODE
CONTACT PHONE ( )
EMERGENCY RESPONSE CONTACT PHONE ( )
(2) BILL TO:

(3A) RADIOACTIVE WASTE TRANSPORTATION PERMIT NO.

(4) USE THIS NUMBER ON ALL CONTINUATION PAGES
SHIPMENT I.D. NUMBER
PAGE OF

(3B) NUMBER OF GENERATORS

(5)
CARRIER ADDRESS
TELEPHONE SHIPPING DATE
SHIPMENT TYPE SHIPMENT SURFACE EXPOSURE mR/hr
CASK IDENTIFICATION NO. USA
SHIPMENT NO. LINER TYPE
LINER SERIAL NO.
DRIVER SIGNATURE DATE

(6) TOTAL FOR EACH CLASS NO. OF PACKAGES	WEIGHT (POUNDS)	PROPER SHIPPING NAME & HAZARD CLASS (PER 49 CFR 172.101)	I.D. NUMBER	Reportable Quantity
		Radioactive Material, empty packages	UN2908	
		Radioactive Material, Resta n.o.s., Radioactive Material	UN2018	
		Radioactive Material, low specific activity n.o.s., Radioactive Material	UN2912	
		Radioactive Material, n.o.s., Radioactive Material	UN2982	
		Radioactive Material, limited quantity n.o.s., Radioactive Material	UN2910	
		Radioactive Material, special form, n.o.s., Radioactive Material	UN2974	
		Radioactive Material, instruments and articles, Radioactive Material	UN2911	
		Other (Specify)		

(7) SHIPMENT TOTALS

Disposal Volume (ft.³)	Total No. of Packages	ACTIVITY (10CFR20.311) Millicuries					Source (Pounds)
		All Isotopes	Tritium	C-14	Tc-99	I-129	

(8) TOTAL SNM

Isotope	Grams	No. Packages
U-233		
U-235		
Total		

(9) MINIMUM WASTE PACKAGE % FILL

(10) SOLIDIFICATION AGENT

(11) NUMBER AND TYPE OF CONTAINERS

(12) WASTE DESCRIPTION

(13) PHYSICAL FORM

(14) CHEMICAL FORM

(15) NAME AND % OF CHELATING AGENT(S)

(16 A) WASTE FORM CLASS ☐ AU ☐ AS ☐ B ☐ C

(16 B) ( ) Yes ( ) No This waste(s) must be disposed in South Carolina Department of Health and Environmental Control Approved Structural Overpack(s) to meet stability requirements.

(17) ( ) Yes ( ) No THIS VEHICLE IS CONSIGNED EXCLUSIVE USE. LOADING AND UNLOADING MUST BE ACCOMPLISHED BY CONSIGNOR OR CONSIGNEE OR HIS DESIGNATED AGENT.

(18) IMPORTANT: "This is to certify that the above named materials are properly classified, described, packaged, marked, and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.

Signature

Company Date

(19) "Certification is hereby made to the South Carolina Department of Health and Environmental Control that this shipment of low-level radioactive waste has been inspected in accordance with the requirements of South Carolina Radioactive Material License No. 097 as amended, and the Nuclear Regulatory Commission's License No. 12-13536-01 as amended, and the effective Barnwell Site Disposal Criteria within 48 hours prior to shipment, and further certification is made that the inspection revealed no items of non-compliance with all applicable laws, rules and regulations."

Date Signature

Title and Organization

Telephone No. ( )

DISPOSAL SITE COPY

Form No. CNS-201
(1-90)

SEE INSTRUCTIONS ON REVERSE SIDE FOR FILLING OUT THIS FORM

CNSI USE ONLY

☐ This material meets all license requirements.

☐ This material was disposed of in accordance with license.

☐ Discrepancy

Date

Authorized Signature Title

Crane ☐ Forklift ☐

Shielded ☐ Personnel Barrier ☐

Overpack S/N

Overpack Lid S/N

Other

Arrival Date Arrival Survey No.

Date/Time Buried H.P Initial

Trench No. Location Code

Waste Class Code

Trench No. Location Code

Waste Class Code

Personnel Exposure

BARNWELL WASTE MANAGEMENT FACILITY

Operated by: CHEM-NUCLEAR SYSTEMS, INC.

CONTINUATION SHEET

GENERATOR NAME ____________________

USE THIS NUMBER ON ALL CONTINUATION PAGES

SHIPMENT I.D. NUMBER ____________

PAGE _____ OF _____

(20) ITEM NO	(21) RADIO-NUCLIDE EACH CONTAINER	(22) PERCENT OF ACTIVITY OR mCi OF EACH NUCLIDE	(23) ACTIVITY EACH CONTAINER (mCi)	(24) PHYSICAL FORM	(25) CHEMICAL FORM AND NAME & % OF CHELATING AGENT	(26) WASTE DESCRIPTION	(27) WASTE FORM CLASS	(28) SPECIAL NUCLEAR MATERIAL (grams)	(29) SOURCE MATERIAL (pounds)	DISPOSAL CONTAINER (30) CONTAINER WEIGHT (pounds)	(31) CONTAINER VOLUME (Cu Ft)	(32) CONTAINER TYPE	(33) RADIATION LEVELS CONTAINER SURFACE ☐mR/HR ☐R/HR	(33) RADIATION LEVELS (T.I.) 1 METER mR/HR	(34) CONTAINATION CONTAINER SURFACE (DPM / 100cm2) Alpha Beta-Gamma	(35) FISSILE CLASS	(36) LABELS/ MARKINGS USED
																	Radioactive--
																	Radioactive--
																	Radioactive--
																	Radioactive--
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Form No. CNS-201
(5-87)

DISPOSAL SITE COPY

APPENDIX B

Low-Level Waste Data Manager
Program Description

1. DATA & SOFTWARE QA/QC CHECKS

Data were received from EG&G on 3 1/2" high-density floppy disks. EG&G compressed the data files via the PKZIP public domain utility, and saved them on the disks using the DOS 3.2 BACKUP command. Compatible versions of these programs were used to load the floppy disks onto the main SC&A hard-disk, and to decompress the files. The decompressed files were in ASCII format, with a fixed record structure per file. Several dBASE III+ databases were created with fields exactly corresponding to the various file's structures. These databases were loaded from the ASCII files via the dBASE APPEND command. As each file was loaded into the system, the FACILITY and YEAR fields were initialized. The original files had this information encoded into the file names and did not have corresponding ASCII fields. Record counts between the dBASE III+ databases and the ASCII file were cross-checked. See software acknowledgements in Section 7.0.

The database consists of 21,678 shipping, 103,355 container, and 705,387 radionuclide records. In addition, the database also contains 32,255 manifest records that characterize brokered waste shipments. The total number of database records is 863,675. The breakdown at the shipping and container level is as follows:

	Richland and Beatty Records		Shipping Records		
Generators	Shipping	Container	Barnwell	Beatty	Richland
Utility	1,408	21,023	9,308	287	1,057
Government	99	3,929	571	128	66
Academic	24	2,492	203	1	384
Medical	2	112	15	0	1,032
Industrial	1,368	75,799	2,949	557	2,218
Total:	2,901	103,355	13,046	973	4,757

In total, the program consists of 57.8 megabytes of data, 20.5 megabytes of index files, and 720.6 kilobytes for the operating program and its supporting files (29).

Once the data were loaded, dBASE was used to perform several validity tests on the data. All unique generator class code, waste codes states, isotopes, solidification agents, etc. were determined. These lists were verified against the EG&G supplied documentation. In addition, numeric fields were validated to ensure that they had proper numeric forms (i.e., no extraneous characters), and maximum and minimum values for each data field were determined. Several minor inconsistencies were found:

* One record in the SHIPPING database has a generator class code of " ", and all data equal to 0.0. No ISOTOPE data was found matching this shipments manifest ID key field.
* Several records in the SHIPPING database had negative activity amounts. These values were always small.
* Numerous records in the CONTAINR database had generator class equal to "X". It is assumed that this corresponds to "unspecified", but this category was not documented in EG&G transmittals.
* Several database records have "NE" coded as the state abbreviation. It is assumed that this should be "NB". State "NE" was not included in the EG&G transmittals.

Numerous visual checks were made to ensure the data in the database matched the data transmitted as ASCII files. In addition, total fields in the databases (such as total activity in the SHIPPING database) were automatically validated by computing the corresponding result from an associated database (such as the activity field in the ISOTOPES database). No errors of this nature were uncovered.

The LLW Data Manager program was written in CLIPPER with two C subroutines (to perform directory manipulations). See file listings in Section 5.0. The code and data were first transmitted to the lead scientist on 5 1/4" disks, in PC Tools PCBACKUP, Ver. 6.0, format. Subsequent transmittals of the code occurred via a MODEM using the XMODEM error detection protocol. The program was packed via the PKZIP utility to shorten transmittal time.

A detailed walk-through of the code was conducted by the programmer and the lead scientist. Note that the lead scientist was already familiar with the workings of the code from extensive testing of the code. In addition, test cases were generated and each subsequent version of the code was bench-marked against this by the lead scientist. Such benchmark verification checks were documented in separate packages showing hand calculation or inspection results and program printouts. Data supporting new features or calculations were dumped and all results were verified by manual inspections or calculations. Subsets of these tests were periodically carried out in parallel by the programmer. This was done to ensure that the two versions of the code exactly matched.

The reports generated by data analyses provided another means to further verify the workings of the program and the consistency of the data. Hundreds of such reports were generated and inspected by the programmer and the lead scientist. Fianlly, the program was benchmarked against DOE's MIMS database by comparing waste

volumes and activity totals for the five categories of waste generators. The results of this comparative analysis are tabulated below.

Waste	SC&A Results		Nearest MIMS Data and Date		
Generator	Vol.(m^3)	Act.(Ci)	Vol.(m^3)	Act.(Ci)	MIMS Date
Acad.	7,290	5,300	7,262	5,309	11/30 & 10/31
Govrt.	13,500	45,100	13,485	45,082	10/31
Indust.	71,300	326,000	71,083	325,200	10/31
Med.	3,980	339	3,982	339.8	11/30
Util.	118,000	1,700,000	118,330	1,701,135	10/31 & 9/30
Totals	214,070	2,076,739	214,096	2,077,066	10/31 & 9/30

A review of the results indicates that all results are in agreement within a fraction of a percent. The reason for these slight differences is due to varying data cut-off dates for each of the three disposal sites. The data cut-off dates are: 9/30/90 for Barnwell; 11/27/90 for Beatty; and 12/07/90 for Richland. The LLW data for Beatty and Richland were supplied as one set of files which do not differentiate between both cut-off dates. The files do not provide the ability to cut the data to a specific date as is possible with the MIMS system.

2. PROGRAM STATISTICAL FUNCTIONS

In support of LLW Data Manager program analyses, statistics on one or more data fields is required. For each such data field a temporary file is maintained containing all data points to be considered by the statistics. The data point file is sorted in numeric ascending order (Ref. 6.1). The following statistics are calculated:

Number data points = Number of records in the file (N).
Minimum = The first data point.
1st percentile = Data point at record number
MAX(1, INT(0.5 + 1.0 * N / 100.0))
10th percentile = Data point at record number
MAX(1, INT(0.5 + 10.0 * N / 100.0))
25th percentile = Data point at record number
MAX(1, INT(0.5 + 25.0 * N / 100.0))
50th percentile = Data point at record number
MAX(1, INT(0.5 + 50.0 * N / 100.0))
75th percentile = Data point at record number
MAX(1, INT(0.5 + 75.0 * N / 100.0))
90th percentile = Data point at record number
MAX(1, INT(0.5 + 90.0 * N / 100.0))

99th percentile	= Data point at record number MAX(1, INT(0.5 + 99.0 * N / 100.0))
Maximum	= The last data point.
Mean	= The sum of the data points divided by the number of data points (Mean).
Average variation	= SUM(ABS(Xi - Mean) / N.
Variance	= SUM((Xi - Mean) ** 2) / N-1
Standard deviation	= The square root of the variance.
Skewness	= SUM(((Xi - Mean) / SDev) ** 3) / N.
Kurtosis	= -3 + SUM(((Xi - Mean) / SDev) ** 4) / N.

3. LLW DATA ANALYSIS PROGRAM

The LLW Data Manager code was developed to aide in the analysis and generation of this report. The program is written in the CLIPPER (S '87) programming language and consists of approximately 8,000 lines of executable code. In addition, two C (Microsoft, 6.0) routines are used for directory manipulation. The program was designed to be self-explanatory in its use. On-line help is available at the touch of one key for all data entry fields. A brief summary of the database files and program procedures are given below. Sections 4.0 and 8.0 discuss and present graphics functions and show some screen functions.

3.1 Procedures and Functions

The LLW Data Manager analysis program is configured as depicted in the hierarchy chart presented at the end of this section. Individual modules are discussed in this section.

BRC

Procedure BRC is the main driver routine for the LLW data analysis program. This routine manages the main menu. The BRC program file also include the following routines:

BANNER	- Displays the banner page.
CLOSE_DATA	- Closes the shipping, manifest, container, and isotopes data files.
CLOSE_IGROUPS	- Closes the valid isotope and isotope groups file.
CLOSE_SUBSETS	- Closes the subset administrative data file.
OPEN_DATA	- Opens the shipping, manifest, container, and isotopes data files. If the files need indexing, this routine determines that and performs the indexing.

OPEN_IGROUPS - Closes the valid isotope and isotope groups file. If this file needs indexing, this routine determines that and performs the indexing.

OPEN_SUBSETS - Opens the subset administrative data file. If this file needs indexing, this routine determines that and performs the indexing.

STARTUP - Initializes the BRC program environment.

BRC_RPT1

Procedure BRC_RPT1 generates the shipment data summary report for all records passing given selection criteria. The parameters of the selection criteria are:

Data set name
Facility
Generator class
Year
Brokered/Unbrokered
State
Waste class
Isotope/group
Manifest ID
Container ID
Generator code

This routine displays all selected data, statistics based on all selected data, or both. The output can be directed to the screen, to a user named file, or directly to the printer. In addition, the user may enter a nominal density values that will be used to calculated the effective weight of a shipment not having container data. The output data can be sorted either alphabetically (by isotope) or numerically (by percentage contribution).

Each shipping record is tested for inclusion in this report via the CHK_SHIPPING routine. If the shipment has container data then the shipments actual weight and density are displayed. If the shipment has brokered waste, then all associated manifest records are displayed. Statistics are gathered on all isotopes listed in the shipment. Statistics are computed for isotope contribution by concentration (in Ci/m^3, and pCi/g), and by volume.

BRC_RPT2

Procedure BRC_RPT2 generates the container data summary report for all records passing given selection criteria. The parameters of the selection criteria are:

Data set name
Facility
Generator class
Year
Brokered/Unbrokered
State
Waste class
Waste code
Waste physical form
Solidification agent
Isotope/group
Manifest ID
Container ID
Generator code

This routine displays all selected data, statistics based on all selected data, or both. The output can be directed to the screen, to a user named file, or directly to the printer. The output data can be sorted either alphabetically (by isotope) or numerically (by percentage contribution).

Each shipping record is tested for inclusion in this report via the CHK_SHIPPING routine. This routine verifies that this shipment has container data associated with it. Each container is tested for inclusion in the report via the CHK_CONTAINR routine. The overall shipment record is displayed followed by each container data. Statistics are gathered on all isotopes listed in the containers. Statistics are computed for isotope by concentration (in Ci/m^3, and pCi/g), and by waste volume.

BRC_RPT3

Procedure BRC_RPT3 computes the overall density (g/cm) for all records passing the given selection criteria. The parameters are:

Data set name
Facility
Generator class
Year
Brokered/Unbrokered
State
Waste

Each shipping record is tested for inclusion in this report via the CHK_SHIPPING routine. This routine verifies that this shipment has container data associated with it. Total activity is computed from the shipping records. Total weight and volume are computed from the container records. The density for each shipment are saved as data points. Statistics are computed and displayed on these points by routine DSP_STATS.

BRC_RPT4

Procedure BRC_RPT4 computes total volume and activity for all brokered data passing the selection criteria. The parameters are:

Data set name
Facility
Generator class
Year
State
Waste class

Each shipping record is tested for inclusion in this report via the CHK_SHIPPING routine. This routine determines if this shipment refers to brokered data. The total activity and volume for nonbrokered data are computed from the shipping records. For brokered data, the state and class fields are rechecked to see if they match any individual manifest record for the shipment. If so, total brokered activity and volumes are computed from the manifest records for each shipment and are then displayed.

BRC_RPT5

Procedure BRC_RPT5 computes the distribution of special nuclear material and source within all records passing given selection criteria. The parameters of the selection criteria are:

Data set name
Facility
Generator class
Year
Brokered/Unbrokered
State
Waste class

Each shipping record is tested for inclusion in this report via the CHK_SHIPPING routine. In addition, shipments with no special material and no source material are omitted. Statistics on each of these two parameters are calculated and displayed on the screen by routine DSP_STATS.

BRC_RPT6

Procedure BRC_RPT6 lists container types for all records passing the given selection criteria. The selection parameters are:

Data set name
Facility
Generator class
Year
Brokered/Unbrokered
State
Waste class
Waste physical form
Waste code

Each shipping record is tested for inclusion in this report via the CHK_SHIPPING routine. This routine verifies that this shipment has container data associated with it. A list is built containing all occurring codes for generator class, physical waste form, waste class, solidification agents, and waste code. The codes are reported on the screen along with total amounts of source and special nuclear materials.

BRC_RPT7

Procedure BRC_RPT7 computes activity and volume totals separated by generator classes for brokered data. The report is based on all records passing given selection criteria. The parameters are:

Data set name
Facility
Generator class
Year
State
Waste class

Each shipping record is tested for inclusion in this report via the CHK_SHIPPING routine. This routine determines if this shipment refers to brokered data. The routine lists total volume, activity, and number of manifest records (brokered data) for each shipment.

RPT_PROF

Procedure BRC_PROF counts shipping records for all records passing given selection criteria. The totals are separated for shipments with container data and those without container data. The parameters of the selection criteria are:

Data set name
Generator class
Year
State
Waste class

Each shipping record is tested for inclusion in this report via the CHK_SHIPPING routine. Then this routine determines if this shipment has container data associated with it. Record counts are kept by container vs. non-container, by facility, and by generator class. The resultant totals are displayed on the screen.

BRC_SUB

Procedure BRC_SUB generates a subset usable by BRC containing all records passing given selection criteria. The parameters of the selection criteria are:

Data set name
Facility
Generator class
Year
Brokered/Unbrokered
State
Waste class
Isotope/group
Manifest ID
Container ID
Generator code

Each shipping record is tested for inclusion in this report via the CHK_SHIPPING routine. Then this routine includes all manifest records, container records and isotope records associated with the selected shipments. The new subset is named by the user and is catalogued by the system so that is is recognizable for use in subsequent runs of BRC program functions.

SUBS_MOD

Procedure SUBS_MOD has two major functions: (1) to display administrative data associated with each data subset, and (2) to delete data subsets. The routine prohibits the user from deleting the original data set.

BRC_MISC

File BRC_MISC consists of procedures and functions used by the report generation and data subsetting procedures. The files members are:

Procedure INIT_H_DATA - Initializes data entry fields for selection parameters.

Function VAL_H_DATA - Validates data entry fields for selection parameters.

Procedure OLD_H_DATA - Saves previous values of data entry fields for selection criteria.

Function CHK_SHIPPING - Validates a shipping record against the following selection parameters:

- Facility
- Generator class
- Year
- Brokered/Unbrokered
- State
- Waste class
- Isotope/group
- Manifest ID
- Container ID
- Generator code

Function CHK_CONTAIN - Validates a shipping record against the following selection parameters:

- Waste class
- Waste code
- Waste physical form
- Solidification agent
- Isotope/group
- Container ID

Function DSP_STATS - Calculates and displays/prints various statistics including percentiles, minimum, maximum, average, average deviation, standard deviation, skewness, and kurtosis.

Function DSP2_STATS - Calculates and displays (on left-hand part of the screen) various statistics including percentiles, minimum, maximum, average, average deviation, standard deviation, skewness, and kurtosis.

Procedure PLOT_N_RECS - Displays/prints a histogram of binned data for the % records charts.

Procedure PLOT_VOLS - Displays/prints a histogram of binned data for the % records charts.

Procedure PLOT_BAR - Display.print one line of a histogram chart.

Procedure PROMPT12 - Issues menu choices for reports 1 (shipment) and 2 (container).

BRC_FUNC

File BRC_FUNC consists of functions used by the report generation and data subsetting procedures. This files members are:

EQL_CLASS - Checks two generator class fields to see if they are equal.
EQL_CODE - Checks two gen/broker code fields to see if they are equal.
EQL_CONTAIN - Checks two container IDs to see if they are equal.
EQL_FAC - Checks two facility codes to see if they are equal.
EQL_MANIFEST - Checks two manifest IDs to see if they are equal.
EQL_PHYS_FORM - Checks two physical form codes to see if they are equal.
EQL_S_AGENT - Checks two solidification agent codes to see if they are equal.
EQL_STATE - Checks to see if two state/compact codes are equal.
EQL_W_CODE - Checks two waste codes to see if they are equal.
EQL_YEAR - Checks two year code fields to see if they are equal.
T_BROKERED - Returns a brokered/unbrokered code as text.
T_CLASSES - Returns a generator class code as text.
T_CODES - Returns a waste code as text.
T_CONTAINER - Returns a container ID as text.
T_FACILITY - Returns a facility code as text.

```
T_ISOTOPES     - Returns an isotope code as text.
T_MANIFEST     - Returns a manifest ID as text.
T_PHYS_FORM    - Returns a physical form code as text.
T_S_AGENT      - Returns a solidification agent code as text.
T_STATES       - Returns a state/compact code as text.
T_W_CLASS      - Returns a container-level waste class code as
                 text.
T_W_CODES      - Returns a container-level waste type code as
                 text.
T_WASTES       - Returns a shipment-level waste class as text.
T_YEARS        - Returns a year code as text.
VALID_STATE    - Verifies a user-entered state/compact code.
```

FUNCTIONS

File FUNCTIONS consists of general purpose, utility functions used by the BRC program. This files members are:

```
Procedure CHK_PAGE  - Tests if a page eject should occur.
                      Prompts for paper tray loading every
                      100 pages.
Procedure CLEAR_ERR - Overwrites the error line with blank
                      spaces.
Procedure CLEAR_PRESS_KEY - Clears the "Press 'C' key to
                            Continue..." message written by
                             PRESS_KEY.
Procedure CREATE_DBF      - Creates a DBF from the formatted
                            input string array.
Function  EDECODE         - Decodes a positive number from a
                            character string composed of a
                            mantissa (9.99) and exponent (E+99).
Function  EENCOD          - Encodes a positive number into a
                            character string composed of a
                            mantissa (9.99) and exponent (E+99).
Function  EENCODE         - Encodes a positive number into a
                            character string composed of a
                            mantissa (9.99) and exponent (E+99).
Function  EENCODN         - Encodes a number into a character
                            string composed of a mantissa (+9.99)
                            and exponent (E+99).
Procedure ERR             - Displays an error message on the
                            bottom line of the screen. Procedure
FRAME                     - Displays boxed frame on the screen.
Function  NEED_NTX        - Tests the need to re-index a database.
Procedure PRESS_KEY       - Writes the "Press 'C' key to
                            Continue..." message and waits for
                            the user to do so.
Procedure SAY_WAIT        - Writes the "Wait..." message.
```

Procedure SAYCENTER - Centers the input string on the input line number.

Function SECS - Converts a time string with format "HH:MM:SS" to seconds of day.

Function SET_DATE - Sets the time/date stamp on a file to the current time/date. Function

VALID_DIR - Validates that the input character string is a valid MS-DOS directory name.

Function _DBEDIT - Processes certain DBEDT keystrokes.

HELP

Procedure HELP controls the help feature that is activated by the user via the F1 key. Also included in this file are the following procedures:

HELP_CHOOSE - Enables the user to select the desired entry from a database file.

HELP_KEYS - Processes control keys pressed by the user while using the BRC HELP feature.

MK_DIR

Procedure MK_DIR is written in C and creates an MS-DOS directory.

RM_DIR

Procedure RM_DIR is written in C and deletes an MS-DOS directory.

3.2 Database Structures

The original dataset and all subsequent datasets created by the BRC data analysis program have administrative data stored in the SUBSETS database. The structure for this database is:

Structure for database : SUBSETS.DBF
Number of data records : 2
Date of last update : 05/06/91

Field	Field Name	Type	Width	Dec
1	SUBNAME	Character	8	0
2	PARNAME	Character	8	0
3	FACILITY	Character	1	0
4	MANIFEST	Character	12	0
5	CODE	Character	12	0

6	CLASS	Character	1	0
7	WASTE	Character	1	0
8	BROKERED	Character	1	0
9	STATE	Character	2	0
10	YEAR	Character	2	0
11	CONTAINER	Character	12	0
12	WASTE_CODE	Character	2	0
13	PHYS_FORM	Character	2	0
14	S_AGENT	Character	2	0
15	ISOTOPE	Character	7	0
16	SUBDATE	Date	8	0
17	CREATOR	Character	16	0
18	COMMENT	Character	60	0
** Total **			158	

Each shipment has exactly one shipping record, uniquely identified by its MANIFEST_I field. If a shipment contains brokered waste, then the shipment will have one or more broker records in the MANIFEST database. If the shipment has container data, then the shipment will have one or more container description records in the CONTAINR database. All isotopes associated with a shipment (and possibly with a container) are stored in the ISOTOPES database. Data analysis programs have administrative data stored in the SUBSETS database. The structures for these databases are:

Structure for database : ORIGINAL\SHIPPING.DBF
Number of data records : 21678
Date of last update : 02/23/91

Field	Field Name	Type	Width	Dec
1	MANIFEST_I	Character	12	0
2	GEN_CODE	Character	12	0
3	GEN_CLASS	Character	1	0
4	DATE	Date	8	0
5	TOT_VOLUME	Numeric	12	2
6	ACTIVITY	Numeric	14	7
7	TOT_SPECIA	Numeric	12	2
8	TOT_SOURCE	Numeric	12	2
9	CLASS_A_U	Numeric	12	2
10	CLASS_A_S	Numeric	12	2
11	CLASS_B	Numeric	12	2
12	CLASS_C	Numeric	12	2
13	ORIGIN_STA	Character	2	0
14	YEAR	Character	2	0
15	FACILITY	Character	1	0
** Total **			137	

Structure for database : ORIGINAL\MANIFEST.DBF
Number of data records : 33255
Date of last update : 02/20/91

Field	Field Name	Type	Width	Dec
1	MANIFEST_I	Character	12	0
2	BROKER_COD	Character	12	0
3	BROKER_CLA	Character	1	0
4	TOTAL_VOL	Numeric	8	2
5	TOTAL_ACT	Numeric	14	7
6	BROKER_STA	Character	2	0
7	YEAR	Character	2	0
8	FACILITY	Character	1	0
** Total **			53	

Structure for database : ORIGINAL\CONTAINR.DBF
Number of data records : 103355
Date of last update : 02/27/91

Field	Field Name	Type	Width	Dec
1	MANIFEST_I	Character	12	0
2	CONTAINER	Character	12	0
3	GEN_CLASS	Character	1	0
4	TOT_VOLUME	Numeric	12	2
5	TOT_WEIGHT	Numeric	12	2
6	CONT_CODE	Character	3	0
7	WASTE_CODE	Character	2	0
8	PHYS_FORM	Character	2	0
9	CHEM_FORM	Character	60	0
10	WASTE_CLAS	Character	2	0
11	S_AGENT	Character	2	0
12	TOT_SPECIA	Numeric	12	2
13	TOT_SOURCE	Numeric	12	2
14	CONTACT_RA	Numeric	12	2
15	RAD_LEVEL1	Numeric	12	2
16	YEAR	Character	2	0
17	FACILITY	Character	1	0
** Total **			172	

Structure for database : ORIGINAL\ISOTOPES.DBF
Number of data records : 705387
Date of last update : 03/13/91

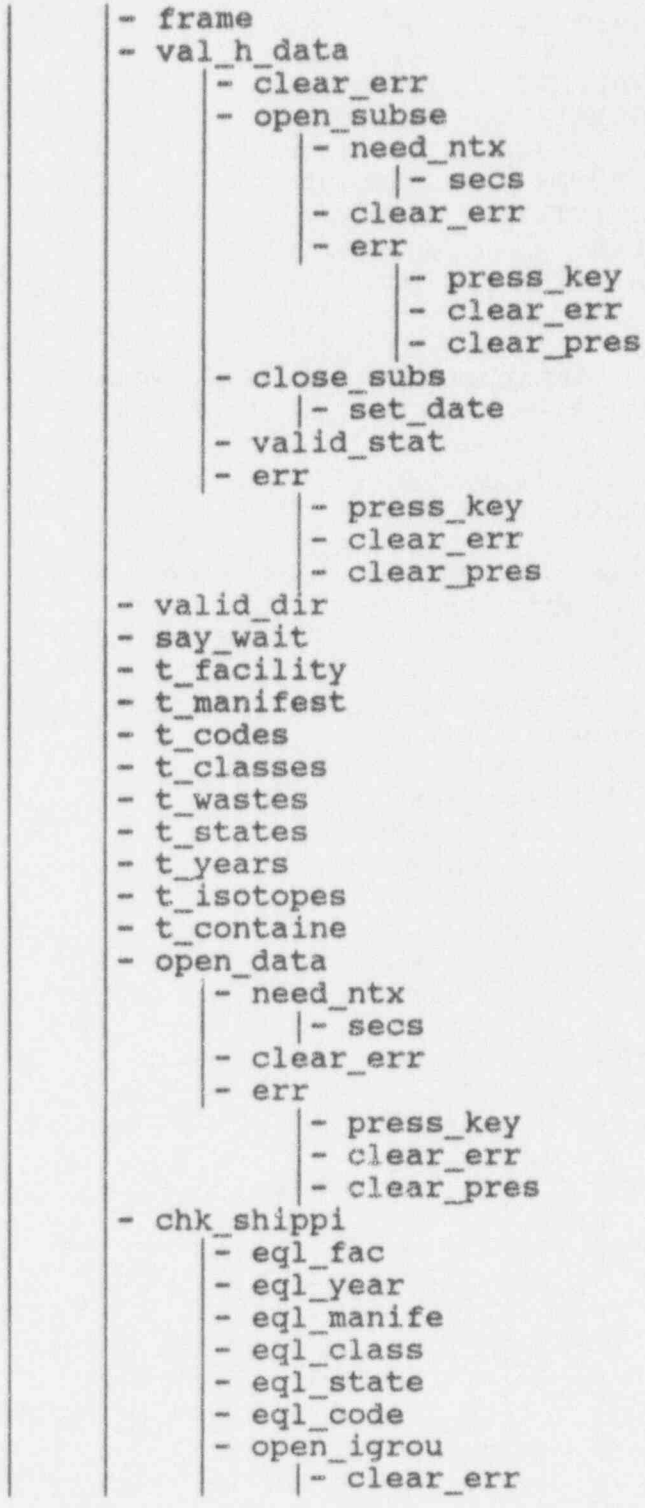
Field	Field Name	Type	Width	Dec
1	MANIFEST_I	Character	12	0
2	CONTAINER	Character	12	0
3	GEN_CLASS	Character	1	0
4	ISOTOPE	Character	7	0
5	ACTIVITY	Numeric	14	7
6	YEAR	Character	2	0
7	FACILITY	Character	1	0
** Total **			50	

In addition, several databases exist that contain valid choices which are used for the on-line help facility and for data validation.

3.3 BRC Hierarchy Chart

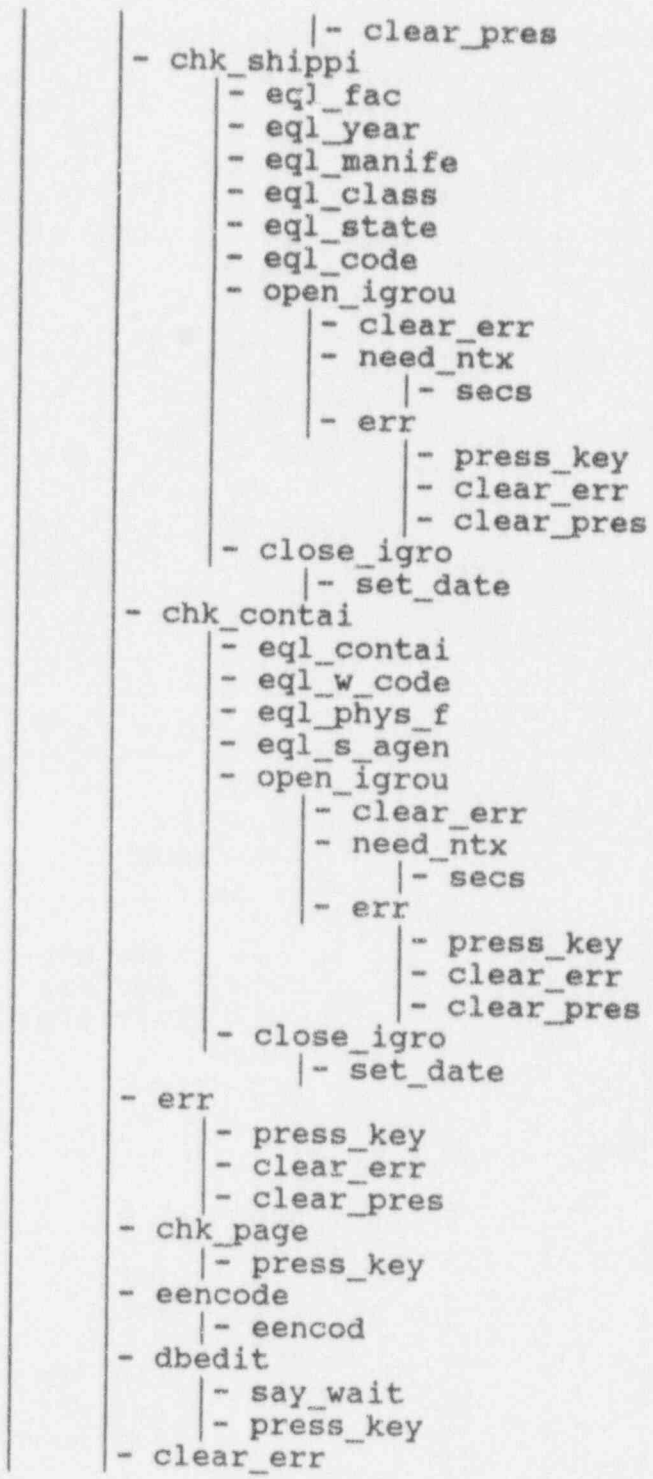
The BRC data analysis program is configured as depicted in the following hierarchy chart:

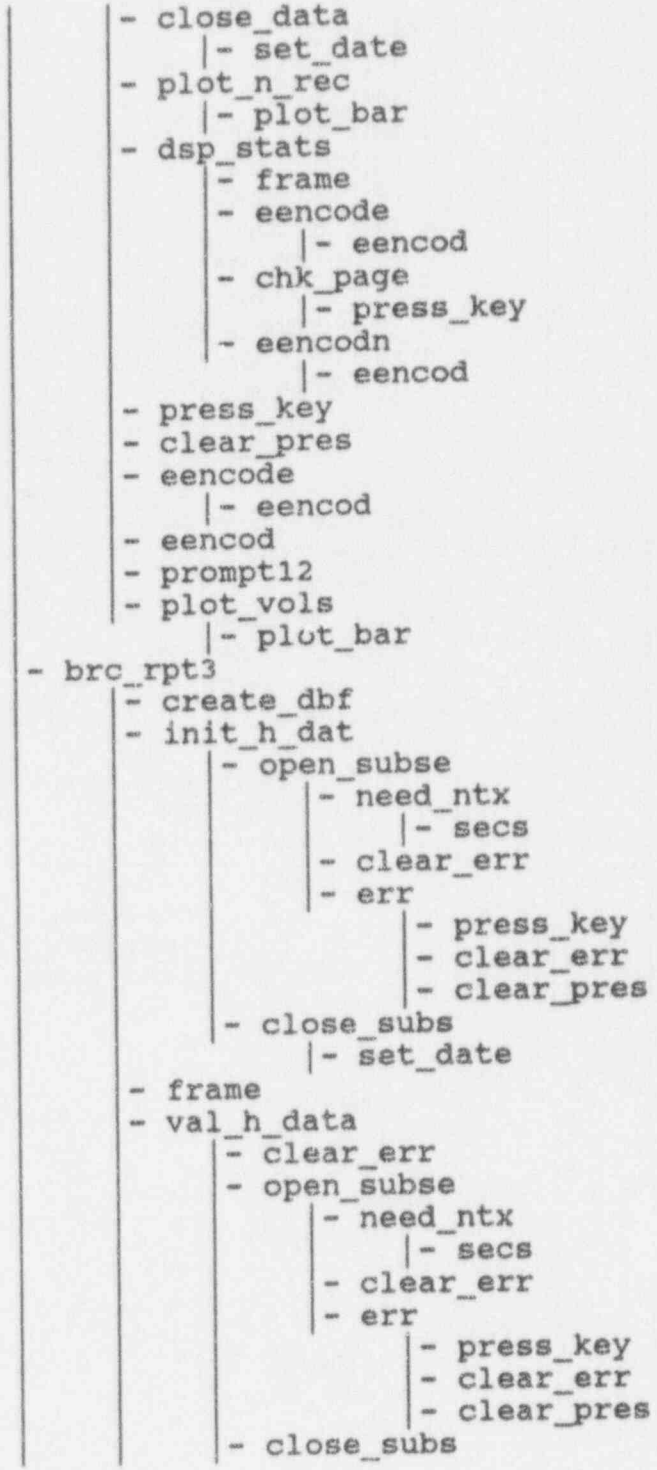
```
brc
  |- startup
  |- banner
  |    |- create_dbf
  |    |- need_ntx
  |    |    |- secs
  |    |- saycenter
  |    |- clear_err
  |    |- err
  |    |    |- press_key
  |    |    |- clear_err
  |    |    |- clear_pres
  |- frame
  |- brc_rpt1
  |    |- create_dbf
  |    |- init_h_dat
  |    |    |- open_subse
  |    |    |    |- need_ntx
  |    |    |    |    |- secs
  |    |    |    |- clear_err
  |    |    |    |- err
  |    |    |    |    |- press_key
  |    |    |    |    |- clear_err
  |    |    |    |    |- clear_pres
  |    |    |- close_subs
  |    |    |    |- set_date
```

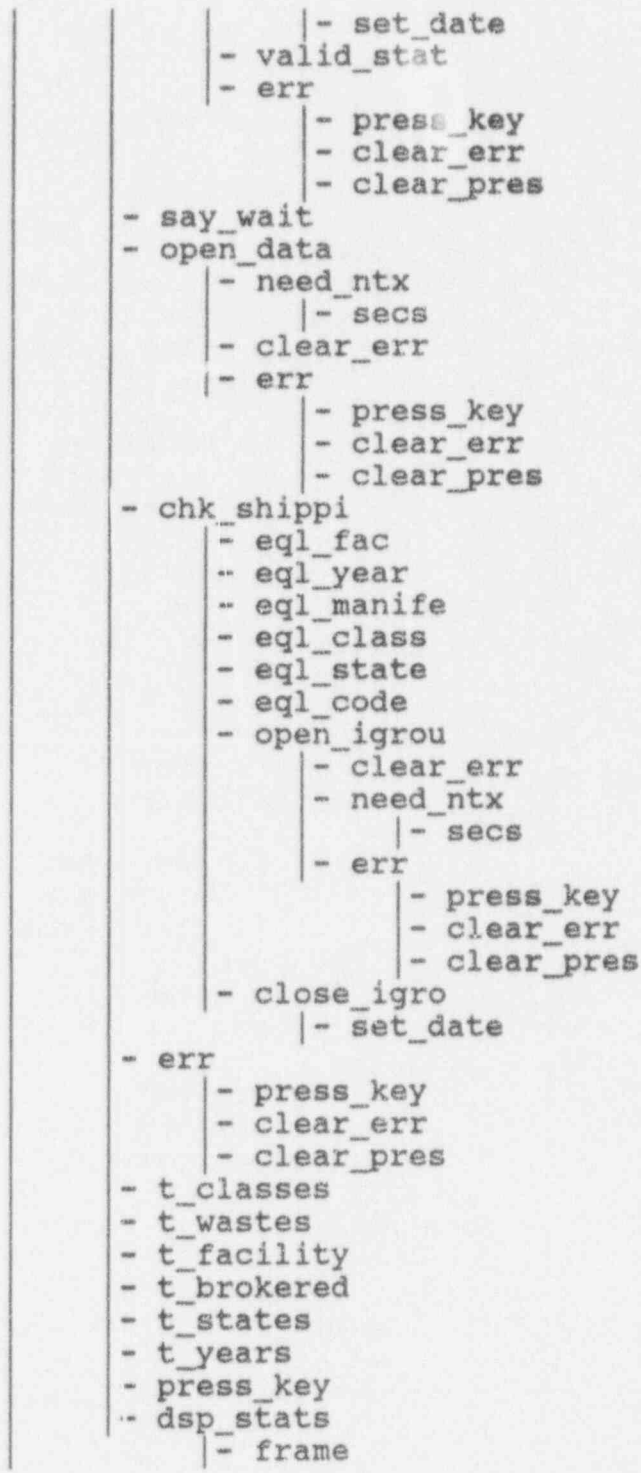

- frame
- val_h_data
- clear_err
- open_subse
- need_ntx
- secs
- clear_err
- err
- press_key
- clear_err
- clear_pres
- close_subs
- set_date
- valid_stat
- err
- press_key
- clear_err
- clear_pres
- valid_dir
- say_wait
- t_facility
- t_manifest
- t_codes
- t_classes
- t_wastes
- t_states
- t_years
- t_isotopes
- t_containe
- open_data
- need_ntx
- secs
- clear_err
- err
- press_key
- clear_err
- clear_pres
- chk_shippi
- eql_fac
- eql_year
- eql_manife
- eql_class
- eql_state
- eql_code
- open_igrou
- clear_err

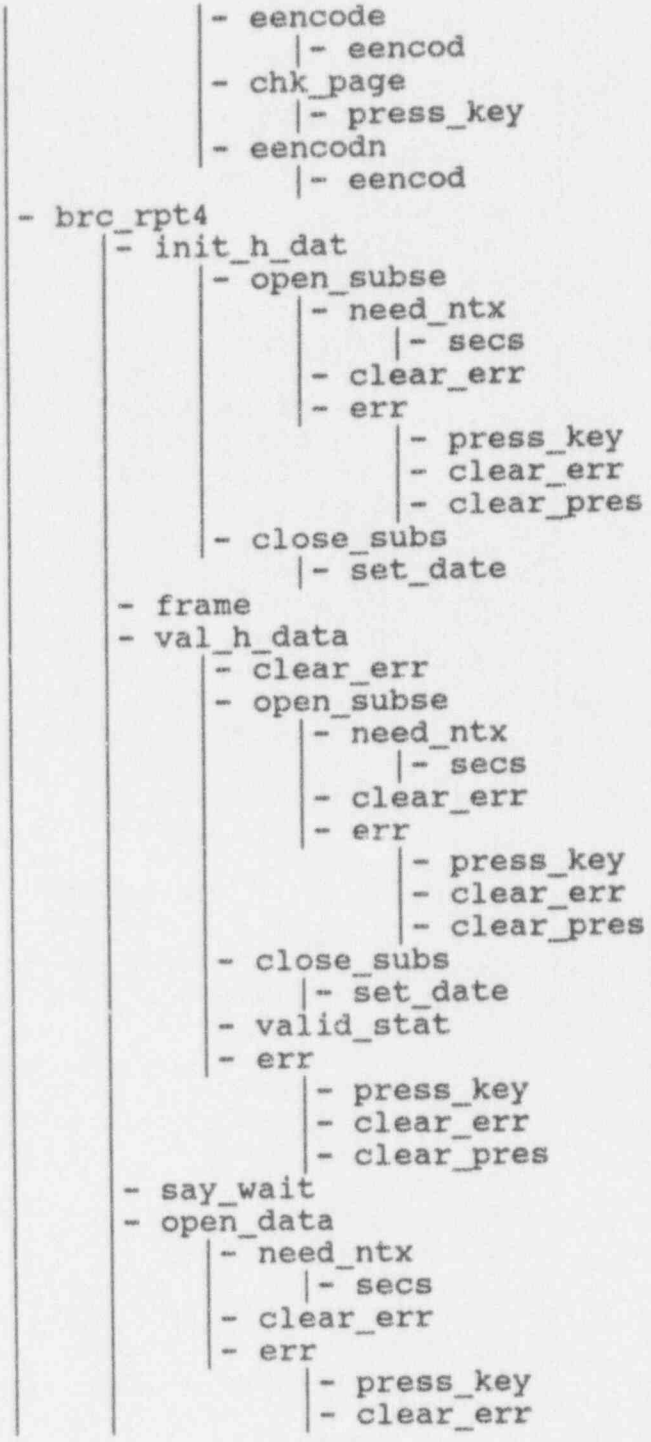
```
|     |     |     |- need_ntx
|     |     |        |- secs
|     |     |- err
|     |     |        |- press_key
|     |     |        |- clear_err
|     |     |        |- clear_pres
|     |     |- close_igro
|     |     |   |- set_date
|     |- err
|     |   |- press_key
|     |   |- clear_err
|     |   |- clear_pres
|     |- chk_page
|     |   |- press_key
|     |- eencode
|     |   |- eencod
|     |- _dbedit
|     |   |- say_wait
|     |   |- press_key
|     |- clear_err
|     |- close_data
|     |   |- set_date
|     |- plot_n_rec
|     |   |- plot_bar
|     |- dsp_stats
|     |   |- frame
|     |   |- eencode
|     |   |   |- eencod
|     |   |- chk_page
|     |   |   |- press_key
|     |   |- eencodn
|     |   |   |- eencod
|     |- press_key
|     |- clear_pres
|     |- eencod
|     |- prompt12
|     |- plot_vols
|     |   |- plot_bar
|- brc_rpt2
|     |- create_dbf
|     |- init_h_dat
|     |   |- open_subse
|     |   |   |- need_ntx
|     |   |   |   |- secs
|     |   |   |- clear_err
|     |   |   |- err
```

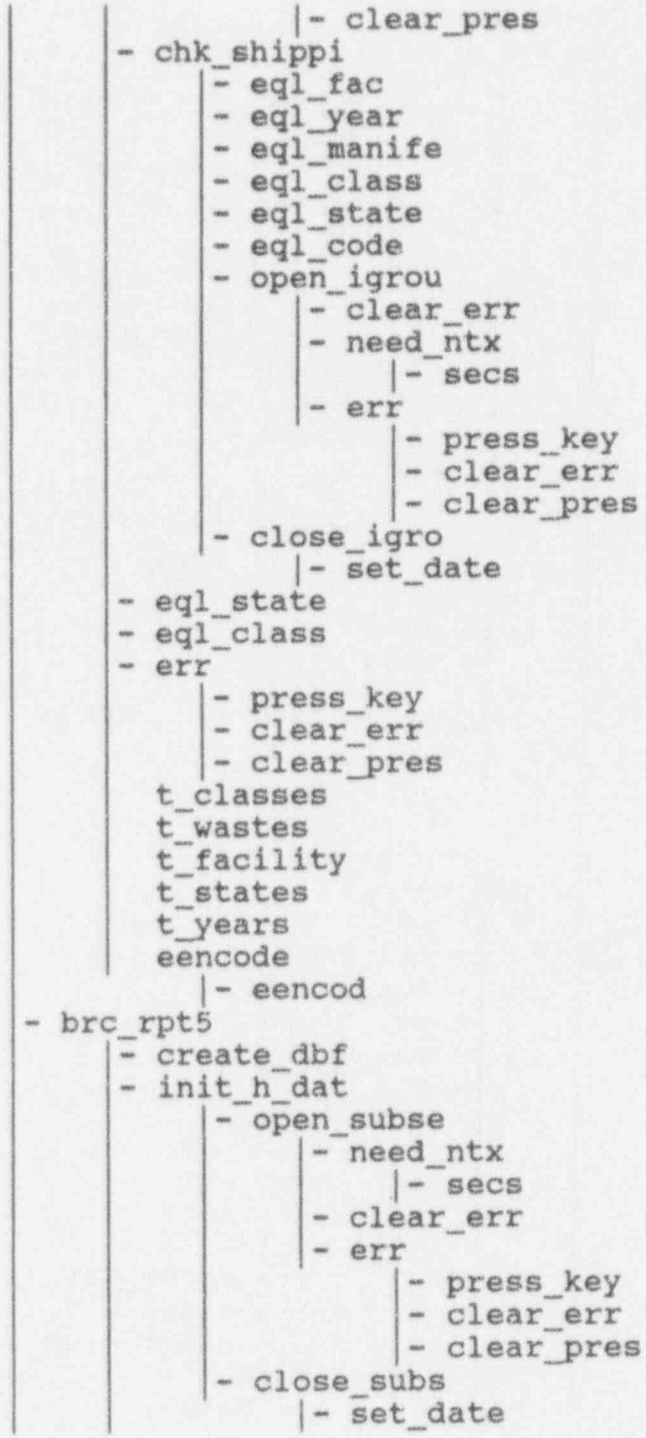
```
|         |         |              |- press_key
|         |         |              |- clear_err
|         |         |              |- clear_pres
|         |         |- close_subs
|         |              |- set_date
|         |- frame
|         |- val_h_data
|         |         |- clear_err
|         |         |- open_subse
|         |         |         |- need_ntx
|         |         |         |         |- secs
|         |         |         |- clear_err
|         |         |         |- err
|         |         |                   |- press_key
|         |         |                   |- clear_err
|         |         |                   |- clear_pres
|         |         |- close_subs
|         |         |         |- set_date
|         |         |- valid_stat
|         |         |- err
|         |                   |- press_key
|         |                   |- clear_err
|         |                   |- clear_pres
|         |- valid_dir
|         |- say_wait
|         |- t_facilit
|         |- t_manifes
|         |- t_codes
|         |- t_classes
|         |- t_wastes
|         |- t_states
|         |- t_years
|         |- t_isotope
|         |- t_contain
|         |- t_codes
|         |- t_phys_fo
|         |- t_s_agent
|         |- t_w_class
|         |- t_w_codes
|         |- open_data
|         |         |- need_ntx
|         |         |         |- secs
|         |         |- clear_err
|         |         |- err
|         |                   |- press_key
|         |                   |- clear_err
```

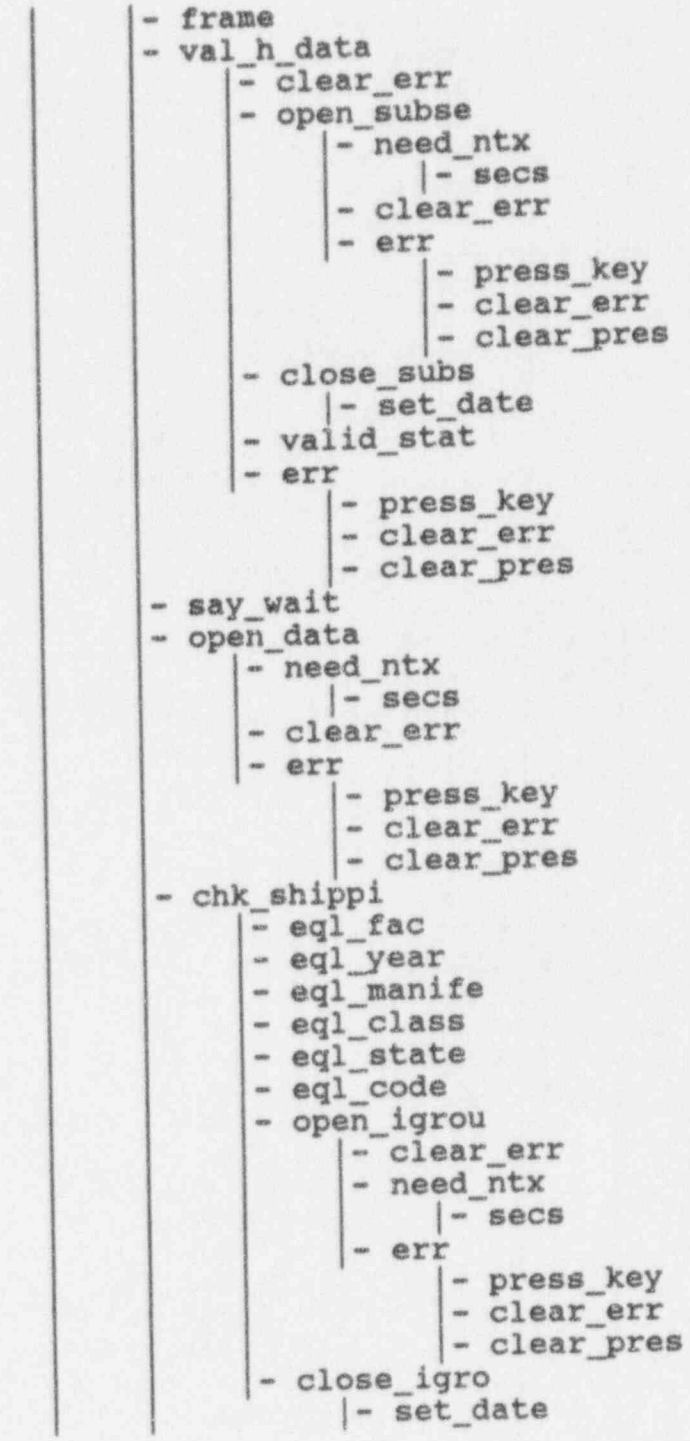

- clear_pres
- chk_shippi
- eql_fac
- eql_year
- eql_manife
- eql_class
- eql_state
- eql_code
- open_igrou
- clear_err
- need_ntx
- secs
- err
- press_key
- clear_err
- clear_pres
- close_igro
- set_date
- chk_contai
- eql_contai
- eql_w_code
- eql_phys_f
- eql_s_agen
- open_igrou
- clear_err
- need_ntx
- secs
- err
- press_key
- clear_err
- clear_pres
- close_igro
- set_date
- err
- press_key
- clear_err
- clear_pres
- chk_page
- press_key
- eencode
- eencod
- dbedit
- say_wait
- press_key
- clear_err

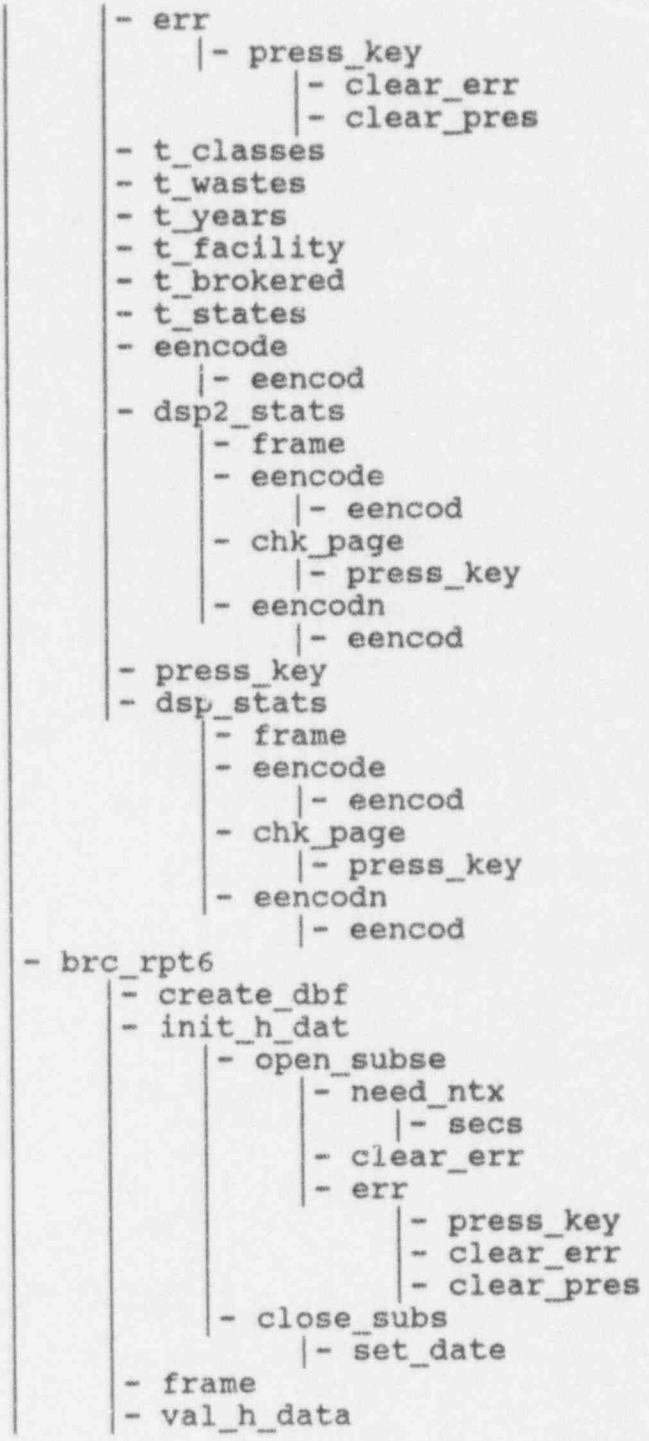

- close_data
- set_date
- plot_n_rec
- plot_bar
- dsp_stats
- frame
- eencode
- eencod
- chk_page
- press_key
- eencodn
- eencod
- press_key
- clear_pres
- eencode
- eencod
- eencod
- prompt12
- plot_vols
- plot_bar
- brc_rpt3
- create_dbf
- init_h_dat
- open_subse
- need_ntx
- secs
- clear_err
- err
- press_key
- clear_err
- clear_pres
- close_subs
- set_date
- frame
- val_h_data
- clear_err
- open_subse
- need_ntx
- secs
- clear_err
- err
- press_key
- clear_err
- clear_pres
- close_subs

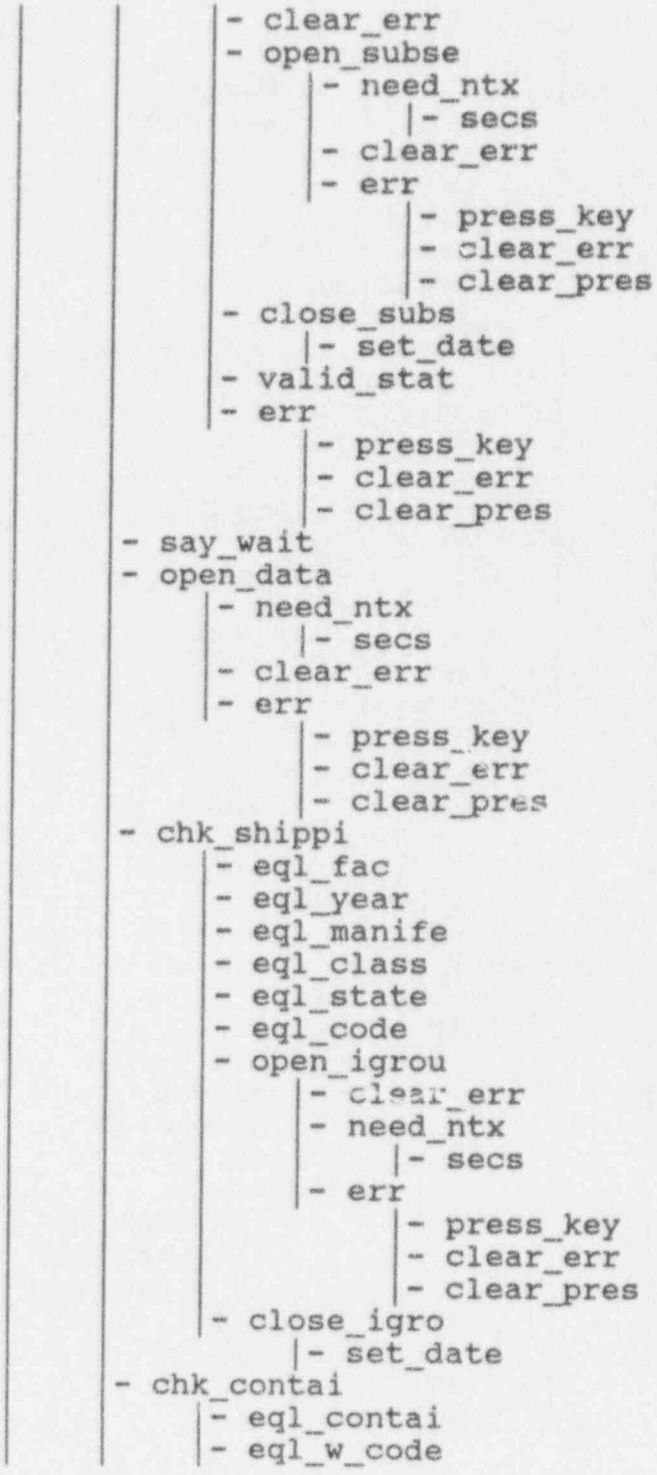

- set_date
- valid_stat
- err
- press_key
- clear_err
- clear_pres
- say_wait
- open_data
- need_ntx
- secs
- clear_err
- err
- press_key
- clear_err
- clear_pres
- chk_shippi
- eql_fac
- eql_year
- eql_manife
- eql_class
- eql_state
- eql_code
- open_igrou
- clear_err
- need_ntx
- secs
- err
- press_key
- clear_err
- clear_pres
- close_igro
- set_date
- err
- press_key
- clear_err
- clear_pres
- t_classes
- t_wastes
- t_facility
- t_brokered
- t_states
- t_years
- press_key
- dsp_stats
- frame

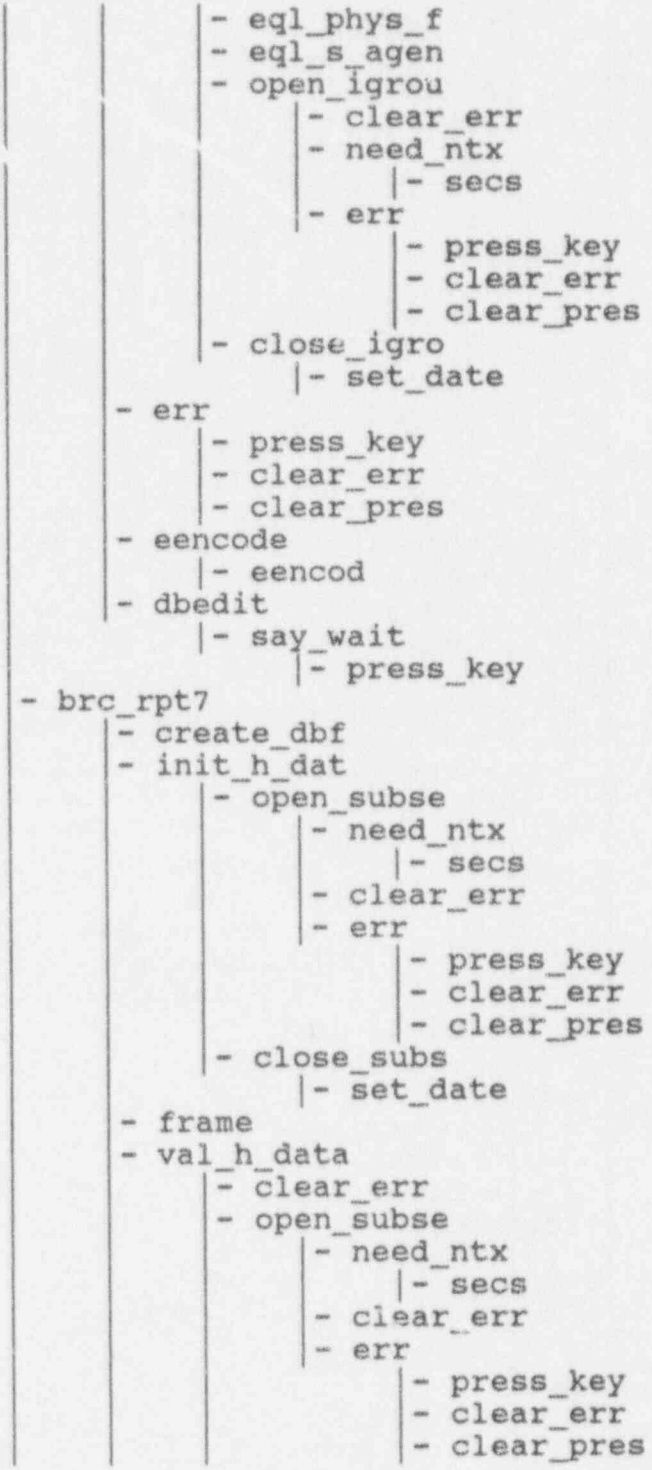

- eencode
- eencod
- chk_page
- press_key
- eencodn
- eencod
- brc_rpt4
- init_h_dat
- open_subse
- need_ntx
- secs
- clear_err
- err
- press_key
- clear_err
- clear_pres
- close_subs
- set_date
- frame
- val_h_data
- clear_err
- open_subse
- need_ntx
- secs
- clear_err
- err
- press_key
- clear_err
- clear_pres
- close_subs
- set_date
- valid_stat
- err
- press_key
- clear_err
- clear_pres
- say_wait
- open_data
- need_ntx
- secs
- clear_err
- err
- press_key
- clear_err

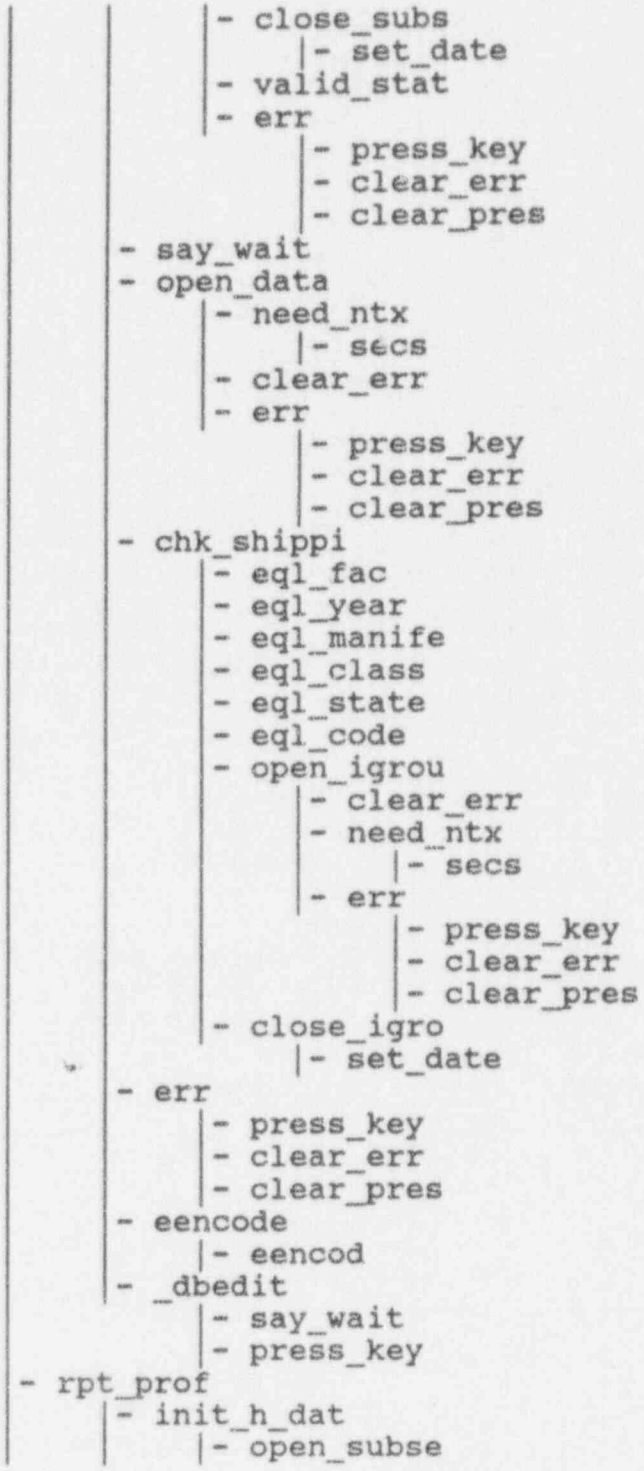

clear_pres
chk_shippi
eql_fac
eql_year
eql_manife
eql_class
eql_state
eql_code
open_igrou
clear_err
need_ntx
secs
err
press_key
clear_err
clear_pres
close_igro
set_date
eql_state
eql_class
err
press_key
clear_err
clear_pres
t_classes
t_wastes
t_facility
t_states
t_years
eencode
eencod
brc_rpt5
create_dbf
init_h_dat
open_subse
need_ntx
secs
clear_err
err
press_key
clear_err
clear_pres
close_subs
set_date

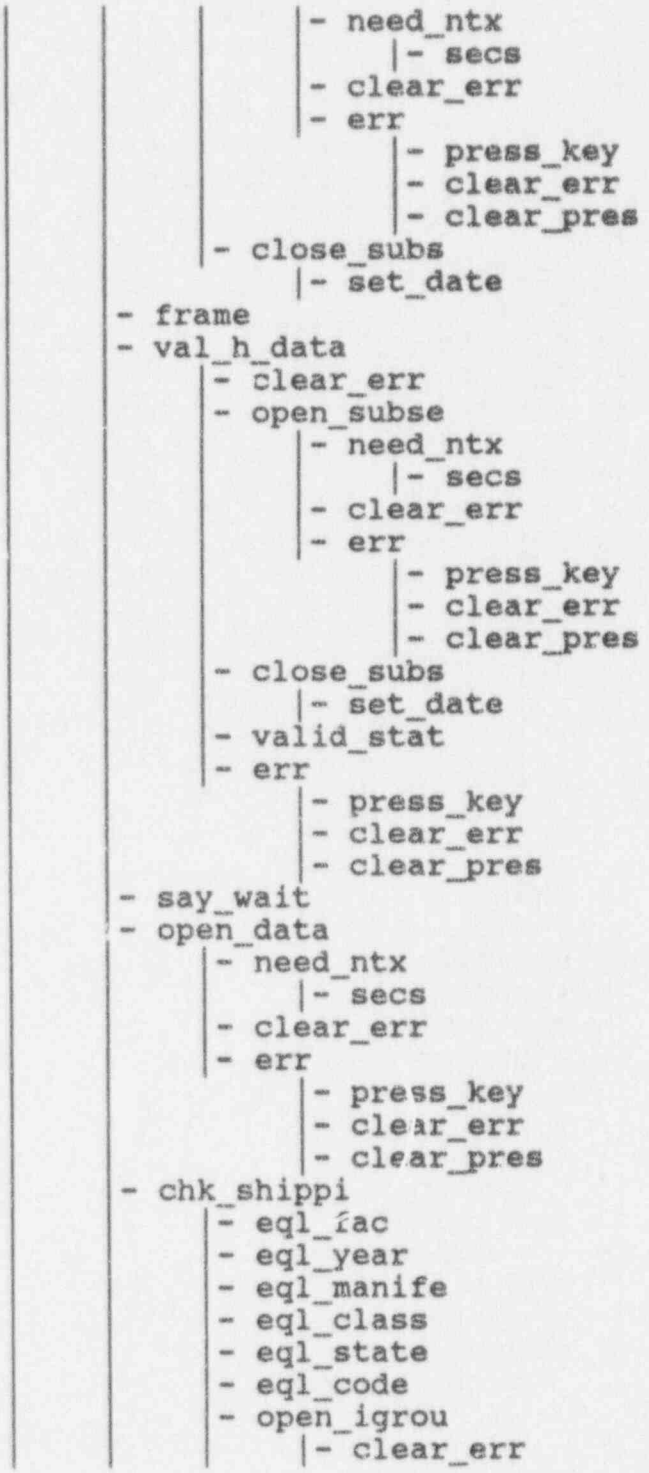

- frame
- val_h_data
- clear_err
- open_subse
- need_ntx
- secs
- clear_err
- err
- press_key
- clear_err
- clear_pres
- close_subs
- set_date
- valid_stat
- err
- press_key
- clear_err
- clear_pres
- say_wait
- open_data
- need_ntx
- secs
- clear_err
- err
- press_key
- clear_err
- clear_pres
- chk_shippi
- eql_fac
- eql_year
- eql_manife
- eql_class
- eql_state
- eql_code
- open_igrou
- clear_err
- need_ntx
- secs
- err
- press_key
- clear_err
- clear_pres
- close_igro
- set_date

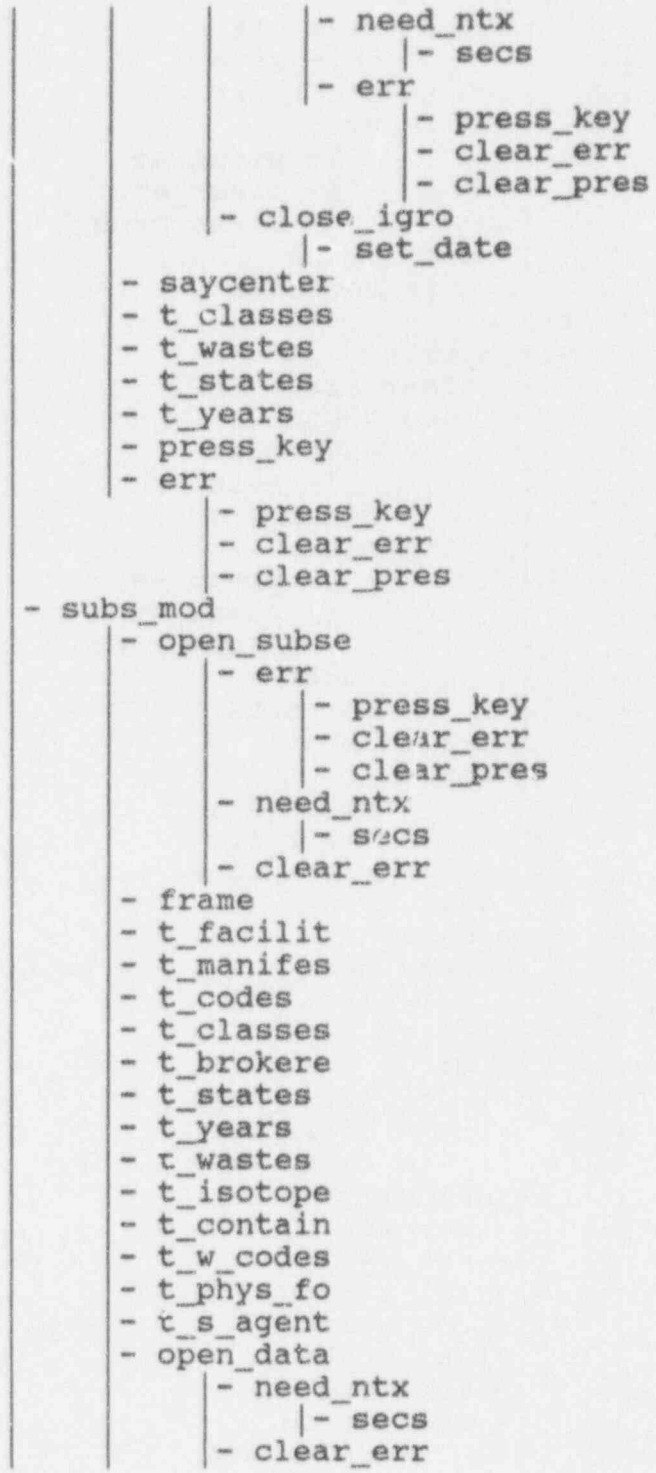

- err
- press_key
- clear_err
- clear_pres
- t_classes
- t_wastes
- t_years
- t_facility
- t_brokered
- t_states
- eencode
- eencod
- dsp2_stats
- frame
- eencode
- eencod
- chk_page
- press_key
- eencodn
- eencod
- press_key
- dsp_stats
- frame
- eencode
- eencod
- chk_page
- press_key
- eencodn
- eencod
- brc_rpt6
- create_dbf
- init_h_dat
- open_subse
- need_ntx
- secs
- clear_err
- err
- press_key
- clear_err
- clear_pres
- close_subs
- set_date
- frame
- val_h_data

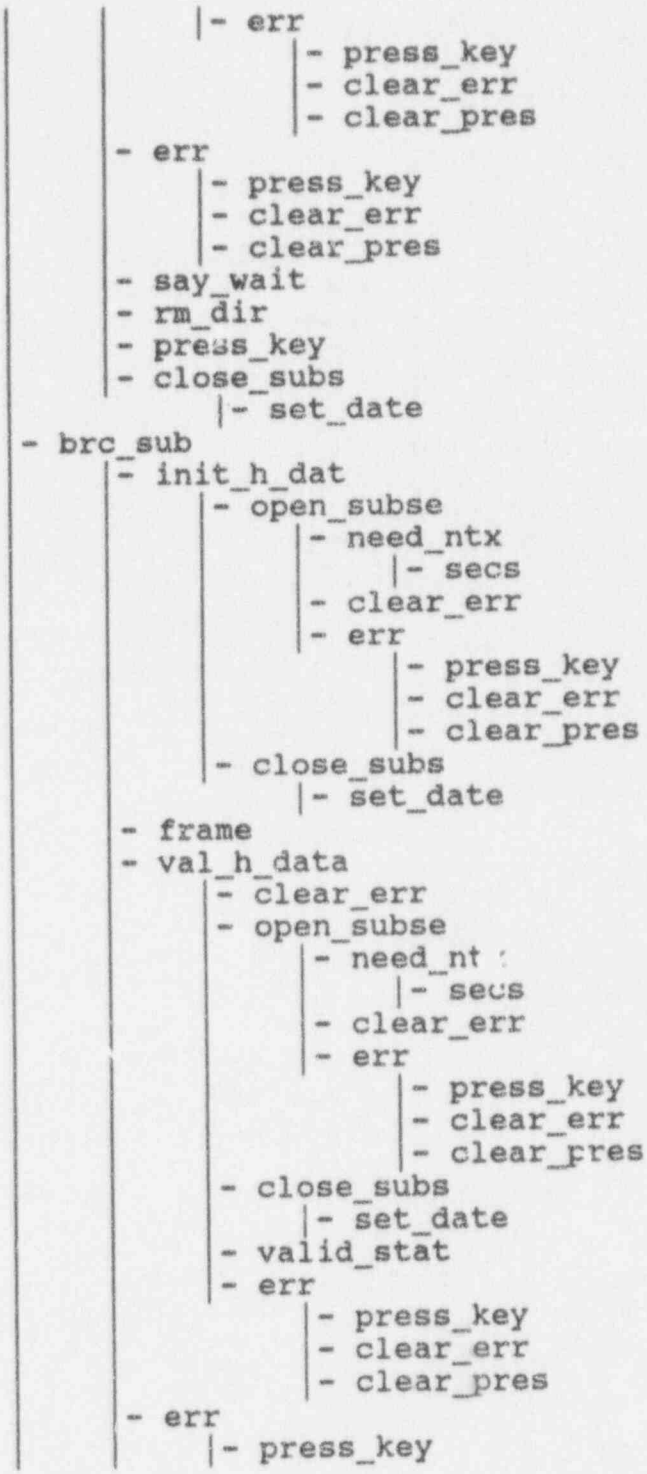

- clear_err
- open_subse
- need_ntx
- secs
- clear_err
- err
- press_key
- clear_err
- clear_pres
- close_subs
- set_date
- valid_stat
- err
- press_key
- clear_err
- clear_pres
- say_wait
- open_data
- need_ntx
- secs
- clear_err
- err
- press_key
- clear_err
- clear_pres
- chk_shippi
- eql_fac
- eql_year
- eql_manife
- eql_class
- eql_state
- eql_code
- open_igrou
- clear_err
- need_ntx
- secs
- err
- press_key
- clear_err
- clear_pres
- close_igro
- set_date
- chk_contai
- eql_contai
- eql_w_code

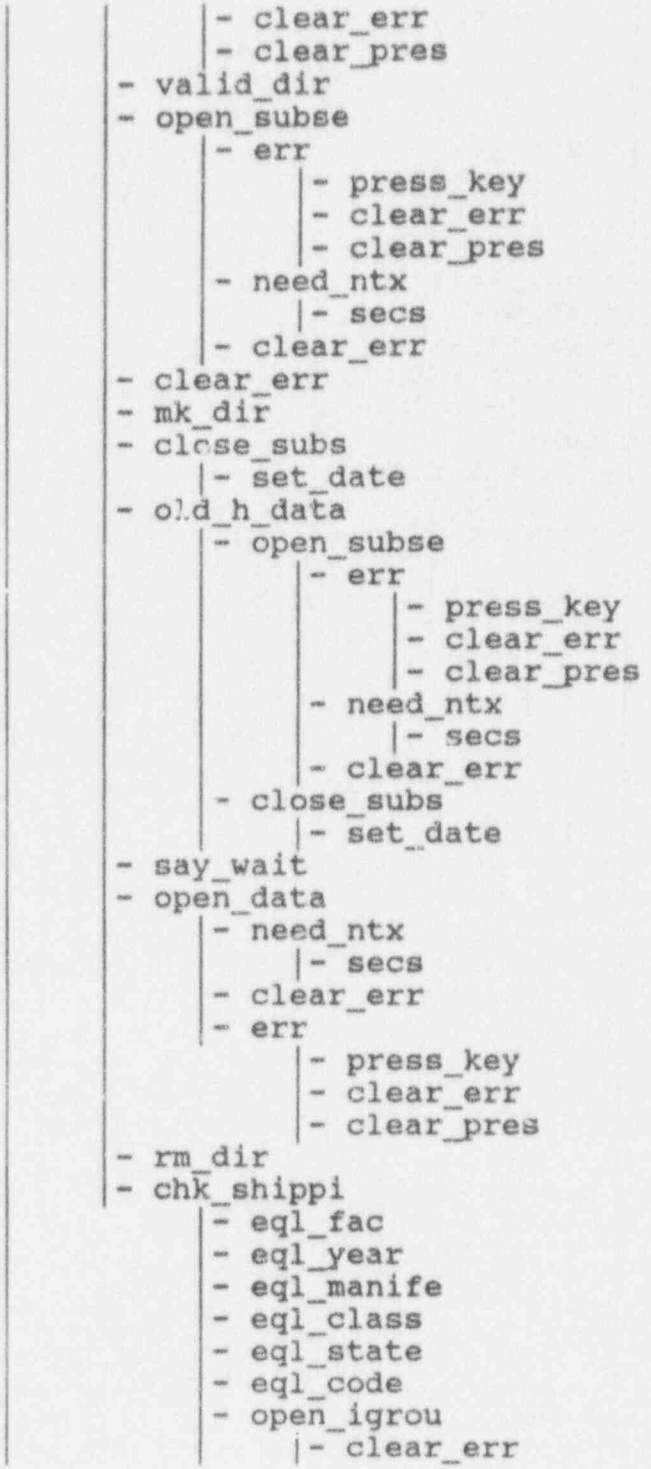

- eql_phys_f
- eql_s_agen
- open_igrou
- clear_err
- need_ntx
- secs
- err
- press_key
- clear_err
- clear_pres
- close_igro
- set_date
- err
- press_key
- clear_err
- clear_pres
- eencode
- eencod
- dbedit
- say_wait
- press_key
- brc_rpt7
- create_dbf
- init_h_dat
- open_subse
- need_ntx
- secs
- clear_err
- err
- press_key
- clear_err
- clear_pres
- close_subs
- set_date
- frame
- val_h_data
- clear_err
- open_subse
- need_ntx
- secs
- clear_err
- err
- press_key
- clear_err
- clear_pres

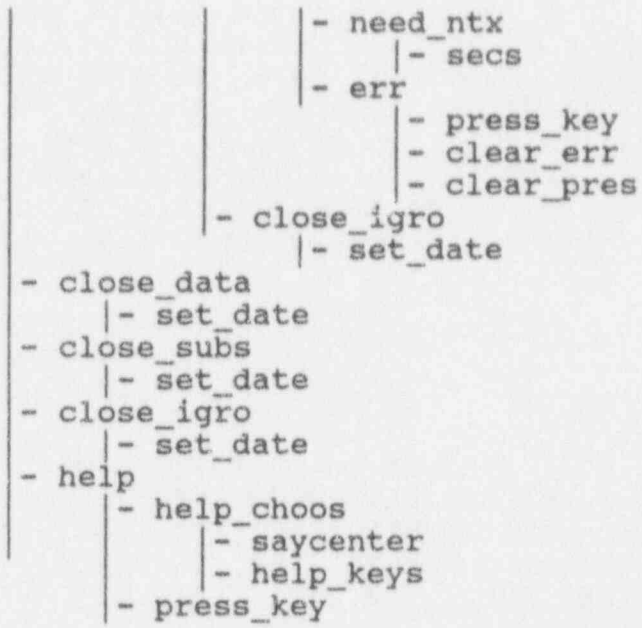

- close_subs
- set_date
- valid_stat
- err
- press_key
- clear_err
- clear_pres
- say_wait
- open_data
- need_ntx
- secs
- clear_err
- err
- press_key
- clear_err
- clear_pres
- chk_shippi
- eql_fac
- eql_year
- eql_manife
- eql_class
- eql_state
- eql_code
- open_igrou
- clear_err
- need_ntx
- secs
- err
- press_key
- clear_err
- clear_pres
- close_igro
- set_date
- err
- press_key
- clear_err
- clear_pres
- eencode
- eencod
- _dbedit
- say_wait
- press_key
- rpt_prof
- init_h_dat
- open_subse


need_ntx
secs
clear_err
err
press_key
clear_err
clear_pres
close_subs
set_date
frame
val_h_data
clear_err
open_subse
need_ntx
secs
clear_err
err
press_key
clear_err
clear_pres
close_subs
set_date
valid_stat
err
press_key
clear_err
clear_pres
say_wait
open_data
need_ntx
secs
clear_err
err
press_key
clear_err
clear_pres
chk_shippi
eql_fac
eql_year
eql_manife
eql_class
eql_state
eql_code
open_igrou
clear_err


need_ntx
secs
err
press_key
clear_err
clear_pres
close_igro
set_date
saycenter
t_classes
t_wastes
t_states
t_years
press_key
err
press_key
clear_err
clear_pres
subs_mod
open_subse
err
press_key
clear_err
clear_pres
need_ntx
secs
clear_err
frame
t_facilit
t_manifes
t_codes
t_classes
t_brokere
t_states
t_years
t_wastes
t_isotope
t_contain
t_w_codes
t_phys_fo
t_s_agent
open_data
need_ntx
secs
clear_err


- err
- press_key
- clear_err
- clear_pres
- err
- press_key
- clear_err
- clear_pres
- say_wait
- rm_dir
- press_key
- close_subs
- set_date
- brc_sub
- init_h_dat
- open_subse
- need_ntx
- secs
- clear_err
- err
- press_key
- clear_err
- clear_pres
- close_subs
- set_date
- frame
- val_h_data
- clear_err
- open_subse
- need_nt
- secs
- clear_err
- err
- press_key
- clear_err
- clear_pres
- close_subs
- set_date
- valid_stat
- err
- press_key
- clear_err
- clear_pres
- err
- press_key


- clear_err
- clear_pres
- valid_dir
- open_subse
- err
- press_key
- clear_err
- clear_pres
- need_ntx
- secs
- clear_err
- clear_err
- mk_dir
- close_subs
- set_date
- old_h_data
- open_subse
- err
- press_key
- clear_err
- clear_pres
- need_ntx
- secs
- clear_err
- close_subs
- set_date
- say_wait
- open_data
- need_ntx
- secs
- clear_err
- err
- press_key
- clear_err
- clear_pres
- rm_dir
- chk_shippi
- eql_fac
- eql_year
- eql_manife
- eql_class
- eql_state
- eql_code
- open_igrou
- clear_err



4.0 GRAPHICS

Histogram and cumulative distribution displays are produced using the dGE V4.0 graphics package and library. dGE is a commercial product written by Bits Per Second, LTD and is distributed and supported in the U.S. by Pinnacle Publishing, Inc. The LLW Data Manager program takes advantage of three features:

a) Low-level graphics subroutines for line drawing
b) Scalable and rotatable graphics fonts for text displays
c) High-resolution device drivers for hard copy output.

dGE imposes a restriction on EGA or higher resolution graphics. Lower level resolution display devices (e.g., CGA) cannot adequately represent the details usually applied in displaying plot graphs. Furthermore, graphic outputs were restricted to Hewlett-Packard compatible laser printers for producing hard copies. This approach was used to keep the program simpler and because such types of printers are widely used.

All calls to dGE functions have been isolated in a small set of subroutines as opposed to distributing them throughout the code. This approach decreases the code's overall dependency on the dGE graphics package and improves the ease with which modifications can be made.

With each displays, the user is provided with several options, including: dumping the current graphics to the printer, terminating the current function, going to the next or previous displays, going to the first or last display, and alternating between plot display units (Ci/cu.m or pCi/g). The user can also select the automatic graphics printing mode when choosing the output device at the onset of the analysis. This is performed after selecting a function from the main menu and setting the search parameters.

5.0 FILE LISTING

Directory of C:\NRC-BRC

UPDATE.EXE, CLASSES.DBF, IGROUPS.DBF, STATES.DBF, USERS.DBF, WASTES.DBF, YEARS.DBF, UPDATE.BAT, USERS.NTX, SUBSETS.NTX, BRC.EXE, IGROUPS.NTX, IISOTOP.NTX, FACILITY. DBF, WASTE_CO.DBF, PHYS_FOR.DBF, S_AGENTS.DBF, DENSITY.DBF, TEMP.DBF, SUBSETS.DBF, BROKERED.DBF, NE.TXT, DIR.TXT, FONT_BIG.STX, FONT_SML.STX, and FONT.STX.

Directory of C:\NRC-BRC\ORIGINAL

SHIPPING.NTX, GEN_CODE.NTX, CONTAINR.DBF, ISOTOPES.DBF, MANIFEST.DBF, SHIPPING.DBF, MANIFEST.NTX, ISOTOPES.NTX, CONTAINR.NTX.

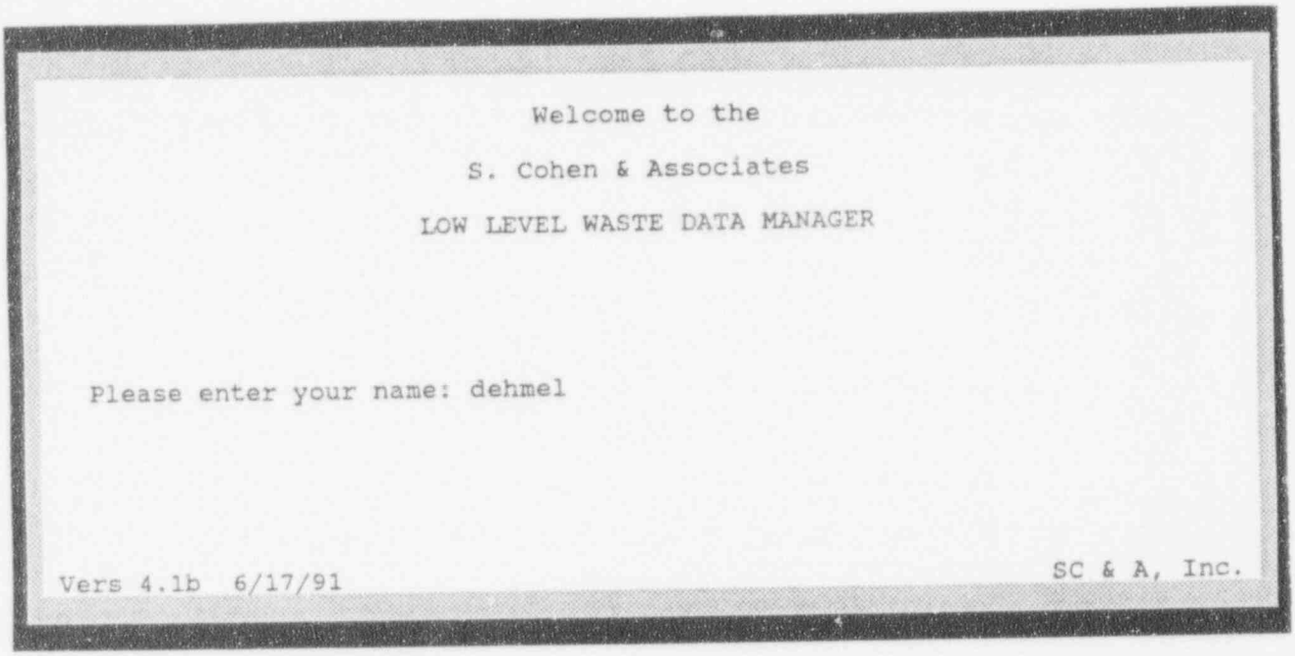
6.0 REFERENCES

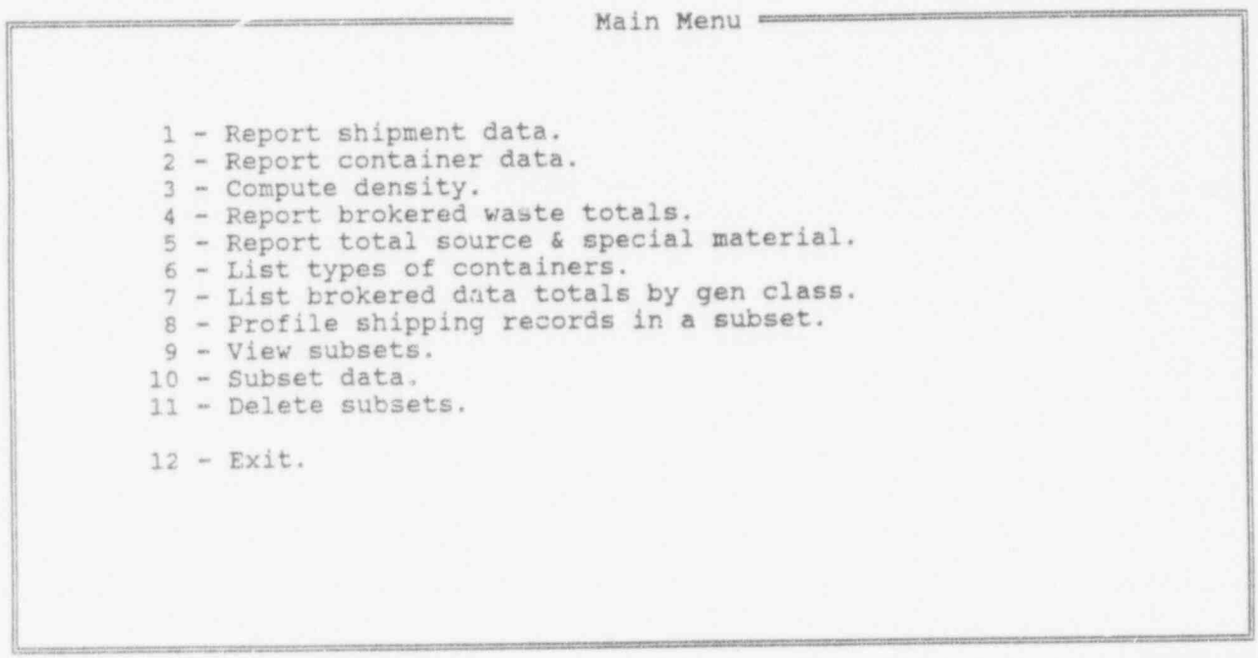
6.1 Press, W.H., at al., Numerical Recipes in C - The Art of Scientific Computing, Cambridge University Press, New York, NY, 1989.

7.0 ACKNOWLEDGEMENTS

8.0 PROGRAM FUNCTION SCREENS

The following pages present examples of program function screens.

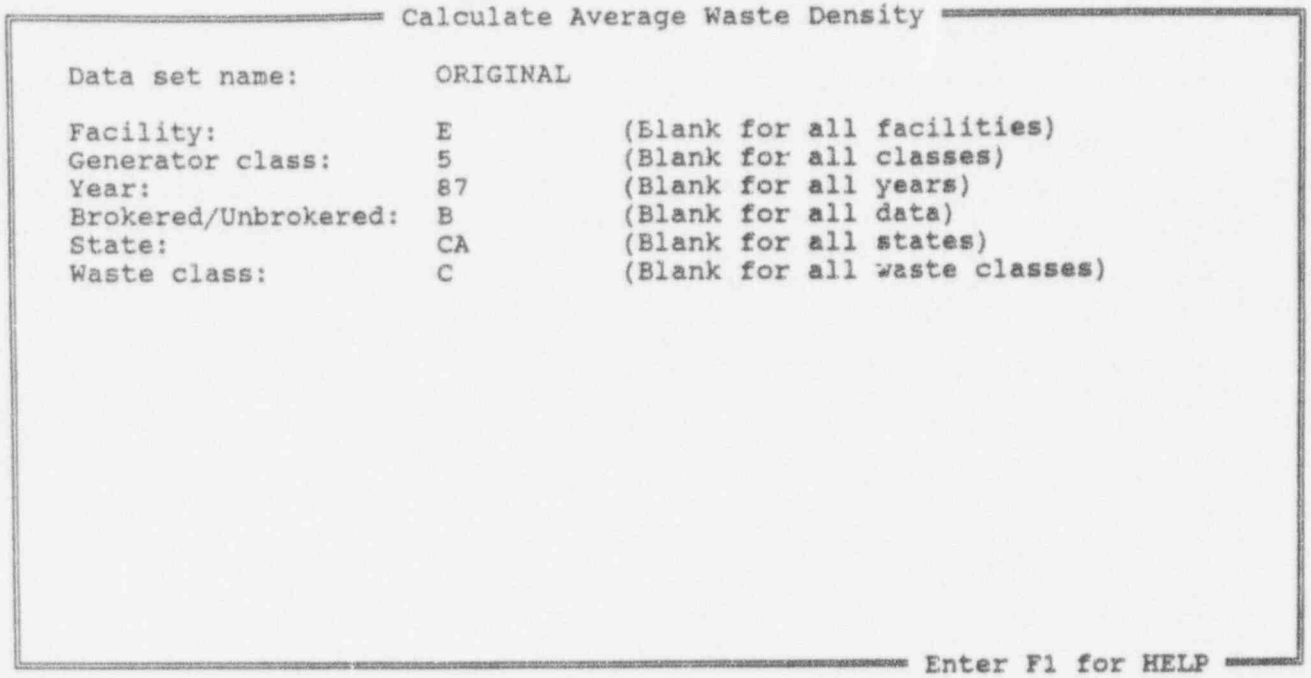

Welcome to the
S. Cohen & Associates
LOW LEVEL WASTE DATA MANAGER
Please enter your name: dehmel
Vers 4.1b 6/17/91
SC & A, Inc.

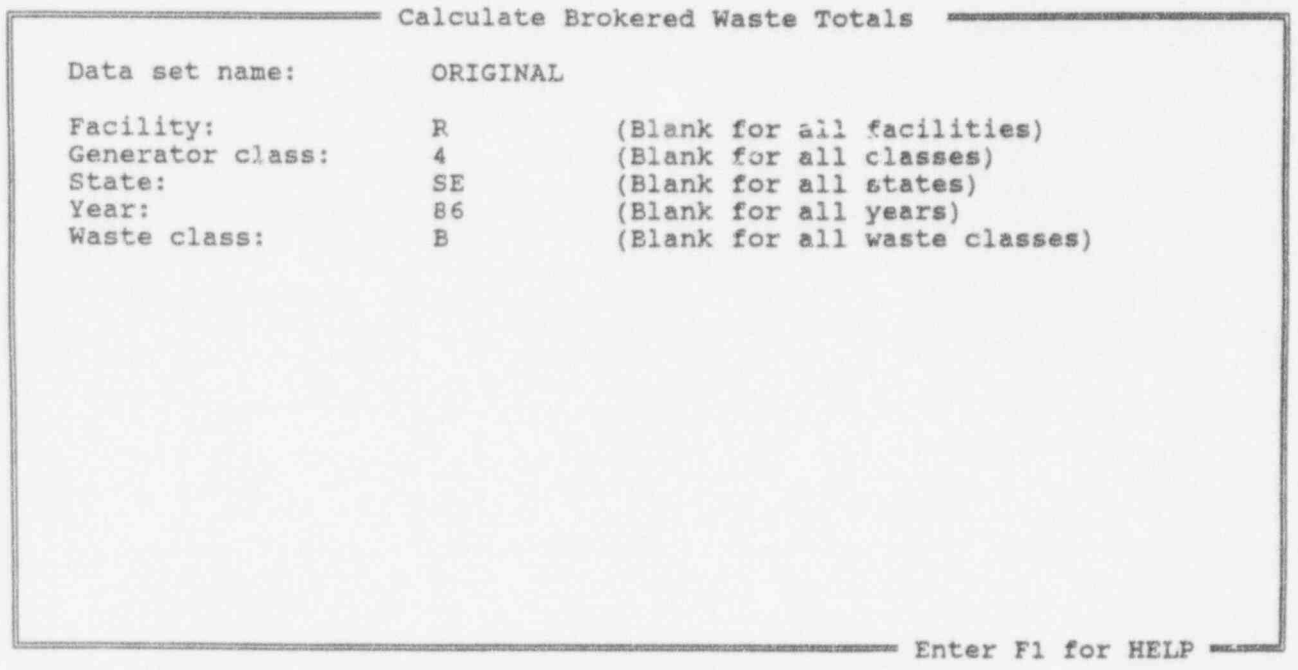

Main Menu
1 - Report shipment data.
2 - Report container data.
3 - Compute density.
4 - Report brokered waste totals.
5 - Report total source & special material.
6 - List types of containers.
7 - List brokered data totals by gen class.
8 - Profile shipping records in a subset.
9 - View subsets.
10 - Subset data.
11 - Delete subsets.
12 - Exit.

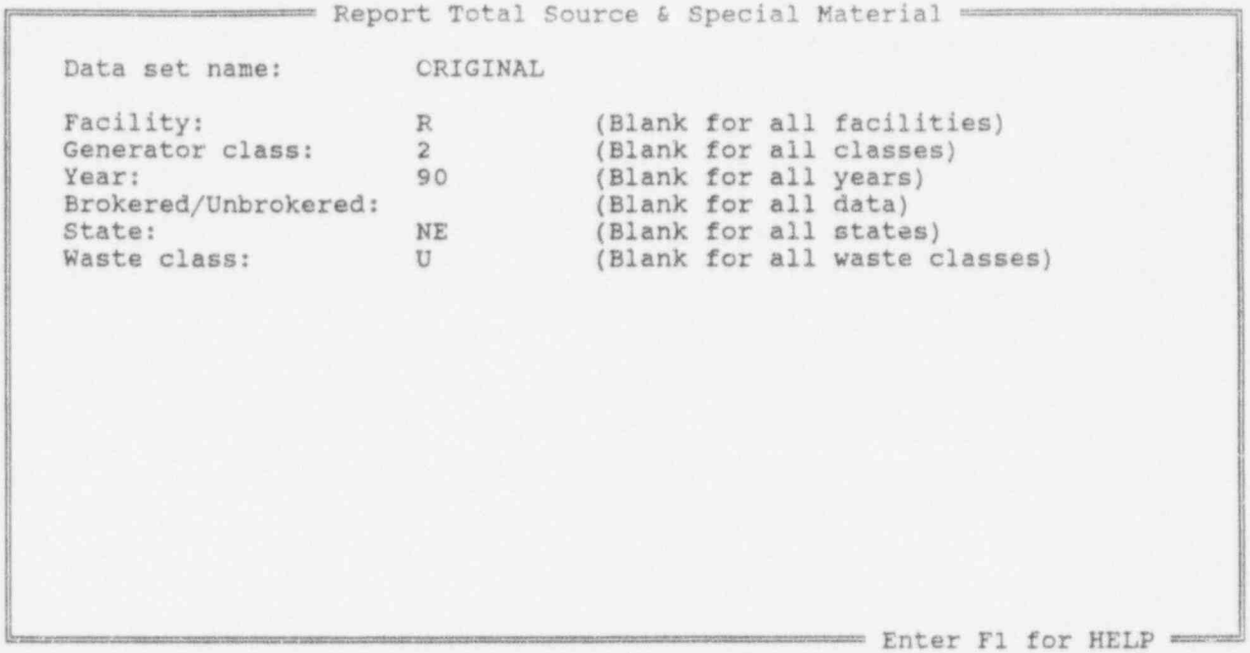
Report on a subset of the data - by shipment

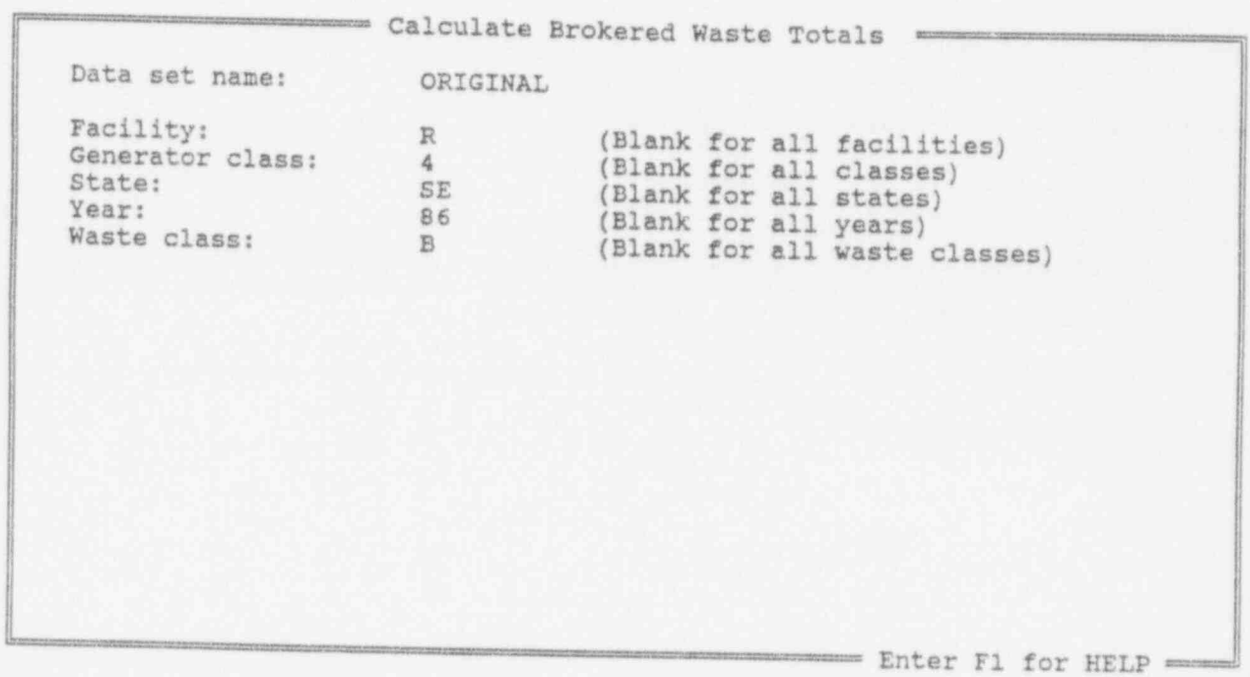
```
Report     Shipping Information

Data set name:          ORIGINAL

Output device:          S          (S= Screen; P= Printer; F= File)
Report type:            S          (D= Data only; S= Stats only; B= Both)

Waste density:            0.70000  (g/cu cm)

Facility:               B          (Blank for all facilities)
Generator class:        1          (Blank for all classes)
Year:                   87         (Blank for all years)
Brokered/Unbrokered:    B          (Blank for all data)
State:                  AP         (Blank for all states)
Waste class:            A          (Blank for all waste classes)

Isotope/group:          BA-133     (Blank for all isotopes)

Manifest ID:            014271044768 (Blank for all manifests)
Container ID:           F-11         (Blank for all containers)
Generator code:           080100011  (Blank for all codes)

                                                  Enter F1 for HELP
```

```
Report     Container Information

Data set name:          ORIGINAL

Output device:          S          (S= Screen; P= Printer; F= File)
Report type:            S          (D= Data only; S= Stats only; B= Both)

Facility:               R          (Blank for all facilities)
Generator class:        3          (Blank for all generator classes)
Year:                   89         (Blank for all years)
Brokered/Unbrokered:    U          (Blank for all data)
State:                  CF         (Blank for all states)
Waste class:            B          (Blank for all waste classes)

Waste code:             02         (Blank for all waste codes)
Waste physical form:    02         (Blank for all physical forms)
Solidification agent:   04         (Blank for all agents)
Isotope/group:          .BIOMED    (Blank for all isotope)

Manifest ID:            014275058066 (Blank for all manifests)
Container ID:           870334A      (Blank for all containers)
Gen/Broker code:          080100450  (Blank for all codes)

                                                  Enter F1 for HELP
```


Calculate Average Waste Density
Data set name: ORIGINAL
Facility: E (Blank for all facilities)
Generator class: 5 (Blank for all classes)
Year: 87 (Blank for all years)
Brokered/Unbrokered: B (Blank for all data)
State: CA (Blank for all states)
Waste class: C (Blank for all waste classes)
Enter F1 for HELP


Calculate Brokered Waste Totals
Data set name: ORIGINAL
Facility: R (Blank for all facilities)
Generator class: 4 (Blank for all classes)
State: SE (Blank for all states)
Year: 86 (Blank for all years)
Waste class: B (Blank for all waste classes)
Enter F1 for HELP


Report Total Source & Special Material
Data set name: CRIGINAL
Facility: R (Blank for all facilities)
Generator class: 2 (Blank for all classes)
Year: 90 (Blank for all years)
Brokered/Unbrokered: (Blank for all data)
State: NE (Blank for all states)
Waste class: U (Blank for all waste classes)
Enter F1 for HELP


Calculate Brokered Waste Totals
Data set name: ORIGINAL
Facility: R (Blank for all facilities)
Generator class: 4 (Blank for all classes)
State: SE (Blank for all states)
Year: 86 (Blank for all years)
Waste class: B (Blank for all waste classes)
Enter F1 for HELP

Report Total Source & Special Material

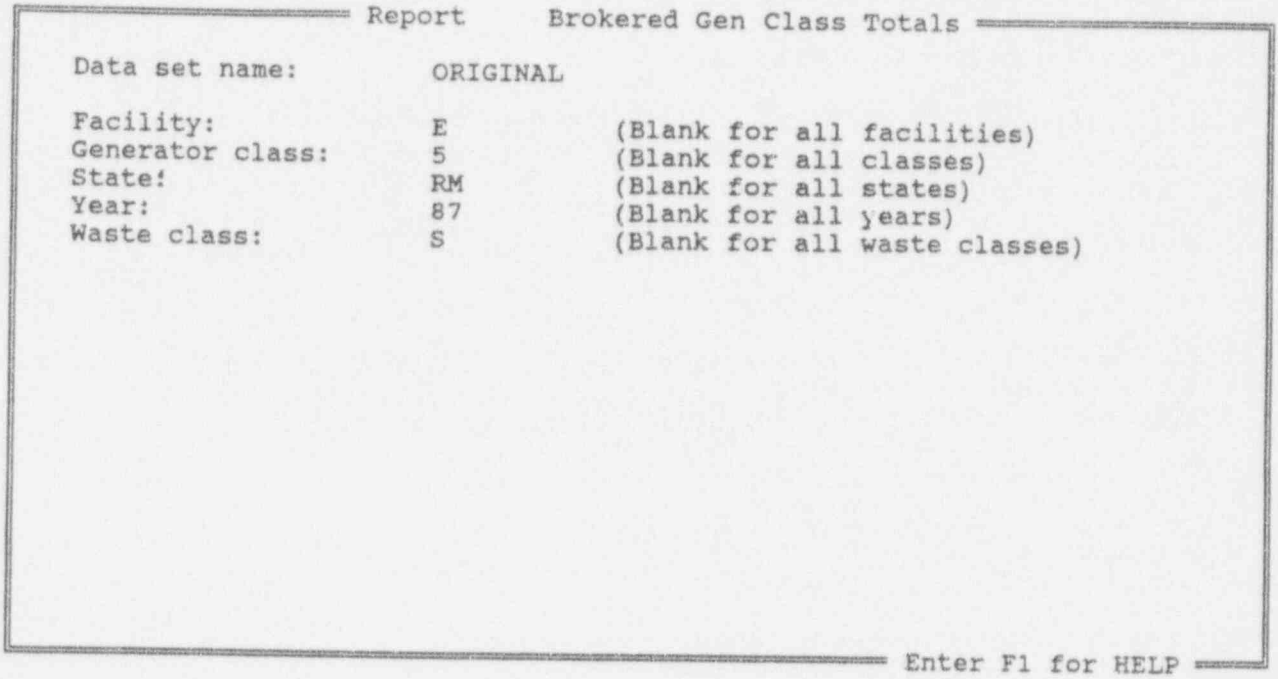
Data set name:	ORIGINAL	
Facility:	R	(Blank for all facilities)
Generator class:	2	(Blank for all classes)
Year:	90	(Blank for all years)
Brokered/Unbrokered:		(Blank for all data)
State:	NE	(Blank for all states)
Waste class:	U	(Blank for all waste classes)

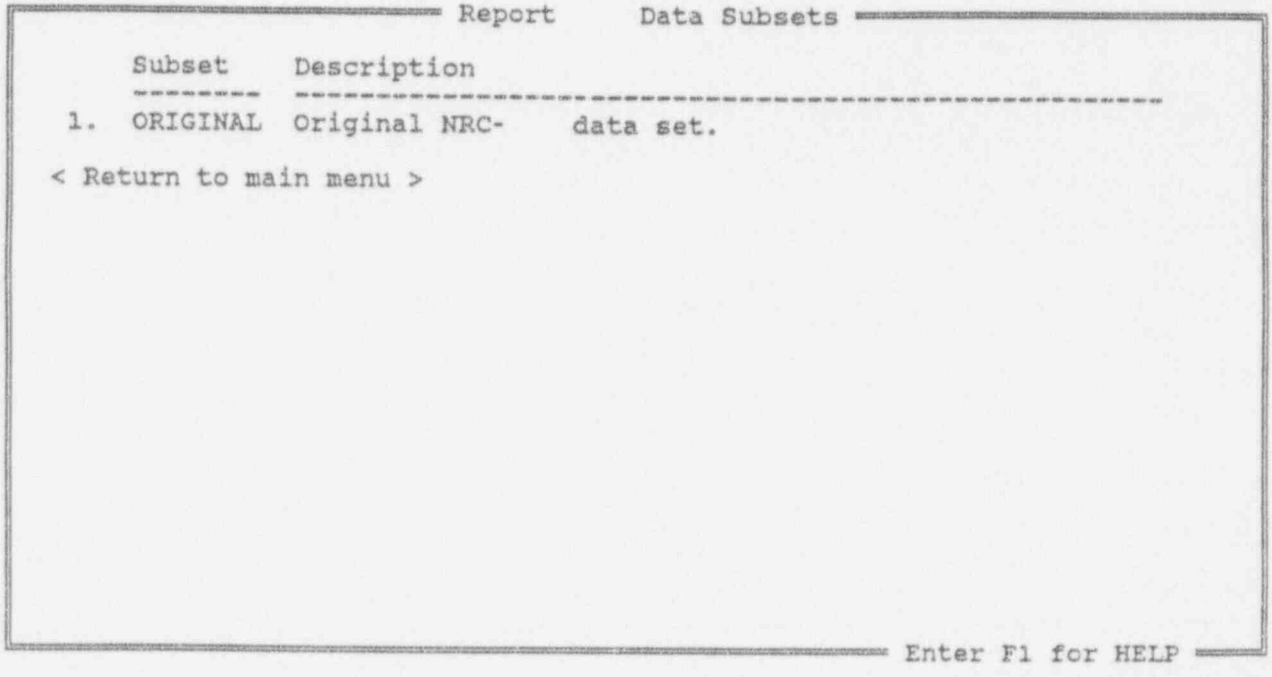
Enter F1 for HELP

List Container Types

Data set name:	ORIGINAL	
Facility:	B	(Blank for all facilities)
Generator class:	1	(Blank for all classes)
Year:	88	(Blank for all years)
Brokered/Unbrokered:	U	(Blank for all data)
State:	NW	(Blank for all states)
Waste class:	C	(Blank for all waste classes)
Waste physical form:	02	(Blank for all physical forms)
Waste code:	22	(Blank for all waste codes)

Enter F1 for HELP


Report Brokered Gen Class Totals
Data set name: ORIGINAL
Facility: E (Blank for all facilities)
Generator class: 5 (Blank for all classes)
State: RM (Blank for all states)
Year: 87 (Blank for all years)
Waste class: S (Blank for all waste classes)
Enter F1 for HELP


Report Data Subsets
Subset Description
1. ORIGINAL Original NRC- data set.
< Return to main menu >
Enter F1 for HELP

Generate a Subset of Data

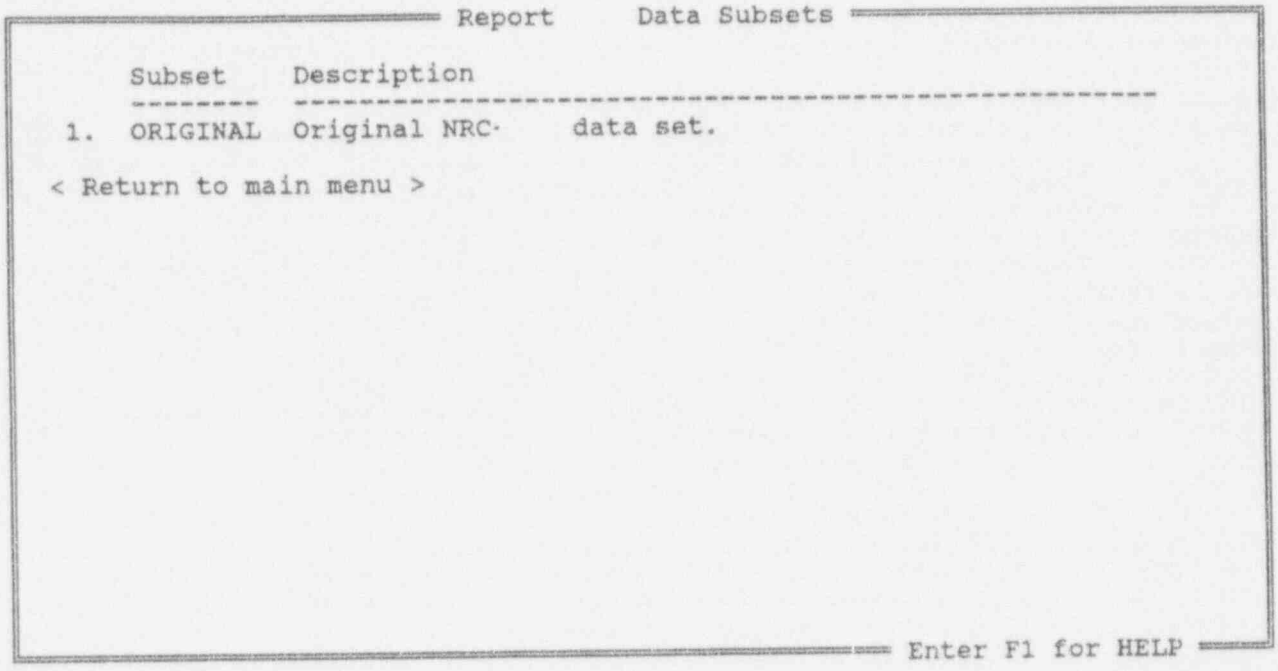
```
Data set name:          ORIGINAL

Facility:               E           (Blank for all facilities)
Generator class:        3           (Blank for all classes)
Year:                   87          (Blank for all years)
Brokered/Unbrokered:                (Blank for all data)
State:                  AK          (Blank for all states)
Waste class:            S           (Blank for all waste classes)

Isotope/group:          .BIOMED     (Blank for all isotopes)

Manifest ID:            014278061351 (Blank for all manifests)
Container ID:           F-33         (Blank for all containers)
Generator code:           080100060  (Blank for all codes)

NEW data set name:      TEST1

Descript:  Original NRC-    data set.
```

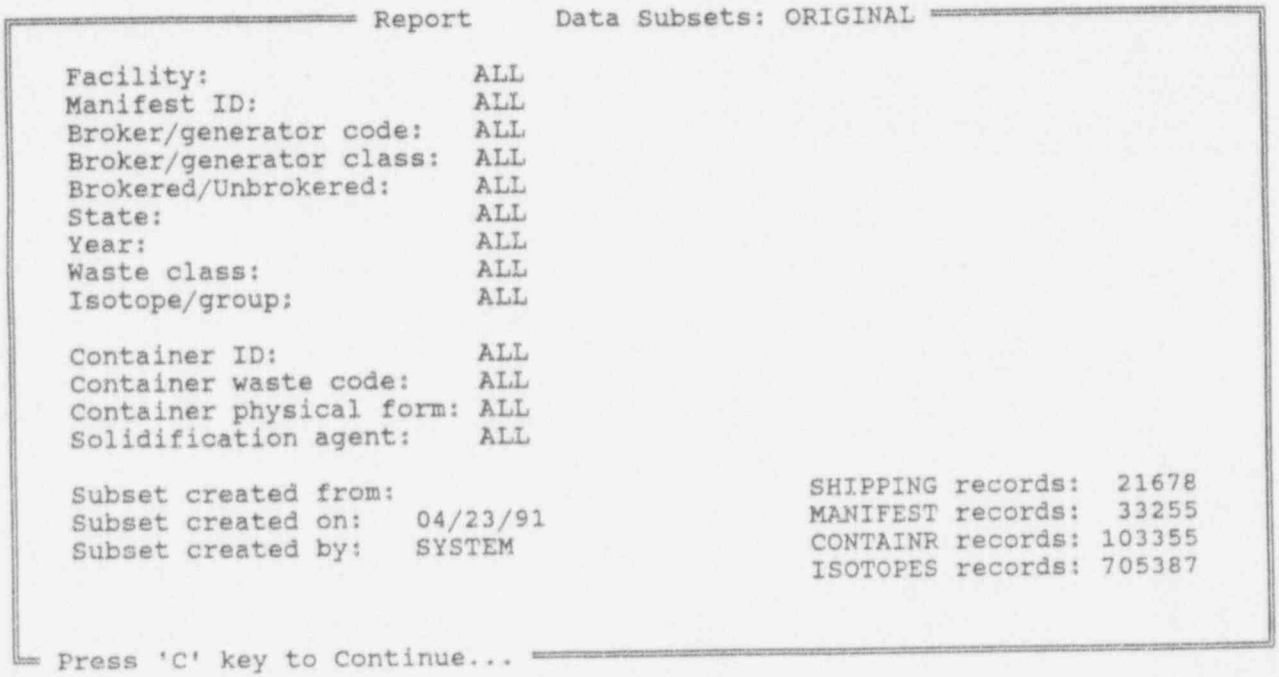
Enter F1 for HELP

Profile Subset

```
Data set name:          ORIGINAL

Generator class:        2           (Blank for all classes)
State:                  MW          (Blank for all states)
Year:                   89          (Blank for all years)
Waste class:            B           (Blank for all waste classes)
```

Enter F1 for HELP


Report Data Subsets
Subset Description
1. ORIGINAL Original NRC· data set.
< Return to main menu >
Enter F1 for HELP


Report Data Subsets: ORIGINAL
Facility: ALL
Manifest ID: ALL
Broker/generator code: ALL
Broker/generator class: ALL
Brokered/Unbrokered: ALL
State: ALL
Year: ALL
Waste class: ALL
Isotope/group: ALL
Container ID: ALL
Container waste code: ALL
Container physical form: ALL
Solidification agent: ALL
Subset created from:
Subset created on: 04/23/91
Subset created by: SYSTEM
SHIPPING records: 21678
MANIFEST records: 33255
CONTAINR records: 103355
ISOTOPES records: 705387
Press 'C' key to Continue...

Manifest ID: 17950-13891 Container Data - ORIGINAL

Gen code: TNR990022840
State: ALL
Facility: Richland
Year: 1990
Gen class: Industrial

Total weight [kg]: 1671.63
Total source [kg]: 14.27
Special mtrl [g]: 0.00

Total vol [cu m]: 1.509
A-Stable [cu m]: 0.000
A-Unstab [cu m]: 1.509
Class B [cu m]: 0.000
Class C [cu m]: 0.000
Containers density [g/cu cm]: 1.108

1 / 1

Container: 147971
Gen class: Industrial
Weight (kg): 1671.63
Volume (cu m): 1.51
Density [g/cu cm]: 1.108
Container type: BOX
Phys form: Solid
Chem form: SOIL,ROCK,PLASTIC,WOOD,METAL,PAPER,ASBESTOS,PLASTIC

Special material (g): 0.000
Source material (kg): 0.000
Contact rad (mr/hr): 0.600
Rad lvl 1 M (mr/hr): 0.100
Agent: None required
Class: Class A (Unstable)
Type: Compacted dry active waste

			--- Activity --- (Ci)	[%]	---- Concentration ---- [Ci/cu m]	[pCi/g]
1.	H-3	I	2.80E-02	70.45	1.86E-02	1.68E+04
2.	NI-63	I	8.00E-03	20.13	5.30E-03	4.79E+03
			3.97E-02	100.00	2.63E-02	2.38E+04

Press 'C' key to Continue... PgDn PgUp Home End Arrows

Manifest ID: 17950-13891 Shipping Data - ORIGINAL

Gen code: TNR990022840
State: ALL
Year: 1990
Facility: Richland
Gen class: Industrial

Actual Waste [kg]: 17464.47
Total source (kg): 14.27
Special mtrl (g): 0.00

Total vol (cu m): 15.484
A-Stable (cu m): 0.000
A-Unstab (cu m): 15.484
Class B (cu m): 0.000
Class C (cu m): 0.000
Shipment density [g/cu cm]: 1.128

			--- Activity --- (Ci)	[%]	---- Concentration ---- [Ci/cu m]	[pCi/g]
1.	P-32	I	3.13E-01	34.46	2.02E-02	1.79E+04
2.	S-35	I	3.11E-01	34.28	2.01E-02	1.78E+04
3.	H-3	I	1.26E-01	13.91	8.16E-03	7.23E+03
4.	I-125	I	9.65E-02	10.64	6.23E-03	5.53E+03
5.	C-14	I	3.41E-02	3.76	2.20E-03	1.95E+03
6.	CR-51	I	1.13E-02	1.24	7.27E-04	6.45E+02
7.	NI-63	I	8.11E-03	0.89	5.24E-04	4.64E+02
8.	CO-57	I	2.01E-03	0.22	1.30E-04	1.15E+02
9.	PM-147	I	1.50E-03	0.17	9.69E-05	8.59E+01
			9.07E-01	100.01	5.86E-02	5.20E+04

Press 'C' key to Continue... PgDn PgUp Home End Arrows

Manifest ID: 17950-13891 Shipping Data - ORIGINAL

Gen code: TNR990022840
State: ALL
Year: 1990
Facility: Richland
Gen class: Industrial

Actual Waste [kg]: 17464.47
Total source (kg): 14.27
Special mtrl (g): 0.00

Total vol (cu m): 15.484
A-Stable (cu m): 0.000
A-Unstab (cu m): 15.484
Class B (cu m): 0.000
Class C (cu m): 0.000
Shipment density [g/cu cm]: 1.128

			--- Activity --- (Ci)	[%]	---- Concentration ---- [Ci/cu m]	[pCi/g]
10.	TH-232	I	1.56E-03	0.17	1.01E-04	8.93E+01
11.	RA-226	I	1.17E-03	0.13	7.53E-05	6.68E+01
12.	CL-36	I	5.20E-04	0.06	3.36E-05	2.98E+01
13.	TC-99	I	2.10E-04	0.02	1.36E-05	1.20E+01
14.	TL-204	I	2.10E-04	0.02	1.36E-05	1.20E+01
15.	CA-45	I	1.14E-04	0.01	7.36E-06	6.53E+00
16.	NA-22	I	5.70E-05	0.01	3.68E-06	3.26E+00
17.	CS-137	I	3.90E-05	0.00	2.52E-06	2.23E+00
18.	BA-133	I	5.00E-06	0.00	3.23E-07	2.86E-01
			9.07E-01	100.01	5.86E-02	5.20E+04

Press 'C' key to Continue... PgDn PgUp Home End Arrows

Manifest ID: 17950-13891 Shipping Data - ORIGINAL

Gen code: TNR990022840
State: ALL
Year: 1990
Facility: Richland
Gen class: Industrial

Actual Waste [kg]: 17464.47
Total source (kg): 14.27
Special mtrl (g): 0.00

Total vol (cu m): 15.484
A-Stable (cu m): 0.000
A-Unstab (cu m): 15.484
Class B (cu m): 0.000
Class C (cu m): 0.000
Shipment density [g/cu cm]: 1.128

			--- Activity --- (Ci)	[%]	---- Concentration ---- [Ci/cu m]	[pCi/g]
19.	CS-134	I	1.00E-06	0.00	6.46E-08	5.73E-02
20.	CE-144	I	1.00E-06	0.00	6.46E-08	5.73E-02
21.	SR-90	I	1.00E-05	0.00	6.46E-07	5.73E-01
22.	TH-228	I	4.00E-06	0.00	2.58E-07	2.29E-01
23.	FE-59	I	4.30E-05	0.00	2.78E-06	2.46E+00
24.	CE-141	I	1.00E-06	0.00	6.46E-08	5.73E-02
25.	NB-95	I	1.00E-06	0.00	6.46E-08	5.73E-02
26.	RU-103	I	4.00E-06	0.00	2.58E-07	2.29E-01
27.	SC-46	I	2.00E-05	0.00	1.29E-06	1.15E+00
			9.07E-01	100.01	5.86E-02	5.20E+04

Press 'C' key to Continue... PgDn PgUp Home End Arrows

Manifest ID: 17950-13891 Shipping Data - ORIGINAL

Gen code: TNR990022840
State: ALL
Year: 1990
Facility:
Richland
Gen class: Industrial

Actual Waste [kg]: 17464.47
Total source (kg): 14.27
Special mtrl (g): 0.00

Total vol (cu m): 15.484
A-Stable (cu m): 0.000
A-Unstab (cu m): 15.484
Class B (cu m): 0.000
Class C (cu m): 0.000
Shipment density [g/cu cm]: 1.128

	Volume (Cu m)	--- Activity --- (Ci)	[%]	---- Concentration ---- [Ci/cu m]	[pCi/g]
1. NYR990012684 I	0.4474	4.67E-01	51.50	1.04E+00	9.26E+05
2. NYR990006488 A	0.6230	2.52E-01	27.71	4.04E-01	3.58E+05
3. MER990006819 I	0.8070	9.62E-02	10.60	1.19E-01	1.06E+05
4. MOR990023525 I	0.3200	3.51E-02	3.87	1.10E-01	9.72E+04
5. NJR990016214 M	2.3588	1.95E-02	2.15	8.27E-03	7.33E+03
6. OHR990020224 M	0.3058	1.02E-02	1.13	3.35E-02	2.97E+04
7. MDR990007379 A	0.1048	5.82E-03	0.64	5.56E-02	4.93E+04
8. MOR990012106 A	0.0623	4.50E-03	0.50	7.22E-02	6.40E+04
9. MAD000846287 A	0.0934	3.45E-03	0.38	3.70E-02	3.28E+04
	15.4839	9.07E-01	100.00	5.86E-02	5.20E+04

Press 'C' key to Continue... PgDn PgUp Home End Arrows

Manifest ID: 1...-13891 Shipping Data - ORIGINAL

Gen code: TNR990022840
State: ALL
Year: 1990
Facility:
Richland
Gen class: Industrial

Actual Waste [kg]: 17464.47
Total source (kg): 14.27
Special mtrl (g): 0.00

Total vol (cu m): 15.484
A-Stable (cu m): 0.000
A-Unstab (cu m): 15.484
Class B (cu m): 0.000
Class C (cu m): 0.000
Shipment density [g/cu cm]: 1.128

	Volume (Cu m)	--- Activity --- (Ci)	[%]	---- Concentration ---- [Ci/cu m]	[pCi/g]
10. MAD076585173 M	0.0368	2.57E-03	0.28	6.97E-02	6.18E+04
11. CAR990023640 M	0.1048	2.33E-03	0.26	2.22E-02	1.97E+04
12. NYR990013500 A	0.0566	2.14E-03	0.24	3.78E-02	3.35E+04
13. PAD003044609 I	0.3738	1.56E-03	0.17	4.17E-03	3.70E+03
14. CTR990013583 M	0.0595	1.20E-03	0.13	2.02E-02	1.79E+04
15. COR990032773 I	7.2549	1.08E-03	0.12	1.49E-04	1.32E+02
16. MAR990029183 M	0.0340	1.04E-03	0.11	3.06E-02	2.71E+04
17. MIR990011181 A	0.1076	8.64E-04	0.10	8.03E-03	7.12E+03
18. NYR990014003 A	0.0368	4.68E-04	0.05	1.27E-02	1.13E+04
	15.4839	9.07E-01	100.00	5.86E-02	5.20E+04

Press 'C' key to Continue... PgDn PgUp Home End Arrows

Manifest ID: 17950-13891 Shipping Data - ORIGINAL

Gen code: TNR990022840
State: ALL
Year: 1990
Facility: Richland
Gen class: Industrial

Actual Waste [kg]: 17464.47
Total source (kg): 14.27
Special mtrl (g): 0.00

Total vol (cu m): 15.484
A-Stable (cu m): 0.000
A-Unstab (cu m): 15.484
Class B (cu m): 0.000
Class C (cu m): 0.000
Shipment density [g/cu cm]: 1.128

	Volume (Cu m)	--- Activity --- (Ci)	[%]	---- Concentration ---- [Ci/cu m]	[pCi/g]
19. NYR990025090 M	0.0396	1.88E-04	0.02	4.74E-03	4.20E+03
20. OHR990025009 I	1.7189	1.82E-04	0.02	1.06E-04	9.39E+01
21. ILR990021644 G	0.0255	5.90E-05	0.01	2.32E-03	2.05E+03
22. NJR990006025 I	0.1586	2.00E-06	0.00	1.26E-05	1.12E+01
23. NJR990022063 I	0.0340	1.00E-06	0.00	2.94E-05	2.61E+01
24. NYR990009847 M	0.0708	4.00E-05	0.00	5.65E-04	5.01E+02
25. NYR990027302 I	0.0680	4.50E-05	0.00	6.62E-04	5.87E+02
26. OHD092621234 I	0.0736	4.00E-05	0.00	5.43E-04	4.82E+02
27. PAR990027120 U	0.1076	3.60E-05	0.00	3.35E-04	2.97E+02
	15.4839	9.07E-01	100.00	5.86E-02	5.20E+04

Press 'C' key to Continue... PgDn PgUp Home End Arrows

Container Stats Menu - ORIGINAL

```
 1 - View activity stats: sorted by isotope.
 2 - View activity stats: sorted by percent.

 3 - View concentration (Ci/cu m) stats: sorted by isotope.
 4 - View concentration (Ci/cu m) stats: sorted by percent.

 5 - View concentration (pCi/g) stats: sorted by isotope.
 6 - View concentration (pCi/g) stats: sorted by percent.

 7 - View isotope plots (% rec): sorted by isotope.
 8 - View isotope plots (% vol): sorted by isotope.

 9 - View volume vs. concentration scatter plots; by isotope.
10 - View cumulative volume vs. concentration scatter plot.

11 - View totals.

12 - Exit.
```

Container Stats - ORIGINAL

```
Number of SHIPPING  records selected:     56
Number of CONTAINER records selected:   2615
Number of ISOTOPE   records selected:  18468

Total activity of containers [Ci]: 2.769E+02
Total volume of containers [cu m]: 6.994E+02
Total weight of containers [kg]:   7.587E+05

Total density [g/cu cm]:       1.085E+00
Total concentration [Ci/cu m]: 3.960E-01
Total concentration [pCi/g]:   3.650E+05
```

Press 'C' key to Continue...

Container Stats - ORIGINAL

Isotope	ACTIVITY (Ci) Total	Average	Minimum	Maximum	Manifest ID @ Maximum
CO-60	3.36E-02	3.36E-03	2.00E-05	3.15E-02	445607116448
FE-55	3.36E-02	3.36E-03	2.00E-05	3.15E-02	445607116448
MN-54	5.71E-03	5.71E-04	3.00E-06	5.36E-03	445607116448
H-3	3.00E-03	4.29E-04	9.50E-05	6.65E-04	445607116448
CO-58	1.68E-03	1.68E-04	1.00E-06	1.58E-03	445607116448
NI-63	1.68E-03	1.68E-04	1.00E-06	1.58E-03	445607116448
C-14	6.70E-04	1.12E-04	2.00E-06	6.30E-04	445607116448

Press 'C' key to Continue... PgDn PgUp Home End Arrows

Container Stats - ORIGINAL

Isotope	CONCENTRATION [Ci/Cu m] Aggregate	Average	Minimum	Maximum	Manifest ID @ Maximum
CO-60	1.58E-02	1.58E-02	9.42E-05	1.48E-01	445607116448
FE-55	1.58E-02	1.58E-02	9.42E-05	1.48E-01	445607116448
MN-54	2.69E-03	2.69E-03	1.41E-05	2.52E-02	445607116448
H-3	2.02E-03	2.02E-03	4.47E-04	3.13E-03	445607116448
CO-58	7.91E-04	7.91E-04	4.71E-06	7.42E-03	445607116448
NI-63	7.91E-04	7.91E-04	4.71E-06	7.42E-03	445607116448
C-14	5.26E-04	5.26E-04	9.42E-06	2.97E-03	445607116448

Press 'C' key to Continue... PgDn PgUp Home End Arrows

Container Stats - ORIGINAL

Isotope	CONCENTRATION [pCi/g] Aggregate	Average	Minimum	Maximum	Manifest ID @ Maximum
CO-60	1.26E+04	1.06E+04	6.67E+01	9.64E+04	445607116448
FE-55	1.26E+04	1.06E+04	6.67E+01	9.64E+04	445607116448
MN-54	2.14E+03	1.80E+03	1.00E+01	1.64E+04	445607116448
H-3	1.46E+03	1.43E+03	3.67E+02	2.03E+03	445607116448
CO-58	6.28E+02	5.29E+02	3.34E+00	4.82E+03	445607116448
NI-63	6.28E+02	5.29E+02	3.34E+00	4.82E+03	445607116448
C-14	4.51E+02	3.52E+02	7.73E+00	1.93E+03	445607116448

Press 'C' key to Continue... PgDn PgUp Home End Arrows

Container Stats Menu - ORIGINAL

1 - View activity stats: sorted by isotope.
2 - View activity stats: sorted by percent.

3 - View concentration (Ci/cu m) stats: sorted by isotope.
4 - View concentration (Ci/cu m) stats: sorted by percent.

5 - View concentration (pCi/g) stats: sorted by isotope.
6 - View concentration (pCi/g) stats: sorted by percent.

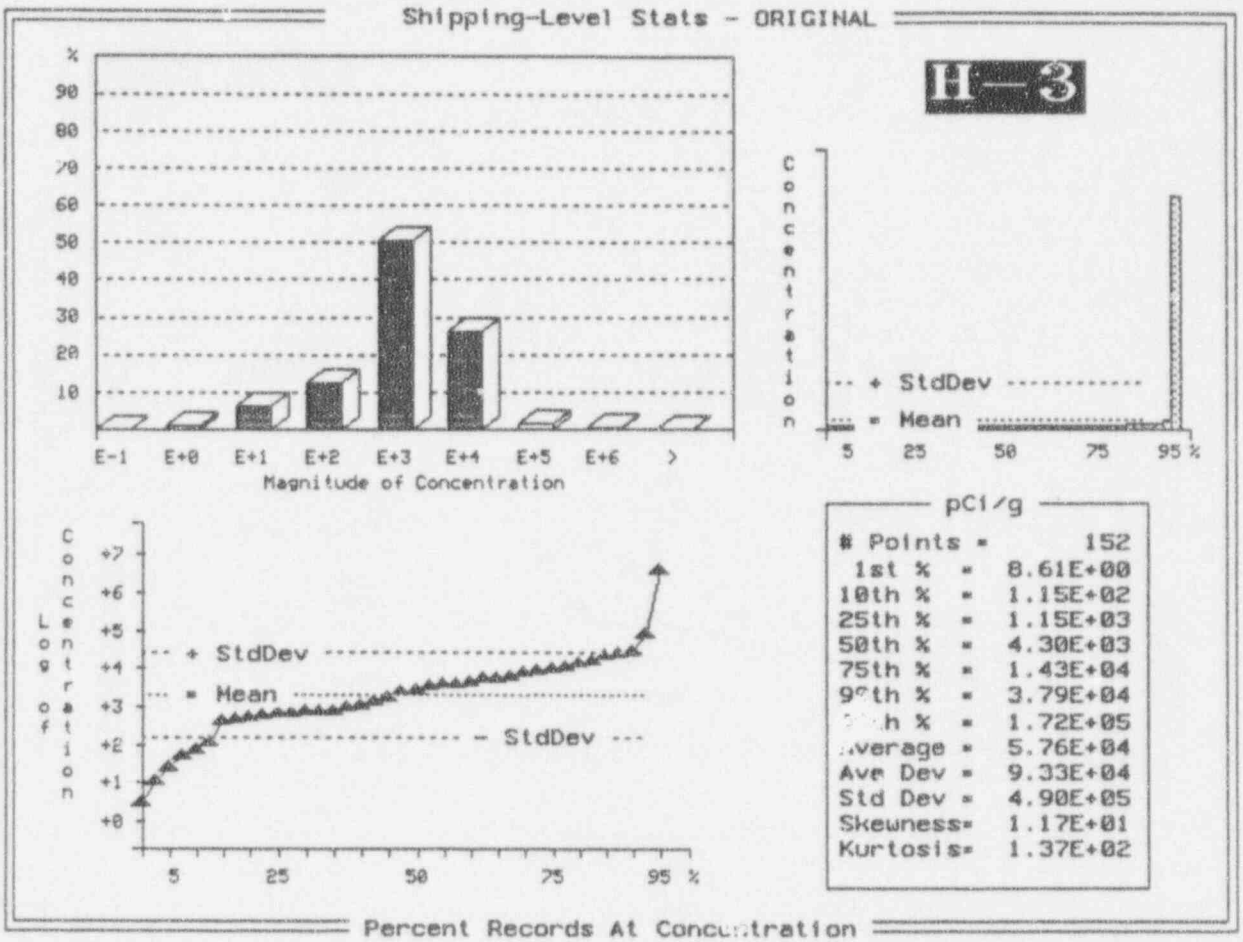
7 - View isotope stats (% rec): sorted by isotope.
8 - View isotope stats (% vol): sorted by isotope.

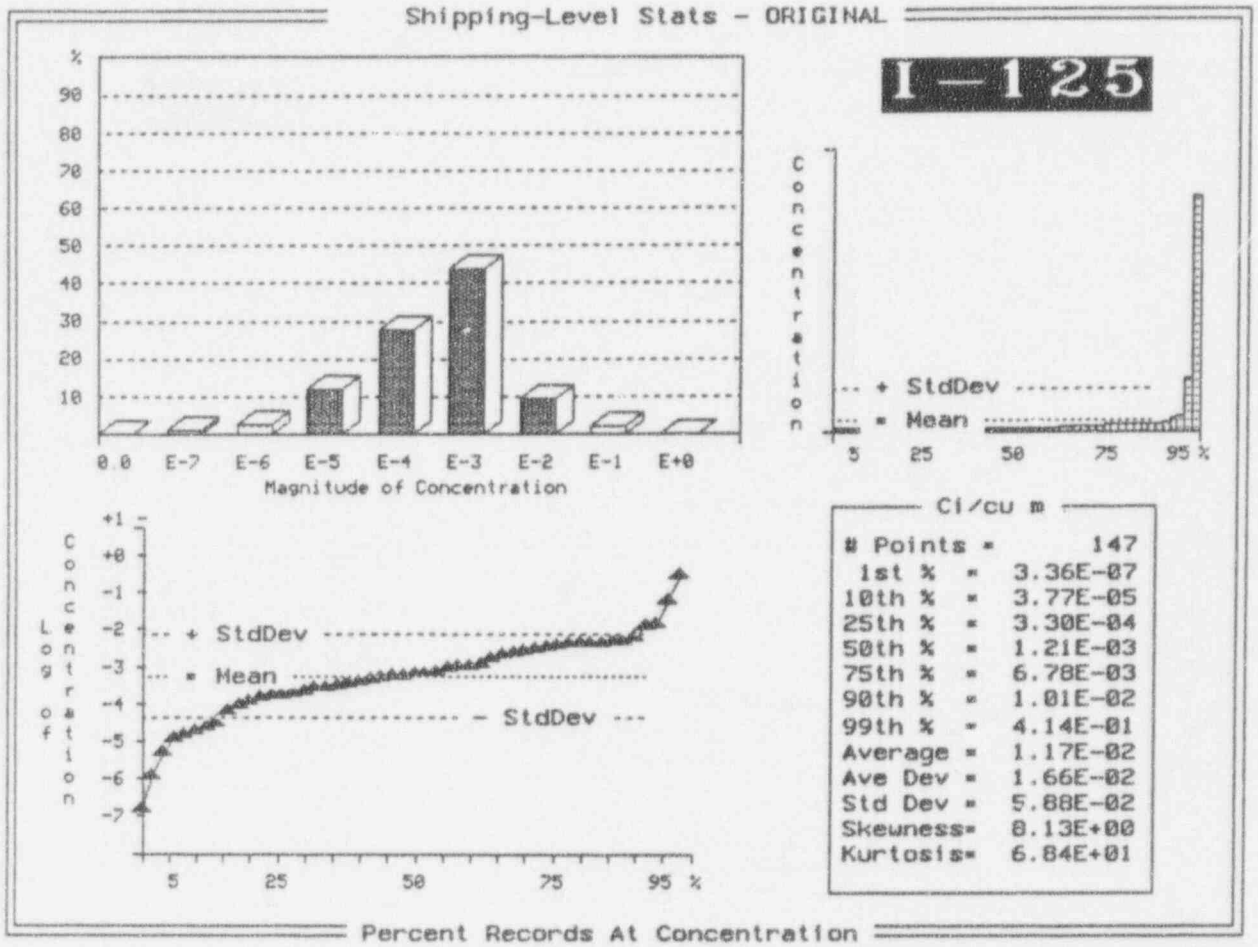
9 - View totals.

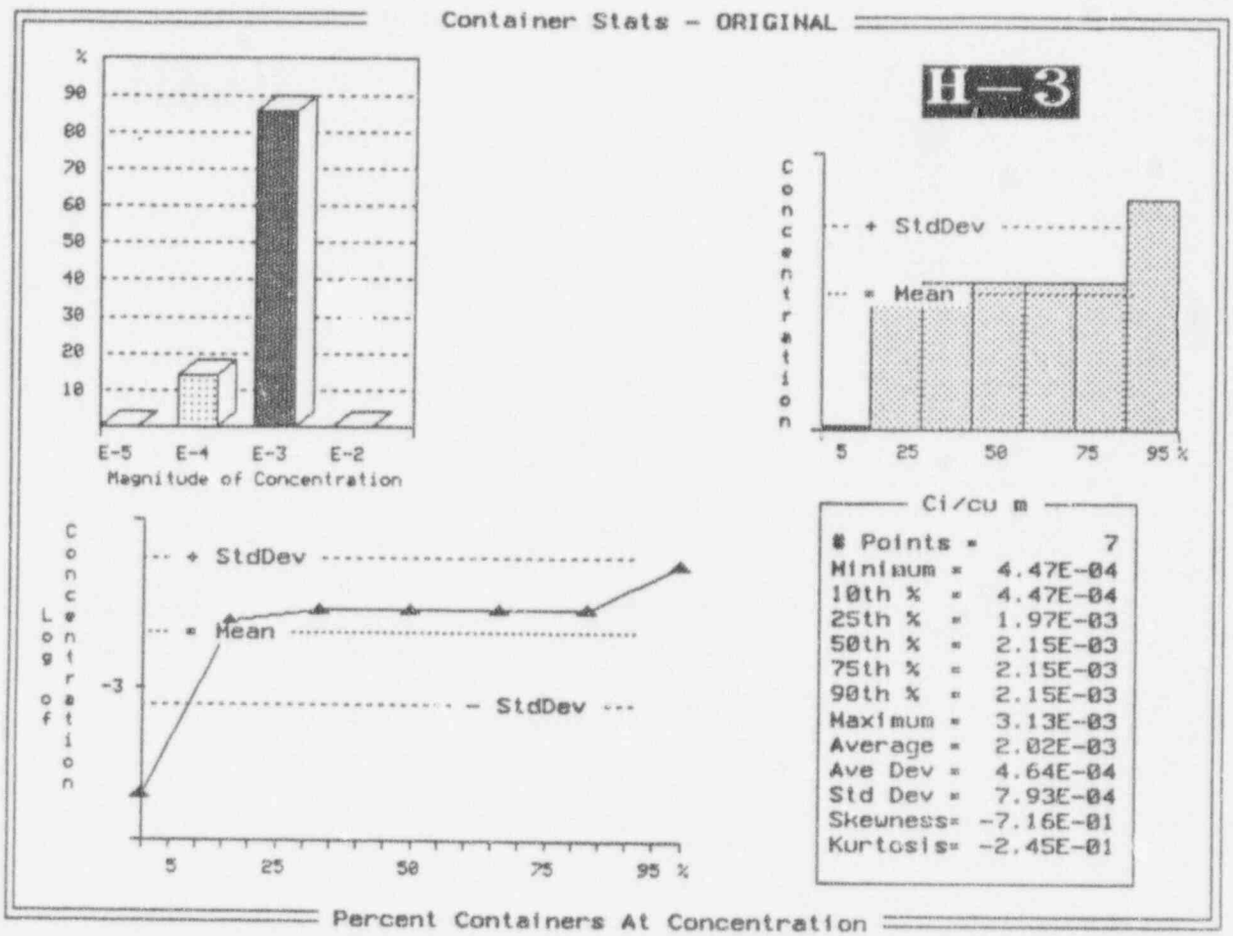
10

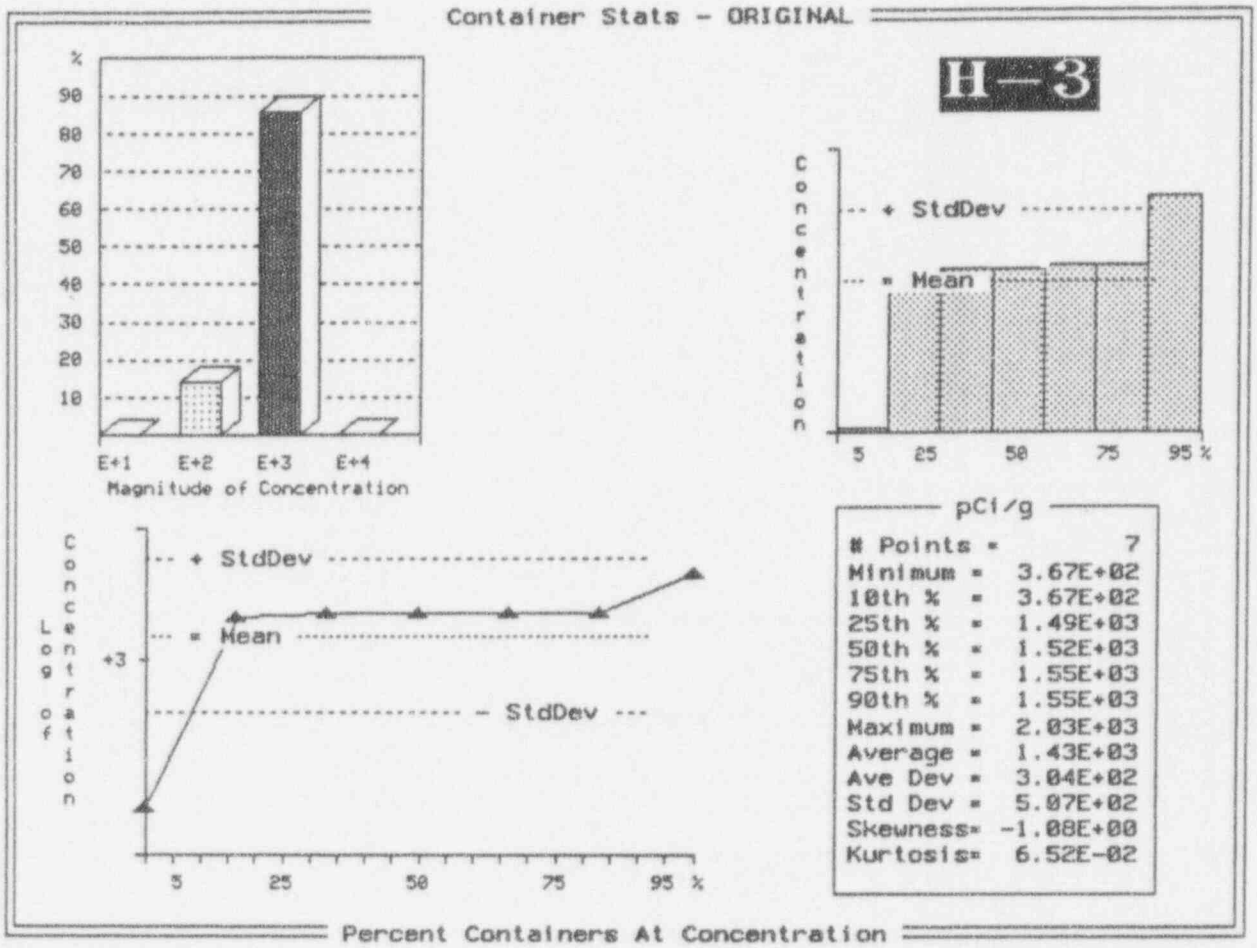
Container Stats - ORIGINAL

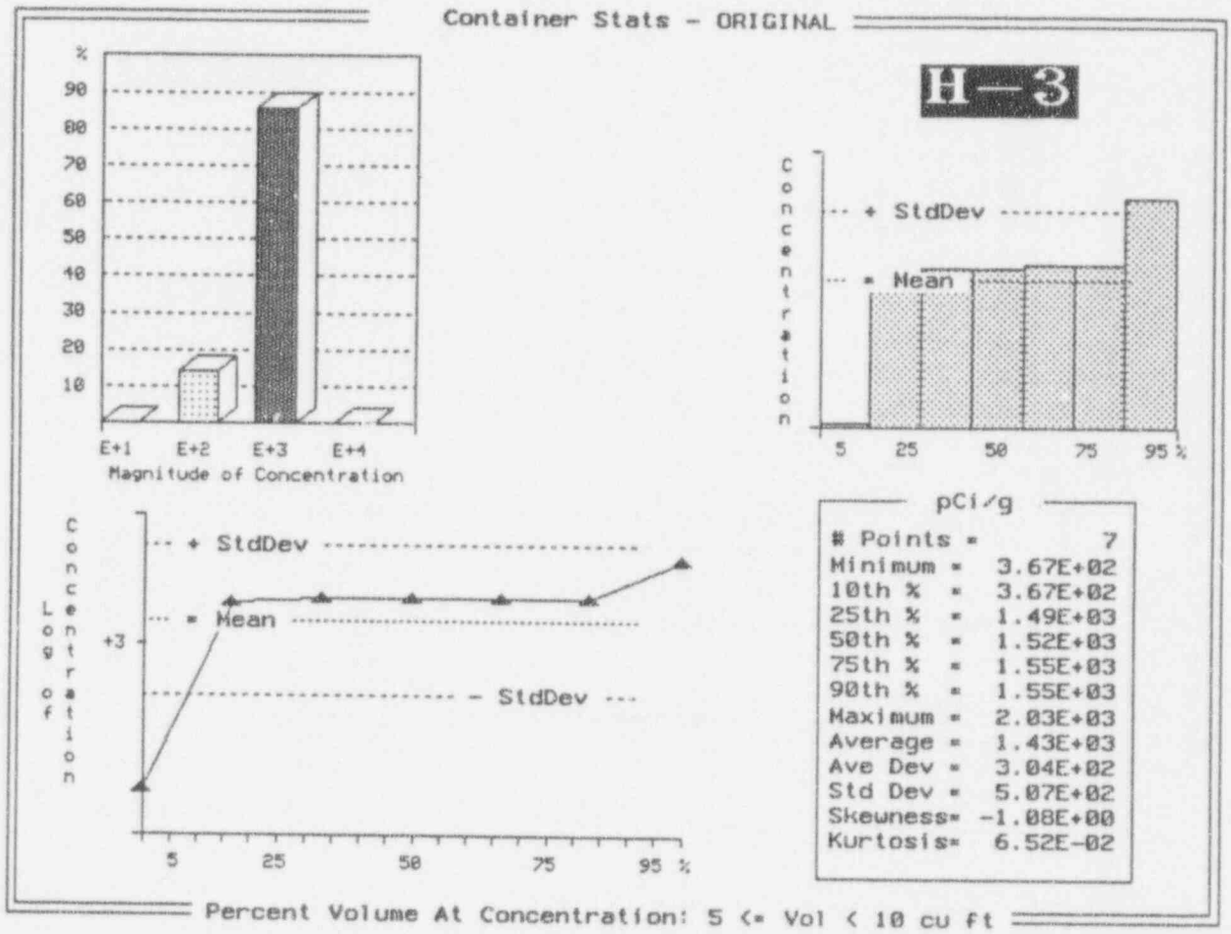
Min num of recs for histograms: 2


Shipping-Level Stats - ORIGINAL
H-3
%
90
80
70
60
50
40
30
20
10
E-1
E+0
E+1
E+2
E+3
E+4
E+5
E+6
>
Magnitude of Concentration
Concentration
+ StdDev
Mean
5
25
50
75
95 %
Log of Concentration
+7
+6
+5
+4
+3
+2
+1
+0
+ StdDev
Mean
- StdDev
5
25
50
75
95 %
pCi/g
Points = 152
1st % = 8.61E+00
10th % = 1.15E+02
25th % = 1.15E+03
50th % = 4.30E+03
75th % = 1.43E+04
90th % = 3.79E+04
95th % = 1.72E+05
Average = 5.76E+04
Ave Dev = 9.33E+04
Std Dev = 4.90E+05
Skewness= 1.17E+01
Kurtosis= 1.37E+02
Percent Records At Concentration


Shipping-Level Stats - ORIGINAL
I-125
%
90
80
70
60
50
40
30
20
10
0.0
E-7
E-6
E-5
E-4
E-3
E-2
E-1
E+0
Magnitude of Concentration
Concentration
+ StdDev
Mean
5
25
50
75
95 %
Log of Concentration
+1
+0
-1
-2
-3
-4
-5
-6
-7
+ StdDev
Mean
- StdDev
5
25
50
75
95 %
Ci/cu m
Points = 147
1st % = 3.36E-07
10th % = 3.77E-05
25th % = 3.30E-04
50th % = 1.21E-03
75th % = 6.78E-03
90th % = 1.01E-02
99th % = 4.14E-01
Average = 1.17E-02
Ave Dev = 1.66E-02
Std Dev = 5.88E-02
Skewness= 8.13E+00
Kurtosis= 6.84E+01
Percent Records At Concentration

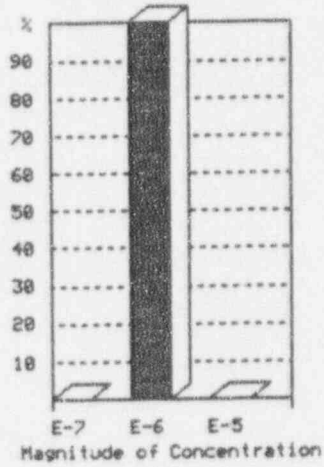

Container Stats - ORIGINAL
H-3
%
90
80
70
60
50
40
30
20
10
E-5
E-4
E-3
E-2
Magnitude of Concentration
Concentration
+ StdDev
= Mean
5
25
50
75
95 %
Log of Concentration
+ StdDev
= Mean
-3
- StdDev
5
25
50
75
95 %
Ci/cu m
# Points = 7
Minimum = 4.47E-04
10th % = 4.47E-04
25th % = 1.97E-03
50th % = 2.15E-03
75th % = 2.15E-03
90th % = 2.15E-03
Maximum = 3.13E-03
Average = 2.02E-03
Ave Dev = 4.64E-04
Std Dev = 7.93E-04
Skewness= -7.16E-01
Kurtosis= -2.45E-01
Percent Containers At Concentration

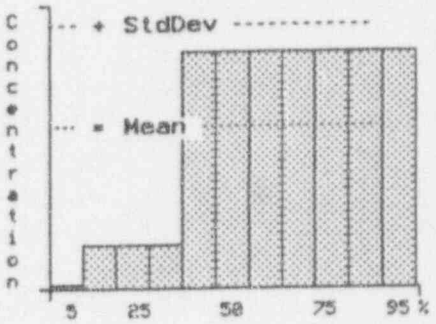

Container Stats - ORIGINAL
H-3
%
90
80
70
60
50
40
30
20
10
E+1
E+2
E+3
E+4
Magnitude of Concentration
Concentration
+ StdDev
= Mean
5
25
50
75
95 %
Log of Concentration
+ StdDev
= Mean
+3
- StdDev
5
25
50
75
95 %
pCi/g
# Points = 7
Minimum = 3.67E+02
10th % = 3.67E+02
25th % = 1.49E+03
50th % = 1.52E+03
75th % = 1.55E+03
90th % = 1.55E+03
Maximum = 2.03E+03
Average = 1.43E+03
Ave Dev = 3.04E+02
Std Dev = 5.07E+02
Skewness= -1.08E+00
Kurtosis= 6.52E-02
Percent Containers At Concentration

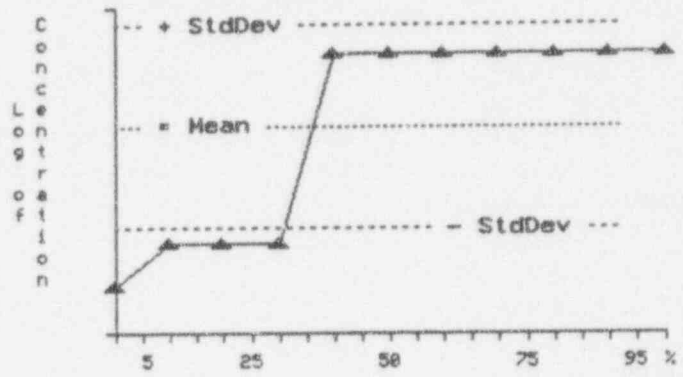

Container Stats - ORIGINAL
H-3
%
90
80
70
60
50
40
30
20
10
E+1
E+2
E+3
E+4
Magnitude of Concentration
Concentration
+ StdDev
Mean
5
25
50
75
95 %
Log of Concentration
+ StdDev
Mean
+3
- StdDev
5
25
50
75
95 %
pCi/g
# Points = 7
Minimum = 3.67E+02
10th % = 3.67E+02
25th % = 1.49E+03
50th % = 1.52E+03
75th % = 1.55E+03
90th % = 1.55E+03
Maximum = 2.03E+03
Average = 1.43E+03
Ave Dev = 3.04E+02
Std Dev = 5.07E+02
Skewness= -1.08E+00
Kurtosis= 6.52E-02
Percent Volume At Concentration: 5 <= Vol < 10 cu ft

Shipping-Level Stats - ORIGINAL Rec: 1 of 8

C-14







Ci/cu m

# Points =	11
Minimum =	4.71E-06
10th % =	4.71E-06
25th % =	4.90E-06
50th % =	5.89E-06
75th % =	5.89E-06
90th % =	5.89E-06
Maximum =	5.89E-06
Average =	5.51E-06
Ave Dev =	4.77E-07
Std Dev =	5.22E-07
Skewness=	-5.22E-01
Kurtosis=	-1.83E+00

Percent Volume At Concentration: 100 <= Vol < 500 cu ft

Container Stats - ORIGINAL

```
Number of SHIPPING  records selected:      1
Number of CONTAINER records selected:     10
Number of ISOTOPE   records selected:     63

Total activity of containers [Ci]: 7.997E-02
Total volume of containers [cu m]: 2.124E+00
Total weight of containers [kg]:   2.674E+03

Total density [g/cu cm]:       1.259E+00
Total concentration [Ci/cu m]: 3.765E-02
Total concentration [pCi/g]:   2.991E+04
```

Press 'C' key to Continue...

Shipment Stats - ORIGINAL

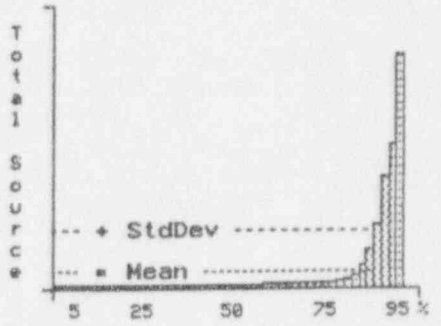
```
Number of SHIPPING records selected:          1
                With container data:          1 *
Number of MANIFEST records selected:         27
Number of CONTAINR records selected:         29 *
Number of ISOTOPE  records selected:         28

Total activity of shipments [Ci]:     9.075E-01
Total volume of shipments [cu m]:     1.548E+01
Computed weight of shipments [kg]:    1.548E+04
Total weight of containers [kg]:      1.746E+04 *

Nominal density [g/cu cm]:            1.000E+00
Total density [g/cu cm]:              1.128E+00 *

Total concentration [Ci/cu m]:        5.861E-02
Total concentration [pCi/g]:          5.197E+04 *


* For shipments with container data.
```

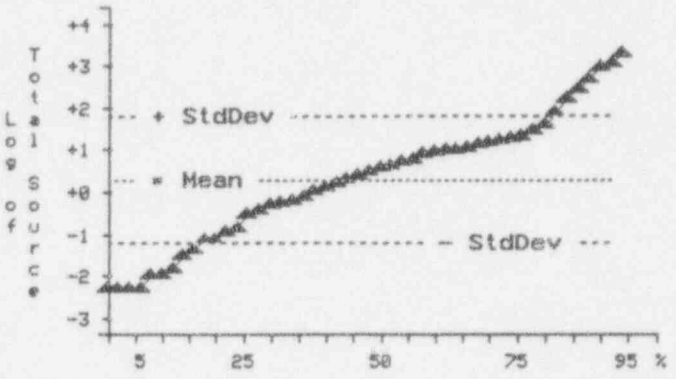
Press 'C' key to Continue...

Total Source & Special Material - ORIGINAL

Generator class: Industrial
Waste class: Class A (All)
Year: ALL
Facility: ALL
Data: ALL
State: New York

Total source material [kg]: 3.64E+04





kg

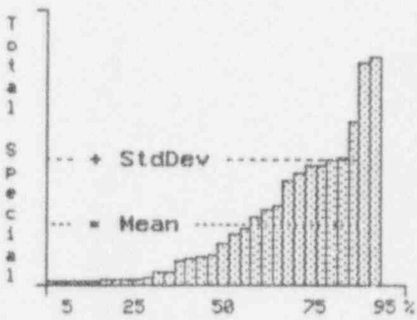
# Points =	234
1st % =	1.00E-02
10th % =	2.00E-02
25th % =	2.70E-01
50th % =	5.06E+00
75th % =	2.88E+01
90th % =	2.98E+02
99th % =	2.77E+03
Average =	1.56E+02
Ave Dev =	2.51E+02
Std Dev =	5.01E+02
Skewness=	4.15E+00
Kurtosis=	1.82E+01

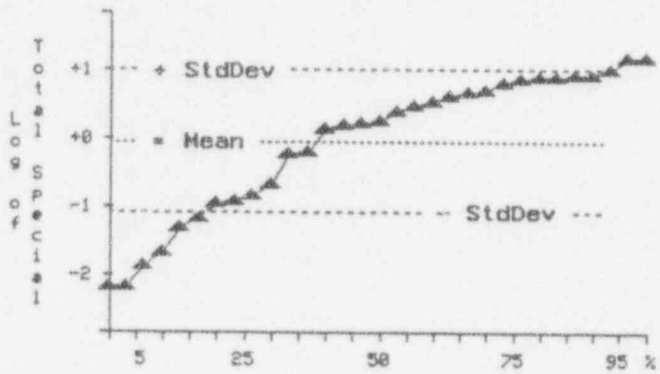
Total Source Material

Total Source & Special Material - ORIGINAL

Generator class: Industrial
Waste class: Class A (All)
Year: ALL
Facility: ALL
Data: ALL
State: New York

Special material [g]: 2.88E+02





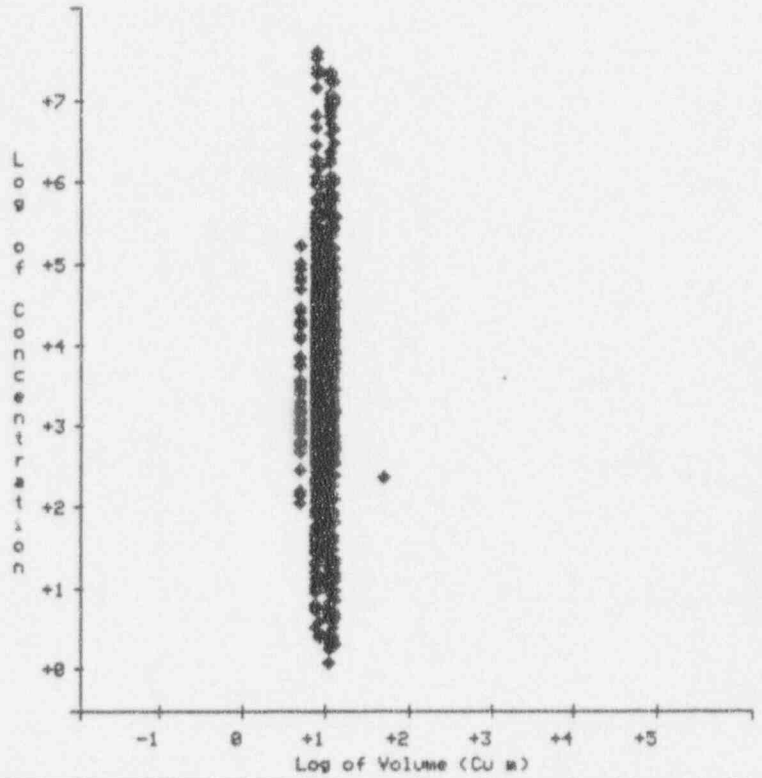
g

# Points =	60
Minimum =	1.00E-02
10th % =	2.00E-02
25th % =	1.70E-01
50th % =	2.36E+00
75th % =	9.02E+00
90th % =	1.12E+01
Maximum =	2.02E+01
Average =	4.80E+00
Ave Dev =	4.39E+00
Std Dev =	5.30E+00
Skewness=	1.05E+00
Kurtosis=	2.87E-01

Total Special Material

Container-Level Stats - ORIGINAL Rec: 34 of 96

H—3



pCi/g

# Points =	2338
1st % =	3.33E+00
10th % =	1.60E+02
25th % =	1.24E+03
50th % =	5.82E+03
75th % =	2.42E+04
90th % =	1.19E+05
99th % =	1.03E+07
Average =	2.97E+05
Ave Dev =	5.26E+05
Std Dev =	2.33E+06
Skewness=	1.15E+01
Kurtosis=	1.52E+02

Volume Vs. Concentration (pCi/g)

APPENDIX C

Waste Forms and Radionuclide Concentrations by Compacts and Unaffiliated States (Analyses at the Container Level) (Non-Brokered Waste - Aggregate Practices 1988-1990)

Table C-1 Northwest Compact Government Waste Generators Biomedical Radionuclide Distributions - Container Level(a)

Waste Class: A-Stable
Waste form: Solidified resins - Cement
Number of shipping records: 2
Number of shipping containers: 2
Total waste volume: 10.0 m^3
Total waste mass: 15,141 kg
Average waste form density: 1.52 g/cm^3

	Concentration Ranges - Percentile - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
C-14	2.01E-02	2.01E-02	7.91E-02	1.33E+04	1.33E+04	5.31E+04
Co-58	6.02E-02	6.02E-02	1.97E-01	3.89E+04	3.89E+04	1.33E+05
Co-60	1.30E-00	1.30E-00	3.95E-00	8.42E+05	8.42E+05	2.65E+06
Fe-55	1.30E-	1.30E-00	3.95E-00	8.42E+05	8.42E+05	2.65E+06
H-3	6.02E-0	6.02E-04	1.22E-03	4.04E+02	4.04E+02	7.90E+02
I-129	2.01E-07	2.01E-07	8.03E-07	1.30E-01	1.30E-01	5.39E-01
Mn-54	2.21E-01	2.21E-01	6.71E-01	1.43E+05	1.43E+05	4.51E+05
Ni-63	6.02E-02	6.02E-02	1.97E-01	3.89E+04	3.89E+04	1.33E+05
Tc-99	2.01E-07	2.01E-07	8.03E-07	1.30E-01	1.30E-01	5.39E-01

Waste Class: A-Stable
Waste form: Dewatered resins
Number of shipping records: 4
Number of shipping containers: 4
Total waste volume: 22.9 m^3
Total waste mass: 21,324 kg
Average waste form density: 0.93 g/cm^3

	Concentration Ranges - Percentile - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
C-14	2.80E-02	2.80E-02	2.97E-02	2.97E+04	2.99E+04	3.22E+04
Co-58	7.17E-02	7.17E-02	7.34E-02	7.62E+04	7.65E+04	7.95E+04
Co-60	1.43E-00	1.43E-00	1.47E-00	1.52E+06	1.53E+06	1.59E+06
Fe-55	1.43E-00	1.43E-00	1.47E-00	1.52E+06	1.53E+06	1.59E+06
H-3	6.64E-04	6.64E-04	6.64E-04	7.06E+02	7.09E+02	7.19E+02
I-129	3.50E-07	3.50E-07	3.50E-07	3.72E-01	3.73E-01	3.78E-01
Mn-54	2.45E-01	2.45E-01	2.45E-01	2.60E+05	2.61E+05	2.65E+05
Ni-63	7.17E-02	7.17E-02	7.34E-02	7.62E+04	7.65E+04	7.95E+04

Table C-1 Northwest Compact Government Waste Generators Biomedical Radionuclide Distributions - Container Level[a], Cont'd

Waste Class: A-Unstable
Waste form: Dry solid
Number of shipping records: 46
Number of shipping containers: 1,935
Total waste volume: 885 m^3
Total waste mass: 530,833 kg
Average waste form density: 0.60 g/cm^3

	Concentration Ranges - Percentile[b] - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
Tc-99	3.50E-07	3.50E-07	3.50E-07	3.72E-01	3.73E-01	3.78E-01
Ag-110m	3.77E-07	3.02E-06	1.37E-04	7.53E-01	8.41E+00	4.08E+02
Am-241	9.42E-06	2.35E-05	2.83E-04	1.92E+01	7.11E+01	8.01E+02
Ba-133*	4.71E-06	4.71E-06	4.71E-06	2.45E+01	2.45E+01	2.45E+01
C-14	4.71E-06	1.41E-05	2.01E-03	4.47E+00	1.49E+01	2.24E+03
Co-58	4.71E-06	1.88E-05	4.39E-03	4.75E+00	2.39E+01	4.56E+03
Co-60	4.71E-06	2.73E-04	7.78E-02	5.66E+00	3.39E+02	8.47E+04
Cr-51	3.52E-07	1.06E-06	3.87E-06	5.69E-01	1.99E+00	1.07E+03
Cs-134	3.52E-07	3.52E-07	3.52E-07	5.59E-01	7.30E-01	1.02E+00
Cs-137	4.76E-06	9.42E-06	5.65E-03	1.24E+01	2.84E+01	1.60E+04
Fe-55	4.71E-06	2.73E-04	7.91E-02	5.65E+00	3.43E+02	8.81E+04
Fe-59	3.77E-07	1.13E-06	4.04E-05	7.53E-01	3.15E+00	1.21E+02
H-3	4.71E-06	2.69E-03	1.70E-02	2.45E+01	2.05E+03	4.81E+04
I-129*	3.52E-07	3.52E-07	3.52E-07	9.77E-01	9.77E-01	9.77E-01
Ir-192*	4.71E-06	4.71E-06	4.71E-06	7.60E+00	7.60E+00	7.60E+00
Kr-85	4.71E-06	4.71E-06	2.02E-03	7.60E+00	2.59E+01	4.03E+03
Mn-54	4.71E-06	5.18E-05	1.34E-02	5.28E+00	6.28E+01	1.50E+04
Ni-63	4.71E-06	1.88E-05	4.71E-03	4.75E+00	2.42E+01	5.09E+03
Pm-147	2.35E-04	2.35E-04	1.41E-01	7.11E+02	7.11E+02	4.00E+05
Po-210	4.71E-03	4.71E-03	4.71E-03	7.60E+03	7.60E+03	1.24E+04
Ra-226	6.12E-05	1.46E-03	3.48E-03	2.58E+02	3.33E+03	6.71E+03
Sr-90	3.77E-04	3.77E-04	4.71E-03	5.78E+02	5.97E+02	1.24E+04
Tc-99	4.71E-06	4.71E-06	4.71E-06	7.47E+00	1.33E+01	2.59E+01
Th-232	2.83E-05	2.59E-04	3.86E-03	2.20E+02	7.02E+02	7.69E+03
U-238*	4.71E-06	4.71E-06	4.71E-06	9.58E+00	9.58E+00	9.58E+00
Zn-65	3.77E-07	1.13E-06	4.98E-05	7.53E-01	3.15E+00	1.49E+02

Table C-1 Northwest Compact Government Waste Generators Biomedical Radionuclide Distributions - Container Level[a], Cont'd

Waste Class: A-Unstable
Waste form: Solidified liquids - Cement
Number of shipping records: 24
Number of shipping containers: 340
Total waste volume: 72.2 m^3
Total waste mass: 90,617 kg
Average waste form density: 1.26 g/cm^3

	Concentration Ranges - Ci/m^3 -			Percentile - pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
C-14	4.71E-06	4.71E-06	8.80E-04	3.02E+00	5.65E+00	6.01E+02
Co-56	5.18E-05	1.27E-04	1.88E-03	5.51E+01	1.43E+02	1.93E+03
Co-58	4.71E-06	1.41E-05	2.20E-03	3.08E+00	9.86E+00	1.50E+03
Co-60	4.71E-06	2.17E-04	4.39E-02	3.25E+00	1.70E+02	3.00E+04
Fe-55	4.71E-06	2.07E-04	4.39E-02	3.25E+00	1.68E+02	3.00E+04
H-3	2.26E-04	3.39E-03	3.39E-03	2.59E+02	2.35E+03	2.87E+03
Mn-54	4.71E-06	4.24E-05	7.47E-03	3.61E+00	3.05E+01	5.10E+03
Ni-63	4.71E-06	1.41E-05	2.20E-03	3.08E+00	9.86E+00	1.50E+03

Waste Class: A-Unstable
Waste form: Compacted dry active waste
Number of shipping records: 7
Number of shipping containers: 56
Total waste volume: 12.0 m^3
Total waste mass: 10,281 kg
Average waste form density: 0.86 g/cm^3

	Concentration Ranges - Ci/m^3 -			Percentile - pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
C-14	4.71E-06	9.42E-06	1.04E-04	4.64E+00	1.11E+01	1.24E+02
Co-58	4.71E-06	1.88E-05	2.59E-04	5.19E+00	2.21E+01	3.11E+02
Co-60	3.77E-05	3.39E-04	5.18E-03	4.28E+01	4.32E+02	6.21E+03
Fe-55	3.77E-05	3.77E-04	5.18E-03	4.28E+01	4.43E+02	6.21E+03
H-3	2.26E-04	4.52E-04	6.78E-04	2.39E+02	5.39E+02	8.76E+02
Mn-54	9.42E-06	6.12E-05	8.80E-04	1.07E+01	7.75E+01	1.06E+03
Ni-63	4.71E-06	1.88E-05	2.59E-04	5.19E+00	2.21E+01	3.11E+02

Table C-1 Northwest Compact Government Waste Generators Biomedical Radionuclide Distributions - Container Level[a], Cont'd

Waste Class: A-Unstable
Waste form: Non-compacted dry active waste
Number of shipping records: 2
Number of shipping containers: 10
Total waste volume: 27.2 m^3
Total waste mass: 12,171 kg
Average waste form density: 0.45 g/cm^3

	Concentration Ranges - Percentile[b] - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
C-14	7.55E-07	1.83E-06	1.36E-03	2.26E+00	4.32E+00	2.33E+03
Co-58	1.89E-06	4.77E-06	3.40E-03	5.64E+00	1.12E+01	5.83E+03
Co-60	3.40E-05	9.21E-05	6.79E-02	1.08E+02	2.11E+02	1.17E+05
Cr-51*	2.93E-06	2.93E-06	2.93E-06	8.75E+00	8.75E+00	8.75E+00
Cs-134*	3.67E-07	3.67E-07	3.67E-07	1.09E+00	1.09E+00	1.09E+00
Fe-55	3.40E-05	9.21E-05	6.79E-02	1.08E+02	2.11E+02	1.17E+05
Mn-54	6.04E-06	1.58E-05	1.15E-02	1.92E+01	3.63E+01	1.98E+04
Ni-63	1.89E-06	4.77E-06	3.340-03	5.64E+00	1.12E+01	5.83E+03

Table C-1 Northwest Compact Government Waste Generators Biomedical Radionuclide Distributions - Container Level[a], Cont'd

Waste Class: A-Unstable
Waste form: Non-cartridge filter media
Number of shipping records: 3
Number of shipping containers: 8
Total waste volume: 1.8 m^3
Total waste mass: 2,578 kg
Average waste form density: 1.43 g/cm^3

	Concentration Ranges - Percentile - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
C-14	6.12E-05	8.95E-05	1.24E-03	4.63E+01	6.71E+01	7.60E+02
Co-58	1.55E-04	2.26E-04	3.11E-03	1.18E+02	1.66E+02	1.90E+03
Co-60	3.02E-03	4.50E-03	6.22E-02	2.29E+03	3.26E+03	3.80E+04
Fe-55	3.02E-03	4.50E-03	6.22E-02	2.29E+03	3.26E+03	3.80E+04
H-3	1.30E-03	2.73E-03	2.87E-03	9.20E+02	1.81E+03	2.17E+03
Mn-54	5.18E-04	7.63E-04	1.06E-02	3.92E+02	5.54E+02	6.46E+03
Ni-63	1.55E-04	2.26E-04	3.11E-03	1.18E+02	1.66E+02	1.90E+03

(a) LLW containers shipped to Beatty and Richland (1988-1990).
(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table C-2 Northwest Compact Academic Waste Generators Biomedical Radionuclide Distributions - Container Level[a]

Waste Class: A-Unstable
Waste form: Absorbed aqueous liquid - Floor Dry, Aquaset
Number of shipping records: 9
Number of shipping containers: 1,154
Total waste volume: 20.3 m^3
Total waste mass: 16,258 kg
Average waste form density: 0.80 g/cm^3

	Concentration Ranges - Percentile[b] - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
C-14	5.27E-05	7.51E-03	5.27E-01	7.34E+01	1.01E+04	7.69E+05
Ca-45	1.05E-03	3.46E-03	1.05E-01	1.63E+03	4.05E+03	2.00E+05
Cd-109	1.48E-03	2.64E-02	3.76E-02	1.93E+03	3.44E+04	5.01E+04
Cl-36	5.65E-05	1.46E-04	7.30E-04	6.22E+01	1.61E+02	8.03E+02
Co-60	4.71E-06	2.40E-04	3.20E-04	5.18E+00	2.64E+02	3.52E+02
Cr-51	1.05E-02	2.33E-01	5.27E-01	1.26E+04	2.94E+05	8.31E+05
Cs-134	2.11E-04	4.51E-04	5.27E-04	2.75E+02	5.29E+02	6.88E+02
Fe-59	3.76E-03	3.76E-03	1.50E-02	3.61E+03	3.61E+03	1.57E+04
H-3	7.51E-05	5.41E-02	4.13E-00	8.47E+01	7.82E+04	6.06E+06
I-125	7.51E-05	3.76E-02	1.50E-00	8.47E+01	4.41E+04	1.72E+06
I-131	1.88E-02	5.27E-02	3.76E-01	2.50E+04	6.67E+04	4.32E+05
Mn-54	5.27E-04	5.27E-03	9.86E-03	8.99E+02	7.73E+03	1.25E+04
Na-22	1.41E-05	1.55E-04	2.42E-03	1.55E+01	1.71E+02	2.67E+03
P-32	7.51E-05	7.51E-02	2.60E-00	1.00E+02	9.73E+04	4.05E+06
S-35	5.27E-05	3.38E-02	1.50E-00	8.20E+01	4.13E+04	1.92E+06
Se-75*	2.54E-04	2.54E-04	2.754-04	2.80E+02	2.80E+02	2.80E+02
Zn-65	1.32E-02	1.32E-02	3.76E-02	1.72E+04	1.72E+04	4.59E+04

Table C-2 Northwest Compact Academic Waste Generators Biomedical Radionuclide Distributions - Container Level[a], Cont'd

Waste Class: A-Unstable
Waste form: Animal carcasses in lime and sorbent - Floor Dry
Number of shipping records: 8
Number of shipping containers: 93
Total waste volume: 19.8 m^3
Total waste mass: 10,389 kg
Average waste form density: 0.53 g/cm^3

	Concentration Ranges - Percentile[b] - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
Ag-110*	2.35E-04	2.35E-04	2.35E-04	4.08E+02	4.08E+02	4.08E+02
Ba-133*	2.35E-04	2.35E-04	2.35E-04	4.08E+02	4.08E+02	4.08E+02
C-14	4.71E-06	1.41E-04	9.42E-02	8.16E+00	3.07E+02	1.63E+05
Ce-141	4.71E-06	4.71E-06	4.71E-04	7.47E+00	1.02E+01	8.01E+02
Cr-51	4.71E-06	4.71E-06	4.71E-04	8.01E+00	8.01E+00	8.01E+02
Fe-59	1.18E-04	1.18E-04	5.89E-04	2.56E+02	2.56E+02	1.28E+03
H-3	4.71E-06	1.21E-01	3.12E-01	8.81E+00	2.27E+05	6.10E+05
I-125	4.71E-06	4.85E-04	1.22E-02	8.16E+00	1.02E+03	2.66E+04
I-131	4.71E-06	2.35E-04	9.42E-03	7.47E+00	3.73E+02	2.32E+04
In-111	1.41E-05	3.77E-05	4.71E-05	2.40E+01	6.41E+01	1.02E+02
Nb-95	4.71E-06	4.71E-06	4.71E-03	7.47E+00	1.02E+01	1.02E+04
P-32	2.35E-03	2.35E-03	4.71E-03	4.08E+03	4.08E+03	8.01E+03
Ru-103	4.71E-06	4.71E-06	4.71E-04	7.47E+00	1.02E+01	8.01E+02
S-35	2.35E-04	8.48E-03	2.35E-01	4.41E+02	1.84E+04	5.12E+05
Sc-46	4.71E-06	5.65E-05	9.42E-04	7.47E+00	1.06E+02	1.60E+03
Sn-113	4.71E-06	4.71E-06	1.18E-03	7.47E+00	7.47E+00	2.00E+03
Sr-85	4.71E-05	9.42E-05	9.42E-05	1.02E+02	2.05E+02	2.05E+02

Table C-2 Northwest Compact Academic Waste Generators Biomedical Radionuclide Distributions - Container Level[a], Cont'd

Waste Class: A-Unstable
Waste form: Dry solid
Number of shipping records: 8
Number of shipping containers: 316
Total waste volume: 67.1 m^3
Total waste mass: 35,867 kg
Average waste form density: 0.53 g/cm^3

	Concentration Ranges - Percentile[b] - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
Ag-110m	4.71E-05	4.71E-04	4.71E-04	8.95E+01	7.32E+02	7.87E+02
Am-241	9.42E-06	9.42E-06	6.14E-03	1.67E+01	1.67E+01	1.17E+04
Ba-133	4.71E-05	4.71E-04	1.55E-03	7.37E+01	7.87E+02	2.95E+03
C-14	4.71E-06	1.39E-03	3.35E-02	7.84E+00	2.94E+03	7.20E+04
Ca-45	4.71E-06	9.42E-04	9.42E-03	8.13E+00	1.92E+03	2.02E+04
Ce-141	4.71E-06	2.35E-04	2.76E-03	7.11E+00	4.75E+02	6.84E+03
Co-57	4.71E-06	1.88E-05	4.71E-03	8.22E+00	1.26E+01	8.33E+03
Co-60	2.35E-05	9.89E-05	3.64E-03	5.18E+01	1.97E+02	6.28E+03
Cr-51	4.71E-06	1.65E-02	1.21E-01	9.70E+00	3.21E+04	2.50E+05
Cs-134*	4.71E-06	4.71E-06	4.71E-06	9.39E+00	9.39E+00	9.39E+00
Cs-137	4.71E-06	4.71E-06	4.71E-06	8.41E+00	8.41E+00	9.39E+00
Fe-59	4.71E-06	2.35E-05	9.42E-05	1.07E+01	4.06E+01	2.25E+02
Ga-68	3.30E-05	1.88E-03	4.71E-03	7.09E+01	3.29E+03	9.49E+03
Gd-153*	4.71E-03	4.71E-03	4.71E-03	8.59E+03	8.59E+03	8.59E+03
Ge-68	4.71E-04	2.35E-03	2.83E-03	9.05E+02	3.68E+03	5.37E+03
H-3	3.77E-05	1.29E-02	2.74E-01	8.85E+01	2.68E+04	6.58E+05
I-125	2.83E-04	1.72E-02	1.84E-01	5.71E+02	3.34E+04	3.65E+05
I-131	4.71E-06	7.06E-03	9.84E-02	9.51E+00	1.39E+04	2.07E+05
In-111	4.71E-04	2.35E-03	7.53E-03	9.79E+02	4.59E+03	1.48E+04
Mn-54	9.42E-06	1.88E-05	4.71E-05	1.30E+01	4.04E+01	8.33E+01
Na-22	9.42E-06	9.42E-06	2.83E-03	6.29E+00	6.29E+00	5.12E+03
Nb-95	4.71E-06	2.35E-04	2.35E-03	7.11E+00	4.92E+02	6.84E+03
Ni-63	9.42E-03	9.42E-03	7.06E-02	1.51E+01	1.67E+04	1.77E+05
P-32	4.71E-06	9.42E-02	1.22E-01	1.40E+01	1.92E+04	2.77E+05
P-33*	4.71E-03	4.71E-03	4.71E-03	1.01E+04	1.01E+04	1.01E+04
Ra-226*	4.42E-05	4.24E-05	4.24E-05	8.06E+01	8.06E+01	8.06E+01
Rb-86	4.71E-04	4.71E-04	4.71E-04	7.87E+02	7.87E+02	8.54E+02
Ru-103	4.71E-06	2.35E-04	2.35E-03	7.11E+00	4.97E+02	6.84E+03
Ru-106*	9.42E-06	9.42E-06	9.42E-06	1.90E+01	1.90E+01	1.90E+01

Table C-2 Northwest Compact Academic Waste Generators Biomedical Radionuclide Distributions - Container Level[a], Cont'd

Nuclide	Concentration Ranges - Percentile[b] - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
S-35	4.71E-05	1.38E-02	1.06E-01	1.02E+02	2.82E+04	2.26E+05
Sc-46	4.71E-06	2.35E-04	3.77E-03	7.11E+00	4.75E+02	6.87E+03
Sn-113	4.71E-06	2.35E-04	2.35E-03	9.51E+00	4.97E+02	6.84E+03
Sr-85	4.71E-06	7.06E-04	3.10E-02	9.51E+00	1.42E+03	5.95E+04
Tc-99*	1.41E-05	1.41E-05	1.41E-05	3.02E+01	3.02E+01	3.02E+01
Zn-65	1.41E-05	1.03E-03	2.37E-02	3.51E+01	2.01E+03	4.82E+04

Waste Class: A-Unstable
Waste form: Compacted dry active waste
Number of shipping records: 3
Number of shipping containers: 116
Total waste volume: 24.6 m^3
Total waste mass: 14,842 kg
Average waste form density: 0.60 g/cm^3

Nuclide	Concentration Ranges - Percentile[b] - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
Am-241	5.18E-05	5.18E-05	1.18E-04	1.04E+02	1.04E+02	2.54E+02
C-14	4.71E-06	9.42E-04	2.14E-02	6.78E+00	1.67E+03	3.38E+04
C-45	6.12E-05	5.84E-04	4.71E-03	8.81E+01	1.25E+03	9.33E+03
Cd-109*	9.42E-05	9.42E-05	9.42E-05	1.90E+02	1.90E+02	1.90E+02
Ce-141	2.35E-05	1.18E-04	4.99E-04	4.74E+01	2.54E+02	8.91E+02
Cl-36	4.71E-06	4.71E-06	4.71E-05	6.78E+00	6.78E+00	6.78E+01
Co-57	9.42E-06	3.77E-05	5.65E-05	1.36E+01	5.56E+01	1.10E+02
Co-60	4.71E-06	4.24E-05	4.76E-03	6.78E+00	6.10E+01	9.39E+03
Cr-51	4.71E-06	1.20E-02	9.44E-02	6.78E+00	2.42E+04	2.19E+05
Cs-134	4.71E-06	4.71E-06	7.06E-04	6.78E+00	6.78E+00	1.02E+03
Cs-137	4.71E-06	4.71E-06	4.71E-05	6.78E+00	6.78E+00	6.78E+01
Fe-55	1.49E-03	1.49E-03	4.44E-03	2.14E+03	2.14E+03	6.39E+03
Ga-68	2.83E-03	2.83E-03	2.35E-02	5.50E+03	5.50E+03	5.03E+04

Table C-2 Northwest Compact Academic Waste Generators Biomedical Radionuclide Distributions - Container Level[a], Cont'd

Nuclide	Concentration Ranges - Percentile[b] - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
H-3	4.71E-06	1.55E-02	6.87E-01	1.07E+01	3.17E+04	9.88E+05
I-125	4.71E-06	4.80E-03	1.22E-01	1.63E+01	8.89E+03	2.15E+05
I-131	2.35E-04	3.77E-03	3.41E-02	4.32E+02	6.59E+03	7.64E+04
Mn-54	4.71E-05	5.04E-04	9.42E-04	8.90E+01	7.25E+02	2.04E+03
Na-22	4.71E-06	1.88E-05	2.35E-03	6.78E+00	2.71E+01	5.11E+03
Nb-95	2.35E-05	1.18E-04	3.53E-04	4.74E+01	2.46E+02	7.51E+02
Ni-63*	4.43E-02	4.43E-02	4.43E-02	6.38E+04	6.38E+04	6.38E+04
P-32	2.35E-05	9.42E-03	3.03E-01	5.08E+01	1.86E+04	6.58E+05
Ru-103	2.35E-05	9.42E-05	3.53E-04	4.74E+01	1.97E+02	7.51E+02
S-35	4.71E-06	4.71E-03	1.11E-01	6.78E+00	8.85E+03	2.38E+05
Sc-46	4.71E-06	3.30E-05	3.20E-04	9.83E+00	4.74E+01	5.51E+02
Se-75	3.30E-05	4.24E-05	1.84E-04	4.74E+01	6.10E+01	2.64E+02
Sn-113*	1.89E-03	1.89E-03	1.89E-03	3.37E+03	3.37E+03	3.37E+03
Sr-85	2.35E-04	2.35E-04	9.42E-04	4.46E+02	4.46E+02	1.90E+03
Zn-65	4.71E-06	1.41E-05	4.71E-02	6.78E+00	2.03E+01	1.02E+05

(a) LLW containers shipped to Beatty and Richland (1988-1990).
(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table C-3 Northwest Compact Industrial Waste Generators Biomedical Radionuclide Distributions - Container Level[a]

Waste Class: A-Unstable
Waste form: Dry solid - Floor Dry, Speedi Dry, Aquaset, Florco, Safe-T-Sorb, Envirostone, Dicaperl, and others
Number of shipping records: 44
Number of shipping containers: 1,020
Total waste volume: 483 m^3
Total waste mass: 517,978 kg
Average waste form density: 1.07 g/cm^3

	Concentration Ranges - Percentile[b] - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
Ag-110m*	9.49E-04	9.49E-04	9.49E-04	7.85E+02	7.85E+02	7.85E+02
Am-241*	4.71E-06	4.71E-06	4.71E-06	1.26E+01	1.26E+01	1.26E+01
C-14*	4.76E-03	4.76E-03	4.76E-03	3.40E+03	3.40E+03	3.40E+03
Ca-45	8.81E-06	8.81E-06	4.40E-05	2.72E+01	3.15E+01	1.51E+02
Cd-109	8.81E-06	3.35E-04	8.45E-04	3.15E+01	1.03E+03	2.90E+03
Ce-139*	3.99E-05	3.99E-05	3.99E-05	4.20E+01	4.20E+01	4.20E+01
Co-57	2.64E-05	2.64E-05	2.64E-04	7.60E+01	7.60E+01	8.16E+02
Co-58*	2.64E-05	2.64E-05	2.64E-05	2.18E+01	2.18E+01	2.18E+01
Co-60	4.71E-06	2.35E-05	4.62E-03	8.16E+00	9.33E+01	1.33E+04
Cs-134	4.71E-06	4.71E-06	4.05E-04	8.25E+00	1.92E+01	1.52E+03
Cs-137	4.71E-06	9.42E-06	1.55E-03	8.16E+00	3.83E+01	5.80E+03
Fe-55	4.71E-06	9.42E-06	1.49E-03	8.25E+00	3.73E+01	5.45E+03
Fe-59*	3.99E-05	3.99E-05	3.99E-05	4.20E+01	4.20E+01	4.20E+01
H-3	4.71E-06	4.71E-03	1.51E-01	1.10E+01	2.71E+04	2.31E+05
Hg-203*	3.99E-05	3.99E-05	3.99E-05	4.20E+01	4.20E+01	4.20E+01
I-125	4.71E-06	4.71E-06	4.71E-06	2.20E+01	2.20E+01	2.20E+01
Kr-85	1.31E-02	2.94E-02	3.39E-02	4.33E+04	8.28E+04	8.92E+04
Mn-54	6.16E-05	6.16E-05	7.91E-05	6.54E+01	6.54E+01	1.90E+02
Na-22*	8.81E-06	8.81E-06	8.81E-06	2.53E+01	2.53E+01	2.53E+01
Ni-63	4.71E-06	4.71E-06	4.00E-04	8.25E+00	1.92E+01	1.46E+03
Po-210*	3.52E-05	3.52E-05	3.52E-05	8.90E+01	8.90E+01	8.90E+01

Table C-3 Northwest Compact Industrial Waste Generators Biomedical Radionuclide Distributions - Container Level[a], Cont'd

Nuclide	Concentration Ranges - Percentile[b] - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
Ra-226	1.41E-05	3.63E-04	8.85E-04	3.80E+01	4.57E+02	5.00E+02
S-35*	8.81E-06	8.81E-06	8.81E-06	3.02E+01	3.02E+01	3.02E+01
Se-75	1.76E-05	1.76E-05	1.76E-05	5.06E+01	5.06E+01	5.06E+01
Sn-113	3.99E-05	3.99E-05	3.99E-05	4.20E+01	4.20E+01	4.20E+01
Sr-85	8.81E-06	2.43E-05	3.99E-05	3.02E+01	3.61E+01	4.20E+01
Sr-90	4.71E-06	8.48E-05	1.46E-04	1.26E+01	1.98E+02	2.53E+02
Th-232	4.71E-06	4.71E-06	4.71E-06	1.10E+01	1.10E+01	1.10E+01
U-238	5.98E-04	5.98E-04	5.98E-04	6.29E+02	6.29E+02	6.29E+02
Y-88*	3.99E-05	3.99E-05	3.99E-05	4.20E+01	4.20E+01	4.20E+01
Zn-65	5.28E-05	5.28E-05	1.67E-04	1.63E+02	1.63E+02	5.73E+02

Waste Class: A-Unstable
Waste form: Sorbed Aqueous liquid - Floor Dry, Aquaset
Number of shipping records: 5
Number of shipping containers: 39
Total waste volume: 6.4 m^3
Total waste mass: 6,212 kg
Average waste form density: 0.97 g/cm^3

Nuclide	Concentration Ranges - Percentile[b] - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
C-14	2.64E-05	2.64E-05	4.40E-05	7.42E+01	7.42E+01	1.16E+02
Ca-45	8.81E-06	8.81E-06	5.28E-05	2.62E+01	3.39E+01	1.39E+02
Cd-109	8.81E-06	7.05E-05	1.36E-03	3.10E+01	1.26E+02	4.92E+03
Co-57	8.81E-06	8.81E-06	3.52E-05	2.47E+01	2.47E+01	9.27E+01
Co-60	4.71E-06	4.71E-06	2.83E-05	3.55E+00	3.55E+00	2.70E+01
Cs-134	4.71E-06	4.71E-06	4.71E-06	3.55E+00	3.55E+00	4.50E+00
Cs-137	4.71E-06	4.71E-06	2.68E-04	3.55E+00	3.55E+00	2.56E+02
H-3	4.71E-06	1.88E-05	1.37E-03	3.55E+00	1.42E+01	1.05E+03
Mn-54	4.71E-06	4.71E-06	4.71E-06	3.55E+00	3.55E+00	3.55E+00
Na-22	8.81E-06	2.64E-05	1.32E-04	2.62E+01	6.29E+01	3.48E+02
Ra-226	4.71E-06	4.71E-06	4.71E-06	3.55E+00	3.55E+00	3.67E+00
Ru-106	4.71E-06	4.71E-06	4.71E-06	3.55E+00	3.55E+00	3.55E+00

Table C-3 Northwest Compact Industrial Waste Generators Biomedical Radionuclide Distributions - Container Level[a], Cont'd

Nuclide	Concentration Ranges - Percentile[b] - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
S-35*	8.81E-06	8.81E-06	8.81E-06	1.76E+01	1.76E+01	1.76E+01
Se-75	8.81E-06	1.76E-05	2.20E-04	1.39E+01	4.64E+01	6.19E+02
Sr-85	8.81E-06	8.81E-06	8.81E-06	2.32E+01	2.32E+01	2.32E+01
Sr-90	4.71E-06	4.71E-06	1.88E-04	3.55E+00	3.55E+00	1.80E+02
U-238	4.71E-06	4.71E-06	4.71E-06	3.55E+00	3.55E+00	4.70E+00
Zn-65	8.81E-06	1.76E-05	4.14E-04	1.76E+01	4.95E+01	1.38E+03

Waste Class: A-Unstable
Waste form: Non-compacted dry active waste
Number of shipping records: 5
Number of shipping containers: 25
Total waste volume: 34.0 m^3
Total waste mass: 11,253 kg
Average waste form density: 0.33 g/cm^3

Nuclide	Concentration Ranges - Percentile[b] - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
Am-241*	5.00E-05	5.00E-05	5.00E-05	3.15E+02	3.15E+02	3.15E+02
Ca-45*	1.00E-06	1.00E-06	1.00E-06	2.94E+01	2.94E+01	2.94E+01
Cd-109	3.52E-05	3.52E-05	4.05E-04	1.10E+02	1.10E+02	1.35E+03
Co-57	4.71E-06	4.71E-06	4.71E-06	6.29E+00	6.29E+00	6.29E+00
Co-60	4.71E-06	1.41E-04	6.08E-01	1.47E+01	4.41E+02	1.90E+06
Cs-137	4.71E-06	5.65E-05	6.08E-02	1.47E+01	8.81E+01	1.90E+05
Gd-153*	9.42E-05	9.42E-05	9.42E-05	5.01E+02	5.01E+02	5.01E+02
Mn-54*	8.48E-05	8.48E-05	8.48E-05	1.13E+02	1.13E+02	1.13E+02
Ru-106*	1.84E-04	1.84E-04	1.84E-04	2.45E+02	2.45E+02	2.45E+02
Se-75*	1.50E-04	1.50E-04	1.50E-04	4.99E+02	4.99E+02	4.99E+02
Tc-99*	4.71E-06	4.71E-06	4.71E-06	2.50E+01	2.50E+01	2.50E+01
Zn-65	8.81E-06	1.03E-04	1.98E-04	2.75E+01	1.46E+02	2.64E+02

Table C-3 Northwest Compact Industrial Waste Generators Biomedical Radionuclide Distributions - Container Level[a], Cont'd

Waste Class: A-Unstable
Waste form: Dewatered resins - Envirostone
Number of shipping records: 1
Number of shipping containers: 3
Total waste volume: 0.6 m^3
Total waste mass: 476.7 kg
Average waste form density: 0.75 g/cm^3

	Concentration Ranges - Ci/m^3 -			Percentile - pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
Am-241	2.40E-00	2.73E-04	2.78E-04	3.21E+02	3.65E+02	3.71E+02
Co-57	4.71E-06	4.71E-06	4.71E-06	6.29E+00	6.29E+00	6.29E+00
Co-60	3.81E-02	4.38E-02	4.43E-02	5.10E+04	5.85E+04	5.92E+04
Cs-137	6.12E-05	6.59E-05	7.06E-05	8.18E+01	8.81E+01	9.44E+01
Mn-54	8.48E-05	9.89E-05	9.89E-05	1.13E+02	1.32E+02	1.32E+02
Ru-106	1.84E-04	2.12E-04	2.17E-04	2.45E+02	2.83E+02	2.89E+02
Zn-65	2.02E-04	2.31E-04	2.35E-04	2.71E+02	3.08E+02	3.15E+02

Waste Class: A-Unstable
Waste form: Unspecified waste and agents
Number of shipping records: 1
Number of shipping containers: 88
Total waste volume: 18.7 m^3
Total waste mass: 18,705 kg
Average waste form density: 1.00 g/cm^3

	Concentration Ranges - Ci/m^3 -			Percentile - pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
Ra-226	9.89E-05	3.30E-04	7.49E-04	7.98E+01	3.42E+02	4.93E+02

Table C-3 Northwest Compact Industrial Waste Generators Biomedical Radionuclide Distributions - Container Level[a], Cont'd

Waste Class: A-Unstable
Waste form: Animal carcasses in lime and sorbent - Floor Dry
Number of shipping records: 1
Number of shipping containers: 2
Total waste volume: 0.4 m^3
Total waste mass: 237.7 kg
Average waste form density: 0.56 g/cm^3

Nuclide	Concentration Ranges - Percentile - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
H-3	1.88E-01	1.88E-01	1.88E-01	3.31E+05	3.31E+05	3.42E+05

Waste Class: A-Unstable
Waste form: Solidified liquids - Aquaset, Envirostone
Number of shipping records: 2
Number of shipping containers: 4
Total waste volume: 0.9 m^3
Total waste mass: 997.4 kg
Average waste form density: 1.17 g/cm^3

Nuclide	Concentration Ranges - Percentile - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
Co-60	4.71E-06	4.71E-06	4.28E-02	3.67E+00	4.00E+00	3.71E+04
Cs-137	4.71E-06	4.71E-06	4.28E-03	3.67E+00	4.00E+00	3.71E+03

(a) LLW containers shipped to Beatty and Richland (1988-1990).
(b) Radionuclide concentrations tagged with an asterisk is based on a single value. In such instances, the percentile distribution does not apply.

Table C-4 Rocky Mountain Compact Academic Waste Generators Biomedical Radionuclide Distributions - Container Level[a]

Waste Class: A-Unstable
Waste form: Absorbed aqueous liquid - Cement
Number of shipping records: 2
Number of shipping containers: 26
Total waste volume: 6.2 m^3
Total waste mass: 7,007 kg
Average waste form density: 1.13 g/cm^3

Nuclide	Concentration Ranges - Percentile[b] - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
C-14	9.42E-06	4.71E-04	4.33E-03	8.44E+00	4.12E+02	3.62E+03
Ca-45	4.71E-06	3.30E-05	3.63E-04	3.61E+00	2.60E+01	3.15E+02
Co-57	4.71E-06	4.71E-06	9.42E-06	3.66E+00	3.99E+00	7.91E+00
Fe-55*	4.71E-05	4.71E-05	4.71E-05	8.41E+01	8.41E+01	8.41E+01
Gd-153	4.71E-06	4.71E-06	7.53E-05	3.61E+00	3.98E+00	5.93E+01
H-3	3.65E-02	5.52E-02	8.48E-02	3.17E+04	4.66E+04	6.50E+04
I-125	4.71E-06	1.88E-05	1.41E-04	4.07E+00	1.60E+01	1.15E+02
S-35	4.71E-06	4.71E-06	4.47E-04	3.61E+00	4.22E+00	3.88E+02

Waste Class: A-Unstable
Waste form: Animal carcasses - Lime and Sorbent
Number of shipping records: 2
Number of shipping containers: 23
Total waste volume: 4.9 m^3
Total waste mass: 2,621 kg
Average waste form density: 0.54 g/cm^3

Nuclide	Concentration Ranges - Percentile - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
C-14	9.42E-06	1.13E-03	2.94E-03	1.92E+01	2.24E+03	5.57E+03
Cr-51	4.71E-06	6.12E-05	1.93E-04	9.18E+00	1.40E+02	4.01E+02
Gd-153	1.88E-05	3.30E-05	6.26E-04	3.30E+01	5.14E+01	1.30E+03
H-3	3.77E-05	9.20E-03	5.47E-02	7.80E+01	1.77E+04	1.11E+05
I-125	4.71E-06	1.88E-05	1.46E-04	7.70E+00	3.57E+01	3.03E+02
S-35	9.42E-06	9.42E-06	2.97E-04	1.50E+01	1.50E+01	5.20E+02

Table C-4 Rocky Mountain Compact Academic Waste Generators Biomedical Radionuclide Distributions - Container Level[a], Cont'd

Waste Class: A-Unstable
Waste form: Compacted dry active waste
Number of shipping records: 2
Number of shipping containers: 118
Total waste volume: 25.0 m^3
Total waste mass: 8,977 kg
Average waste form density: 0.36 g/cm^3

Nuclide	Concentration Ranges - Ci/m^3 - 1st	50th	99th	Percentile - pCi/g - 1st	50th	99th
C-14	4.71E-06	4.71E-05	2.59E-03	1.24E+01	1.47E+02	7.07E+03
Ca-45	2.35E-05	1.84E-04	8.00E-04	7.06E+01	4.94E+02	2.37E+03
Co-57	4.71E-06	4.71E-06	1.88E-05	1.15E+01	1.35E+01	4.89E+01
Cr-51	4.71E-06	4.71E-06	2.26E-04	1.27E+01	1.36E+01	5.94E+02
Gd-153	4.71E-06	9.42E-06	1.22E-04	1.19E+01	2.90E+01	3.82E+02
H-3	1.41E-05	1.86E-03	2.09E-01	3.81E+01	5.27E+03	5.41E+05
I-125	4.71E-06	1.04E-04	1.92E-02	1.15E+01	3.19E+02	5.26E+04
P-32	4.71E-06	4.71E-06	3.30E-05	1.33E+01	1.33E+01	1.01E+02
S-35	4.71E-06	1.32E-04	1.11E-02	1.19E+01	3.63E+02	3.16E+04

(a) LLW containers shipped to Beatty and Richland (1988-1990).
(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table C-5 Rocky Mountain Compact Industrial Waste Generators Biomedical Radionuclide Distributions - Container Level(a)

Waste Class: A-Unstable
Waste form: Dry solid - Floor Dry
Number of shipping records: 1
Number of shipping containers: 68
Total waste volume: 14.4 m^3
Total waste mass: 18,668 kg
Average waste form density: 1.29 g/cm^3

Nuclide	Concentration Ranges - Ci/m^3 - 1st	50th	99th	Percentile - pCi/g - 1st	50th	99th
Co-60	4.71E-06	8.05E-04	2.07E-03	9.83E+00	5.66E+02	2.55E+03
Cs-137	4.71E-06	5.65E-04	1.51E-03	9.83E+00	3.99E+02	1.82E+03
U-238	4.71E-06	9.42E-06	2.35E-05	3.25E+00	6.86E+00	2.73E+01

Waste Class: A-Unstable
Waste form: Non-compacted dry active waste - Floor Dry
Number of shipping records: 1
Number of shipping containers: 15
Total waste volume: 3.2 m^3
Total waste mass: 2,088 kg
Average waste form density: 0.66 g/cm^3

Nuclide	Concentration Ranges - Ci/m^3 - 1st	50th	99th	Percentile - pCi/g - 1st	50th	99th
Co-60	4.71E-06	2.59E-04	8.48E-03	1.11E+01	5.38E+02	1.69E+04
Cs-137	4.71E-06	1.88E-04	6.12E-03	1.11E+01	3.92E+02	1.22E+04
U-238	4.71E-06	4.71E-06	9.89E-05	3.54E+00	1.14E+01	1.97E+02

Table C-5 Rocky Mountain Compact Industrial Waste Generators Biomedical Radionuclide Distributions - Container Level(a)

Waste Class: A-Unstable
Waste form: Biological - Unspecified solidification agent
Number of shipping records: 1
Number of shipping containers: 1
Total waste volume: 0.2 m^3
Total waste mass: 312.3 kg
Average waste form density: 1.47 g/cm^3

	Concentration Ranges - Percentile(b) - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
Co-60*	1.32E-03	1.32E-03	1.32E-03	8.96E+02	8.96E+02	8.96E+02
Cs-137*	9.42E-04	9.42E-04	9.42E-04	6.40E+02	6.40E+02	6.40E+02
U-238*	4.71E-06	4.71E-06	4.71E-06	9.60E+00	9.60E+00	9.60E+00

(a) LLW containers shipped to Beatty and Richland (1988-1990).
(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table C-6 Central Compact Industrial Waste Generators Biomedical Radionuclide Distributions - Container Level[a]

Waste Class: A-Unstable
Waste form: Non-compacted dry active waste
Number of shipping records: 2
Number of shipping containers: 2
Total waste volume: 2.8 m^3
Total waste mass: 2,300 kg
Average waste form density: 0.81 g/cm^3

	Concentration Ranges - Percentile - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
U-238	3.81E-02	3.81E-02	5.37E-02	4.80E+04	4.80E+04	6.47E+04

Waste Class: A-Unstable
Waste form: Compacted dry active waste - Cement
Number of shipping records: 3
Number of shipping containers: 104
Total waste volume: 31.8 m^3
Total waste mass: 56,355 kg
Average waste form density: 1.77 g/cm^3

	Concentration Ranges - Percentile - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
U-238	3.27E-03	1.31E-02	1.14E-01	1.83E+03	7.50E+03	6.67E+04

Table C-6 Central Compact Industrial Waste Generators Biomedical Radionuclide Distributions - Container Level[a], Cont'd

Waste Class: A-Unstable
Waste form: Dry solid
Number of shipping records: 10
Number of shipping containers: 730
Total waste volume: 155.0 m^3
Total waste mass: 141,668 kg
Average waste form density: 0.91 g/cm^3

	Concentration Ranges - Percentile[b] - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
Am-241	1.41E-05	2.83E-05	1.91E-03	1.79E+01	4.24E+01	1.65E+03
Ba-133*	2.35E-05	2.35E-05	2.35E-05	2.73E+01	2.73E+01	2.73E+01
Cd-109*	9.42E-06	9.42E-06	9.42E-06	1.09E+01	1.09E+01	1.09E+01
Co-57*	4.71E-06	4.71E-06	4.71E-06	5.45E+00	5.45E+00	5.45E+00
Co-60*	4.71E-06	4.71E-06	4.71E-06	5.45E+00	5.45E+00	5.45E+00
Kr-85	7.77E-03	1.10E-02	1.39E-02	3.02E+04	3.85E+04	4.53E+04
Ra-226	1.82E-03	1.84E-03	2.16E-03	5.51E+03	6.55E+03	7.83E+03
Th-228*	4.71E-06	4.71E-06	4.71E-06	5.45E+00	5.45E+00	5.45E+00
U-238	1.41E-05	3.77E-05	1.72E-02	1.47E+01	4.09E+01	1.18E+04

Waste Class: A-Unstable
Waste form: Solidified oil - Cement
Number of shipping records: 2
Number of shipping containers: 8
Total waste volume: 1.7 m^3
Total waste mass: 2,636 kg
Average waste form density: 1.55 g/cm^3

	Concentration Ranges - Percentile - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
Am-241	9.42E-05	7.63E-04	2.05E-03	5.81E+01	4.90E+02	1.36E+03

Table C-6 Central Compact Industrial Waste Generators Biomedical Radionuclide Distributions - Container Level[a], Cont'd

Waste Class: A-Unstable
Waste form: Solidified resins - Cement
Number of shipping records: 3
Number of shipping containers: 4
Total waste volume: 0.9 m^3
Total waste mass: 1,164 kg
Average waste form density: 1.37 g/cm^3

	Concentration Ranges - Ci/m^3 -			Percentile - pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
U-238	1.41E-05	2.35E-05	6.86E-02	9.23E+00	1.66E+01	4.54E+04

Waste Class: A-Unstable
Waste form: Sorbed aqueous liquid - Hi Dri
Number of shipping records: 1
Number of shipping containers: 21
Total waste volume: 4.5 m^3
Total waste mass: 4,327 kg
Average waste form density: 0.97 g/cm^3

	Concentration Ranges - Ci/m^3 -			Percentile - pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
Am-241	1.93E-04	2.07E-04	1.39E-03	2.04E+02	2.13E+02	1.37E+03

(a) LLW containers shipped to Beatty and Richland (1988-1990).
(b) Radionuclide concentrations tagged with an asterisk is based on a single value. In such instances, the percentile distribution does not apply.

Table C-7 Midwest Compact Medical Waste Generators Biomedical Radionuclide Distributions - Container Level[a]

Waste Class: A-Unstable
Waste form: Absorbed aqueous liquid - Floor Dry/Super Fine
Number of shipping records: 1
Number of shipping containers: 73
Total waste volume: 15.5 m^3
Total waste mass: 11,562 kg
Average waste form density: 0.75 g/cm^3

	Concentration Ranges - Percentile[b] - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
C-14	4.71E-06	7.06E-05	5.65E-02	5.80E+00	9.18E+01	1.16E+05
Ca-45	4.71E-05	1.18E-03	5.80E-03	5.65E+01	1.43E+03	7.33E+03
Ce-141	4.71E-06	4.71E-05	4.71E-03	5.58E+00	5.31E+01	5.65E+03
Cl-36	9.42E-06	1.08E-04	7.06E-03	1.16E+01	1.39E+02	9.23E+03
Co-57	4.71E-06	3.30E-05	1.41E-02	5.15E+00	3.72E+01	3.00E+04
Cr-51	4.71E-06	2.80E-02	4.44E-01	1.09E+01	3.45E+04	5.70E+05
Cs-137*	4.71E-05	4.71E-05	4.71E-05	8.41E+01	8.41E+01	8.41E+01
Fe-59	4.71E-06	8.00E-05	3.53E-04	5.65E+00	9.02E+01	4.46E+02
H-3	3.30E-05	1.19E-02	4.95E-01	4.28E+01	1.47E+04	6.04E+05
I-125	2.83E-05	5.69E-03	4.99E-01	3.15E+01	8.22E+03	1.02E+06
In-111	2.35E-05	1.04E-03	2.92E-03	2.98E+01	1.17E+03	3.67E+03
Hg-203*	2.35E-02	2.35E-02	2.35E-02	5.01E+04	5.01E+04	5.01E+04
Na-22	4.71E-06	2.35E-04	1.29E-02	5.41E+00	2.68E+02	1.43E+04
Nb-95	4.71E-06	9.42E-06	1.41E-03	5.15E+00	1.26E+01	2.52E+03
P-32	4.71E-06	2.34E-03	6.87E-02	5.80E+00	3.06E+03	8.81E+04
Po-210*	4.71E-06	4.71E-06	3.71E-06	5.80E+00	5.80E+00	5.80E+00
Rb-86	1.88E-03	4.24E-03	4.71E-02	2.46E+03	5.22E+03	1.00E+05
S-35	4.71E-06	5.84E-03	2.38E-01	5.95E+00	7.00E+03	2.86E+05
Sc-46	4.71E-06	9.42E-06	7.53E-03	5.15E+00	1.26E+01	9.04E+03
Sn-113	4.71E-06	4.71E-06	1.88E-05	5.15E+00	6.03E+00	2.20E+01
Sr-85	4.71E-06	9.42E-06	4.71E-03	5.15E+00	1.21E+01	5.65E+03
Sr-90*	1.88E-04	1.88E-04	1.88E-04	3.36E+02	3.36E+02	3.36E+02

Table C-7 Midwest Compact Medical Waste Generators Biomedical Radionuclide Distributions - Container Level[a], Cont'd

Waste Class: A-Unstable
Waste form: Animal carcasses - Lime and Sorbent - Floor Dry
Number of shipping records: 1
Number of shipping containers: 36
Total waste volume: 7.6 m^3
Total waste mass: 5,558 kg
Average waste form density: 0.73 g/cm^3

Nuclide	Concentration Ranges - Percentile[b] - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
C-14	1.41E-04	1.41E-04	7.06E-03	1.89E+02	1.93E+02	8.93E+03
Ce-141	9.42E-06	1.88E-05	8.95E-05	1.22E+01	2.65E+01	1.20E+02
Co-57	1.41E-05	1.41E-05	2.35E-05	1.83E+01	2.04E+01	3.30E+01
Cr-51	4.71E-06	1.88E-05	2.59E-02	6.12E+00	2.67E+01	3.51E+04
H-3	1.41E-05	1.74E-02	5.98E-01	1.83E+01	2.25E+04	8.66E+05
I-125	9.42E-06	1.88E-05	4.27E-03	1.26E+01	2.58E+01	5.40E+03
In-111*	3.67E-04	3.67E-04	3.67E-04	5.01E+02	5.01E+02	5.01E+02
Nb-95	4.71E-06	2.35E-05	1.93E-04	6.29E+00	3.16E+01	2.66E+02
P-32	9.42E-06	9.42E-06	1.41E-05	1.26E+01	1.26E+01	1.83E+01
Rb-86	1.13E-03	2.12E-03	4.00E-03	1.53E+03	3.10E+03	5.31E+03
S-35	1.41E-05	2.12E-02	4.94E-02	1.83E+01	2.82E+04	6.25E+03
Sc-46	4.71E-06	2.35E-05	6.12E-05	6.38E+00	3.30E+01	8.68E+01
Sn-113	1.41E-05	1.41E-05	2.35E-05	1.83E+01	2.00E+01	3.30E+01
Sr-85	9.42E-06	2.35E-05	7.06E-05	1.22E+01	3.24E+01	9.78E+01
Y-90*	3.53E-03	3.53E-03	3.53E-03	4.83E+03	4.83E+03	4.83E+03

(a) LLW containers shipped to Beatty and Richland (1988-1990).
(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table C-8 Midwest Compact Industrial Waste Generators Biomedical Radionuclide Distributions - Container Level(a)

Waste Class: A-Unstable
Waste form: Dry solid - Cement, Floor Dry, Envirostone
Number of shipping records: 60
Number of shipping containers: 1,216
Total waste volume: 849.0 m^3
Total waste mass: 1,079,944 kg
Average waste form density: 1.27 g/cm^3

	Concentration Ranges - Percentile(b) - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
Am-241*	4.71E-06	4.71E-06	4.71E-06	3.67E+00	3.67E+00	3.67E+00
C-14	4.71E-06	7.63E-03	9.42E-02	1.47E+01	4.46E+03	4.41E+05
Cl-36	4.71E-06	4.71E-06	5.89E-04	8.25E+00	1.47E+01	1.09E+03
Co-60*	4.71E-06	4.71E-06	4.71E-06	1.47E+01	1.47E+01	1.47E+01
Cs-137	3.68E-05	3.68E-05	9.27E-03	2.12E+01	2.80E+01	8.19E+03
H-3	4.05E-03	4.41E-03	4.41E-03	9.96E+03	1.40E+04	2.07E+04
I-129*	4.71E-06	4.71E-06	4.71E-06	1.47E+01	1.47E+01	1.47E+01
Ni-63	4.71E-06	4.71E-04	9.42E-02	1.07E+01	8.81E+02	9.12E+04
Ra-226	4.71E-06	4.71E-06	3.80E-03	8.47E+00	1.47E+01	2.96E+03
Sr-90	7.06E-03	7.06E-03	2.10E-02	1.32E+04	1.32E+04	1.64E+04
Tc-99	4.71E-06	4.71E-06	4.71E-06	8.71E+00	8.71E+00	1.47E+01
Th-232	7.06E-04	1.51E-03	1.93E-03	7.46E+02	8.36E+02	8.69E+02
U-238	4.71E-05	1.34E-01	6.54E-01	1.72E+02	1.13E+05	3.06E+05

Waste Class: A-Unstable
Waste form: Non-compacted dry active waste
Number of shipping records: 1
Number of shipping containers: 1
Total waste volume: 0.3 m^3
Total waste mass: 179.8 kg
Average waste form density: 0.55 g/cm^3

	Concentration Ranges - Percentile(b) - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
U-238*	3.04E-05	3.04E-05	3.04E-05	5.56E+01	5.56E+01	5.56E+01

Table C-8 Midwest Compact Industrial Waste Generators Biomedical Radionuclide Distributions - Container Level[a], Cont'd

Waste Class: A-Unstable
Waste form: Solidified oil - Aquaset, Envirostone
Number of shipping records: 4
Number of shipping containers: 173
Total waste volume: 36.7 m^3
Total waste mass: 41,928 kg
Average waste form density: 1.14 g/cm^3

	Concentration Ranges - Ci/m^3 -			Percentile - pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
U-238	1.74E-04	2.02E-04	4.66E-04	1.76E+02	1.79E+02	3.32E+02

Waste Class: A-Stable
Waste form: Solidified oil - Aquaset
Number of shipping records: 1
Number of shipping containers: 45
Total waste volume: 9.6 m^3
Total waste mass: 10,974 kg
Average waste form density: 1.15 g/cm^3

	Concentration Ranges - Ci/m^3 -			Percentile - pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
U-238	1.74E-04	2.02E-04	4.10E-04	1.75E+02	1.80E+02	3.29E+02

Table C-8 Midwest Compact Industrial Waste Generators Biomedical Radionuclide Distributions - Container Level[a], Cont'd

Waste Class: A-Stable
Waste form: Dry solid - Cement
Number of shipping records: 1
Number of shipping containers: 37
Total waste volume: 1.2 m^3
Total waste mass: 4,100 kg
Average waste form density: 3.66 g/cm^3

	Concentration Ranges - Ci/m^3 -			Percentile - pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
Ra-226	3.83E-01	1.32E+00	1.49E+00	1.03E+05	3.61E+05	4.11E+05

(a) LLW containers shipped to Beatty and Richland (1988-1990).
(b) Radionuclide concentrations tagged with an asterisk is based on a single value. In such instances, the percentile distribution does not apply.

Table C-9 Central Midwest Compact Industrial Waste Generators Biomedical Radionuclide Distributions - Container Level(a)

Waste Class: A-Unstable
Waste form: Dry solid
Number of shipping records: 12
Number of shipping containers: 630
Total waste volume: 144.3 m^3
Total waste mass: 202,924 kg
Average waste form density: 1.41 g/cm^3

	Concentration Ranges - Ci/m^3 -			Percentile - pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
U-238	2.33E-03	7.32E-03	2.16E-02	1.26E+03	4.59E+03	1.67E+04

Waste Class: A-Unstable
Waste form: Solidified oil - Unspecified agent
Number of shipping records: 1
Number of shipping containers: 1
Total waste volume: 5.9 m^3
Total waste mass: 8,399 kg
Average waste form density: 1.43 g/cm^3

	Concentration Ranges - Ci/m^3 -			Percentile(b) - pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
Co-60*	1.70E-07	1.70E-07	1.70E-07	1.19E-01	1.19E-01	1.19E-01
Cs-137*	1.70E-07	1.70E-07	1.70E-07	1.19E-01	1.19E-01	1.19E-01

LLW containers shipped to Beatty and Richland (1988-1990).
(b) Radionuclide concentrations tagged with an asterisk is based on a single value. In such instances, the percentile distribution does not apply.

Table C-10 Southeast Compact Medical Waste Generators Biomedical Radionuclide Distributions - Container Level(a)

Waste Class: A-Unstable
Waste form: Dry solid - Sealed sources in concrete
Number of shipping records: 1
Number of shipping containers: 3
Total waste volume: 0.6 m^3
Total waste mass: 1,307 kg
Average waste form density: 2.05 g/cm^3

	Concentration Ranges - Percentile - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
Ra-226	4.52E-01	4.54E-01	4.71E-01	2.20E+05	2.21E+05	2.29E+05

(a) LLW containers shipped to Beatty and Richland (1988-1990).

Table C-11 Southeast Compact Industrial Waste Generators Biomedical Radionuclide Distributions - Container Level[a]

Waste Class: A-Unstable
Waste form: Non-compacted dry active waste
Number of shipping records: 1
Number of shipping containers: 4
Total waste volume: 10.5 m^3
Total waste mass: 17,691 kg
Average waste form density: 1.68 g/cm^3

	Concentration Ranges - Percentile - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
Ra-226	8.73E-04	8.83E-04	1.75E-03	5.11E+02	5.36E+02	1.03E+03

Waste Class: A-Unstable
Waste form: Solidified oil - Bitumen
Number of shipping records: 1
Number of shipping containers: 70
Total waste volume: 17.4 m^3
Total waste mass: 20,534 kg
Average waste form density: 1.18 g/cm^3

	Concentration Ranges - Percentile - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
U-238	2.83E-03	2.83E-03	2.83E-03	2.01E+03	2.36E+03	2.57E+03

Table C-11 Southeast Compact Industrial Waste Generators Biomedical Radionuclide Distributions - Container Level[a], Cont'd

Waste Class: A-Unstable
Waste form: Other - Unspecified
Number of shipping records: 1
Number of shipping containers: 7
Total waste volume: 18.2 m^3
Total waste mass: 20,302 kg
Average waste form density: 1.11 g/cm^3

	Concentration Ranges - Ci/m^3 -			Percentile - pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
U-238	2.53E-03	2.53E-03	2.53E-03	2.22E+03	2.26E+03	2.39E+03

(a) LLW containers shipped to Beatty and Richland (1988-1990).
(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table C-12 Northeast Compact Industrial Waste Generators Biomedical Radionuclide Distributions - Container Level[a]

Waste Class: A-Unstable
Waste form: Dry solid
Number of shipping records: 1
Number of shipping containers: 14
Total waste volume: 2.9 m^3
Total waste mass: 866.7 kg
Average waste form density: 0.29 g/cm^3

	Concentration Ranges - Ci/m^3 -			Percentile - pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
Kr-85	7.77E-03	1.10E-02	1.39E-02	3.02E+04	3.85E+04	4.53E+04
Ra-226	1.82E-03	1.84E-03	2.16E-03	5.51E+03	6.55E+03	7.83E+03

Waste Class: A-Unstable
Waste form: Solidified resins - Bitumen
Number of shipping records: 3
Number of shipping containers: 136
Total waste volume: 32.5 m^3
Total waste mass: 41,476 kg
Average waste form density: 1.28 g/cm^3

	Concentration Ranges - Ci/m^3 -			Percentile - pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
C-14	4.71E-06	4.71E-06	4.71E-06	2.32E+00	3.67E+00	5.51E+00
Co-60	4.71E-06	4.71E-06	4.71E-06	2.32E+00	3.67E+00	6.29E+00
Cs-137	4.71E-06	4.71E-06	4.71E-06	2.32E+00	3.67E+00	6.29E+00
I-129	4.71E-06	4.71E-06	4.71E-06	2.32E+00	3.67E+00	5.51E+00
Tc-99	4.71E-06	4.71E-06	4.71E-06	2.32E+00	3.67E+00	5.51E+00

Table C-12 Northeast Compact Industrial Waste Generators Biomedical Radionuclide Distributions - Container Level[a], Cont'd

Waste Class: A-Unstable
Waste form: Solidified oils - Petroset
Number of shipping records: 1
Number of shipping containers: 56
Total waste volume: 11.9 m^3
Total waste mass: 14,006 kg
Average waste form density: 1.18 g/cm^3

	Concentration Ranges - Percentile - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
C-14	4.71E-06	4.71E-06	4.71E-06	3.39E+00	4.00E+00	4.41E+00
Co-60	4.71E-06	4.71E-06	4.71E-06	3.39E+00	4.00E+00	4.41E+00
H-3	4.71E-06	4.71E-06	4.71E-06	3.39E+00	4.00E+00	4.41E+00
I-129	4.71E-06	4.71E-06	4.71E-06	3.39E+00	4.00E+00	4.41E+00
Tc-99	4.71E-06	4.71E-06	4.71E-06	3.39E+00	4.00E+00	4.41E+00

Waste Class: A-Unstable
Waste form: Non-compacted dry active waste
Number of shipping records: 1
Number of shipping containers: 4
Total waste volume: 10.9 m^3
Total waste mass: 15,322 kg
Average waste form density: 1.41 g/cm^3

	Concentration Ranges - Percentile - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
Co-60	1.18E-02	1.25E-02	1.54E-02	9.13E+03	9.19E+03	9.44E+03
Mn-54	1.91E-03	2.06E-03	2.50E-03	1.50E+03	1.51E+03	1.53E+03

Table C-12 Northeast Compact Industrial Waste Generators Biomedical Radionuclide Distributions - Container Level[a], Cont'd

Waste Class: A-Unstable
Waste form: Solidified oils - Aquaset
Number of shipping records: 1
Number of shipping containers: 42
Total waste volume: 11.5 m^3
Total waste mass: 12,233 kg
Average waste form density: 1.06 g/cm^3

	Concentration Ranges - Ci/m^3 -			Percentile - pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
C-14	4.71E-06	4.71E-06	4.71E-06	3.51E+00	4.14E+00	4.78E+00
Co-60	4.71E-05	2.12E-04	1.63E-03	4.16E+01	1.94E+02	1.55E+03
Fe-55	6.07E-04	2.67E-03	2.03E-02	5.37E+02	2.44E+03	1.93E+04
H-3	4.71E-06	4.71E-06	4.71E-06	3.51E+00	4.14E+00	4.78E+00
Mn-54	4.24E-05	2.12E-04	1.03E-03	3.75E+01	1.94E+02	9.74E+02
Zn-65	2.17E-04	9.84E-04	3.06E-03	1.92E+02	8.99E+02	2.09E+03

(a) LLW containers shipped to Beatty and Richland (1988-1990).

Table C-13 Appalachian Compact Industrial Waste Generators Biomedical Radionuclide Distributions - Container Level[a]

Waste Class: A-Unstable
Waste form: Compacted dry active waste
Number of shipping records: 1
Number of shipping containers: 16
Total waste volume: 3.4 m^3
Total waste mass: 1,444 kg
Average waste form density: 0.43 g/cm^3

	Concentration Ranges - Percentile - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
Ag-110m	3.81E-04	5.09E-04	2.69E-03	8.92E+02	1.18E+03	4.85E+03
C-14	1.41E-05	1.88E-05	1.04E-04	3.15E+01	4.64E+01	1.86E+02
Cd-109	4.14E-03	5.53E-03	7.64E-02	9.68E+03	1.28E+04	1.37E+05
Co-57	4.59E-03	6.13E-03	3.25E-02	1.07E+04	1.42E+04	5.84E+04
Co-58	2.01E-03	2.69E-03	1.43E-02	4.70E+03	6.24E+03	2.56E+04
Co-60	1.12E-02	1.49E-02	7.92E-02	2.62E+04	3.46E+04	1.42E+05
Cr-51	8.48E-05	1.76E-03	5.82E-03	1.52E+02	3.73E+03	1.36E+04
Cs-137	3.30E-05	4.71E-05	2.40E-04	7.71E+01	1.04E+02	4.32E+02
Fe-55	8.82E-03	4.44E-02	2.35E-01	2.17E+04	9.25E+04	4.23E+05
H-3	4.71E-06	4.71E-06	4.71E-06	8.47E+00	1.10E+01	1.69E+01
I-129	4.71E-06	4.71E-06	4.71E-06	8.47E+00	1.10E+01	1.69E+01
Mn-54	6.48E-03	8.67E-03	4.59E-02	1.52E+04	2.01E+04	8.26E+04
Ni-63	5.60E-04	7.49E-04	3.96E-03	1.31E+03	1.73E+03	7.12E+03
Sr-90	4.71E-06	4.71E-06	5.18E-05	8.47E+00	1.10E+01	1.28E+02
Tc-99	4.71E-06	4.71E-06	4.71E-06	8.47E+00	1.10E+01	1.69E+01

Table C-13 Appalachian Compact Industrial Waste Generators Biomedical Radionuclide Distributions - Container Level[a], Cont'd

Waste Class: A-Unstable
Waste form: Non-compacted dry active waste
Number of shipping records: 2
Number of shipping containers: 22
Total waste volume: 12.2 m^3
Total waste mass: 4,984 kg
Average waste form density: 0.41 g/cm^3

	Concentration Ranges - Percentile - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
Ag-110m	2.78E-04	6.78E-04	3.37E-03	8.81E+02	1.95E+03	1.04E+04
C-14	9.42E-06	2.83E-05	1.27E-04	2.94E+01	7.75E+01	3.96E+02
Cd-109	3.03E-03	7.37E-03	3.66E-02	9.57E+03	2.11E+04	1.13E+05
Co-57	3.36E-03	8.16E-03	4.06E-02	1.06E+04	2.34E+04	1.25E+05
Co-58	1.47E-03	3.58E-03	1.78E-02	4.66E+03	1.03E+04	5.48E+04
Co-60	8.20E-02	1.99E-02	9.90E-02	2.59E+04	5.71E+04	3.04E+05
Cr-51	9.84E-04	2.39E-03	1.19E-02	3.11E+03	6.86E+03	3.65E+04
Cs-137	2.35E-05	6.12E-05	2.97E-04	7.34E+01	1.73E+02	9.10E+02
Fe-55	2.44E-02	5.91E-02	2.94E-01	7.68E+04	1.70E+05	9.04E+05
H-3	4.71E-06	4.71E-06	1.88E-05	4.08E+00	1.47E+01	2.52E+01
I-129	4.71E-06	4.71E-06	4.71E-06	4.08E+00	1.38E+01	1.84E+01
Mn-54	4.76E-03	1.16E-02	5.74E-02	1.50E+04	3.31E+04	1.77E+05
Ni-63	4.10E-04	9.94E-04	4.95E-03	1.30E+03	2.86E+03	1.52E+04
Sr-90	4.71E-06	4.71E-06	4.71E-06	4.08E+00	1.38E+01	1.84E+01
Tc-99	4.71E-06	4.71E-06	4.71E-06	4.08E+00	1.31E+01	1.84E+01
U-238	5.18E-05	5.18E-05	5.18E-05	6.92E+01	1.12E+02	3.37E+02

Table C-13 Appalachian Compact Industrial Waste Generators Biomedical Radionuclide Distributions - Container Level[a], Cont'd

Waste Class: A-Unstable
Waste form: Solidified liquids - Delaware Media
Number of shipping records: 1
Number of shipping containers: 4
Total waste volume: 0.8 m^3
Total waste mass: 1,103 kg
Average waste form density: 1.30 g/cm^3

	Concentration Ranges - Ci/m^3 -			Percentile - pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
Ag-110m	1.29E-03	1.37E-03	2.18E-03	1.01E+03	1.05E+03	1.64E+03
C-14	4.71E-05	5.18E-05	8.48E-05	3.67E+01	3.97E+01	6.39E+01
Cd-109	1.40E-02	1.49E-02	2.37E-02	1.10E+04	1.14E+04	1.79E+04
Co-57	1.56E-02	1.65E-02	2.62E-02	1.21E+04	1.26E+04	1.98E+04
Co-58	6.83E-03	7.24E-03	1.15E-02	5.33E+03	5.55E+03	8.69E+03
Co-60	3.80E-02	4.02E-02	6.39E-02	2.96E+04	3.09E+04	4.82E+04
Cr-51	4.56E-03	4.83E-03	7.67E-03	3.55E+03	3.70E+03	5.79E+03
Cs-137	1.13E-04	1.22E-04	1.93E-04	8.81E+01	9.39E+01	1.46E+02
Fe-55	1.13E-01	1.20E-01	1.90E-01	8.79E+04	9.16E+04	1.43E+05
H-3	4.71E-06	4.71E-06	4.71E-06	3.55E+00	3.61E+00	3.67E+00
I-129	4.71E-06	4.71E-06	4.71E-06	3.55E+00	3.61E+00	3.67E+00
Mn-54	2.20E-02	2.33E-02	3.71E-02	1.72E+04	1.79E+04	2.80E+04
Ni-63	1.90E-03	2.01E-03	3.20E-03	1.48E+03	1.54E+03	2.41E+03
Sr-90	4.71E-06	4.71E-06	4.71E-06	3.55E+00	3.61E+00	3.67E+00
Tc-99	4.71E-06	4.71E-06	4.71E-06	3.55E+00	3.61E+00	3.67E+00

Table C-13 Appalachian Compact Industrial Waste Generators Biomedical Radionuclide Distributions - Container Level[a], Cont'd

Waste Class: A-Unstable
Waste form: Dry solid
Number of shipping records: 10
Number of shipping containers: 162
Total waste volume: 251.0 m^3
Total waste mass: 158,092 kg
Average waste form density: 0.63 g/cm^3

	Concentration Ranges - Percentile[b] - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
Ag-110m	1.41E-06	1.41E-06	3.94E-06	2.00E+00	2.00E+00	6.81E+00
Am-241	6.56E-07	1.06E-04	1.43E-04	1.02E+00	2.70E+02	3.07E+02
C-14	4.71E-06	4.71E-06	4.71E-06	2.73E+00	2.98E+00	4.56E+00
Co-58	5.39E-04	4.59E-03	9.67E-03	9.36E+02	1.05E+04	2.27E+04
Co-60	4.71E-06	3.77E-05	2.87E-04	4.56E+00	2.39E+01	1.93E+02
Cs-134	4.71E-06	4.71E-06	9.42E-06	2.73E+00	3.00E+00	6.05E+00
Cs-137	4.71E-06	2.83E-05	4.24E-05	4.56E+00	1.79E+01	2.70E+01
Fe-55	5.65E-06	1.26E-03	7.47E-02	7.94E+00	2.69E+03	1.59E+05
H-3	4.71E-06	4.75E-05	5.65E-05	4.56E+00	3.13E+01	3.63E+01
I-129	2.94E-07	3.28E-07	3.41E-05	4.91E-01	7.06E-01	6.47E+01
Mn-54	2.83E-06	4.86E-05	5.43E-03	3.83E+00	8.40E+01	1.15E+04
Nb-95	1.13E-03	1.13E-03	2.59E-03	2.14E+03	2.14E+03	6.09E+03
Ni-63	3.53E-06	7.07E-04	1.67E-02	4.96E+00	1.77E+03	3.92E+04
Ru-106*	2.60E-04	2.60E-04	2.60E-04	4.93E+02	4.93E+02	4.93E+02
Sr-89*	2.12E-03	2.12E-03	2.12E-03	4.97E+03	4.97E+03	4.97E+03
Sr-90	4.71E-06	3.77E-05	6.12E-05	4.56E+00	2.39E+01	3.91E+01
Tc-99	4.71E-06	4.71E-06	4.71E-06	3.10E+00	3.22E+00	4.40E+00
U-238	6.56E-07	1.12E-05	9.55E-05	1.38E+00	2.24E+01	2.10E+02
Zn-65	1.05E-03	2.06E-03	2.59E-02	2.22E+03	3.29E+03	5.51E+04

Table C-13 Appalachian Compact Industrial Waste Generators Biomedical Radionuclide Distributions - Container Level[a], Cont'd

Waste Class: A-Unstable
Waste form: Solidified liquids - Unspecified agent
Number of shipping records: 2
Number of shipping containers: 4
Total waste volume: 20.0 m^3
Total waste mass: 28,806 kg
Average waste form density: 1.44 g/cm^3

Nuclide	Concentration Ranges - Ci/m^3 - 1st	50th	99th	Percentile - pCi/g - 1st	50th	99th
C-14	9.73E-05	1.18E-04	2.66E-04	7.12E+01	7.53E+01	1.85E+02
Co-60	8.18E-03	2.58E-02	3.39E-02	5.68E+03	1.79E+04	2.41E+04
Cs-134	3.39E-04	4.78E-04	1.41E-03	2.41E+02	3.06E+02	9.81E+02
Cs-137	1.99E-03	2.99E-03	1.55E-02	1.28E+03	2.12E+03	1.08E+04
Fe-55	6.14E-03	1.61E-02	3.19E-02	4.26E+03	1.15E+04	2.04E+04
H-3	1.14E-05	1.33E-05	4.78E-05	7.28E+00	9.74E+00	3.40E+01
I-129	1.79E-06	4.76E-06	1.49E-05	1.15E+00	3.41E+00	1.06E+01
Mn-54	1.00E-05	3.59E-05	1.45E-04	6.96E+00	2.30E+01	1.03E+02
Ni-63	6.55E-04	1.71E-03	1.99E-03	4.55E+02	1.22E+03	1.28E+03
Sr-90	1.99E-07	1.27E-05	1.69E-05	1.28E-01	9.30E+00	1.20E+01
Tc-99	3.39E-06	4.30E-06	1.37E-05	2.17E+00	2.98E+00	9.77E+00

(a) LLW containers shipped to Beatty and Richland (1988-1990).
(b) Radionuclide concentrations tagged with an asterisk is based on a single value. In such instances, the percentile distribution does not apply.

Table C-14 Southwest Compact Academic Waste Generators Biomedical Radionuclide Distributions - Container Level(a)

Waste Class: A-Unstable
Waste form: Dry solid
Number of shipping records: 1
Number of shipping containers: 3
Total waste volume: 0.6 m^3
Total waste mass: 249.7 kg
Average waste form density: 0.39 g/cm^3

	Concentration Ranges - Percentile - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
C-14	2.35E-04	3.77E-04	9.89E-04	6.48E+02	9.79E+02	2.31E+03
H-3	9.89E-04	9.42E-03	1.04E-02	2.31E+03	2.59E+04	2.70E+04
I-125	5.18E-03	5.18E-03	1.70E-02	1.43E+04	1.43E+04	3.96E+04
P-32	2.35E-03	5.18E-02	5.18E-02	6.48E+03	1.21E+05	1.35E+05
S-35	2.35E-04	1.41E-02	1.41E-02	5.51E+02	3.67E+04	3.89E+04

Waste Class: A-Stable
Waste form: Activated reactor hardware and concrete
Number of shipping records: 1
Number of shipping containers: 4
Total waste volume: 3.9 m^3
Total waste mass: 12,124 kg
Average waste form density: 3.10 g/cm^3

	Concentration Ranges - Percentile - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
Co-60	1.40E-03	5.33E-03	1.60E-01	3.70E+02	1.42E+03	4.25E+04
Cs-134	3.04E-05	1.32E-04	2.44E-03	8.04E+00	3.51E+01	6.48E+02
Eu-152	1.46E-03	7.92E-03	1.46E-01	3.86E+02	2.11E+03	3.89E+04
Eu-154	1.67E-04	9.24E-04	1.71E-02	4.42E+01	2.46E+02	4.53E+03
Mn-54	4.57E-05	1.49E-04	4.07E-03	1.21E+01	3.95E+01	1.08E+03

Table C-14 Southwest Compact Academic Waste Generators Biomedical Radionuclide Distributions - Container Level[a], Cont'd

Waste Class: A-Unstable
Waste form: Dry solid - sealed sources in cement
Number of shipping records: 1
Number of shipping containers: 2
Total waste volume: 0.4 m^3
Total waste mass: 1,111 kg
Average waste form density: 2.62 g/cm^3

	Concentration Ranges - Ci/m^3 -			Percentile - pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
Ra-226	1.93E-00	1.93E-00	1.95E-00	7.38E+05	7.38E+05	7.45E+05

(a) LLW containers shipped to Beatty and Richland (1988-1990).

Table C-15 Southwest Compact Government Waste Generators Biomedical Radionuclide Distributions - Container Level(a)

Waste Class: A-Unstable
Waste form: Non-compacted dry active waste
Number of shipping records: 21
Number of shipping containers: 81
Total waste volume: 268.9 m^3
Total waste mass: 145,668 kg
Average waste form density: 0.54 g/cm^3

Nuclide	Concentration Ranges - Ci/m^3 - 1st	50th	99th	Percentile - pCi/g - 1st	50th	99th
C-14	2.50E-08	6.64E-06	4.29E-04	1.29E-01	1.20E+01	8.42E+02
Co-58	7.49E-08	1.71E-05	1.06E-03	3.60E-01	2.97E+01	2.07E+03
Co-60	1.35E-06	3.42E-04	2.10E-02	6.98E-00	5.97E+02	4.11E+04
Fe-55	1.35E-06	3.42E-04	2.10E-02	6.98E+00	6.61E+02	4.11E+04
H-3	1.12E-03	1.12E-03	1.45E-03	1.38E+03	1.38E+03	1.86E+03
Mn-54	2.25E-07	5.82E-05	3.56E-03	1.16E+00	1.02E+02	7.03E+03
Ni-63	7.49E-08	1.71E-05	1.09E-03	3.60E+01	3.30E+01	2.07E+03
Zn-65	5.28E-04	5.28E-04	2.29E-03	1.58E+03	1.58E+03	3.63E+03

Waste form: Evaporator bottom - Cement, Envirostone
Number of shipping records: 3
Number of shipping containers: 19
Total waste volume: 4.0 m^3
Total waste mass: 5,430 kg
Average waste form density: 1.35 g/cm^3

Nuclide	Concentration Ranges - Ci/m^3 - 1st	50th	99th	Percentile - pCi/g - 1st	50th	99th
C-14	3.30E-05	1.88E-04	4.61E-04	2.21E+01	1.43E+02	3.61E+02
Co-58	4.71E-06	2.07E-04	1.15E-03	3.62E+00	1.31E+02	9.02E+02
Co-60	9.42E-05	4.14E-03	2.31E-02	7.25E+01	2.62E+03	1.80E+04
Fe-55	9.42E-05	4.14E-03	2.31E-02	7.25E+01	2.62E+03	1.80E+04
H-3	1.79E-03	2.50E-03	2.50E-03	1.36E+03	1.94E+03	2.17E+03
Mn-54	1.41E-05	7.02E-04	3.92E-03	1.09E+01	4.44E+02	3.07E+03
Ni-63	4.71E-06	2.07E-04	1.15E-03	3.62E+00	1.31E+02	9.02E+02

Table C-15 Southwest Compact Government Waste Generators Biomedical Radionuclide Distributions - Container Level[a], Cont'd

Waste Class: A-Unstable
Waste form: Solidified resins - Cement
Number of shipping records: 14
Number of shipping containers: 54
Total waste volume: 14.9 m^3
Total waste mass: 18,009 kg
Average waste form density: 1.21 g/cm^3

	Concentration Ranges - Percentile[b] - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
Ag-110m*	5.57E-03	5.57E-03	5.57E-03	8.56E+03	8.56E+03	8.56E+03
C-14	4.71E-06	4.24E-05	1.55E-02	3.38E+00	2.90E+01	1.12E+04
Co-58	4.71E-06	5.65E-05	1.65E-02	3.30E+00	4.61E+01	1.17E+04
Co-60	9.42E-05	1.13E-03	3.30E-01	6.59E+01	9.22E+02	2.35E+05
Cs-134*	3.23E-05	3.23E-05	3.23E-05	4.96E+01	4.96E+01	4.96E+01
Cs-137*	5.67E-04	5.67E-04	5.67E-04	8.72E+02	8.72E+02	8.72E+02
Fe-55	9.42E-05	1.13E-03	3.30E-01	6.59E+01	9.22E+02	2.35E+05
Fe-59*	1.76E-03	1.76E-03	1.76E-03	2.71E+03	2.71E+03	2.71E+03
H-3	4.05E-04	2.86E-03	4.65E-03	2.85E+02	2.03E+03	3.22E+03
Mn-54	1.41E-05	1.93E-04	5.65E-02	9.89E+00	1.57E+02	4.02E+04
Ni-63	4.71E-06	5.65E-05	1.65E-02	3.30E+00	4.61E+01	1.17E+04
Nb-95*	1.73E-03	1.73E-03	1.73E-03	2.66E+03	2.66E+03	2.66E+03
Sb-125	2.29E-05	2.29E-05	2.29E-05	3.52E+01	3.52E+01	3.52E+01
Sn-113*	2.94E-04	2.94E-04	2.94E-04	4.51E+02	4.51E+02	4.51E+02
Sr-90*	8.28E-06	8.28E-06	8.28E-06	1.27E+01	1.27E+01	1.27E+01
Zn-65*	1.23E-02	1.23E-02	1.23E-02	1.90E+04	1.90E+04	1.90E+04

Table C-15 Southwest Compact Government Waste Generators Biomedical Radionuclide Distributions - Container Level[a], Cont'd

Waste Class: A-Unstable
Waste form: Compacted dry active trash
Number of shipping records: 21
Number of shipping containers: 635
Total waste volume: 152.8 m^3
Total waste mass: 134,362 kg
Average waste form density: 0.88 g/cm^3

Nuclide	Concentration Ranges - Percentile - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
C-14	4.71E-06	9.42E-06	1.04E-03	4.14E+00	1.07E+01	1.05E+03
Co-58	4.71E-06	1.88E-05	2.07E-03	3.54E+00	1.89E+01	2.22E+03
Co-60	3.77E-05	3.01E-04	4.14E-02	3.54E+01	3.33E+02	4.43E+04
Fe-55	3.77E-05	3.01E-04	4.14E-02	3.54E+01	3.33E+02	4.43E+04
H-3	4.05E-04	2.46E-03	3.96E-03	3.57E+02	1.92E+03	2.79E+03
Mn-54	4.71E-06	5.18E-05	7.04E-03	4.70E+00	5.84E+01	7.54E+03
Ni-63	4.71E-06	1.88E-05	2.07E-03	3.54E+00	1.89E+01	2.22E+03

Waste Class: A-Unstable
Waste form: Solidified liquids - Cement, Envirostone
Number of shipping records: 7
Number of shipping containers: 19
Total waste volume: 4.0 m^3
Total waste mass: 5,110 kg
Average waste form density: 1.27 g/cm^3

Nuclide	Concentration Ranges - Percentile - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
C-14	4.71E-06	4.24E-05	3.67E-04	3.75E+00	3.35E+01	2.77E+02
Co-58	4.71E-06	6.12E-05	9.18E-04	3.39E+00	4.62E+01	6.93E+02
Co-60	9.42E-05	1.22E-03	1.84E-02	6.78E+01	9.24E+02	1.39E+04
Fe-55	9.42E-05	1.22E-03	1.84E-02	6.78E+01	9.24E+02	1.39E+04
H-3	3.58E-04	8.95E-04	3.13E-03	2.70E+02	6.49E+02	2.52E+03
Mn-54	1.41E-05	2.07E-04	3.12E-03	1.02E+01	1.56E+02	2.36E+03
Ni-63	4.71E-06	6.12E-05	9.18E-04	3.39E+00	4.62E+01	6.93E+02

Table C-15 Southwest Compact Government Waste Generators Biomedical Radionuclide Distributions - Container Level[a], Cont'd

Waste Class: A-Unstable
Waste form: Dry solid
Number of shipping records: 3
Number of shipping containers: 9
Total waste volume: 9.6 m^3
Total waste mass: 11,532 kg
Average waste form density: 1.20 g/cm^3

	Concentration Ranges - Percentile[b] - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
Ag-110m	3.84E-04	3.84E-04	6.43E-03	2.85E+02	2.85E+02	9.45E+02
C-14	9.32E-04	9.32E-04	1.34E-03	6.93E+02	6.93E+02	1.97E+03
Co-58	4.71E-06	4.71E-06	4.71E-06	1.97E+00	2.36E+00	2.55E+00
Co-60	9.42E-05	9.42E-05	9.42E-05	3.93E+01	4.71E+01	5.09E+01
Cr-51*	1.73E-03	1.73E-03	1.73E-03	1.28E+03	1.28E+03	1.28E+03
Cs-134*	1.11E-04	1.11E-04	1.11E-04	8.26E+01	8.26E+01	8.26E+01
Cs-137	5.61E-06	5.61E-06	3.56E-03	8.24E+00	8.24E+00	2.64E+03
Fe-55	9.42E-05	9.42E-05	9.42E-05	3.93E+01	4.71E+01	5.09E+01
Fe-59	2.01E-04	2.01E-04	1.95E-03	2.95E+02	2.95E+02	1.45E+03
H-3	1.68E-05	1.68E-05	1.35E-04	1.25E+01	1.25E+01	1.98E+02
I-131*	1.79E-05	1.79E-05	1.79E-05	1.33E+01	1.33E+01	1.33E+01
Mn-54	1.41E-05	1.41E-05	1.41E-05	5.90E+00	7.07E+00	7.64E+00
Ni-63	4.71E-06	4.71E-06	4.71E-06	1.97E+00	2.36E+00	2.55E+00
Nb-95*	4.01E-04	4.01E-04	4.01E-04	2.98E+02	2.98E+02	2.98E+02
Zr-95*	4.44E-04	4.44E-04	4.44E-04	3.30E+02	3.30E+02	3.30E+02
Zn-65*	5.54E-05	5.54E-05	5.54E-05	4.12E+01	4.12E+01	4.12E+01

Table C-15 Southwest Compact Government Waste Generators Biomedical Radionuclide Distributions - Container Level[a], Cont'd

Waste Class: A-Unstable
Waste form: Non-Cartridge Filter Media - Cement and other agent
Number of shipping records: 1
Number of shipping containers: 10
Total waste volume: 2.1 m^3
Total waste mass: 2,674 kg
Average waste form density: 1.26 g/cm^3

	Concentration Ranges - Ci/m^3 -			Percentile - pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
C-14	9.42E-06	2.35E-05	2.97E-03	7.73E+00	2.15E+01	1.93E+03
Co-58	4.71E-06	2.35E-05	7.42E-03	3.34E+00	1.93E+01	4.82E+03
Co-60	9.42E-05	5.13E-04	1.48E-01	6.67E+01	4.21E+02	9.64E+04
Fe-55	9.42E-05	5.13E-04	1.48E-01	6.67E+01	4.21E+02	9.64E+04
H-3	4.47E-04	2.15E-03	3.13E-03	3.67E+02	1.52E+03	2.02E+03
Mn-54	1.41E-05	8.95E-05	2.52E-02	1.00E+01	7.34E+01	1.64E+04
Ni-63	4.71E-06	2.35E-05	7.42E-03	3.34E+00	1.93E+01	4.82E+03

(a) LLW containers shipped to Beatty and Richland (1988-1990).
(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table C-16 Southwest Compact Industrial Waste Generators Biomedical Radionuclide Distributions - Container Level[a]

Waste Class: A-Unstable
Waste form: Dry solid - Cement, Floor Dry, Florco
Number of shipping records: 62
Number of shipping containers: 887
Total waste volume: 1,089 m^3
Total waste mass: 767,280 kg
Average waste form density: 0.71 g/cm^3

	Concentration Ranges - Percentile[b] - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
Ag-110m*	9.42E-05	9.42E-05	9.42E-05	4.89E+02	4.89E+02	4.89E+02
Ba-133*	9.42E-05	9.42E-05	9.42E-05	2.94E+02	2.94E+02	2.94E+02
C-14	4.71E-03	4.71E-03	4.71E-03	1.76E+04	2.32E+04	2.94E+04
Cd-109	1.88E-05	4.24E-05	4.71E-04	1.26E+02	2.00E+02	1.57E+03
Ce-139*	1.41E-05	1.41E-05	1.41E-05	3.22E+01	3.22E+01	3.22E+01
Co-57	4.71E-03	9.42E-03	4.71E-02	2.20E+04	5.18E+04	2.20E+05
Co-58*	4.71E-06	4.71E-06	4.71E-06	2.45E+01	2.45E+01	2.45E+01
Co-60	4.71E-06	1.29E-02	9.45E-01	1.68E+01	2.04E+04	1.70E+06
Cr-51*	4.24E-04	4.24E-04	2.24E-04	1.42E+03	1.42E+03	1.42E+03
Cs-134	4.71E-06	2.35E-05	1.88E-03	1.69E+01	1.10E+02	6.78E+03
Cs-137	4.71E-06	1.25E-02	4.64E-02	1.05E+01	1.46E+04	7.00E+04
H-3	4.71E-03	4.71E-03	2.35E-02	1.76E+04	2.45E+04	1.16E+05
I-125	4.71E-03	4.71E-03	2.35E-02	2.45E+04	2.75E+04	1.22E+05
I-129	4.71E-06	4.71E-06	4.71E-06	1.30E+01	1.84E+01	3.15E+01
I-131*	4.71E-03	4.71E-03	4.71E-03	2.45E+04	2.45E+04	2.45E+04
Mn-54	4.71E-06	4.71E-06	1.88E-04	1.47E+01	2.45E+01	4.30E+02
P-32	4.71E-03	4.24E-02	2.83E-01	2.00E+04	1.42E+05	1.47E+06
S-35	4.71E-03	4.71E-03	9.42E-03	1.84E+04	2.20E+04	4.41E+04
Sc-46*	1.41E-05	1.41E-05	1.41E-05	7.34E+01	7.34E+01	7.34E+01
Sn-113*	4.71E-06	4.71E-06	4.71E-06	2.45E+01	2.45E+01	2.45E+01
Sr-90	4.71E-06	8.38E-03	3.02E-02	1.69E+01	1.33E+04	8.43E+04
Tc-99	4.71E-06	4.71E-06	4.71E-06	1.30E+01	1.69E+01	3.15E+01
Th-228	4.71E-06	4.71E-06	9.42E-06	2.28E+00	3.17E+00	8.92E+00
Th-232	4.71E-06	1.41E-05	5.18E-05	2.73E+00	1.14E+01	2.82E+01
U-238	4.71E-06	4.71E-04	1.88E-02	3.44E+00	4.28E+02	5.51E+04
Y-90	4.71E-06	1.12E-02	3.07E-02	1.69E+01	2.53E+04	9.28E+04
Zn-65	4.71E-06	9.42E-06	2.83E-05	1.84E+01	4.89E+01	9.79E+01

Table C-16 Southwest Compact Industrial Waste Generators Biomedical Radionuclide Distributions - Container Level[a], Cont'd

Waste Class: A-Unstable
Waste form: Compacted dry active waste - Petroset, Opalex
Number of shipping records: 8
Number of shipping containers: 27
Total waste volume: 101.3 m^3
Total waste mass: 47,218 kg
Average waste form density: 0.47 g/cm^3

	Concentration Ranges - Percentile[b] - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
Ag-110m	7.09E-07	1.65E-05	3.22E-05	1.95E+00	3.98E+01	7.77E+01
C-14	3.54E-07	3.96E-06	2.25E-04	8.29E-01	1.10E+01	3.79E+02
Cd-109*	7.68E-05	7.68E-05	7.68E-05	2.01E+02	2.01E+02	2.01E+02
Co-57	3.07E-07	3.58E-07	4.09E-07	7.40E-01	9.09E-01	1.08E+00
Co-58	1.48E-05	3.37E-05	1.33E-03	2.49E+01	9.93E+01	4.02E+03
Co-60	4.38E-02	4.38E-02	2.59E-01	5.93E+04	6.82E+04	4.11E+05
Cr-51*	6.14E-06	6.14E-06	6.14E-06	1.48E+01	1.48E+01	1.48E+01
Cs-134	3.54E-07	4.09E-07	8.19E-07	8.29E-01	1.06E+00	2.15E+00
Cs-137	4.09E-07	5.32E-06	5.98E-05	1.24E+00	1.41E+01	1.55E+02
Fe-59	3.54E-07	4.09E-07	2.96E-06	8.29E-01	1.08E+00	4.98E+00
H-3	3.54E-07	4.09E-07	6.50E-06	8.29E-01	1.08E+00	1.09E+01
Mn-54	1.13E-05	6.38E-05	6.90E-04	2.65E+01	1.70E+02	1.81E+03
Nb-95	3.07E-07	3.58E-07	4.09E-07	7.40E-01	9.02E-01	1.06E+00
Ru-106*	2.76E-06	2.76E-06	2.76E-06	6.19E+00	6.19E+00	6.19E+00
Sc-46	6.76E-06	6.76E-06	3.07E-05	1.63E+01	1.63E+01	6.88E+01
Se-75*	3.07E-07	3.07E-07	3.07E-07	7.40E-01	7.40E-01	7.40E-01
Sr-85	3.54E-07	3.54E-07	4.09E-07	9.42E-01	1.05E+00	1.24E+00
Sr-90	3.54E-07	3.54E-07	5.91E-07	8.29E-01	1.06E+00	1.38E+00
Tc-99	2.13E-06	2.33E-05	1.26E-03	4.98E+00	6.14E+01	2.13E+03
U-238	3.54E-07	3.54E-07	5.91E-07	8.29E-01	1.06E+00	1.38E+00
Zn-65*	1.84E-06	1.84E-06	1.84E-06	4.44E+00	4.44E+00	4.44E+00

Table C-16 Southwest Compact Industrial Waste Generators Biomedical Radionuclide Distributions - Container Level[a], Cont'd

Waste Class: A-Unstable
Waste form: Non-compacted dry active waste
Number of shipping records: 10
Number of shipping containers: 142
Total waste volume: 75.6 m^3
Total waste mass: 42,413 kg
Average waste form density: 0.56 g/cm^3

	Concentration Ranges - Percentile[b] - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
Ag-110m	4.71E-06	9.42E-06	8.95E-05	1.51E+01	3.52E+01	4.10E+02
Am-241*	6.14E-07	6.14E-07	6.14E-07	1.63E+00	1.63E+00	1.63E+00
Ba-133*	8.00E-04	8.00E-04	8.00E-04	2.46E+03	2.46E+03	2.46E+03
Cl-36*	2.46E-06	2.46E-06	2.46E-06	6.53E+00	6.53E+00	6.53E+00
Co-58	4.71E-06	4.71E-06	2.35E-05	2.16E+01	2.20E+01	1.08E+02
Co-60	4.71E-06	2.35E-05	4.77E-01	1.51E+01	2.47E+01	1.02E+06
Cr-51	9.42E-06	9.42E-06	2.26E-04	4.32E+01	4.32E+01	8.46E+02
Cs-134	4.71E-06	8.95E-05	1.13E-03	2.47E+01	3.35E+02	3.02E+03
Cs-137	4.71E-06	1.65E-04	3.01E-02	4.41E+00	1.41E+02	9.27E+04
Fe-59	7.06E-06	5.77E-05	1.08E-04	6.41E+00	2.06E+02	4.05E+02
I-129	4.71E-06	4.71E-06	4.71E-06	1.42E+01	1.42E+01	1.42E+01
I-131	1.23E-06	2.97E-06	4.71E-06	1.12E+00	9.37E+00	1.76E+01
Mn-54	4.71E-06	8.00E-05	3.81E-04	1.51E+01	3.67E+02	1.43E+03
Ni-63*	3.07E-06	3.07E-06	3.07E-06	8.16E+00	8.16E+00	8.16E+00
Ru-106*	1.11E-05	1.11E-05	1.11E-05	2.43E+01	2.43E+01	2.43E+01
Sc-46*	4.24E-05	4.24E-05	4.24E-05	1.94E+02	1.94E+02	1.94E+02
Sn-113*	4.71E-06	4.71E-06	4.71E-06	1.51E+01	1.51E+01	1.51E+01
Sr-90	4.71E-04	1.07E-03	2.61E-02	3.44E+02	9.26E+02	1.03E+05
Tc-99	4.71E-06	4.71E-06	1.79E-03	9.79E+00	1.49E+01	5.51E+03
Th-228	6.03E-03	6.03E-03	2.68E-02	4.03E+04	4.03E+04	1.39E+05
Th-232	2.35E-05	2.35E-05	2.35E-05	1.22E+02	1.22E+02	1.57E+02
U-238	4.71E-06	8.76E-04	8.80E-04	2.20E+01	3.41E+03	4.12E+03
Y-90	1.65E-02	1.95E-02	2.61E-02	4.97E+04	5.83E+04	1.03E+05
Zn-65	2.35E-05	3.30E-05	5.65E-05	5.82E+01	1.08E+02	2.11E+02

Table C-16 Southwest Compact Industrial Waste Generators Biomedical Radionuclide Distributions - Container Level[a], Cont'd

Waste Class: A-Unstable
Waste form: Solidified liquid - Cement, Aquaset, Petroset
Number of shipping records: 10
Number of shipping containers: 197
Total waste volume: 41.8 m^3
Total waste mass: 53,239 kg
Average waste form density: 1.27 g/cm^3

	Concentration Ranges - Percentile[b] - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
Cd-109*	2.10E-01	2.10E-01	2.10E-01	1.59E+05	1.59E+05	1.59E+05
Co-58*	1.19E-03	1.19E-03	1.19E-03	9.06E+02	9.06E+02	9.06E+02
Co-60	1.94E-03	2.06E-02	8.07E-02	1.47E+03	1.93E+04	8.51E+04
Cs-137	5.16E-03	1.55E-02	4.12E-02	3.73E+03	1.45E+04	4.82E+04
Fe-59*	2.31E-04	2.31E-04	2.31E-04	1.75E+02	1.75E+02	1.75E+02
H-3	1.41E+02	4.00E+03	4.45E+03	6.99E+07	1.93E+09	2.13E+09
Mn-54*	6.17E-03	6.17E-03	6.17E-03	4.69E+03	4.69E+03	4.69E+03
Na-24*	2.02E-04	2.02E-04	2.02E-04	1.54E+02	1.54E+02	1.54E+02
Sr-90	3.53E-03	1.01E-02	2.68E-02	2.42E+03	9.41E+03	3.14E+04
U-238	4.71E-06	2.35E-05	8.48E-04	3.50E+00	1.98E+01	4.89E+02
Zn-65	3.84E-03	3.84E-03	3.84E-03	2.92E+03	2.92E+03	2.92E+03

Waste Class: A-Unstable
Waste form: Sorbed aqueous liquid - Floor Dry, Aquaset
Number of shipping records: 9
Number of shipping containers: 433
Total waste volume: 92.0 m^3
Total waste mass: 49,091 kg
Average waste form density: 0.53 g/cm^3

	Concentration Ranges - Percentile[b] - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
C-14	4.71E-03	4.71E-02	7.53E-01	7.11E+03	1.19E+05	1.18E+06
Ca-45	2.35E-02	2.35E-02	4.71E-01	3.61E+04	4.89E+04	7.73E+05
Cl-36*	9.42E-03	9.42E-03	9.42E-03	1.55E+04	1.55E+04	1.55E+04
Co-57	4.71E-03	2.35E-02	2.35E-01	7.22E+03	6.48E+04	6.67E+05
Co-60	5.16E-03	2.92E-02	3.23E-01	4.78E+03	3.14E+04	4.65E+05

Table C-16 Southwest Compact Industrial Waste Generators Biomedical Radionuclide Distributions - Container Level[a], Cont'd

Nuclide	Concentration Ranges - Percentile - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
Cr-51	4.71E-02	1.41E-01	4.71E-01	9.79E+04	3.57E+05	7.73E+05
Cs-137	2.50E-03	1.25E-02	1.18E-01	4.10E+03	1.65E+04	1.07E+05
H-3	4.71E-03	4.71E-02	2.35E+01	6.99E+03	1.42E+05	4.20E+07
I-125	4.71E-03	2.35E-02	4.71E-01	6.38E+03	5.34E+04	1.33E+06
I-131	4.71E-03	9.42E-03	6.59E-02	7.22E+03	2.84E+04	2.06E+05
P-32	4.71E-03	1.41E-01	1.18E+01	6.99E+03	3.44E+05	3.30E+07
S-35	4.71E-03	4.00E-01	2.38E+01	6.99E+03	8.31E+05	3.92E+07
Sr-90	4.71E-05	8.13E-03	3.02E-02	6.29E+01	1.00E+04	3.53E+04

Waste Class: A-Unstable
Waste form: Cartridge type filter media - Cement
Number of shipping records: 2
Number of shipping containers: 31
Total waste volume: 6.6 m^3
Total waste mass: 10,088 kg
Average waste form density: 1.53 g/cm^3

Nuclide	Concentration Ranges - Percentile[b] - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
Cd-109	1.35E-01	1.95E-01	2.64E-01	1.09E+05	1.52E+05	2.06E+05
Co-57	2.35E-05	2.35E-05	1.91E-01	1.84E+01	1.84E+01	1.54E+05
Co-58	3.30E-04	4.76E-04	2.19E-03	2.57E+02	3.71E+02	1.77E+03
Co-60	7.63E-04	1.12E-03	3.73E-03	6.15E+02	9.00E+02	2.91E+03
Cr-51*	9.94E-04	9.94E-04	9.94E-04	8.01E+02	8.01E+02	8.01E+02
Mn-54	2.42E-03	3.63E-03	5.17E-03	1.95E+03	2.92E+03	4.03E+03
U-238	4.71E-06	8.76E-04	8.80E-04	3.15E+00	5.46E+02	7.06E+02
Zn-65	2.87E-03	2.87E-03	3.84E-03	2.24E+03	2.24E+03	2.99E+03

Table C-16 Southwest Compact Industrial Waste Generators Biomedical Radionuclide Distributions - Container Level[a], Cont'd

Waste Class: A-Unstable
Waste form: Solidified oil - Petroset
Number of shipping records: 6
Number of shipping containers: 52
Total waste volume: 11.0 m^3
Total waste mass: 13,693 kg
Average waste form density: 1.24 g/cm^3

Nuclide	Concentration Ranges - Percentile - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
Co-60	5.16E-03	1.27E-02	1.18E-01	5.24E+03	1.08E+04	1.58E+05
Cs-137	5.16E-03	1.27E-02	3.87E-02	5.24E+03	1.08E+04	4.44E+04
Sr-90	3.35E-03	8.24E-03	2.51E-02	3.41E+03	7.01E+03	2.88E+04

Waste Class: A-Unstable
Waste form: Dewatered resins - Floor Dry
Number of shipping records: 3
Number of shipping containers: 7
Total waste volume: 1.5 m^3
Total waste mass: 1,362 kg
Average waste form density: 0.92 g/cm^3

Nuclide	Concentration Ranges - Percentile - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
Co-60	5.18E-03	1.55E-02	1.30E+01	4.85E+03	1.52E+04	1.52E+07
Cs-137	5.18E-03	1.03E-02	5.65E-02	4.85E+03	1.29E+04	5.29E+04
Sr-90	3.37E-03	6.69E-03	3.67E-02	3.15E+03	8.34E+03	3.44E+04

Table C-16 Southwest Compact Industrial Waste Generators Biomedical Radionuclide Distributions - Container Level[a], Cont'd

Waste Class: A-Unstable
Waste form: Resins - Petroset
Number of shipping records: 1
Number of shipping containers: 2
Total waste volume: 0.4 m^3
Total waste mass: 404.0 kg
Average waste form density: 0.95 g/cm^3

Nuclide	Concentration Ranges - Percentile - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
Co-60	1.30E+00	1.30E+00	7.06E+00	1.22E+06	1.22E+06	8.47E+06
Cs-137	6.50E-03	6.50E-03	3.53E-02	6.08E+03	6.08E+03	4.24E+04
Sr-90	4.24E-03	4.24E-03	2.31E-02	3.96E+03	3.96E+03	2.77E+04

(a) LLW containers shipped to Beatty and Richland (1988-1990).
(b) Radionuclide concentrations tagged with an asterisk is based on a single value. In such instances, the percentile distribution does not apply.

Table C-17 Massachusetts Industrial Waste Generators Biomedical Radionuclide Distributions - Container Level(a)

Waste Class: A-Unstable
Waste form: Dry solid - Cement, Dicaperl
Number of shipping records: 58
Number of shipping containers: 2,171
Total waste volume: 544.8 m^3
Total waste mass: 631,895 kg
Average waste form density: 1.16 g/cm^3

	Concentration Ranges - Ci/m^3 -			Percentile - pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
Ag-110m	4.71E-06	4.71E-04	1.88E-02	5.72E+00	6.24E+02	3.29E+04
Au-195	2.35E-05	8.48E-05	2.12E-02	3.16E+01	9.91E+01	2.28E+04
Ba-133	4.71E-06	4.66E-04	7.07E-02	6.29E+00	6.67E+02	8.27E+04
C-14	2.83E-05	7.44E-01	7.89E-01	4.07E+01	1.16E+06	2.55E+06
Ca-45	3.30E-05	7.06E-03	1.18E-01	4.11E+01	1.10E+04	1.97E+05
Ce-139	4.71E-06	9.42E-06	1.41E-04	7.11E+00	1.33E+01	2.28E+02
Ce-141	4.71E-06	1.60E-04	8.00E-03	6.12E+00	2.88E+02	1.23E+04
Cl-36	4.71E-06	4.71E-03	1.18E-01	7.11E+00	7.34E+03	1.72E+05
Co-57	9.42E-06	4.80E-03	8.05E-02	8.81E+00	7.27E+03	1.18E+05
Co-58	4.71E-06	1.65E-04	2.52E-03	6.48E+00	2.45E+02	4.53E+03
Co-60	4.71E-06	4.71E-04	3.26E-01	6.88E+00	7.03E+02	4.42E+05
Cr-51	4.71E-06	1.41E-03	1.75E-01	6.12E+00	2.10E+03	2.28E+05
Cs-137	4.71E-06	1.88E-04	9.42E-03	6.29E+00	2.80E+02	1.40E+04
Fe-59	9.42E-06	4.24E-05	3.43E-02	1.26E+01	5.51E+01	4.23E+04
Ga-67	9.42E-06	9.42E-06	1.88E-05	1.42E+01	1.42E+01	2.99E+01
Gd-153	4.71E-06	6.22E-04	3.71E-01	7.11E+00	8.99E+02	6.43E+05
Ge-68	4.71E-06	4.71E-04	4.24E-03	6.29E+00	7.34E+02	5.92E+03
H-3	4.71E-03	3.11E+00	3.60E+01	7.22E+03	5.01E+06	8.22E+07
Hg-203	4.71E-04	4.71E-04	1.68E-01	8.99E+02	8.99E+02	2.27E+05
I-125	1.88E-05	1.41E-03	6.36E-03	4.41E+01	1.84E+03	8.50E+03
I-129	4.71E-06	1.41E-05	2.35E-02	5.31E+00	1.74E+01	3.93E+04
In-114m	4.71E-06	4.71E-04	9.32E-02	6.20E+00	8.22E+02	1.36E+05
Kr-85	4.24E-05	9.42E-05	6.94E-02	5.75E+01	1.63E+02	1.20E+05
Mn-54	1.41E-05	3.44E-04	4.43E-02	2.10E+01	4.98E+02	6.68E+04
Na-22	4.71E-06	4.71E-04	2.18E-01	6.20E+00	7.34E+02	4.03E+05
Nb-95	4.71E-06	2.54E-04	1.94E-02	7.87E+00	3.77E+02	2.59E+04
Ni-63	4.71E-06	4.28E-02	1.18E+00	7.87E+00	6.52E+04	1.83E+06
P-32	4.71E-06	8.48E-04	3.79E-00	6.48E+00	1.37E+03	5.13E+06
P-33	1.41E-05	2.45E-04	2.83E-03	2.75E+01	3.32E+02	5.39E+03

Table C-17 Massachusetts Industrial Waste Generators Biomedical Radionuclide Distributions - Container Level[a], Cont'd

Nuclide	Concentration Ranges - Ci/m³ - 1st	50th	99th	Percentile - pCi/g - 1st	50th	99th
Pm-147	9.42E-06	8.95E-03	2.35E-02	1.28E+01	1.40E+04	4.41E+04
Rb-86	4.71E-06	3.96E-04	6.25E-03	6.48E+00	4.93E+02	9.91E+03
Ru-103	4.71E-06	2.17E-04	3.14E-03	6.48E+00	3.59E+02	4.98E+03
S-35	2.35E-05	2.75E-01	5.88E+01	3.44E+01	3.68E+05	1.09E+08
Sc-46	4.71E-06	4.71E-04	5.14E-03	6.26E+00	8.22E+02	8.74E+03
Se-75	1.41E-05	3.67E-04	2.03E-02	1.94E+01	5.37E+02	3.58E+04
Sn-113	4.71E-06	2.01E-03	4.57E-02	6.67E+00	2.89E+03	6.19E+04
Sr-85	4.71E-06	2.83E-04	1.23E-03	5.51E+00	4.34E+02	1.65E+03
Sr-90	4.71E-06	4.71E-05	1.98E-04	6.12E+00	7.22E+01	2.68E+02
Tc-99	9.42E-06	4.71E-03	2.92E-01	1.30E+01	7.46E+03	5.41E+05
Tl-201	9.42E-06	4.71E-04	2.83E-03	1.24E+01	6.48E+02	3.57E+03
Tl-204	4.71E-03	4.71E-03	9.42E-03	6.58E+03	6.58E+03	1.17E+04
U-238	1.32E-02	3.08E-01	6.17E-01	1.73E+04	1.93E+05	2.81E+05
Y-88	4.71E-06	9.42E-06	4.71E-04	6.29E+00	1.26E+01	7.34E+02
Zn-65	4.71E-06	3.30E-05	9.75E-02	6.12E+00	4.72E+01	1.38E+05

Waste Class: A-Unstable
Waste form: Non-compacted dry active waste - Unspecified agent
Number of shipping records: 17
Number of shipping containers: 36
Total waste volume: 42.7 m^3
Total waste mass: 34,075 kg
Average waste form density: 0.80 g/cm^3

Nuclide	Concentration Ranges - Ci/m³ - 1st	50th	99th	Percentile - pCi/g - 1st	50th	99th
U-238	9.42E-05	3.30E-03	3.30E-03	8.19E+01	3.54E+03	6.82E+03

Table C-17 Massachusetts Industrial Waste Generators Biomedical Radionuclide Distributions - Container Level[a], Cont'd

Waste Class: A-Unstable
Waste form: Evaporator bottom - Unspecified agent
Number of shipping records: 8
Number of shipping containers: 34
Total waste volume: 10.8 m^3
Total waste mass: 17,338 kg
Average waste form density: 1.60 g/cm^3

Nuclide	Concentration Ranges - Ci/m^3 - 1st	50th	99th	Percentile - pCi/g - 1st	50th	99th
U-238	3.87E-01	4.41E-01	5.59E-01	2.69E+05	2.73E+05	2.80E+05

Waste Class: A-Unstable
Waste form: Sorbed aqueous liquids - Speedy dry, Petroset, Dicaperl, Envirostone, and other unspecified agents
Number of shipping records: 12
Number of shipping containers: 61
Total waste volume: 12.9 m^3
Total waste mass: 8,623 kg
Average waste form density: 0.67 g/cm^3

Nuclide	Concentration Ranges - Ci/m^3 - 1st	50th	99th	Percentile[b] - pCi/g - 1st	50th	99th
Ag-110m	1.79E-04	5.56E-04	1.90E-03	3.64E+02	8.16E+02	3.78E+03
Au-195	7.53E-05	1.88E-03	2.12E-02	1.12E+02	3.39E+03	3.12E+04
Ba-133	4.71E-05	4.61E-04	6.09E-03	1.10E+02	7.87E+02	7.92E+03
C-14	4.71E-05	6.89E-01	7.90E-01	5.58E+01	9.04E+05	1.29E+06
Ca-45	9.42E-05	2.92E-01	2.40E+00	1.36E+02	5.06E+05	3.85E+06
Cd-109	3.77E-05	1.88E-02	2.41E-01	7.05E+01	2.91E+04	4.17E+05
Ce-139*	5.65E-04	5.65E-04	5.65E-04	1.32E+03	1.32E+03	1.32E+03
Ce-141	4.71E-06	1.65E-04	1.65E-02	7.73E+00	3.28E+02	2.53E+04
Cl-36	2.83E-03	1.41E-02	4.74E-01	5.62E+03	2.24E+04	1.11E+06
Co-57	2.31E-04	9.15E-03	1.05E+00	3.79E+02	1.65E+04	1.54E+06
Co-58	4.71E-06	2.73E-04	1.55E-02	9.18E+00	5.94E+02	2.69E+04
Co-60	4.24E-05	1.88E-03	9.13E-02	7.21E+01	3.05E+03	1.71E+05
Cr-51	4.71E-06	8.48E-04	3.70E-01	9.58E+00	1.98E+03	5.40E+03
Cs-134	3.86E-04	2.47E-03	4.71E-02	6.57E+02	4.91E+03	6.88E+04
Cs-137	4.71E-06	4.61E-04	3.96E-02	7.34E+00	6.64E+02	8.04E+04

Table C-17 Massachusetts Industrial Waste Generators Biomedical Radionuclide Distributions - Container Level[a], Cont'd

Nuclide	Concentration Ranges - Percentile[b] - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
Fe-55	4.71E-06	3.48E-02	8.83E-01	5.80E+00	5.58E+04	1.05E+06
Fe-59	1.88E-05	1.88E-03	8.48E-03	2.20E+01	2.75E+03	1.20E+04
Ga-68*	3.48E-04	3.48E-04	3.48E-04	5.26E+02	5.26E+02	5.26E+02
Gd-153	4.71E-05	4.71E-03	1.20E-01	7.11E+01	6.91E+03	1.57E+05
Ge-68	1.88E-04	2.59E-03	4.76E-02	2.45E+02	4.41E+03	7.54E+04
H-3	4.71E-05	8.86E+00	3.53E+01	9.18E+01	1.14E+07	5.12E+07
Hg-203	2.35E-05	1.32E-04	2.83E-03	3.48E+01	1.54E+02	4.00E+03
I-125	4.71E-06	4.71E-06	6.12E-05	6.78E+00	6.78E+00	1.24E+02
I-129*	4.71E-03	4.71E-03	4.71E-03	8.16E+03	8.16E+03	8.16E+03
In-111*	3.72E-02	3.72E-02	3.72E-02	5.90E+04	5.90E+04	5.90E+04
In-114m	8.00E-05	1.65E-04	4.71E-02	1.31E+02	3.28E+02	6.99E+04
Kr-85	6.92E-04	1.41E-03	1.40E-02	1.04E+03	2.20E+03	2.01E+04
Mn-54	2.17E-04	2.84E-03	5.65E-02	2.67E+02	4.24E+03	1.06E+05
Mo-99*	1.41E-02	1.41E-02	1.41E-02	2.13E+04	2.13E+04	2.13E+04
Na-22	1.88E-05	2.94E-02	4.64E-01	2.23E+01	5.97E+04	8.68E+05
Nb-95	4.71E-06	4.71E-04	1.04E-02	5.80E+00	6.99E+02	1.47E+04
Ni-63	4.68E-03	4.90E-01	3.34E+00	7.69E+03	7.66E+05	4.92E+06
P-32	3.15E-04	4.71E-03	9.42E-02	5.57E+02	7.11E+03	1.33E+05
P-33*	4.71E-04	4.71E-04	4.71E-04	8.99E+02	8.99E+02	8.99E+02
Pm-147	2.00E-03	4.45E-03	1.05E-01	3.40E+03	7.85E+03	1.63E+05
Rb-86	1.08E-04	1.65E-02	4.71E-02	2.53E+02	2.41E+04	6.67E+04
Ru-103	8.00E-05	2.35E-03	1.04E-02	1.31E+02	3.55E+03	1.59E+04
S-35	1.41E-03	6.73E-01	2.67E+02	2.24E+03	1.57E+06	3.57E+08
Sc-46	1.88E-05	2.64E-04	2.92E-02	3.20E+01	5.36E+02	4.14E+04
Se-75	1.88E-05	1.33E-03	2.35E-02	3.83E+01	1.73E+03	3.55E+04
Sn-113	2.83E-05	4.24E-03	1.35E-01	3.67E+01	6.98E+03	1.92E+05
Sr-85	9.42E-06	4.38E-04	5.18E-03	1.16E+01	7.47E+02	7.94E+03
Sr-90	4.71E-05	9.42E-05	1.85E-03	9.18E+01	1.36E+02	3.04E+03
Tc-99	9.42E-06	4.71E-03	9.83E-02	1.36E+01	8.31E+03	1.53E+05
Tc-99m	4.71E-06	4.71E-04	1.88E-02	8.01E+00	6.67E+02	2.67E+04
Tl-201	4.71E-04	7.06E-03	9.42E-03	7.47E+02	1.00E+04	1.44E+04
Tl-204*	5.18E-03	5.18E-03	5.18E-03	7.34E+03	7.34E+03	7.34E+03
Y-88	1.37E-04	4.71E-04	1.41E-03	2.66E+02	8.16E+02	2.06E+03
Y-90*	4.71E-04	4.71E-04	4.71E-04	6.67E+02	6.67E+02	6.67E+02
Zn-65	4.71E-06	1.59E-03	4.99E-02	1.00E+01	2.81E+03	9.34E+04

Table C-17 Massachusetts Industrial Waste Generators Biomedical Radionuclide Distributions - Container Level[a], Cont'd

Waste Class: A-Unstable
Waste form: Solidified liquids - Cement, Petroset, Envirostone, and other unspecified agents
Number of shipping records: 15
Number of shipping containers: 229
Total waste volume: 48.6
Total waste mass: 76,04[illegible]
Average waste form densit[illegible] .56 g/cm^3

	Concentration Ranges - Percentile[b] - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
C-14	4.24E-01	7.53E-01	7.93E-0	.70E+05	4.79E+05	5.64E+05
Co-57*	4.71E-04	4.71E-04	4.71E-04	3.15E+02	3.15E+02	3.15E+02
H-3	5.88E+00	3.29E+01	3.70E+01	3.87E+06	2.05E+07	2.43E+07
S-35	1.41E-02	5.37E-02	3.77E+01	9.37E+03	3.51E+04	2.34E+07

Waste Class: A-Unstable
Waste form: Aqueous liquids in vials & sorbents - Speedy Dry
Number of shipping records: 1
Number of shipping containers: 1
Total waste volume: 0.2 m^3
Total waste mass: 113.5 kg
Average waste form density: 0.53 g/cm^3

	Concentration Ranges - Percentile[b] - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
C-14*	7.67E-01	7.67E-01	7.67E-01	1.44E+06	1.44E+06	1.44E+06
H-3*	3.54E+01	3.54E+01	3.54E+01	6.62E+07	6.62E+07	6.62E+07
S-35*	3.11E+00	3.11E+00	3.11E+00	5.81E+06	5.81E+06	5.81E+06

Table C-17 Massachusetts Industrial Waste Generators Biomedical Radionuclide Distributions - Container Level[a], Cont'd

Waste Class: A-Unstable
Waste form: Solidified oil - Cement, Petroset, Envirostone, and other unspecified agents
Number of shipping records: 26
Number of shipping containers: 1,238
Total waste volume: 262.6 m^3
Total waste mass: 278,097 kg
Average waste form density: 1.06 g/cm^3

	Concentration Ranges - Percentile[b] - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
C-14	6.91E-01	7.40E-01	7.40E-01	7.05E+05	7.24E+05	7.75E+05
H-3	6.21E+00	6.75E+00	9.98E+00	6.51E+06	7.07E+06	9.51E+06
S-35*	6.38E-01	6.38E-01	6.38E-01	6.69E+05	6.69E+05	6.69E+05
U-238	9.42E-05	9.42E-05	9.42E-04	7.52E+01	8.88E+01	8.71E+02

(a) LLW containers shipped to Beatty and Richland (1988-1990).
(b) Radionuclide concentrations tagged with an asterisk is based on a single value. In such instances, the percentile distribution does not apply.

Table C-18 Massachusetts Government Waste Generators Biomedical Radionuclide Distributions - Container Level(a)

Waste Class: A-Stable
Waste form: Solidified liquids - Agent not specified
Number of shipping records: 1
Number of shipping containers: 1
Total waste volume: 0.1 m^3
Total waste mass: 249.7 kg
Average waste form density: 2.15 g/cm^3

	Concentration Ranges - Percentile(b) - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
Co-60*	2.58E-03	2.58E-03	2.58E-03	1.20E+03	1.20E+03	1.20E+03
U-238*	1.72E-05	1.72E-05	1.72E-05	8.01E+00	8.01E+00	8.01E+00
Am-241*	8.61E-06	8.61E-06	8.61E-06	4.00E+00	4.00E+00	4.00E+00
Na-22*	8.61E-06	8.61E-06	8.61E-06	4.00E+00	4.00E+00	4.00E+00
Sr-90*	8.61E-06	8.61E-06	8.61E-06	4.00E+00	4.00E+00	4.00E+00
Tl-204*	8.61E-06	8.61E-06	8.61E-06	4.00E+00	4.00E+00	4.00E+00
Tc-99*	8.61E-06	3.61E-06	8.61E-06	4.00E+00	4.00E+00	4.00E+00

Waste Class: A-Unstable
Waste form: Dry solids
Number of shipping records: 1
Number of shipping containers: 1
Total waste volume: 0.2 m^3
Total waste mass: 476.7 kg
Average waste form density: 2.25 g/cm^3

	Concentration Ranges - Percentile(b) - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
Ra-226*	4.23E-02	4.23E-02	4.23E-02	1.89E+04	1.89E+04	1.89E+04

(a) LLW containers shipped to Beatty and Richland (1988-1990).
(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table C-19 New Hampshire Industrial Waste Generators Biomedical Radionuclide Distributions - Container Level[a]

Waste Class: A-Unstable
Waste form: Dry solid
Number of shipping records: 1
Number of shipping containers: 1
Total waste volume: 0.2 m^3
Total waste mass: 528.9 kg
Average waste form density: 2.49 g/cm^3

	Concentration Ranges - Percentile[b] - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
Co-60*	3.63E-03	3.63E-03	3.63E-03	1.46E+03	1.46E+03	1.46E+03

(a) LLW containers shipped to Beatty and Richland (1988-1990).
(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table C-20 New York Industrial Waste Generators
Biomedical Radionuclide Distributions - Container Level(a)

Waste Class: A-Unstable
Waste form: Dry solid
Number of shipping records: 1
Number of shipping containers: 1
Total waste volume: 0.8 m^3
Total waste mass: 1,385 kg
Average waste form density: 1.71 g/cm^3

	Concentration Ranges - Percentile(b) - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
Am-241*	1.22E-01	1.22E-01	1.22E-01	7.14E+04	7.14E+04	7.14E+04

(a) LLW containers shipped to Beatty and Richland (1988-1990).
(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table C-21 Texas Industrial Waste Generators Biomedical Radionuclide Distributions - Container Level[a]

Waste Class: A-Unstable
Waste form: Dry solid
Number of shipping records: 26
Number of shipping containers: 418
Total waste volume: 291.0 m^3
Total waste mass: 377,024 kg
Average waste form density: 1.30 g/cm^3

	Concentration Ranges - Percentile[b] - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
Am-241	3.04E-06	3.36E-06	3.68E-06	6.48E+00	7.83E+00	9.18E+00
C-14*	9.98E-03	9.98E-03	9.98E-03	1.53E+04	1.53E+04	1.53E+04
Co-60	4.71E-05	1.79E-02	9.42E+00	7.87E+01	1.42E+04	2.90E+06
Cs-137	9.42E-06	1.41E-04	1.08E-02	8.81E+00	1.16E+02	1.45E+04
Gd-153	1.41E-03	7.06E-03	5.65E-02	5.08E+03	2.13E+04	1.43E+05
H-3*	3.25E-03	3.25E-03	3.25E-03	4.98E+03	4.98E+03	4.98E+03
I-125*	2.83E-03	2.83E-03	2.83E-03	1.32E+04	1.32E+04	1.32E+04
I-131*	1.41E-03	1.41E-03	1.41E-03	7.77E+03	7.77E+03	7.77E+03
Ir-192	9.42E-05	7.06E-03	3.77E+01	1.27E+02	1.57E+04	5.95E+06
Kr-85*	5.65E-03	5.65E-03	5.65E-03	1.76E+04	1.76E+04	1.76E+04
S-35*	1.41E-03	1.41E-03	1.41E-03	8.26E+03	8.26E+03	8.26E+03

Waste Class: A-Unstable
Waste form: Non-compacted dry active waste
Number of shipping records: 2
Number of shipping containers: 4
Total waste volume: 0.9 m^3
Total waste mass: 895.3 kg
Average waste form density: 1.05 g/cm^3

	Concentration Ranges - Percentile - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
Co-60	1.65E-01	1.88E-01	2.35E-01	1.58E+05	2.06E+05	2.17E+05

Table C-21 Texas Industrial Waste Generators Biomedical Radionuclide Distributions - Container Level[a], Cont'd

Waste Class: A-Unstable
Waste form: Compacted dry active waste
Number of shipping records: 2
Number of shipping containers: 16
Total waste volume: 3.4 m^3
Total waste mass: 2,166 kg
Average waste form density: 0.64 g/cm^3

	Concentration Ranges - Percentile[b] - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
C-14	1.51E-04	7.23E-02	6.54E-01	2.56E+02	1.23E+05	9.00E+05
Ca-45	1.41E-04	1.41E-04	2.17E-04	2.71E+02	2.71E+02	4.41E+02
Cl-36	2.83E-04	2.83E-04	9.42E-04	5.75E+02	5.75E+02	1.64E+03
Co-57	9.42E-05	1.46E-03	3.75E-03	1.64E+02	2.80E+03	7.62E+03
Co-60*	7.16E-04	7.16E-04	7.16E-04	1.31E+03	1.31E+03	1.31E+03
Cs-137	3.30E-04	1.93E-03	2.45E-03	6.05E+02	1.74E+03	3.94E+03
Fe-55*	3.77E-03	3.77E-03	3.77E-03	8.81E+03	8.81E+03	8.81E+03
H-3	3.34E-03	3.30E-01	3.47E+00	5.69E+03	6.33E+05	4.78E+06
I-125*	1.01E-03	1.01E-03	1.01E-03	1.85E+03	1.85E+03	1.85E+03
Na-22*	9.42E-05	9.42E-05	9.42E-05	1.63E+02	1.63E+02	1.63E+02
Po-210	8.95E-03	8.95E-03	8.95E-03	1.47E+04	1.47E+04	1.47E+04
Sn-113*	1.88E-04	1.88E-04	1.88E-04	3.83E+02	3.83E+02	3.83E+02
Tc-99	4.71E-02	4.71E-02	1.41E-01	8.22E+04	8.22E+04	2.45E+05

Waste Class: A-Unstable
Waste form: Cartridge type filter media
Number of shipping records: 1
Number of shipping containers: 2
Total waste volume: 0.4 m^3
Total waste mass: 292.8 kg
Average waste form density: 0.69 g/cm^3

	Concentration Ranges - Percentile[b] - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
C-14*	1.35E-01	1.35E-01	1.35E-01	1.84E+05	1.84E+05	1.84E+05
H-3	1.12E-01	1.12E-01	2.22E+01	1.75E+05	1.75E+05	3.01E+07
I-131*	1.32E-03	1.32E-03	1.32E-03	1.79E+03	1.79E+03	1.79E+03
Kr-85*	5.18E-03	5.18E-03	5.18E-03	7.02E+03	7.02E+03	7.02E+03

Table C-21 Texas Industrial Waste Generators Biomedical Radionuclide Distributions - Container Level[a], Cont'd

Waste Class: A-Stable
Waste form: Solidified liquid - Cement
Number of shipping records: 1
Number of shipping containers: 3
Total waste volume: 0.6 m^3
Total waste mass: 912.5 kg
Average waste form density: 1.43 g/cm^3

	Concentration Ranges - Percentile[b] - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
C-14	2.35E-04	2.35E-04	7.06E-04	1.64E+02	1.64E+02	4.93E+02
Ca-45	1.65E-03	1.65E-03	2.45E-03	1.15E+03	1.15E+03	1.71E+03
Cr-51*	1.65E-03	1.65E-03	1.65E-03	1.15E+03	1.15E+03	1.15E+03
Fe-55*	3.30E-05	3.30E-05	3.30E-05	2.30E+01	2.30E+01	2.30E+01
H-3	2.38E-02	2.43E-02	4.28E-01	1.66E+04	1.70E+04	2.99E+05
I-125	6.78E-03	1.58E-02	8.84E-02	4.73E+03	1.10E+04	6.17E+04
P-32	2.35E-05	5.08E-02	5.60E-02	1.64E+01	3.55E+04	3.91E+04
S-35	8.80E-02	1.30E-01	1.52E-01	6.14E+04	9.06E+04	1.06E+05

Waste Class: A-Stable
Waste form: Dry solid - Not specified agent
Number of shipping records: 4
Number of shipping containers: 21
Total waste volume: 4.9 m^3
Total waste mass: 12,830 kg
Average waste form density: 2.60 g/cm^3

	Concentration Ranges - Percentile[b] - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
Cs-137*	5.89E-01	5.89E-01	5.89E-01	1.25E-01	1.25E+01	1.25E-01
Ra-226	1.18E-01	2.28E+00	2.35E+00	3.06E+04	9.14E+05	9.47E+05

(a) LLW containers shipped to Beatty and Richland (1988-1990).
(b) Radionuclide concentrations tagged with an asterisk is based on a single value. In such instances, the percentile distribution does not apply.

Table C-22 Texas Government Waste Generators Biomedical Radionuclide Distributions - Container Level[a]

Waste Class: A-Unstable
Waste form: Solidified liquids - Cement
Number of shipping records: 1
Number of shipping containers: 2
Total waste volume: 0.2 m^3
Total waste mass: 395.0 kg
Average waste form density: 1.58 g/cm^3

	Concentration Ranges - Percentile[b] - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
C-14*	1.31E-01	2.35E-01	3.40E-01	8.04E+04	1.65E+05	2.50E+05
Co-57*	3.96E-01	3.96E-01	3.96E-01	2.44E+05	2.44E+05	2.44E+05
Kr-85*	4.27E-02	4.27E-02	4.27E-02	2.63E+04	2.63E+04	2.63E+04
Am-241*	1.23E-02	1.23E-02	1.23E-02	7.56E+03	7.56E+03	7.56E+03
Sr-90*	1.23E-02	1.23E-02	1.23E-02	7.56E+03	7.56E+03	7.56E+03
Cs-137*	8.71E-04	8.71E-04	8.71E-04	5.36E+02	5.36E+02	5.36E+02
Co-60*	3.72E-04	3.72E-04	3.72E-04	2.29E+02	2.29E+02	2.29E+02
Ra-226*	1.41E-05	1.41E-05	1.41E-05	8.69E+00	8.69E+00	8.69E+00
Cl-36*	4.71E-06	4.71E-06	4.71E-06	2.90E+00	2.90E+00	2.90E+00
Cs-137*	4.71E-06	4.71E-06	4.71E-06	2.90E+00	2.90E+00	2.90E+00
Pm-147*	4.71E-06	4.61E-06	4.71E-06	2.90E+00	2.90E+00	2.90E+00
U-238*	4.71E-06	4.71E-06	4.71E-06	2.90E+00	2.90E+00	2.90E+00

(a) LLW containers shipped to Beatty and Barnwell (1988-1990).
(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

APPENDIX D

Waste Forms and Radionuclide Concentrations
(Analyses at the Container Level for Selected Waste Forms)
(Beatty and Richland: 1988 to 1990)

Exhibit D-1
Data Summary - Analyses at the Container Level
(Aggregate Practices for non-brokered waste: 1988 to 1990)
(Beatty and Richland Disposal Sites only)

	Data or Parameters
Waste generator class:	Medical
Compact or unaffiliated state:	all
Total associated waste volume (m^3):	3,980
Total associate waste activity (Ci):	339
Waste form:	Dry solid
Waste class:	A-Unstable and A-Stable
Total number of shipping records:	1
Number of waste containers:	3
Weight of shipments (kg):	1,308
Total waste volume (m^3):	0.64
Fractional waste volume (%): (this analysis/total)	0.02
Total waste activity (Ci):	0.29
Fractional waste activity (%): (this analysis/total)	0.09

Exhibit D-1 (Continued)

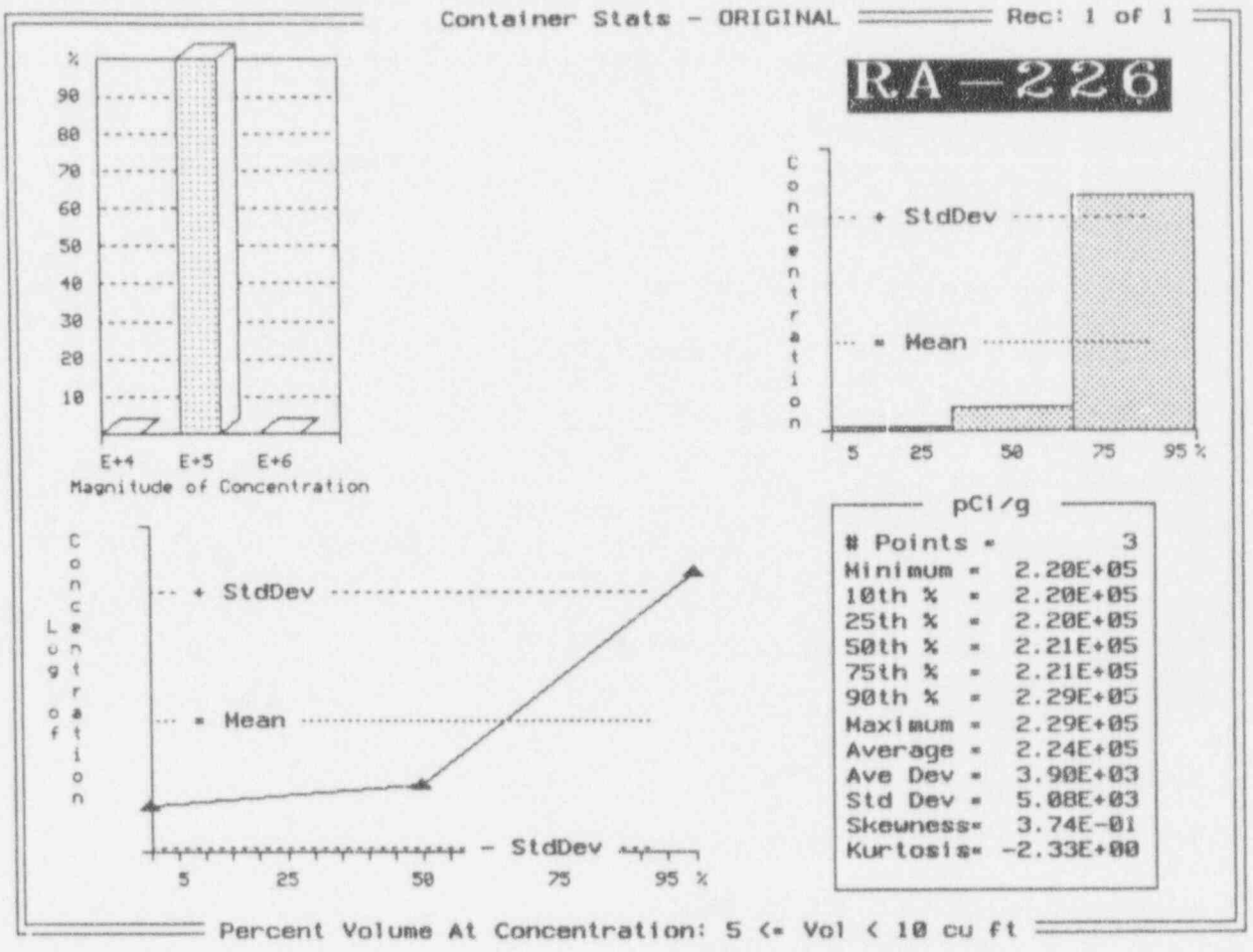


Exhibit D-2
Data Summary - Analyses at the Container Level
(Aggregate Practices for non-brokered waste: 1988 to 1990)
(Beatty and Richland Disposal Sites only)

	Data or Parameters
Waste generator class:	Academic
Compact or unaffiliated state:	all
Total associated waste volume (m^3):	7,290
Total associate waste activity (Ci):	5,300
Waste form:	Compacted dry active
Waste class:	A-Unstable and A-Stable
Total number of shipping records:	13
Number of waste containers:	838
Weight of shipments (kg):	79,990
Total waste volume (m^3):	178
Fractional waste volume (%): (this analysis/total)	2.4
Total waste activity (Ci):	7.7
Fractional waste activity (%): (this analysis/total)	0.1

Exhibit D-2 (Continued)

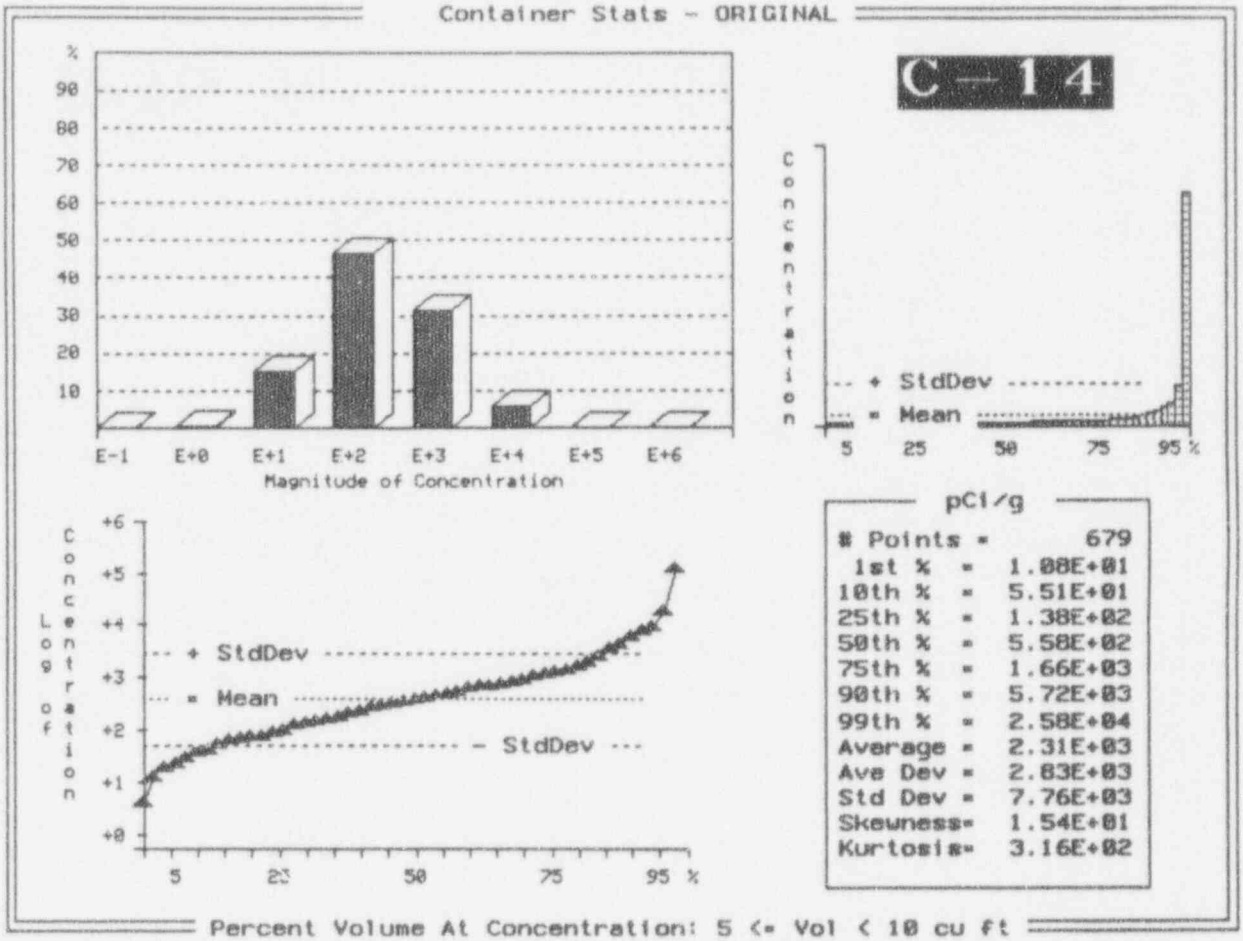


Exhibit D-2 (Continued)

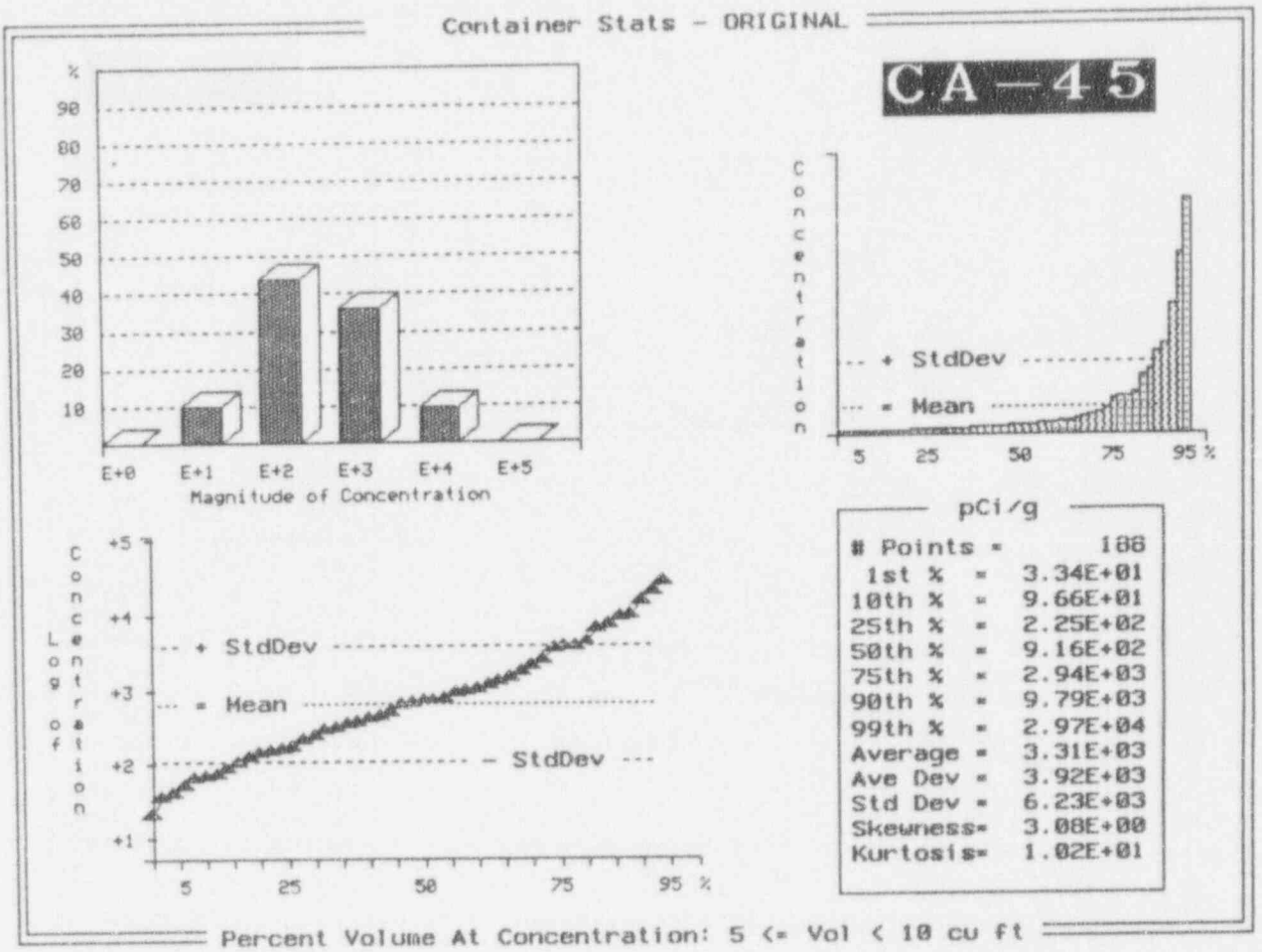


Exhibit D-2 (Continued)

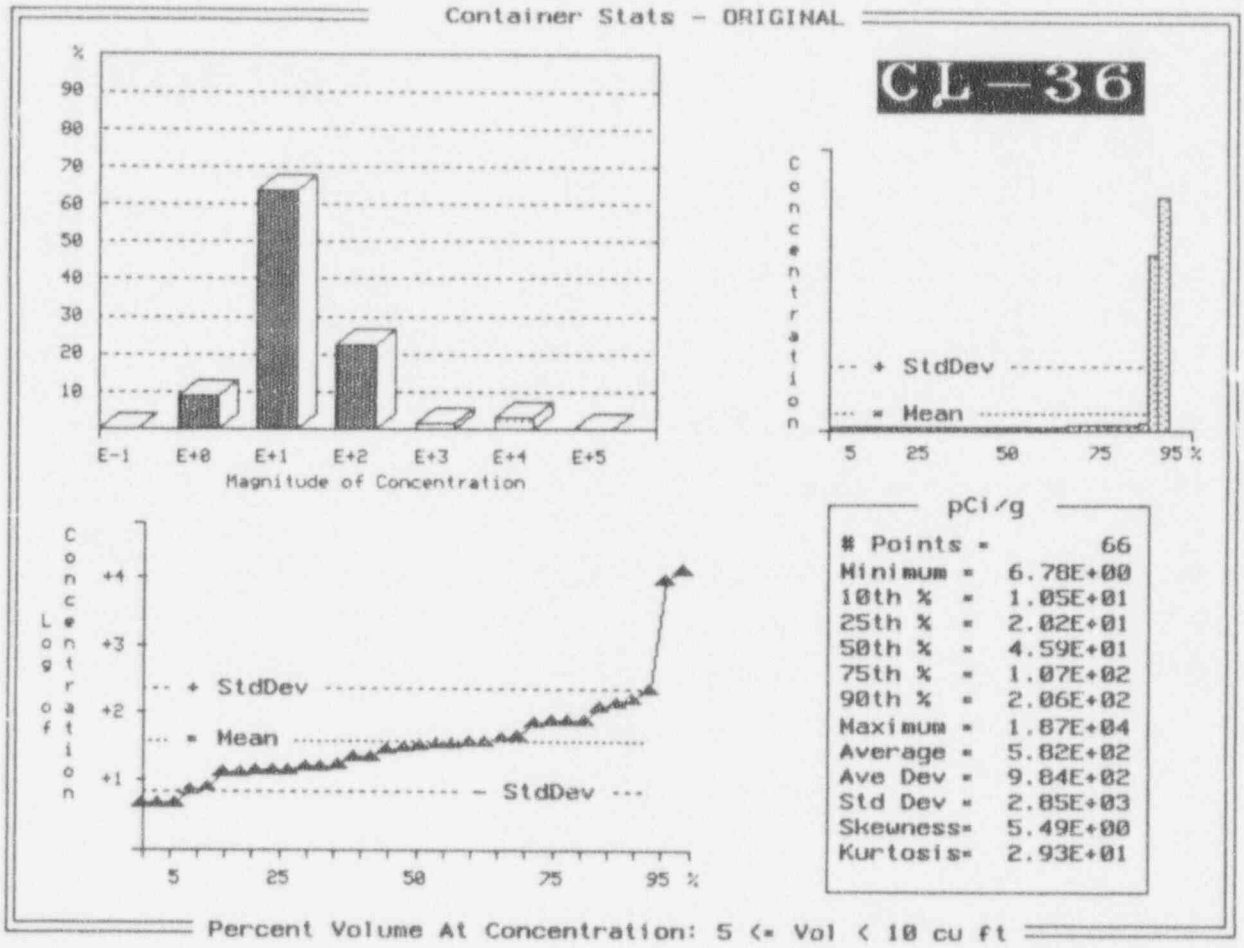


Exhibit D-2 (Continued)

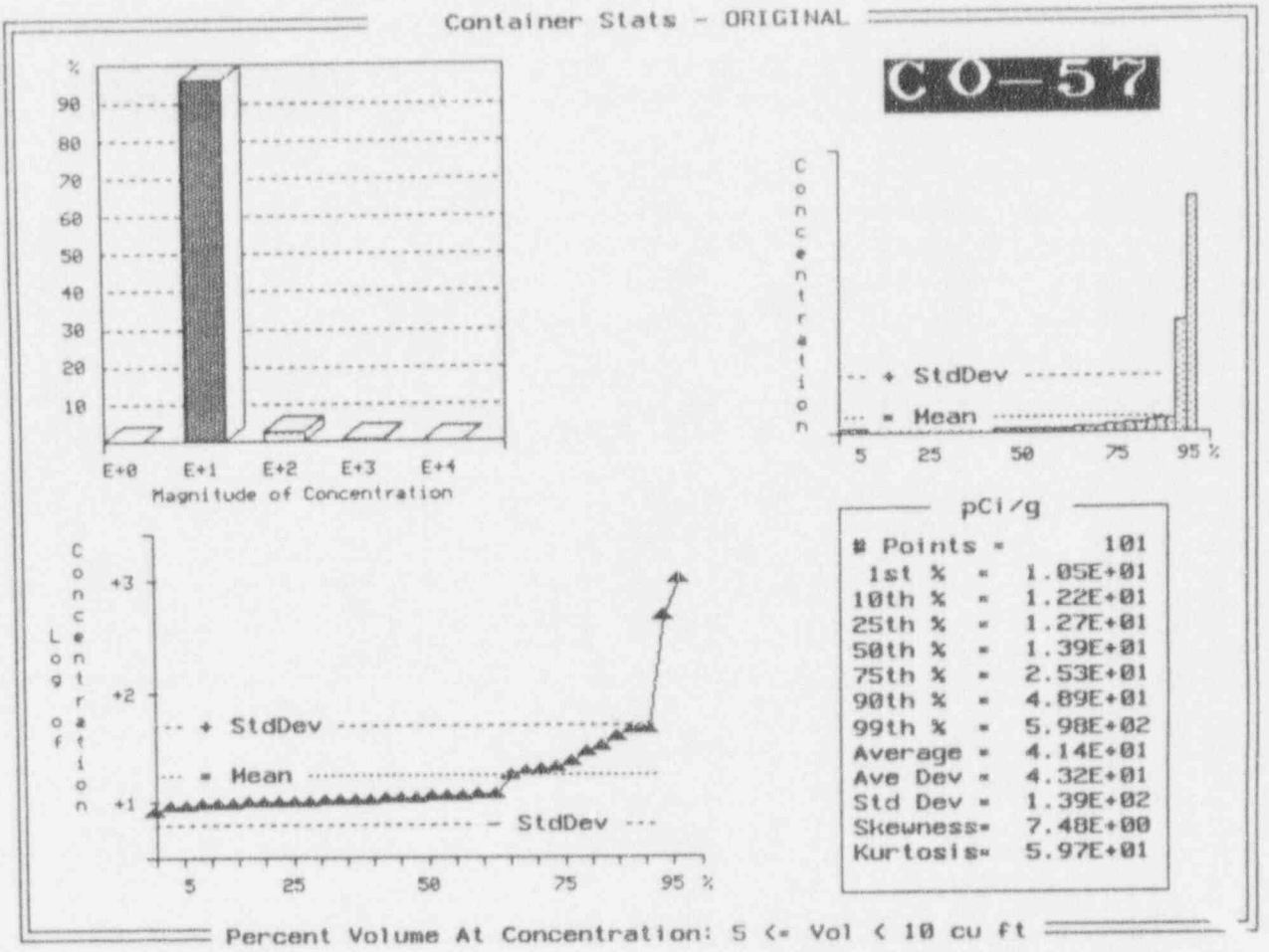


Exhibit D-2 (Continued)

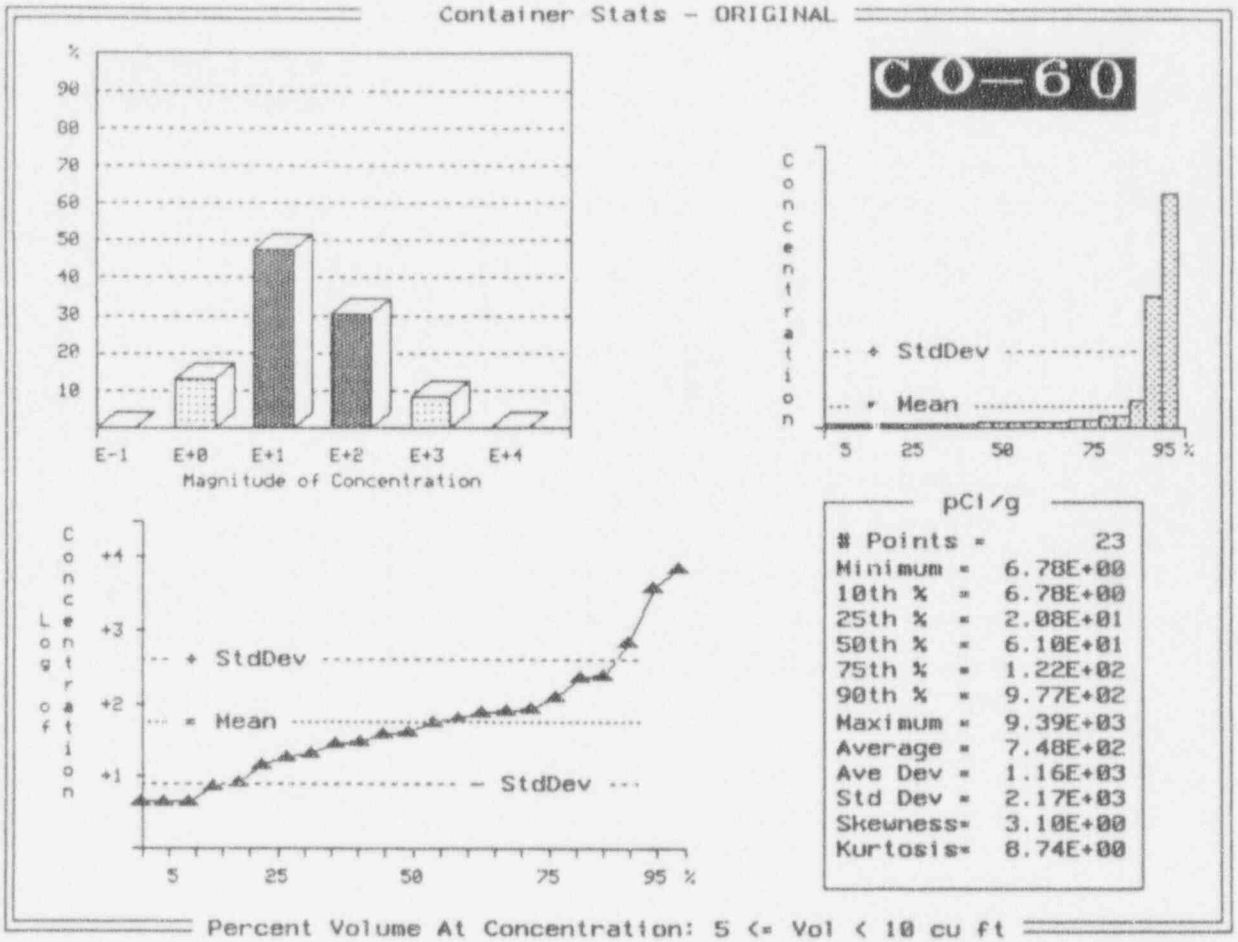


Exhibit D-2 (Continued)

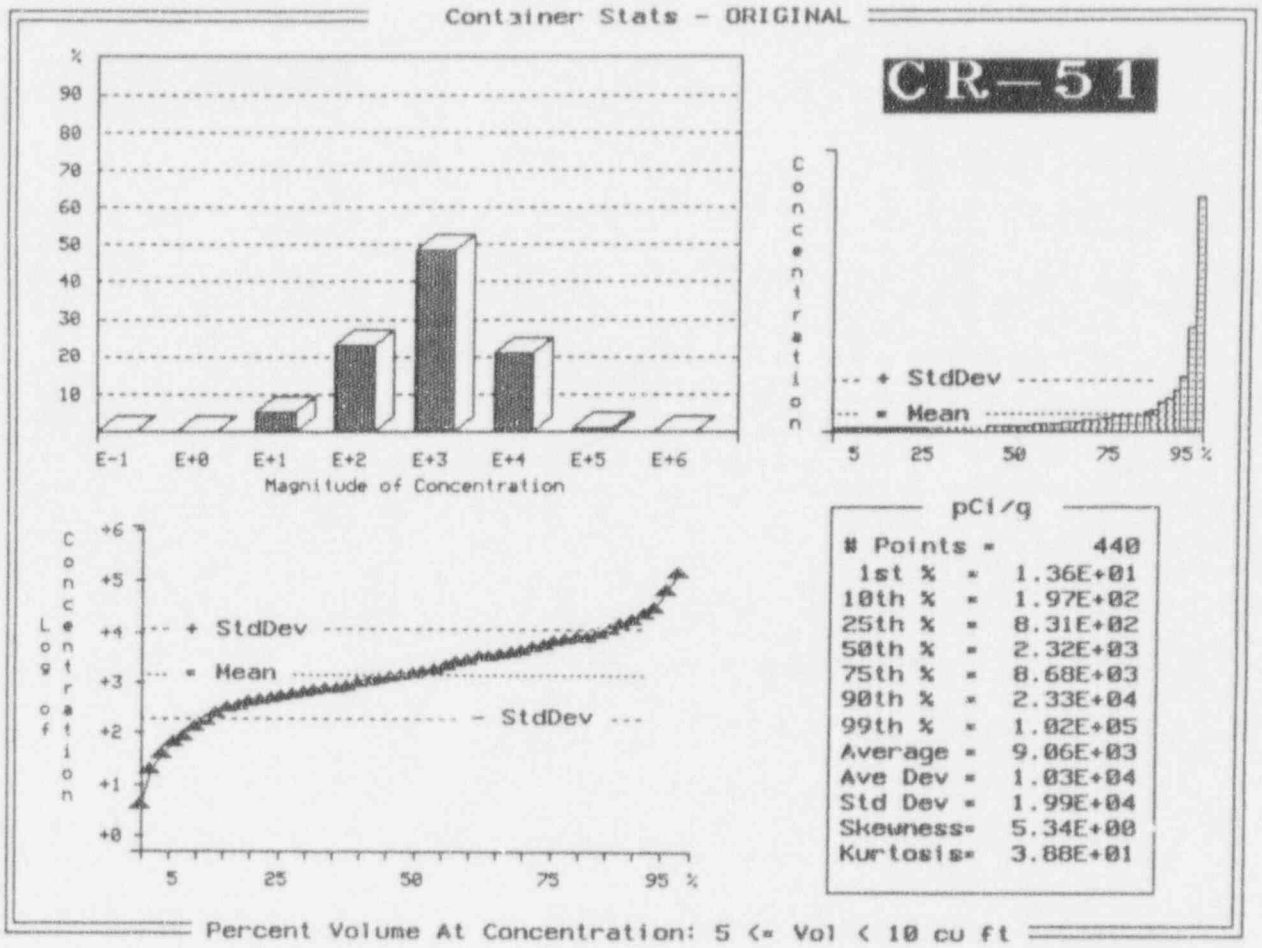


Exhibit D-2 (Continued)

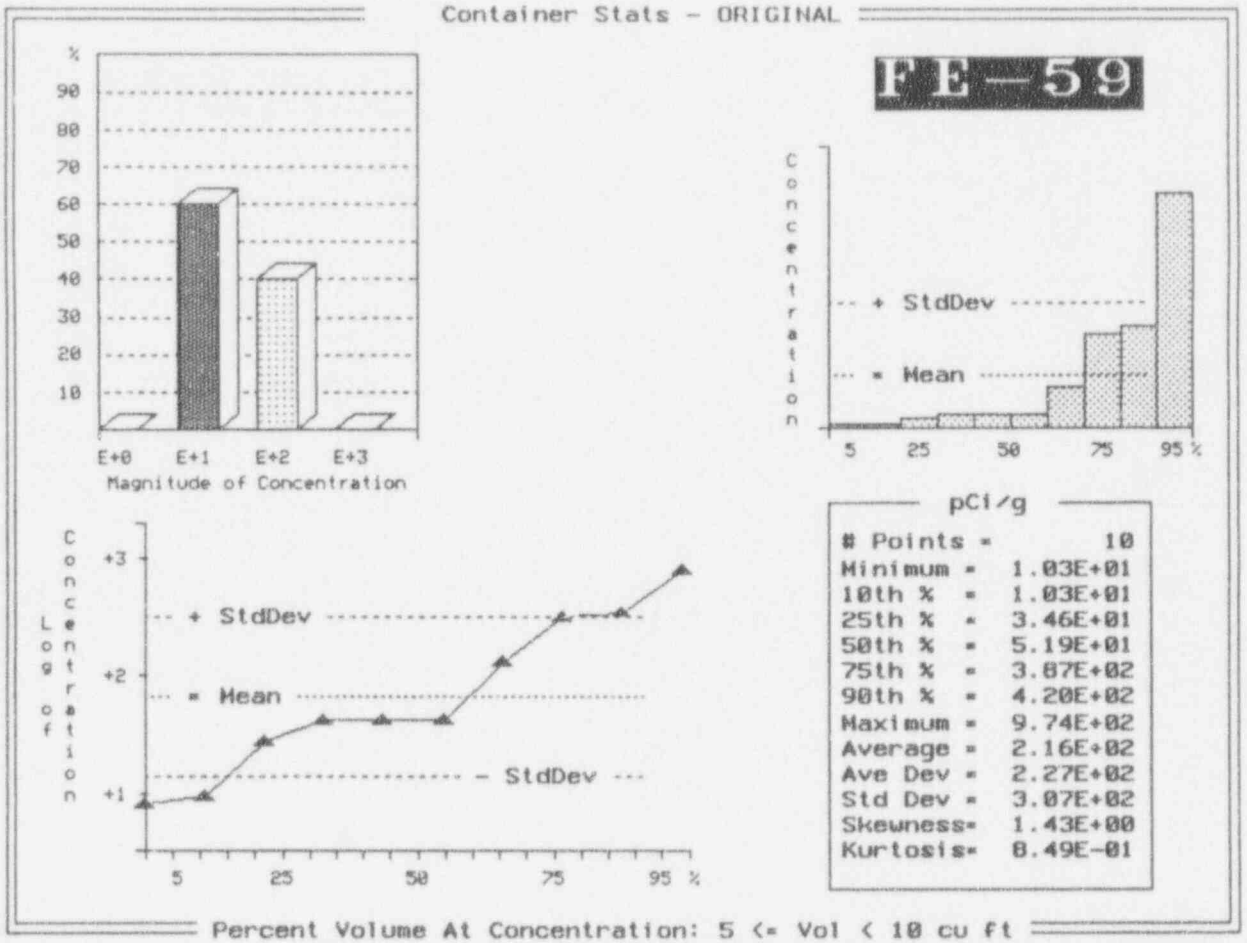


Exhibit D-2 (Continued)

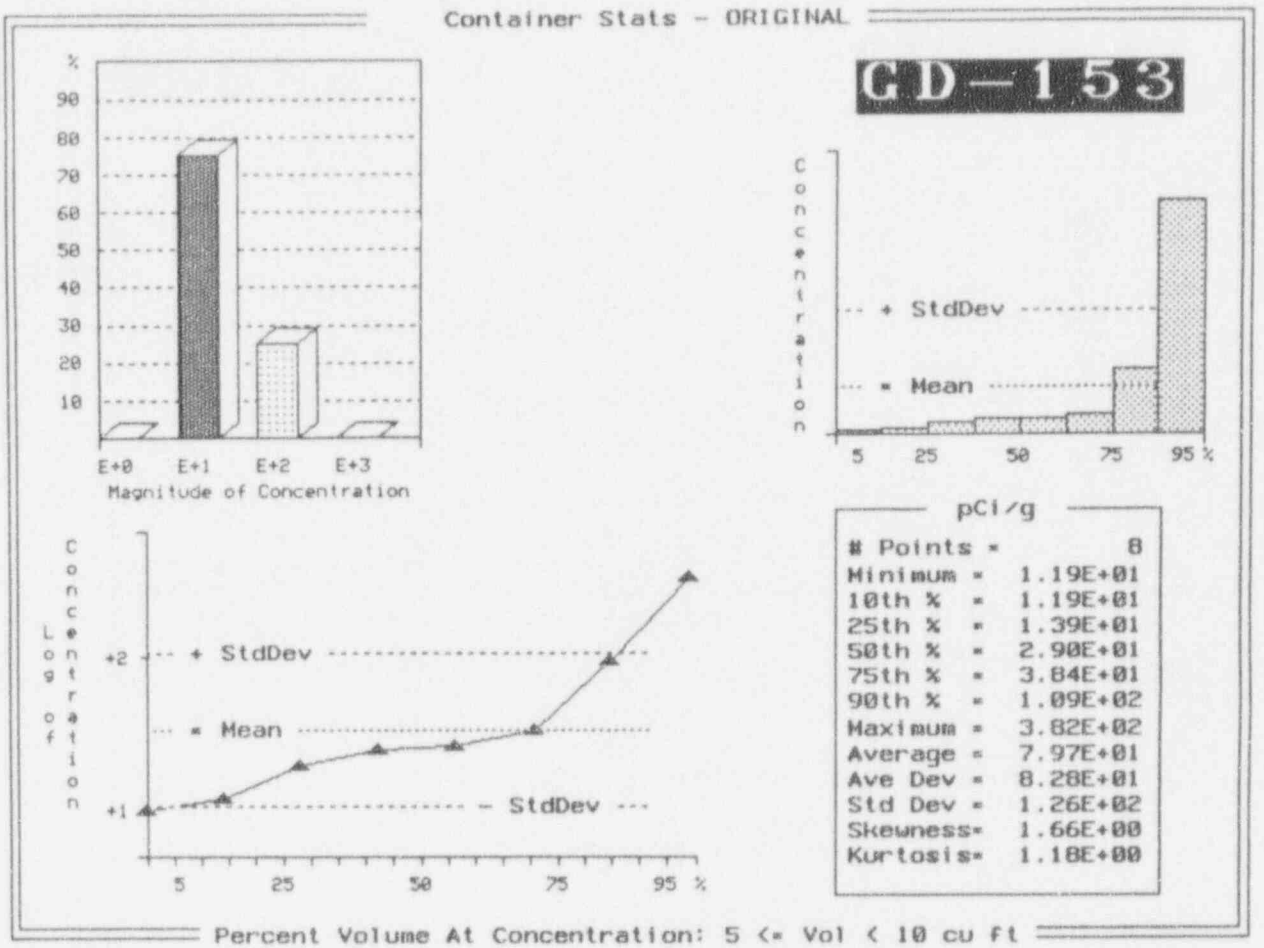


Exhibit D-2 (Continued)

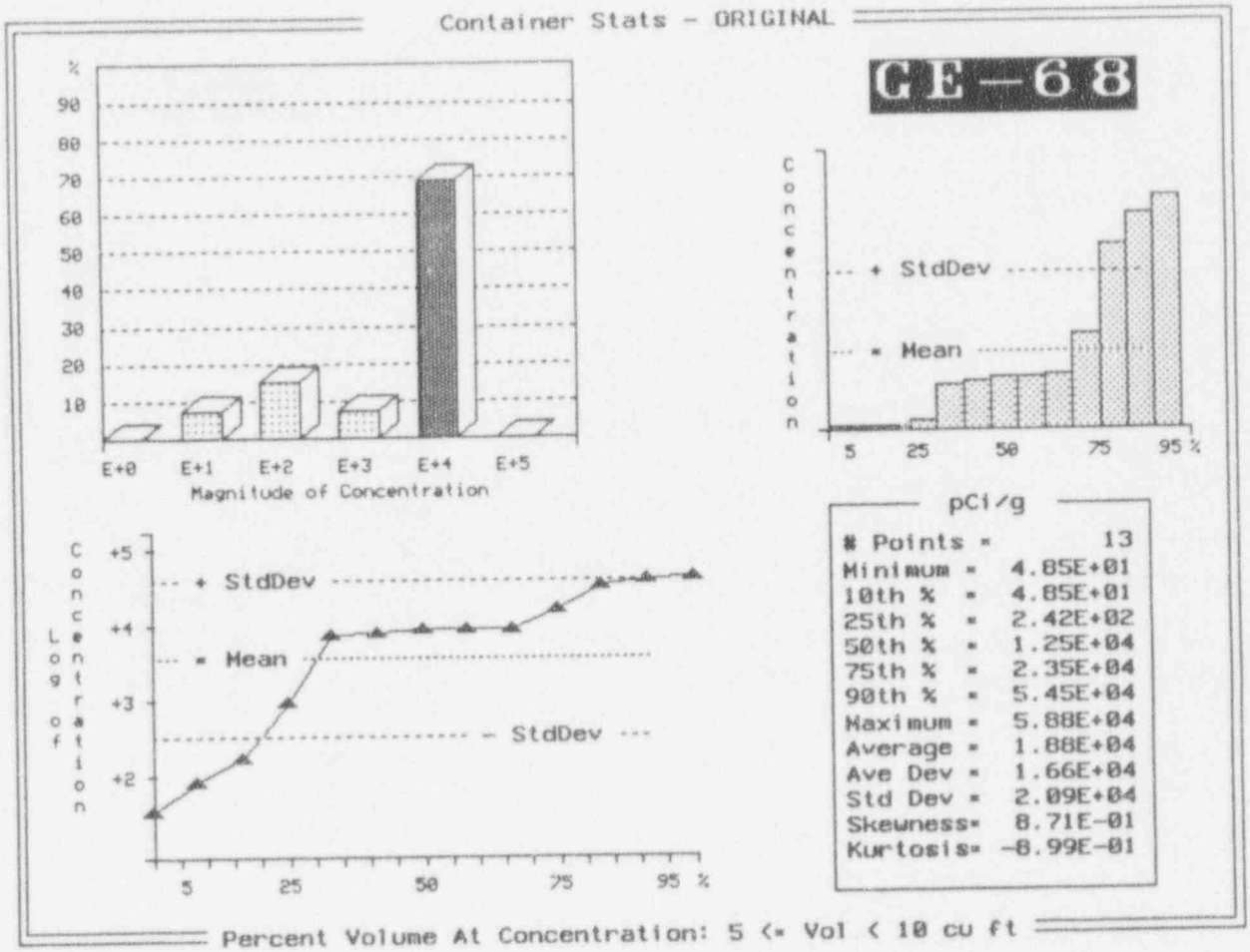


Exhibit D-2 (Continued)

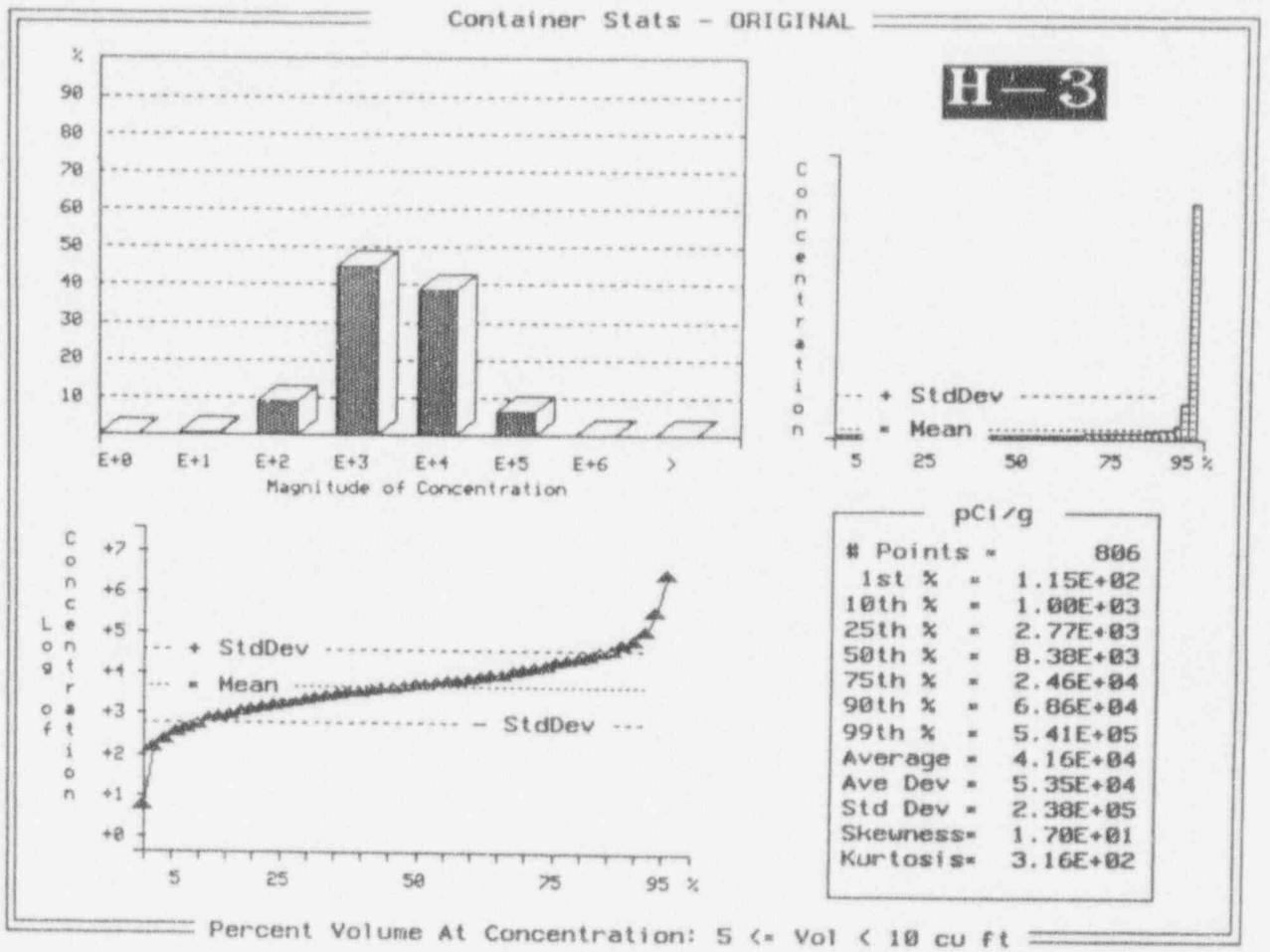
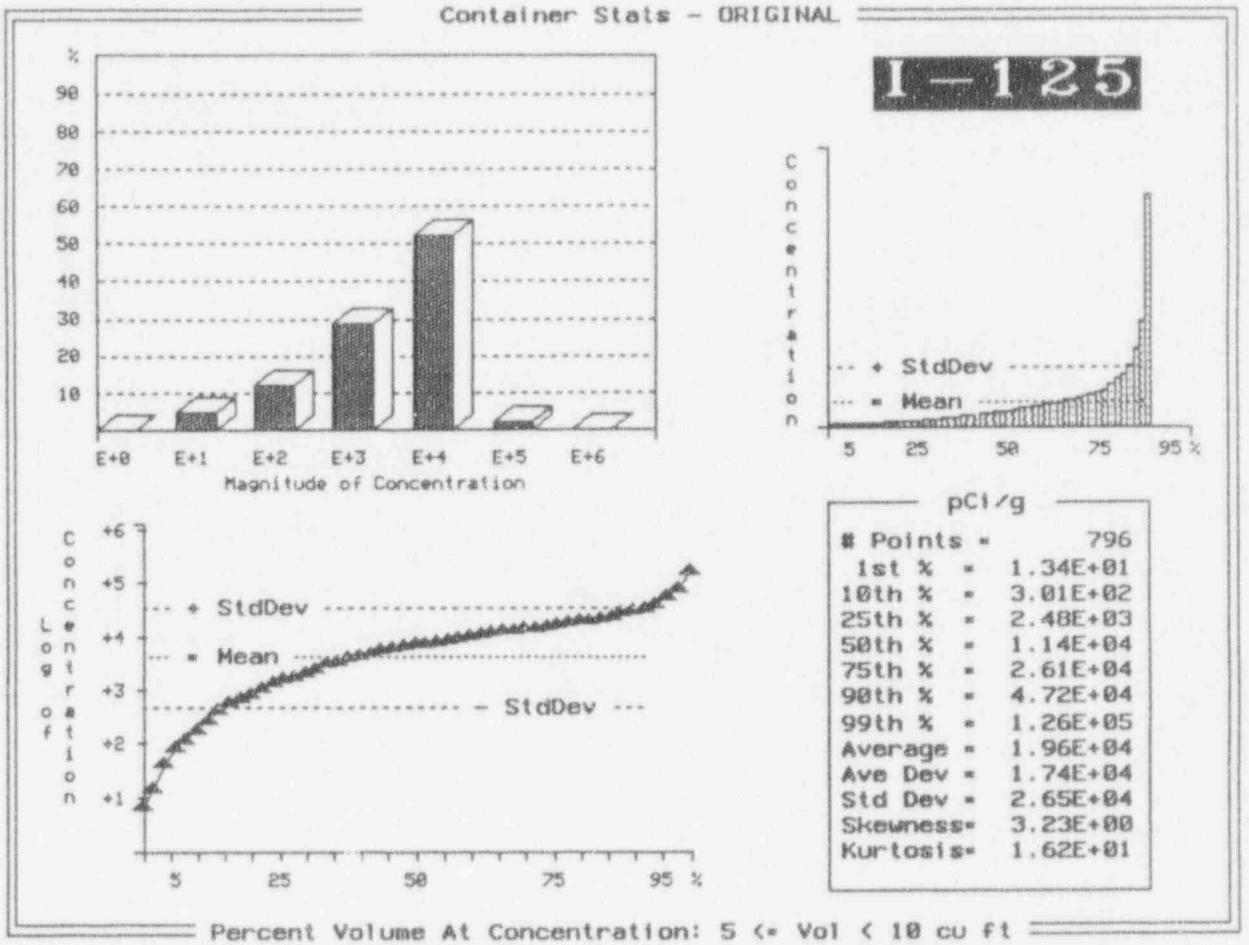


Exhibit D-2 (Continued)



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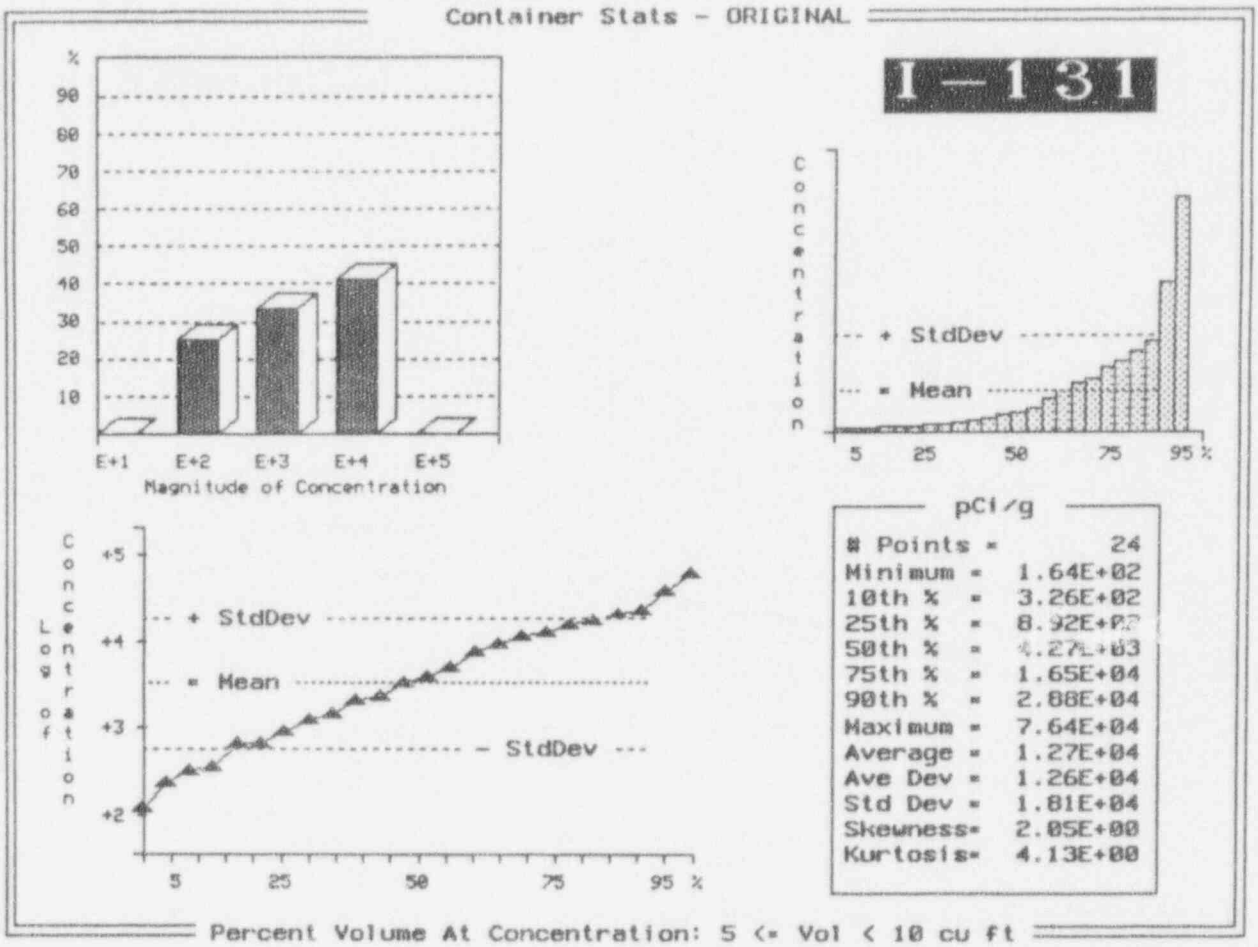

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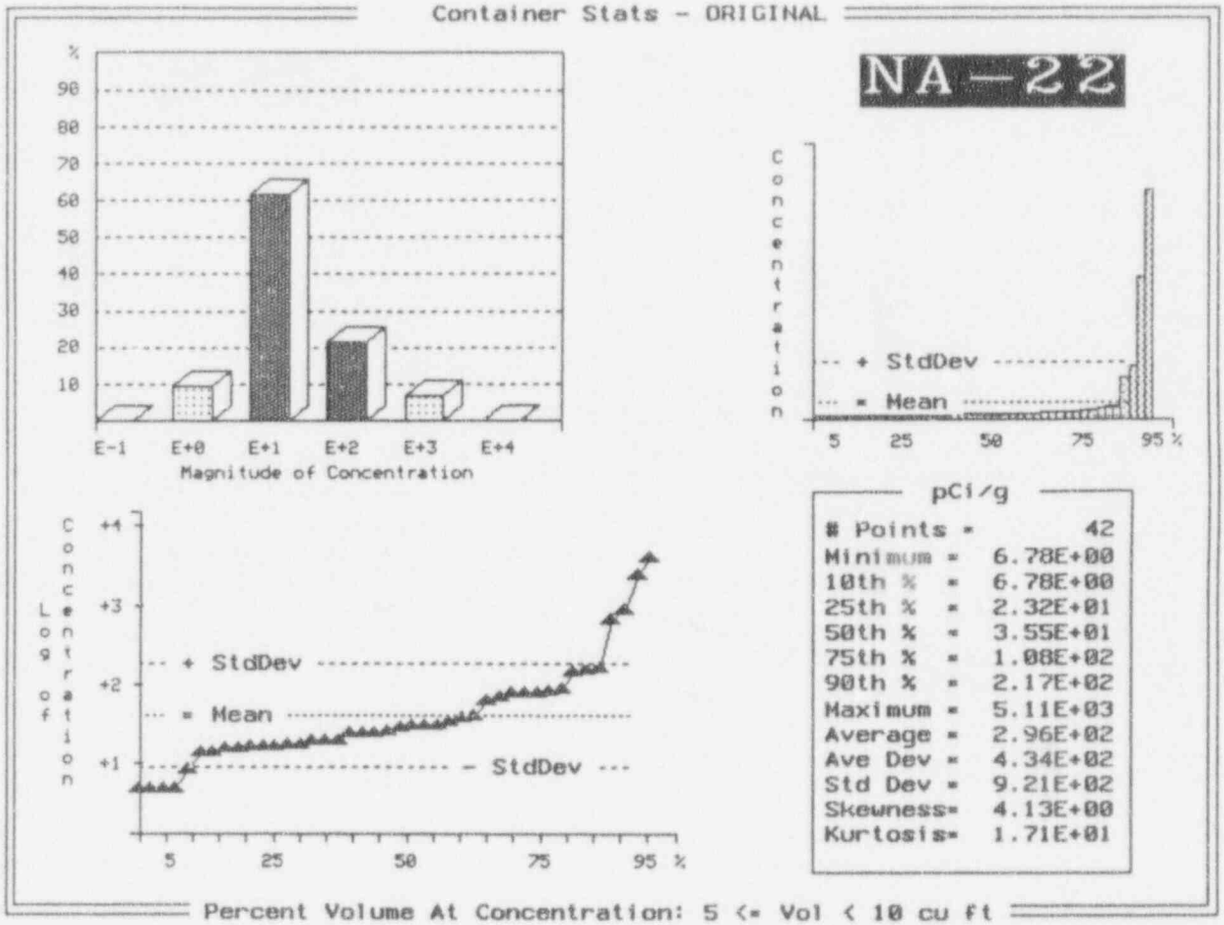

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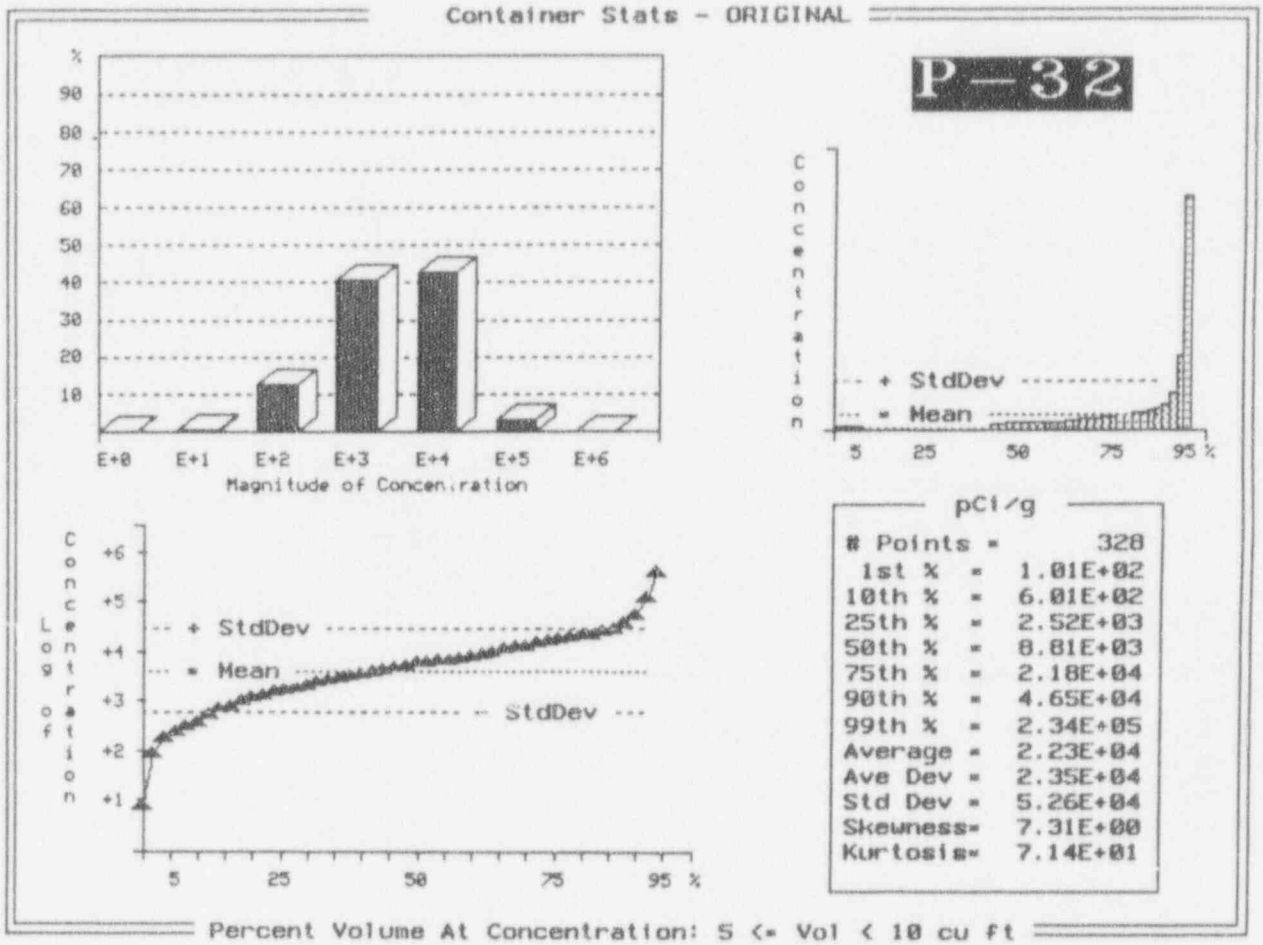


Exhibit D-2 (Continued)

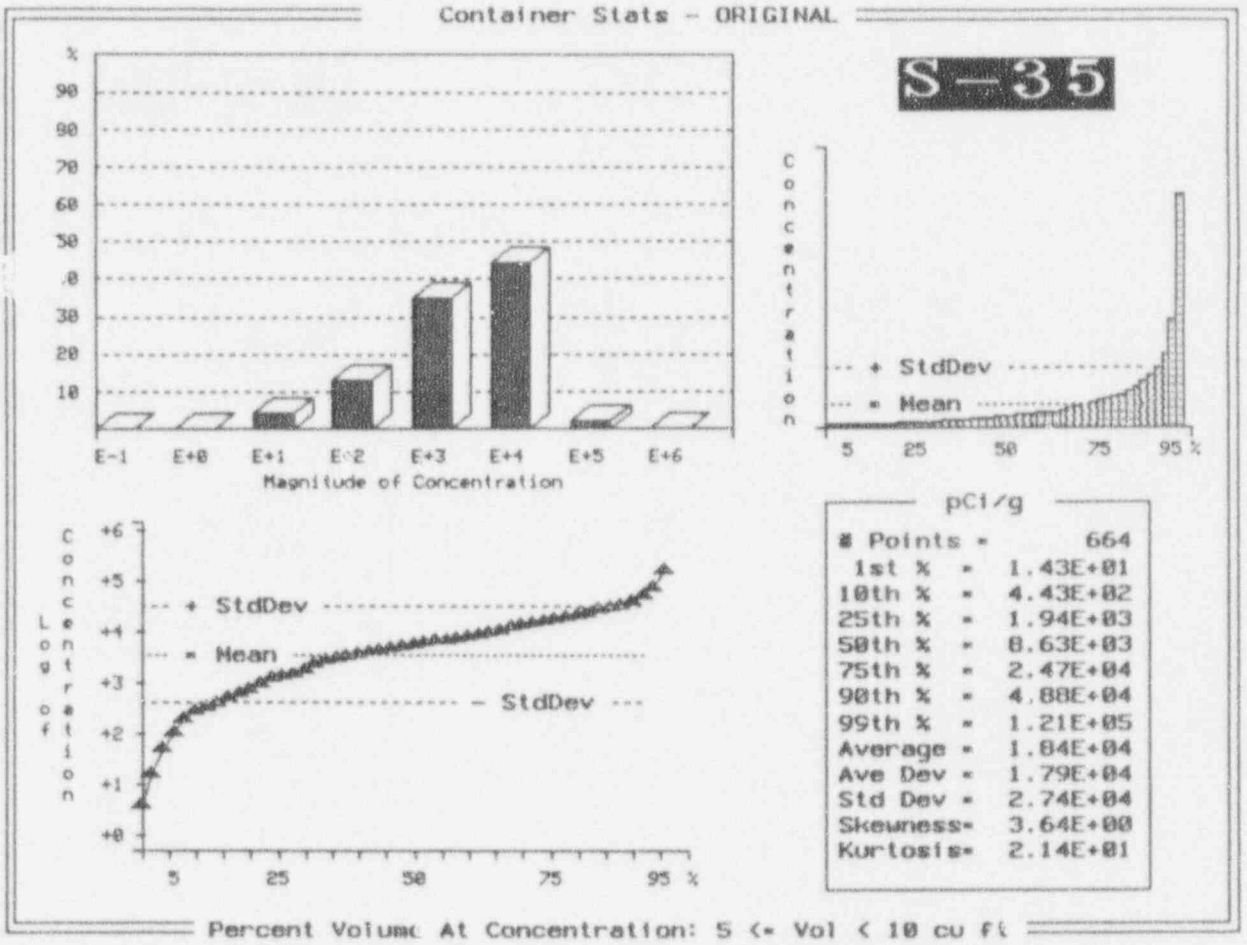


Exhibit D-2 (Continued)

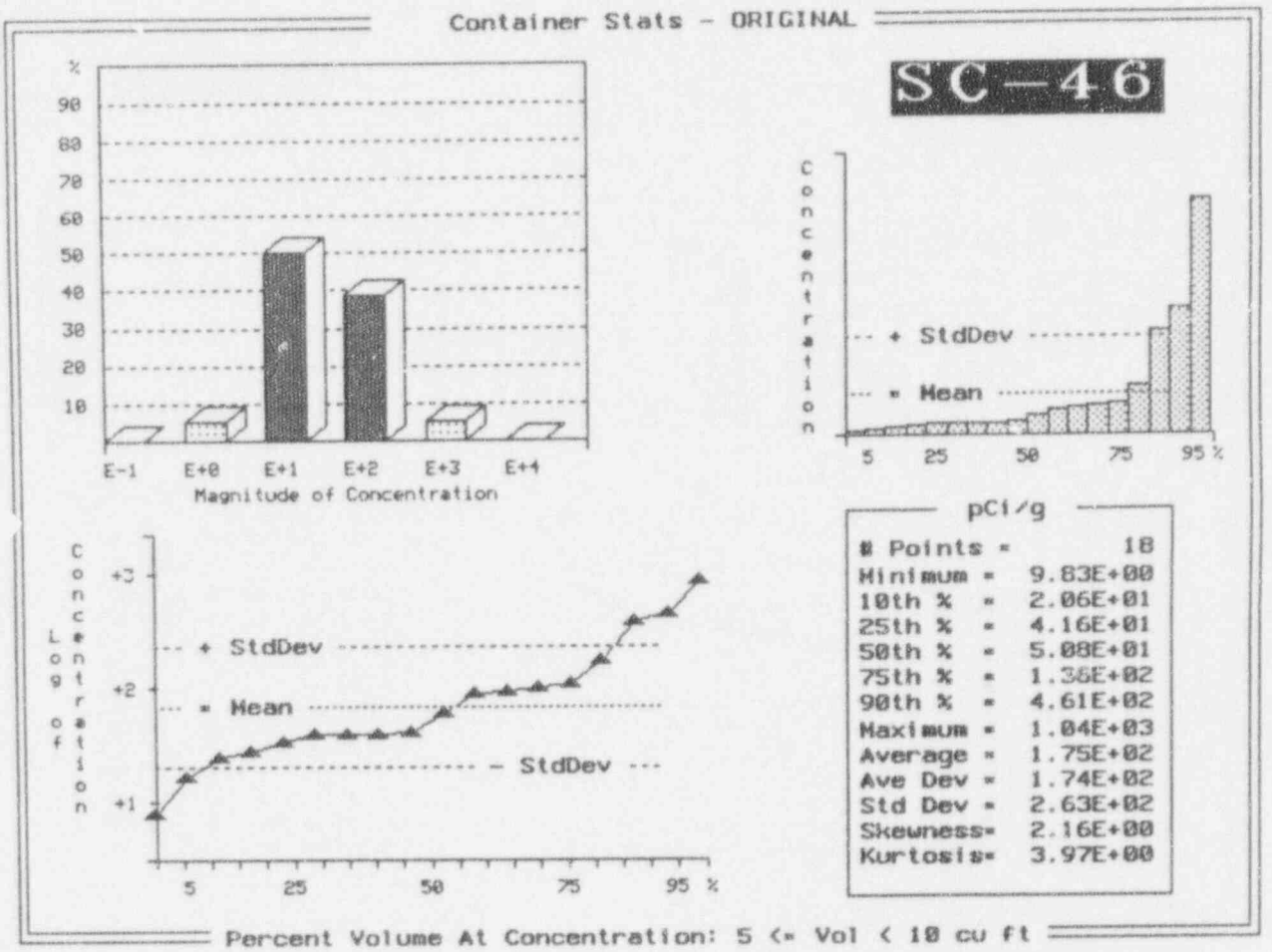
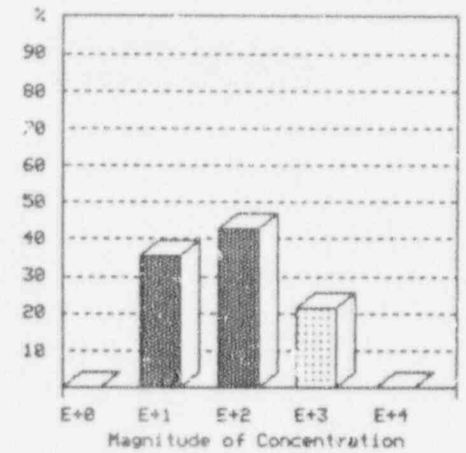


Exhibit D-2 (Continued)

Container Stats - ORIGINAL



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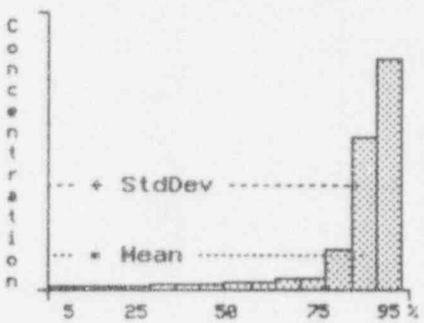
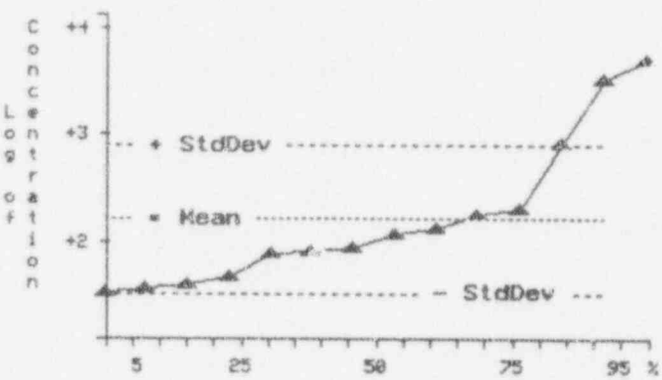




pCi/g

# Points =	14
Minimum =	4.30E+01
10th % =	4.30E+01
25th % =	6.10E+01
50th % =	1.11E+02
75th % =	2.64E+02
90th % =	4.22E+03
Maximum =	6.38E+03
Average =	9.25E+02
Ave Dev =	1.26E+03
Std Dev =	1.92E+03
Skewness=	1.95E+00
Kurtosis=	2.32E+00

Percent Volume At Concentration: 5 <= Vol < 10 cu ft

Exhibit D-2 (Continued)

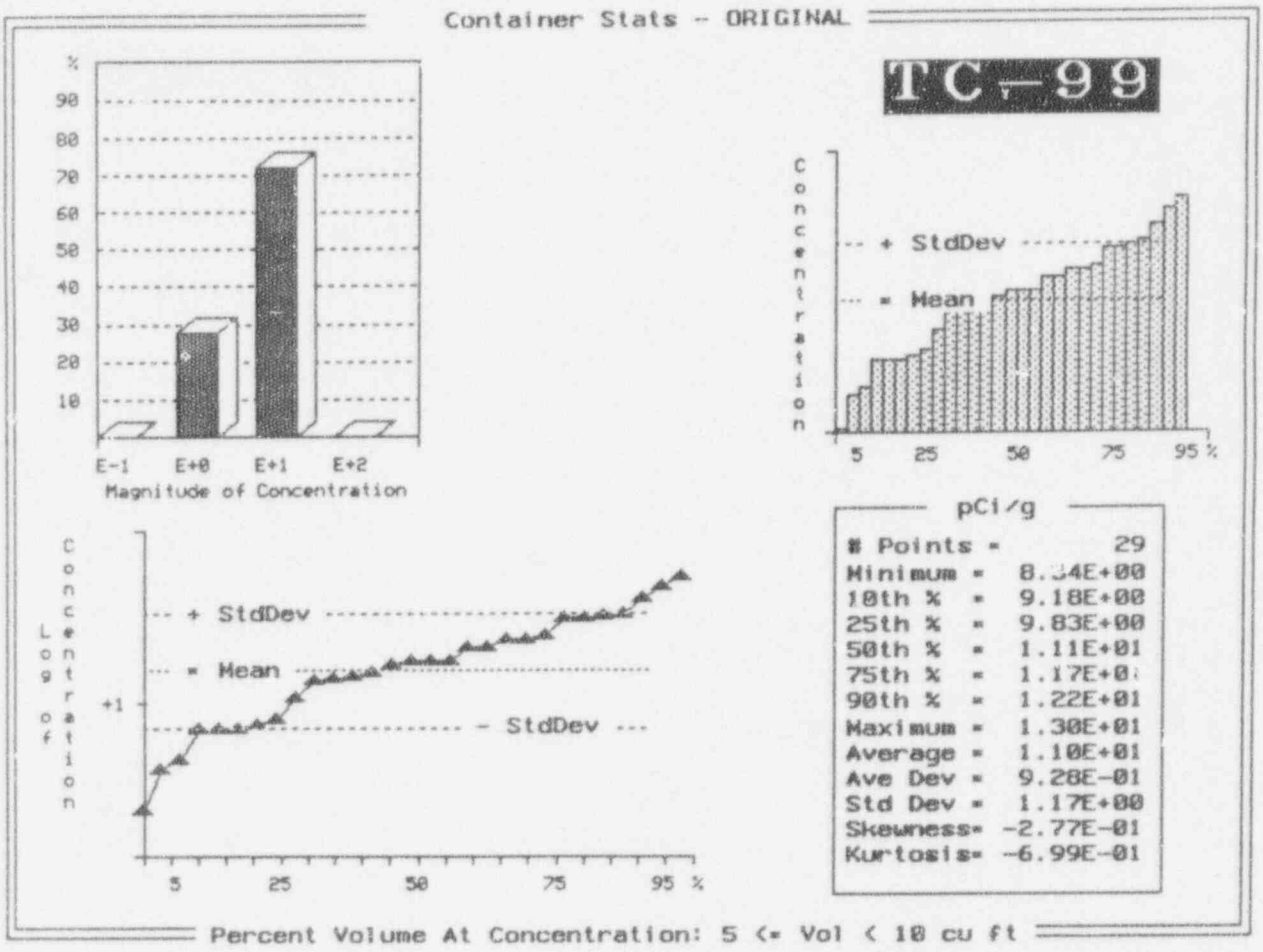


Exhibit D-2 (Continued)

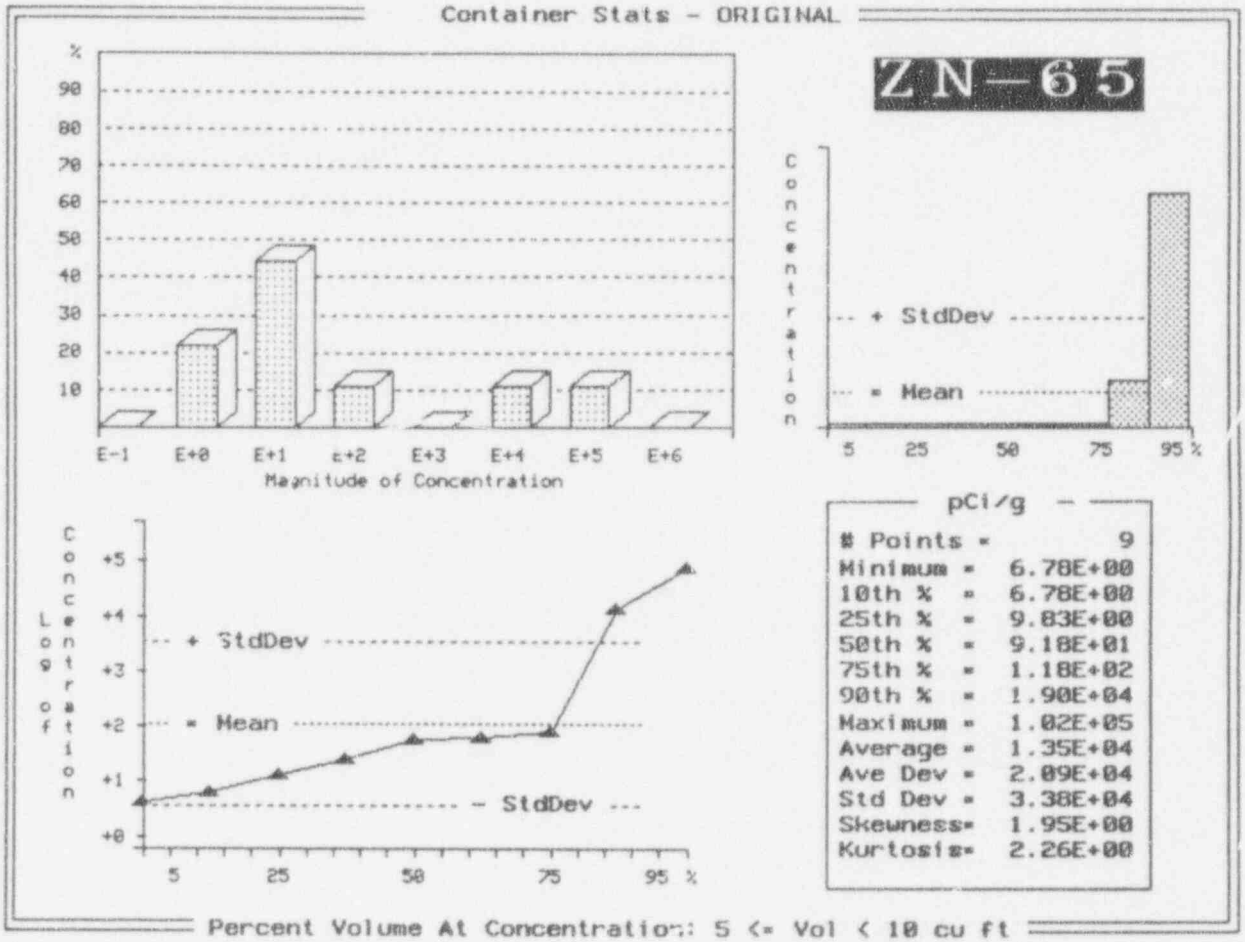
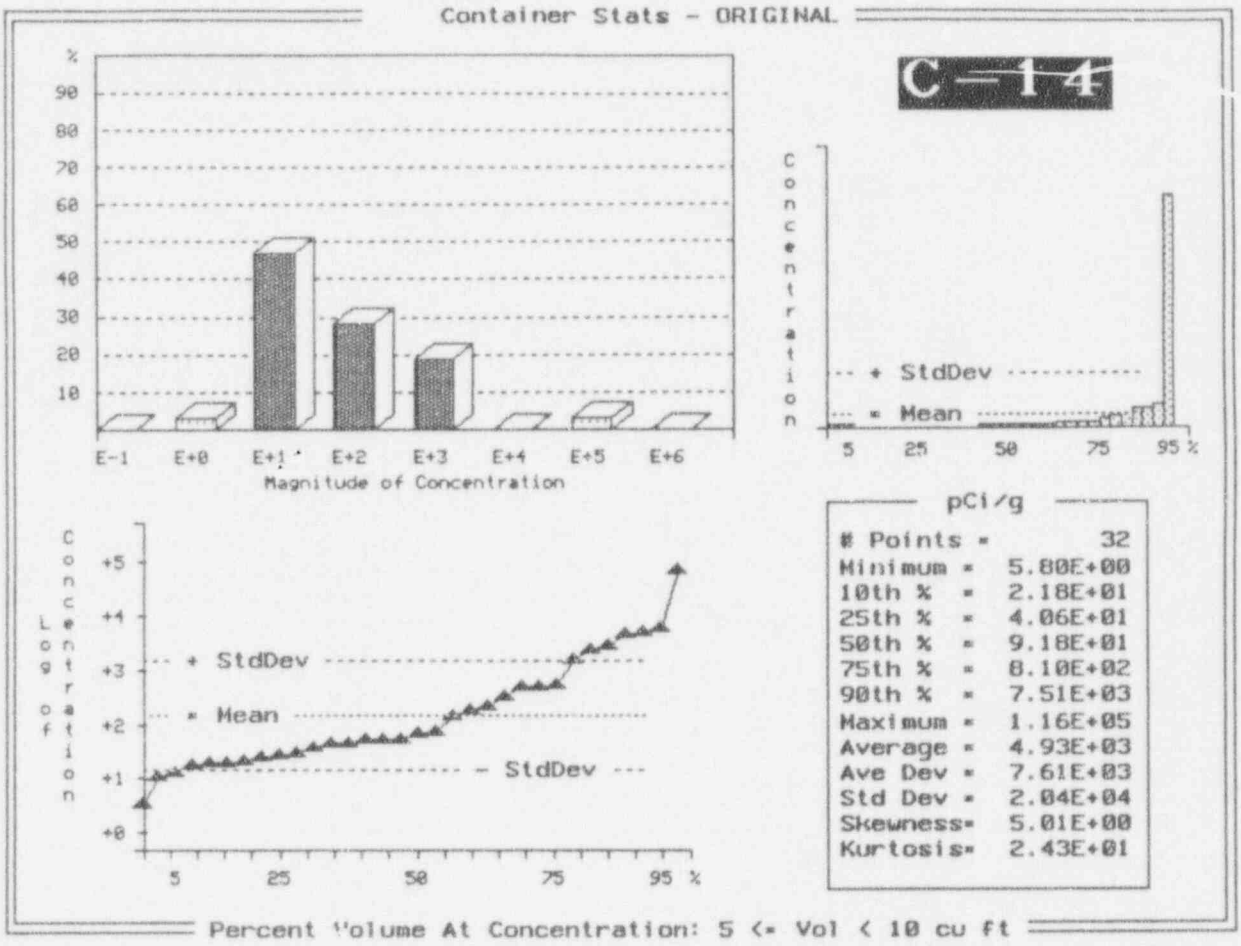


Exhibit D-3
Data Summary - Analyses at the Container Level
(Aggregate Practices for non-brokered waste: 1988 to 1990)
(Beatty and Richland Disposal Sites only)

	Data or Parameters
Waste generator class:	Medical
Compact or unaffiliated state:	all
Total associated waste volume (m^3):	3,980
Total associate waste activity (Ci):	339
Waste form:	Absorbed aqueous liquid
Waste class:	A-Unstable and A-Stable
Total number of shipping records:	1
Number of waste containers:	73
Weight of shipments (kg):	11,560
Total waste volume (m^3):	15.5
Fractional waste volume (%): (this analysis/total)	0.39
Total waste activity (Ci):	3.0
Fractional waste activity (%): (this analysis/total)	0.89

Exhibit D-3 (Continued)



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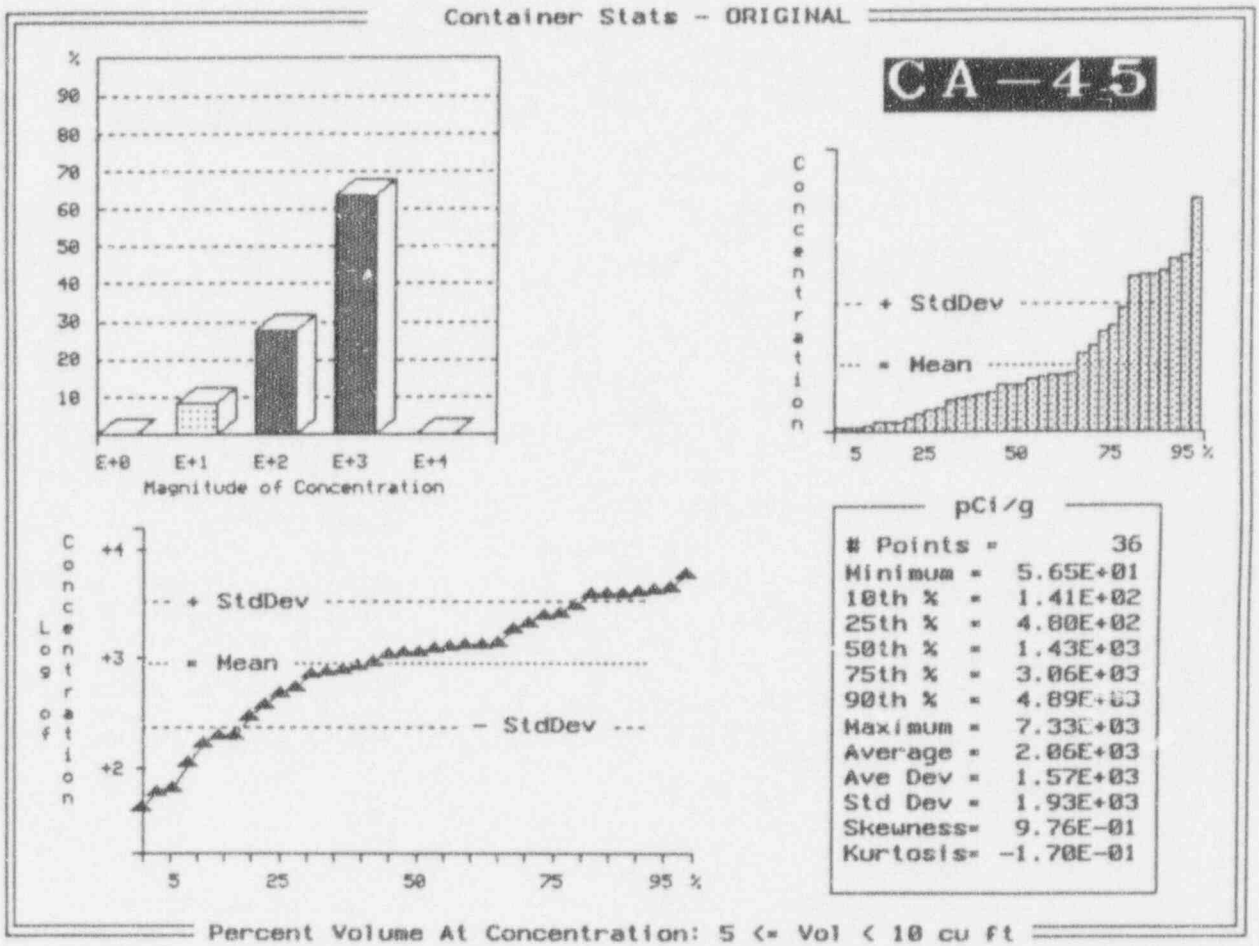

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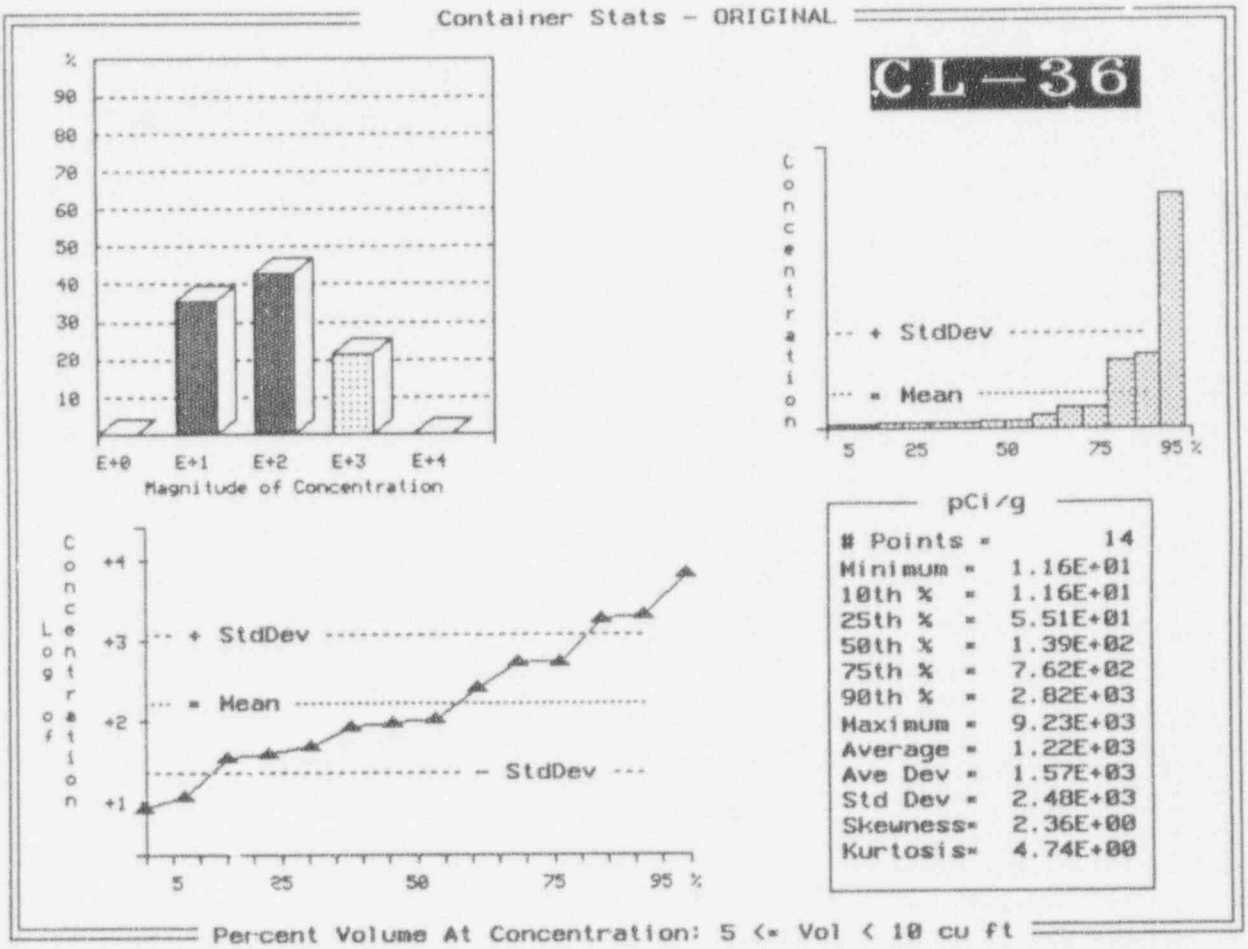

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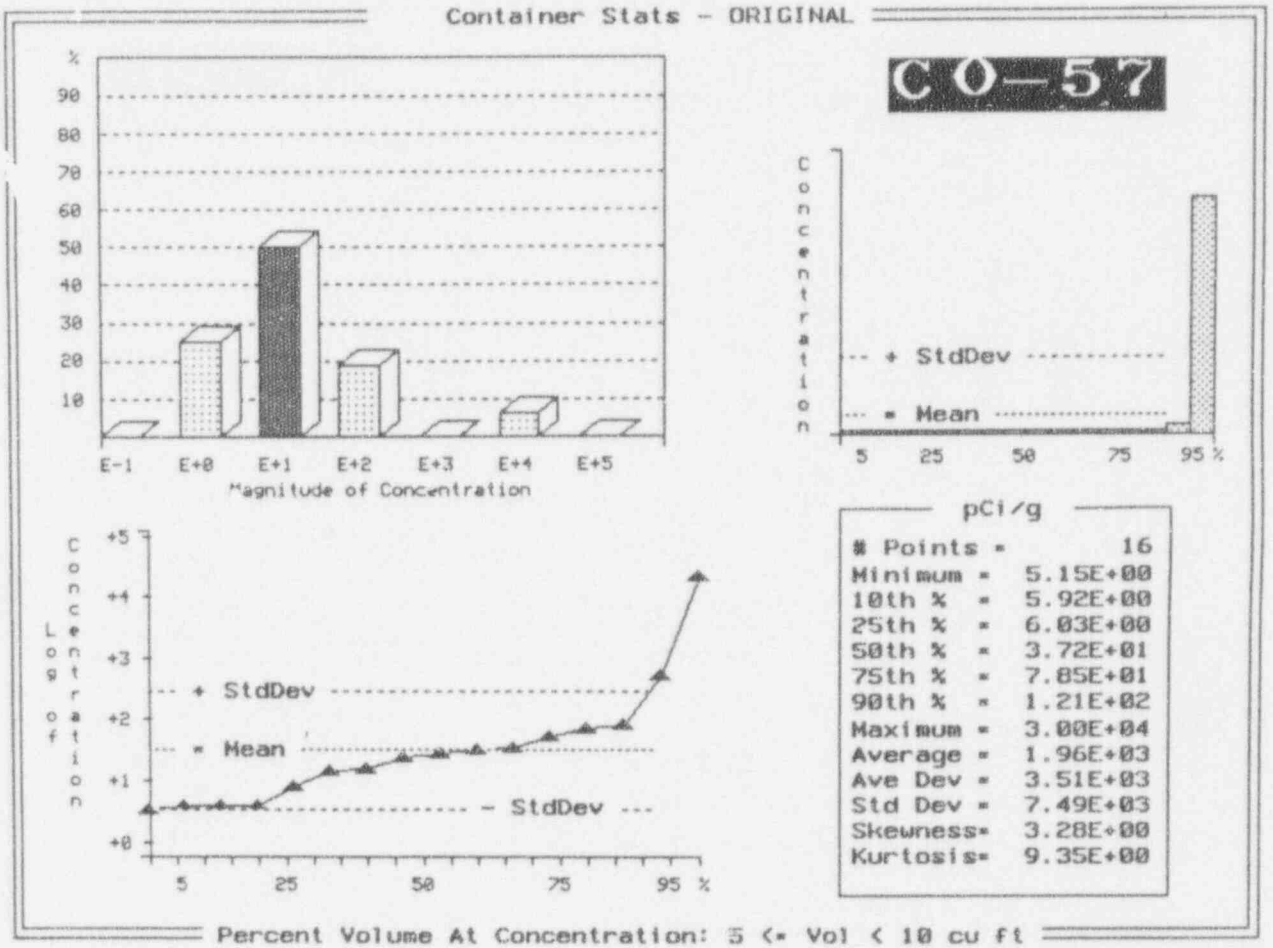

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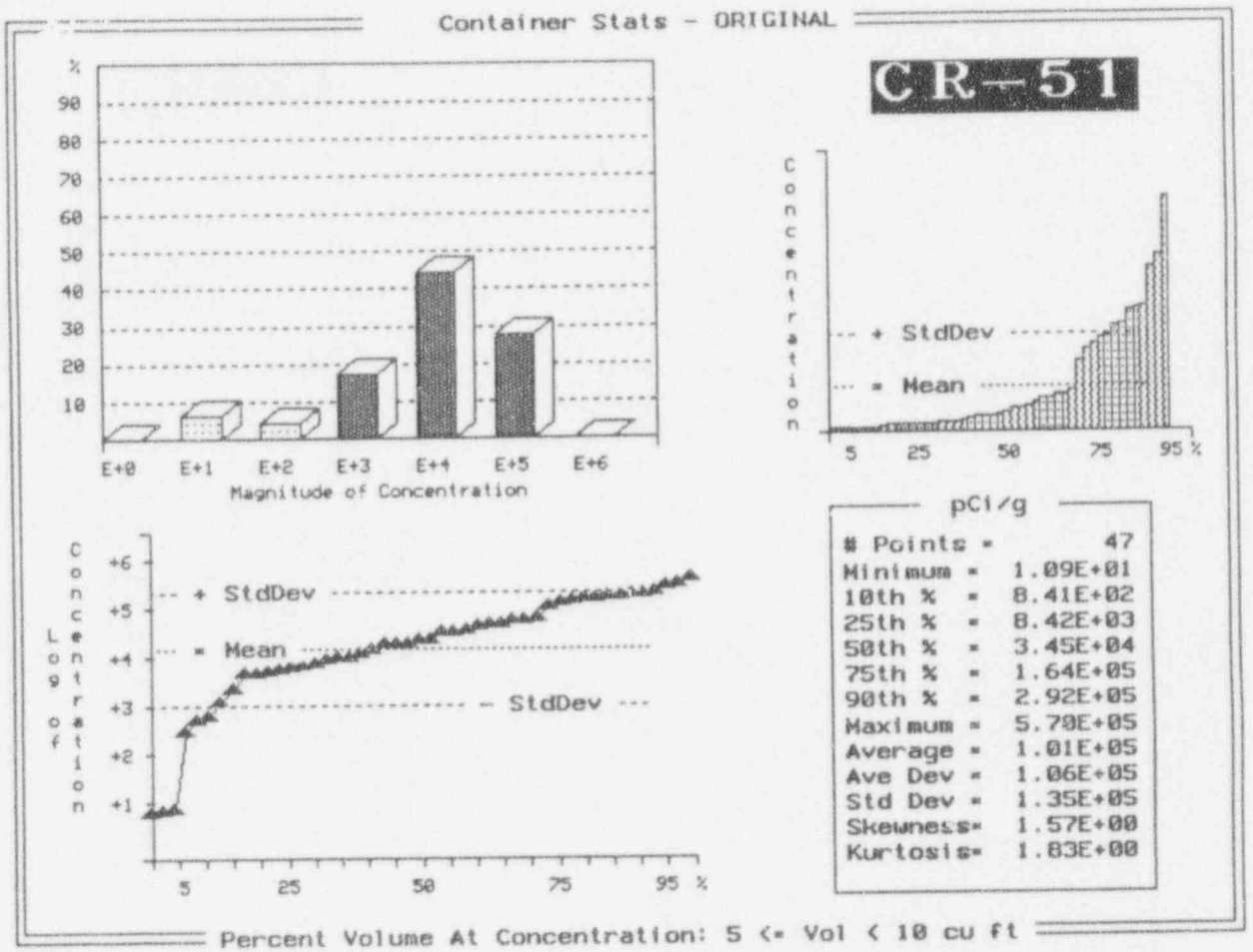

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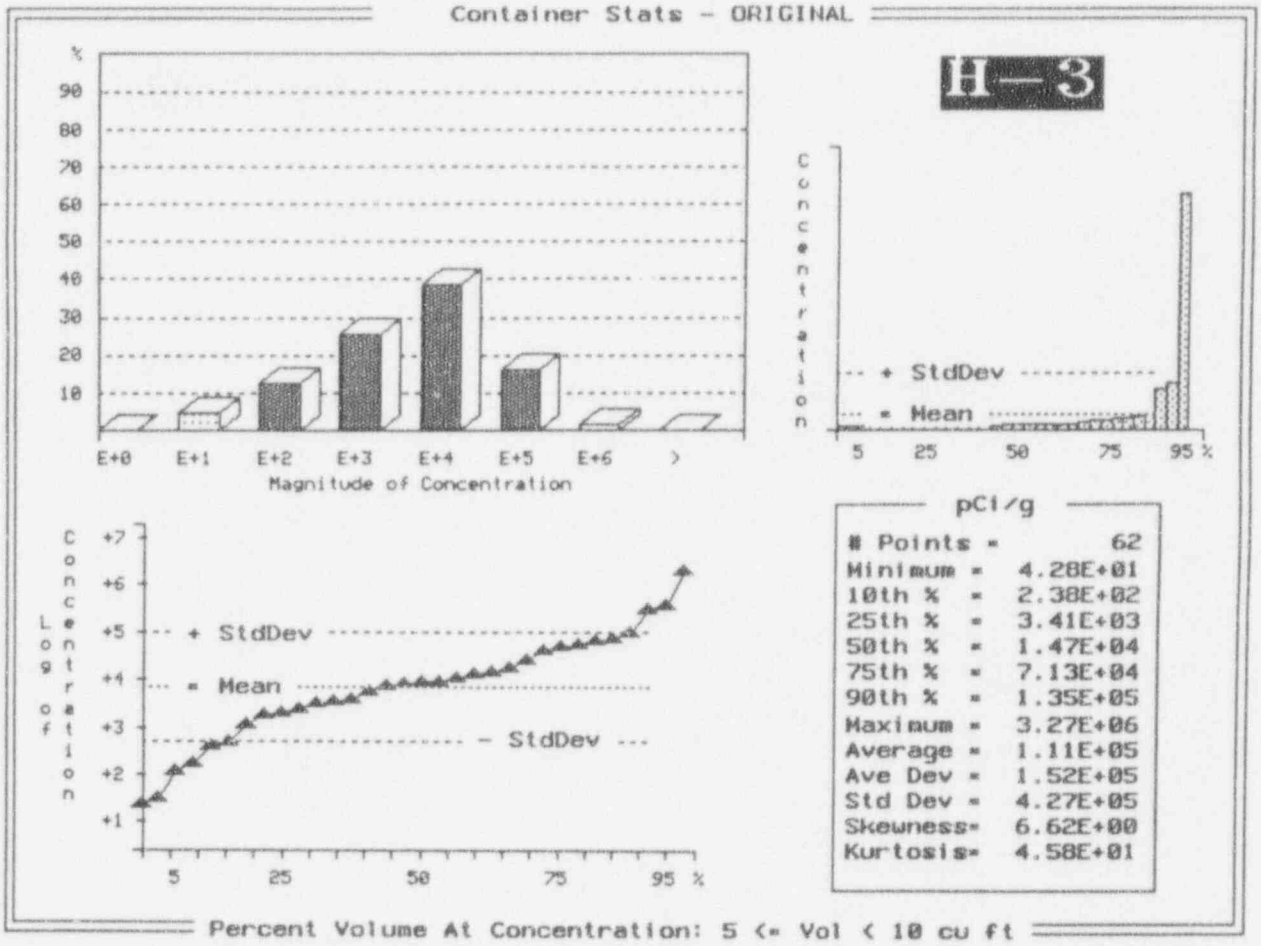


Exhibit D-3 (Continued)

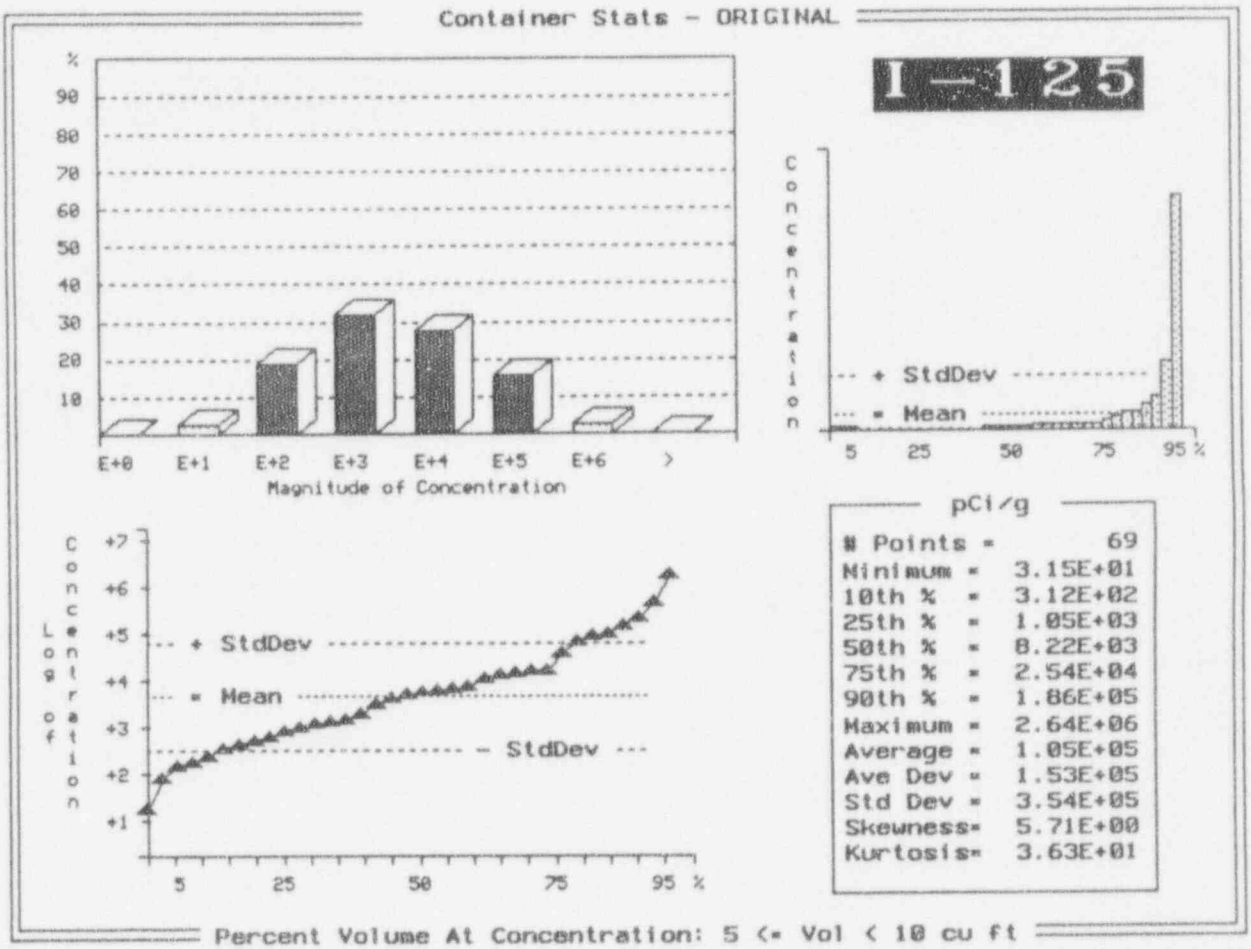
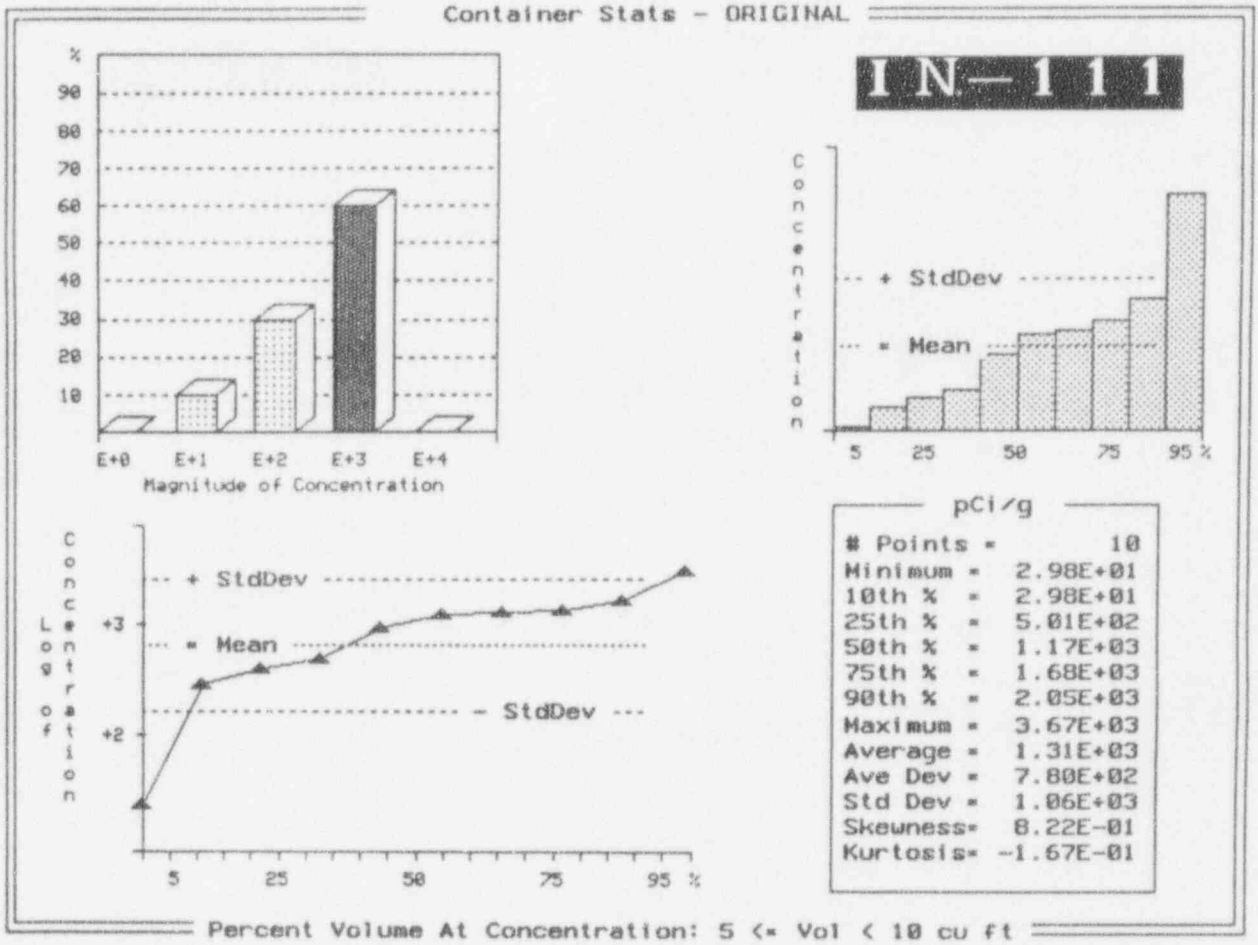


Exhibit D-3 (Continued)



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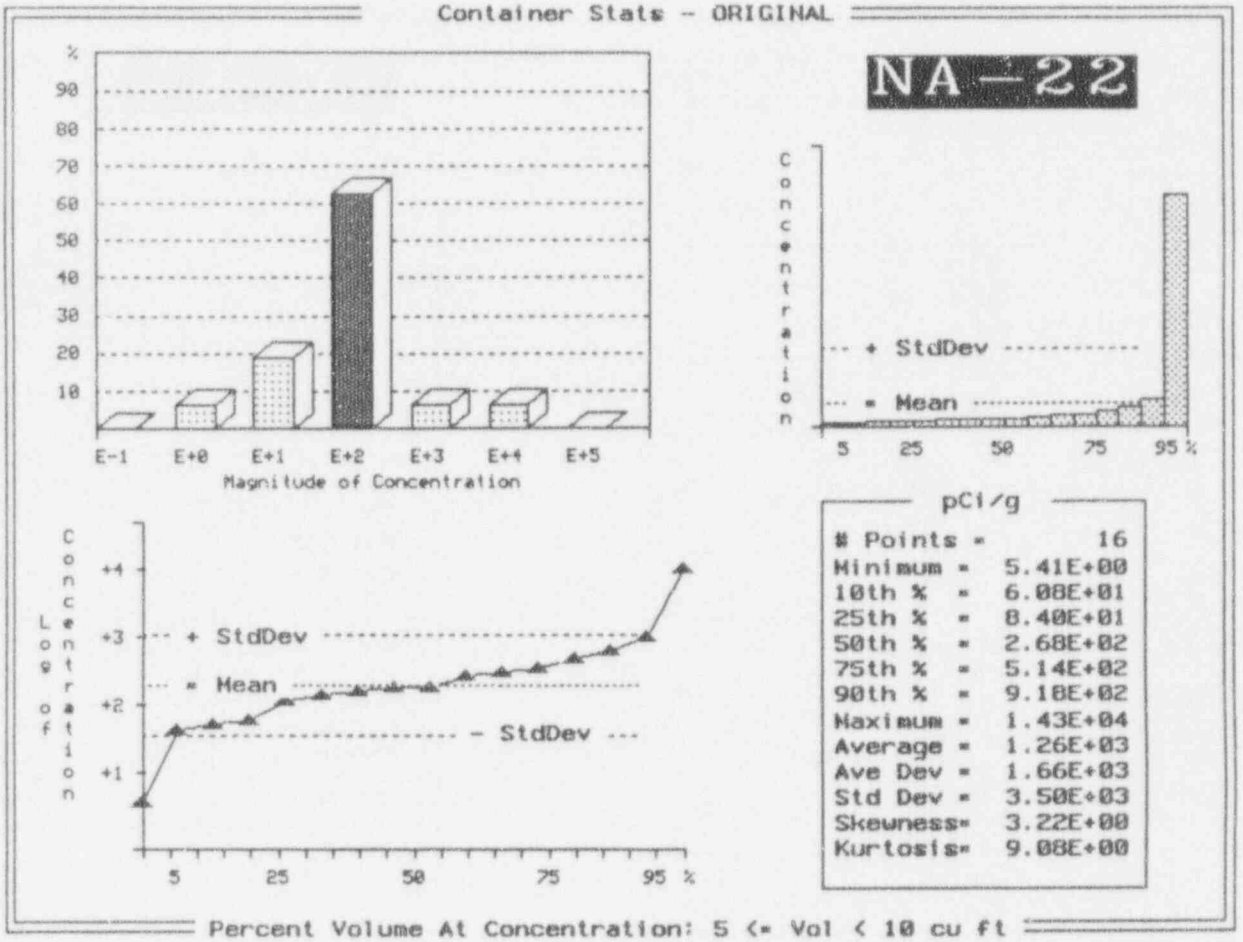


Exhibit D-3 (Continued)

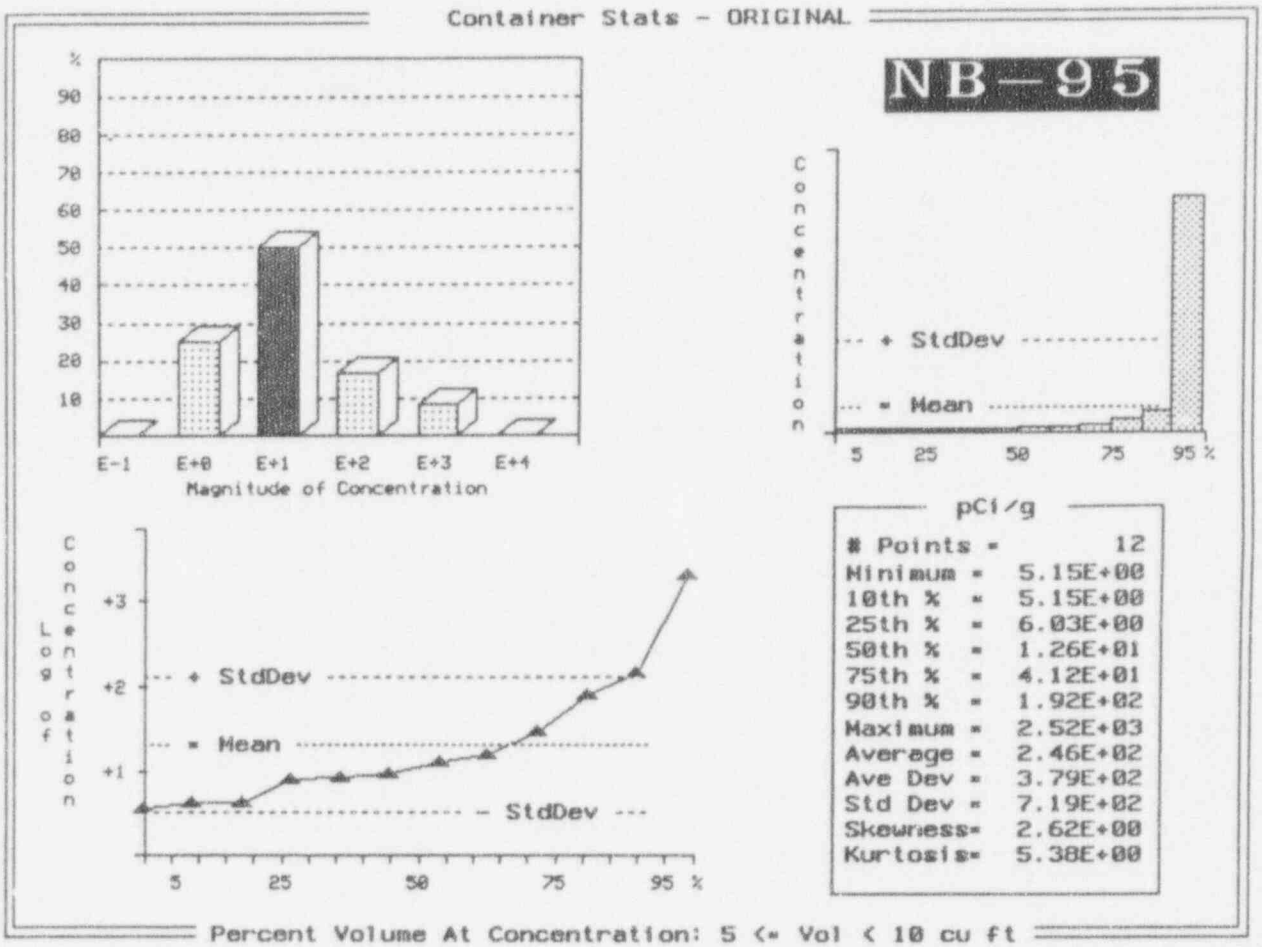


Exhibit D-3 (Continued)

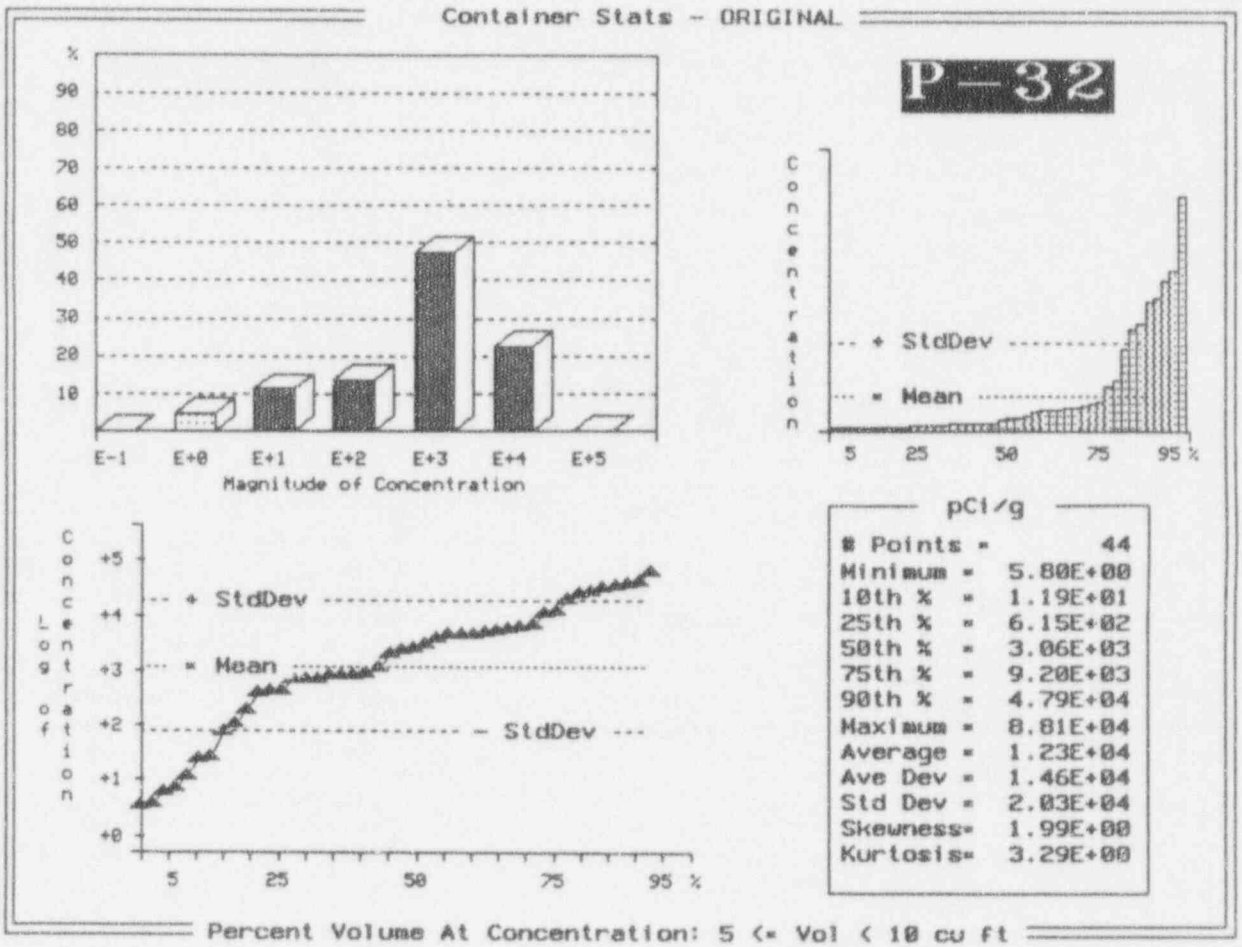
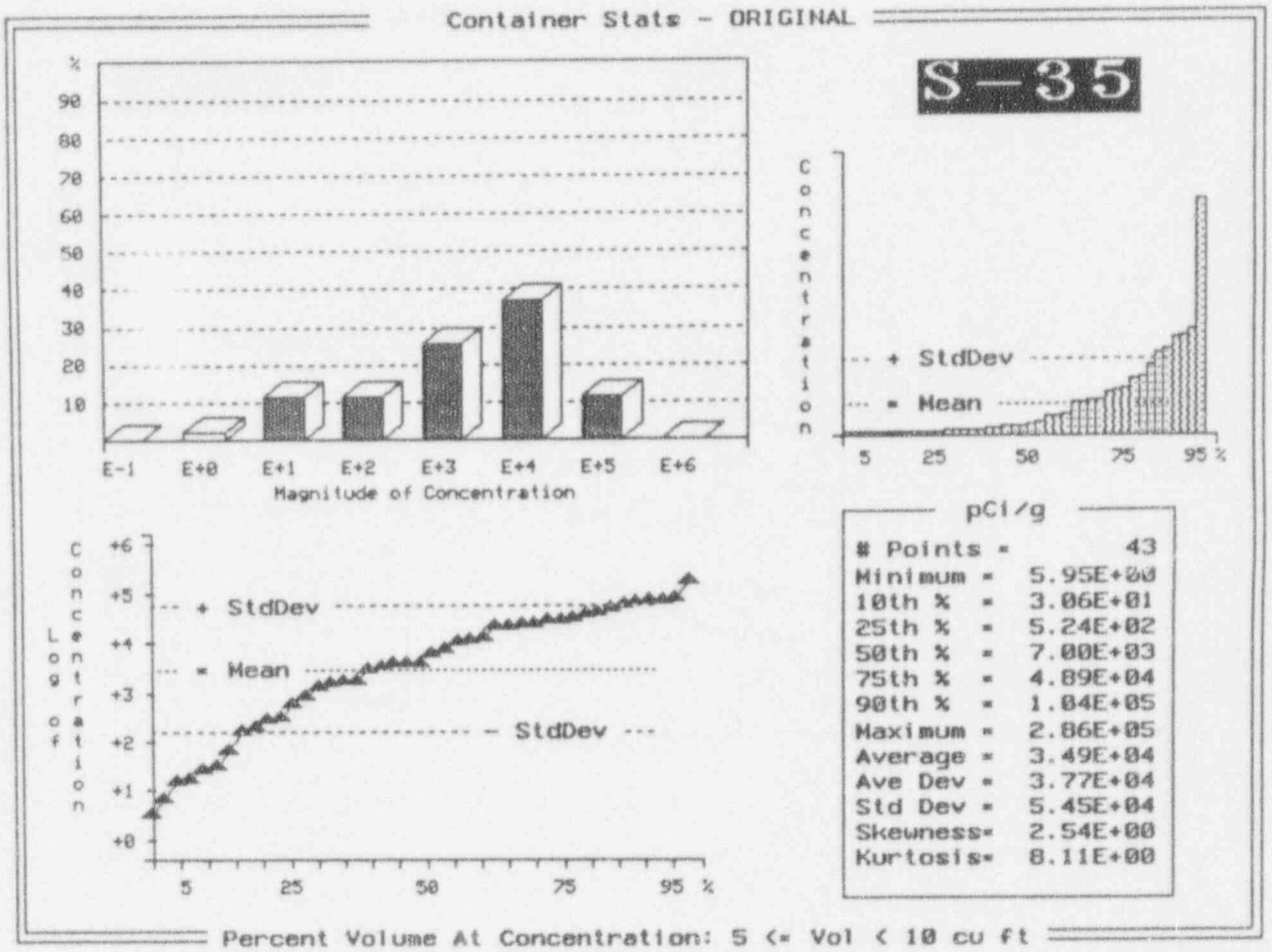


Exhibit D-3 (Continued)



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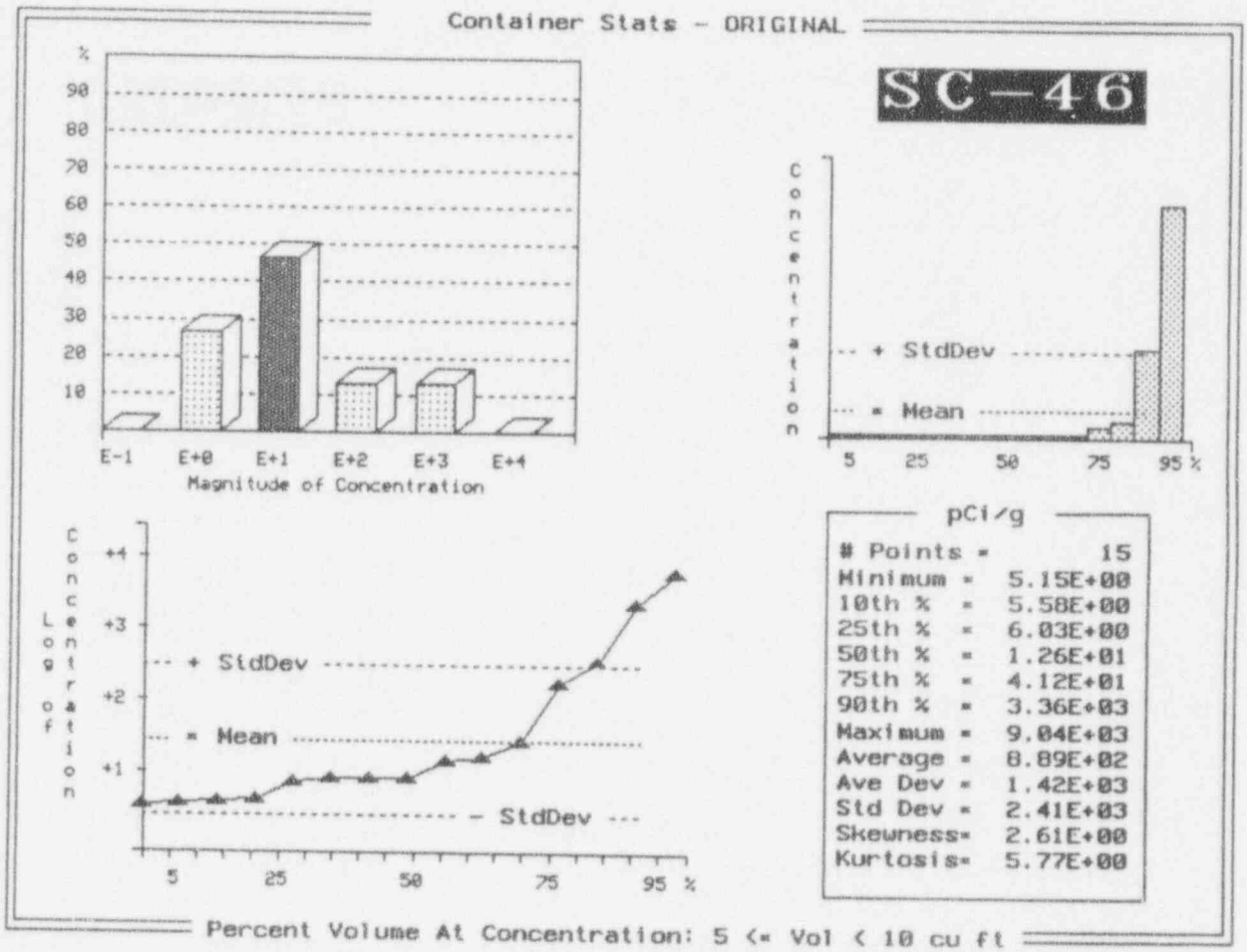

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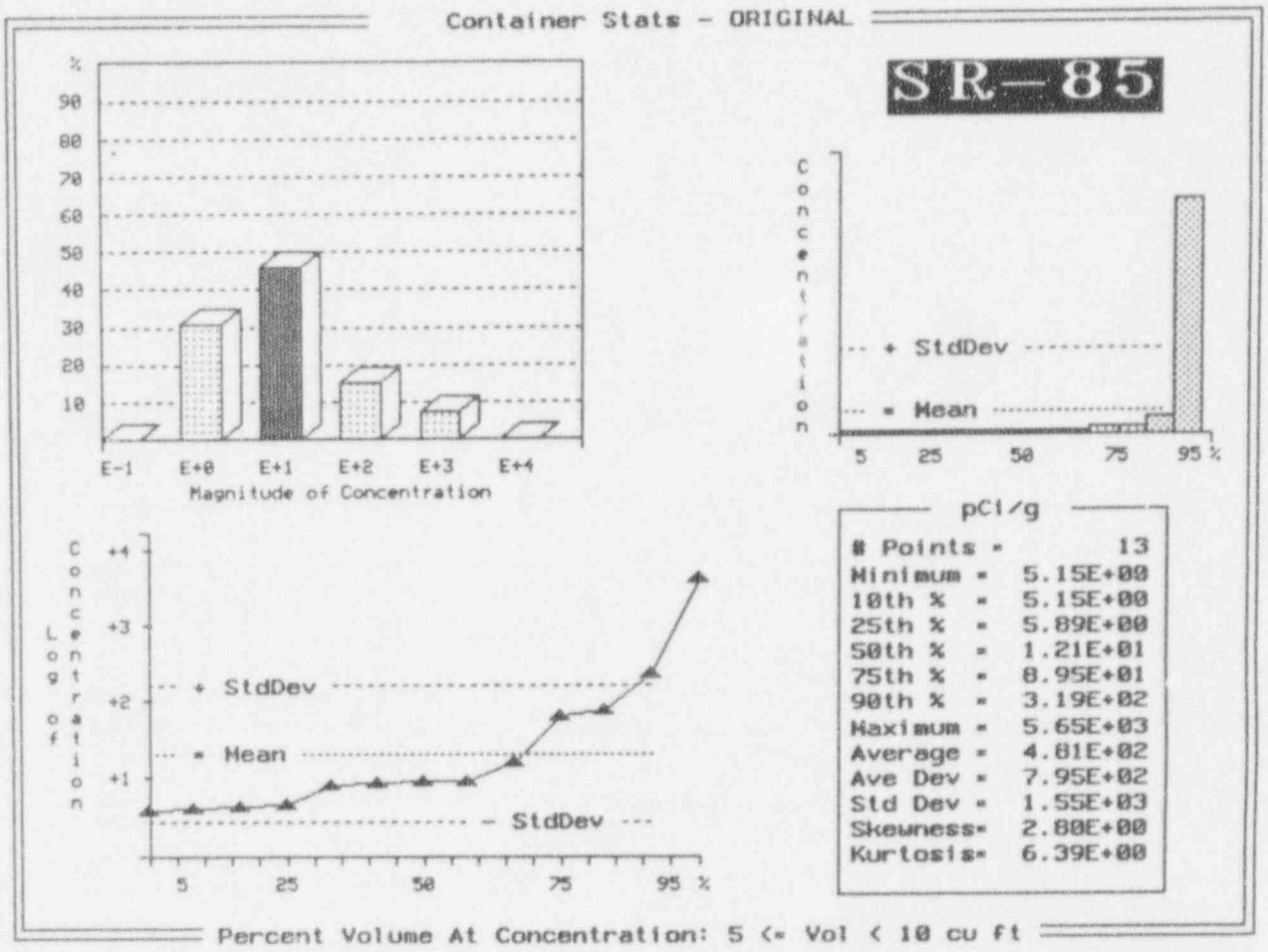
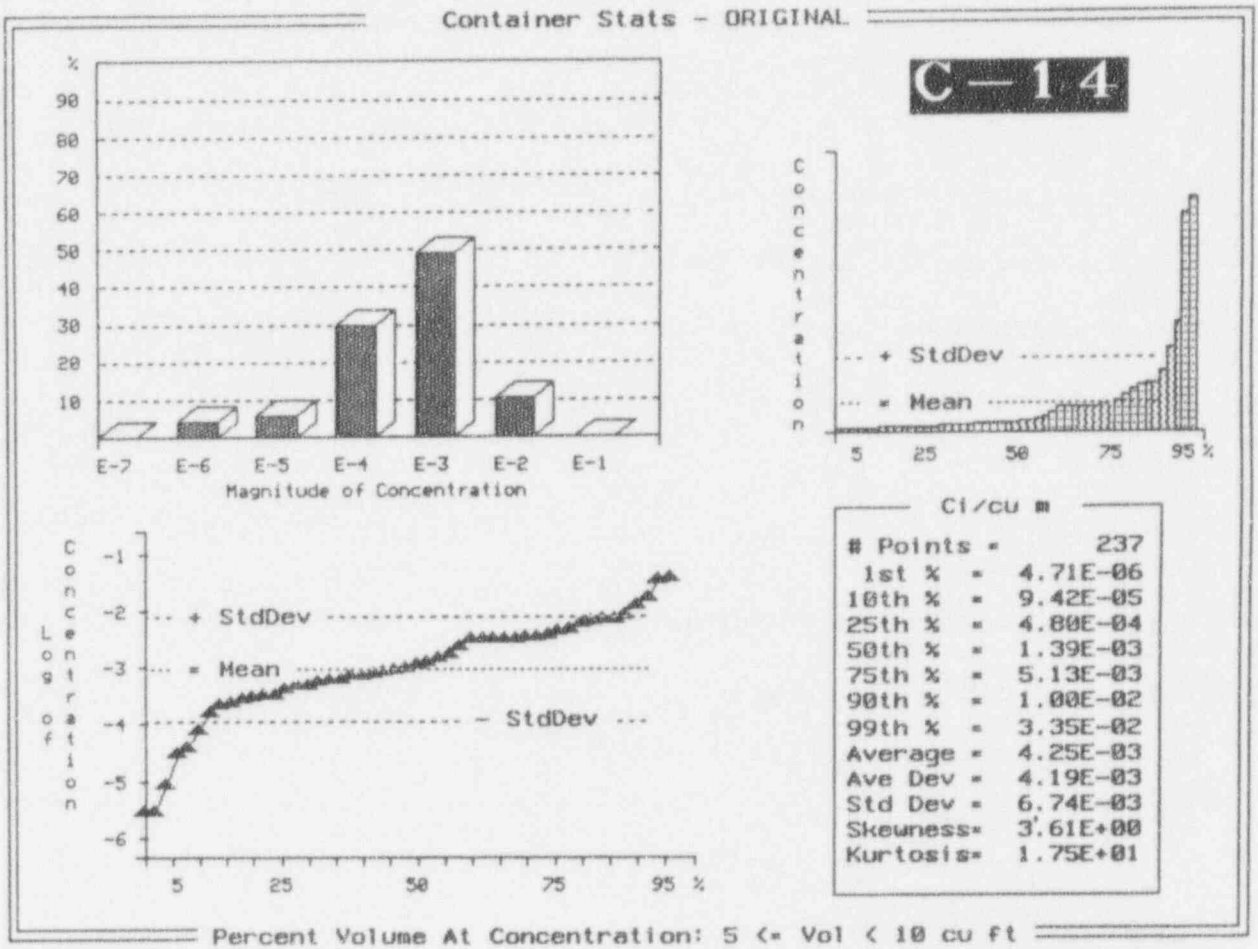


Exhibit D-4
Data Summary - Analyses at the Container Level
(Aggregate Practices for non-brokered waste: 1988 to 1990)
(Beatty and Richland Disposal Sites only)

	Data or Parameters
Waste generator class:	Academic
Compact or unaffiliated state:	all
Total associated waste volume (m^3):	7,290
Total associate waste activity (Ci):	5,300
Waste form:	Dry solid
Waste class:	A-Unstable and A-Stable
Total number of shipping records:	11
Number of waste containers:	324
Weight of shipments (kg):	38,140
Total waste volume (m^3):	68.8
Fractional waste volume (%): (this analysis/total)	0.94
Total waste activity (Ci):	8.1
Fractional waste activity (%): (this analysis/total)	0.15

Exhibit D-4 (Continued)



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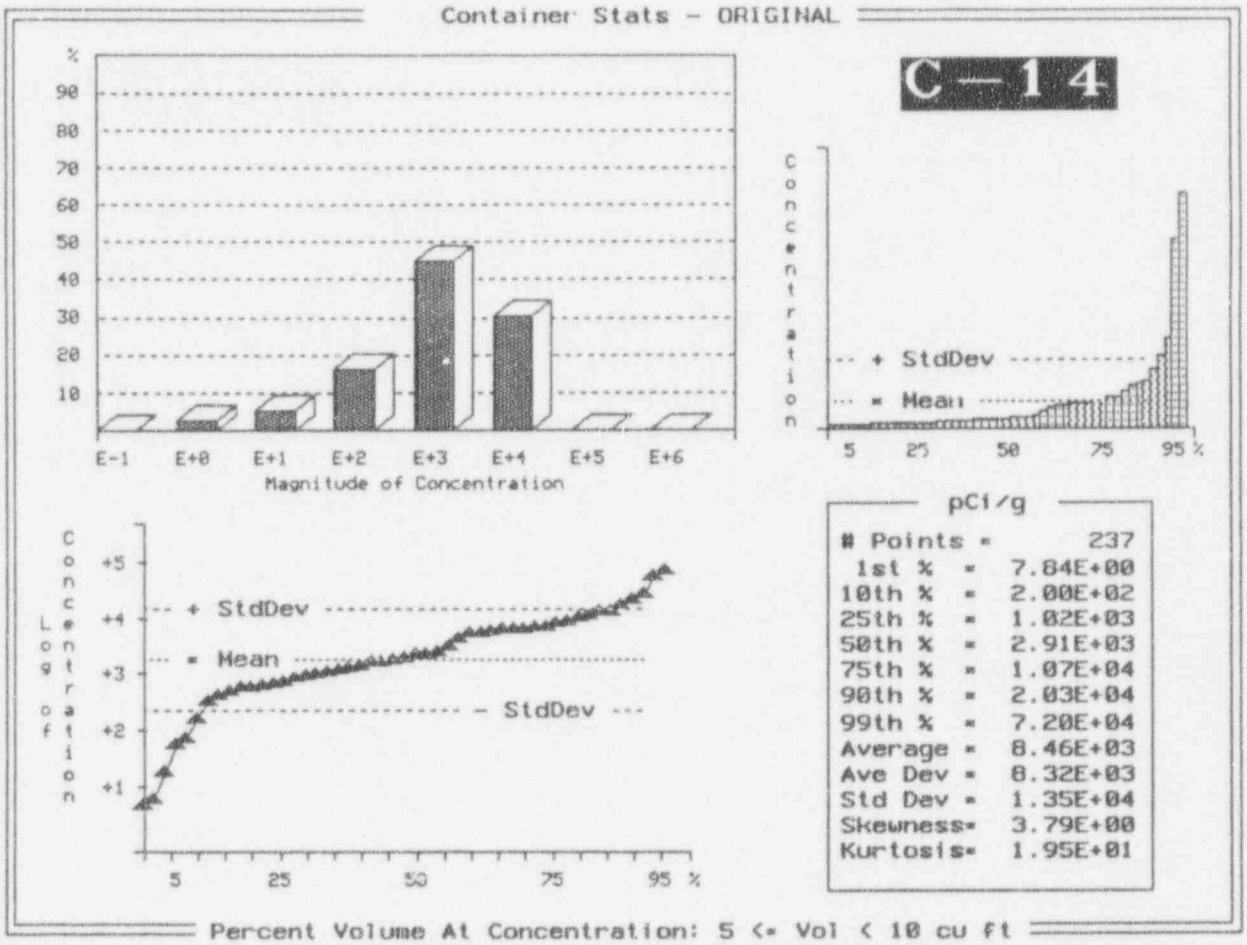

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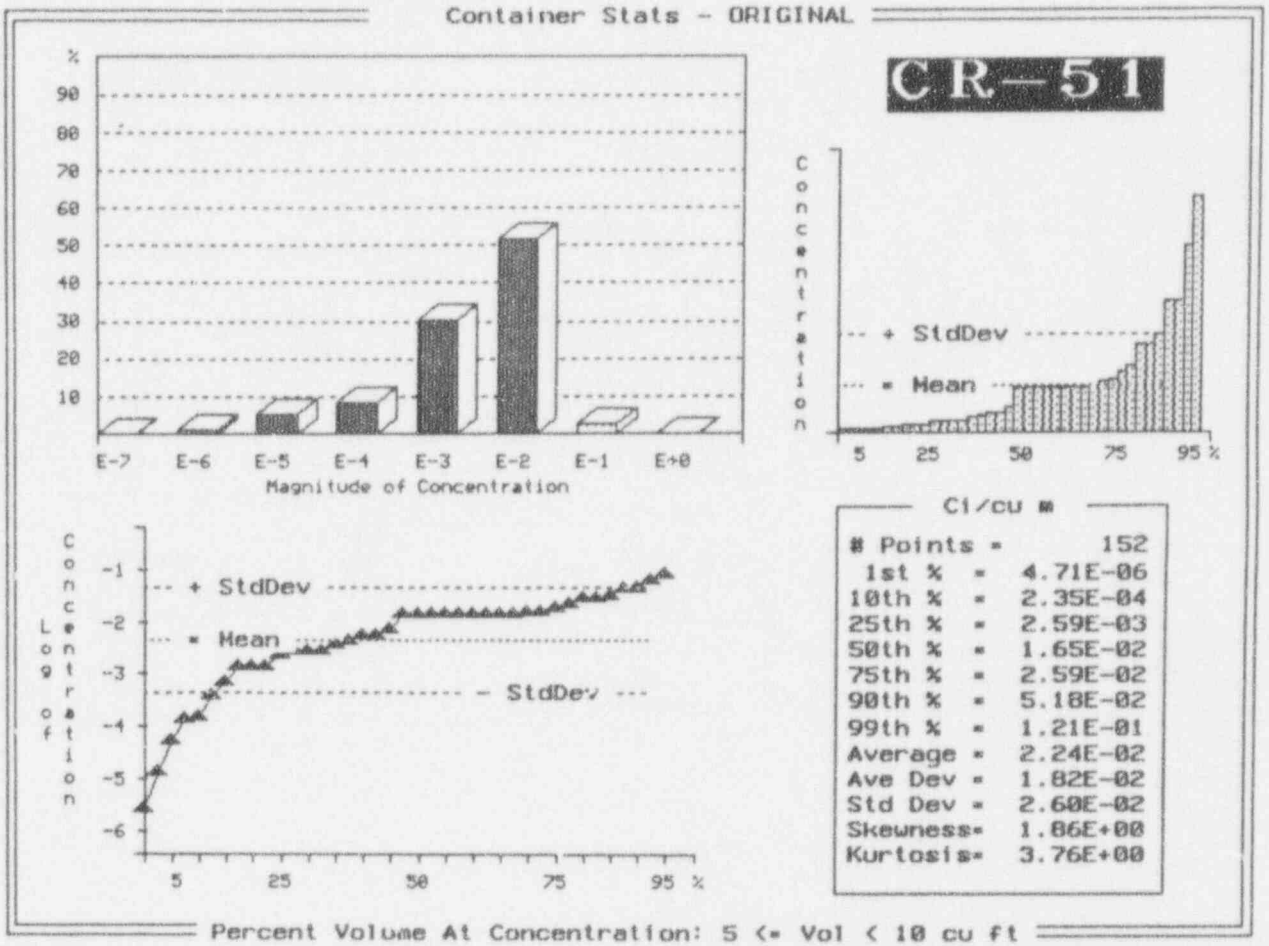

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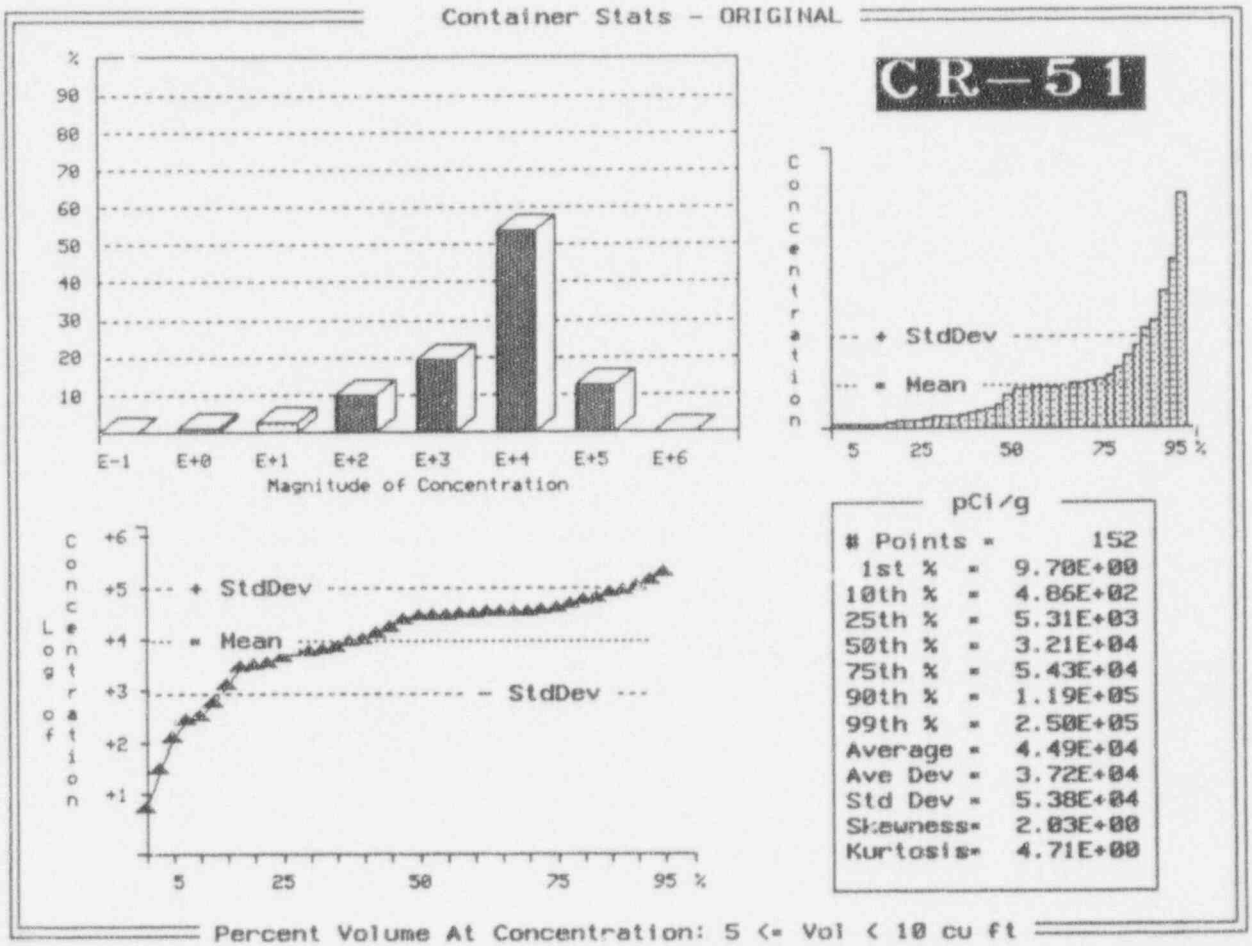
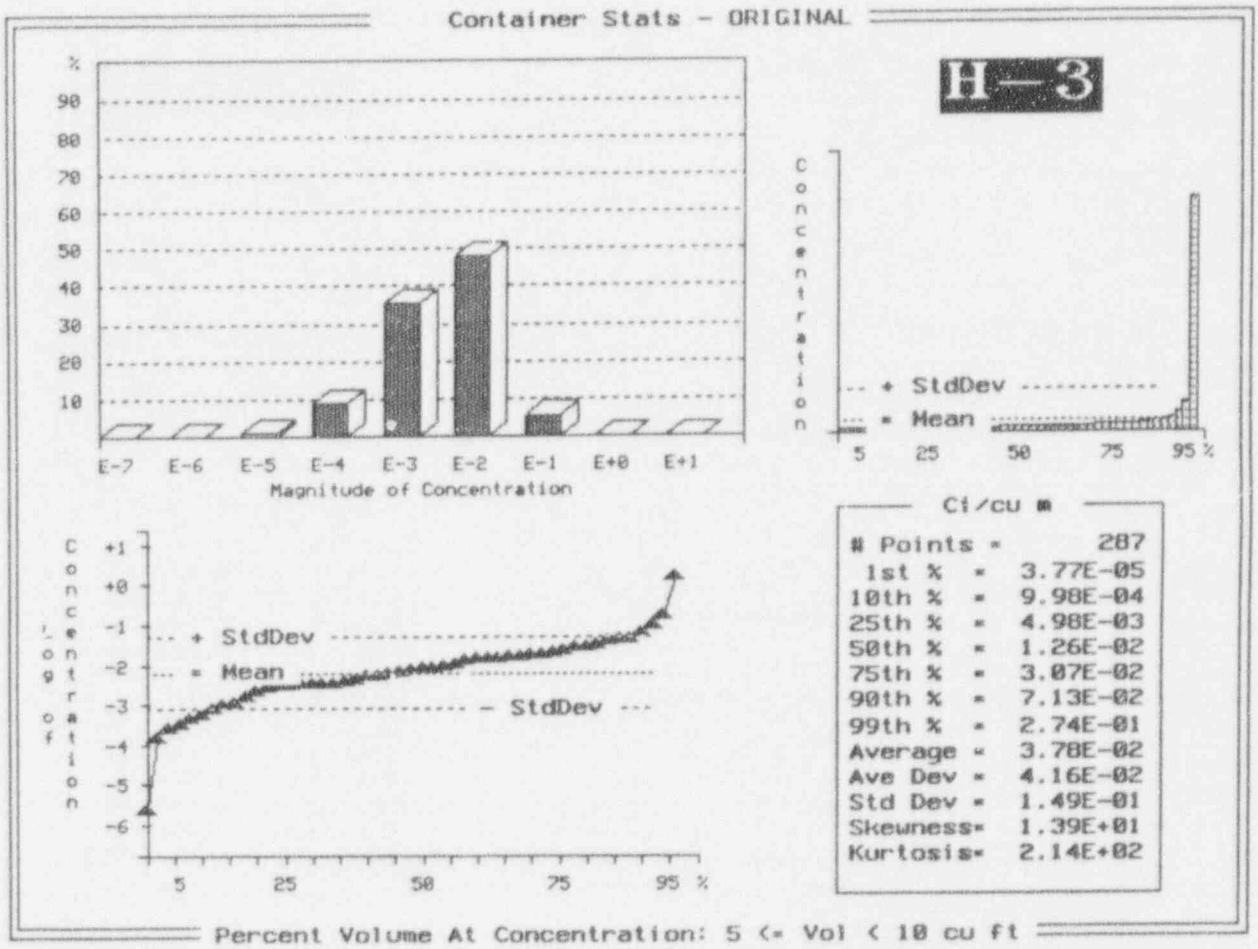


Exhibit D-4 (Continued)



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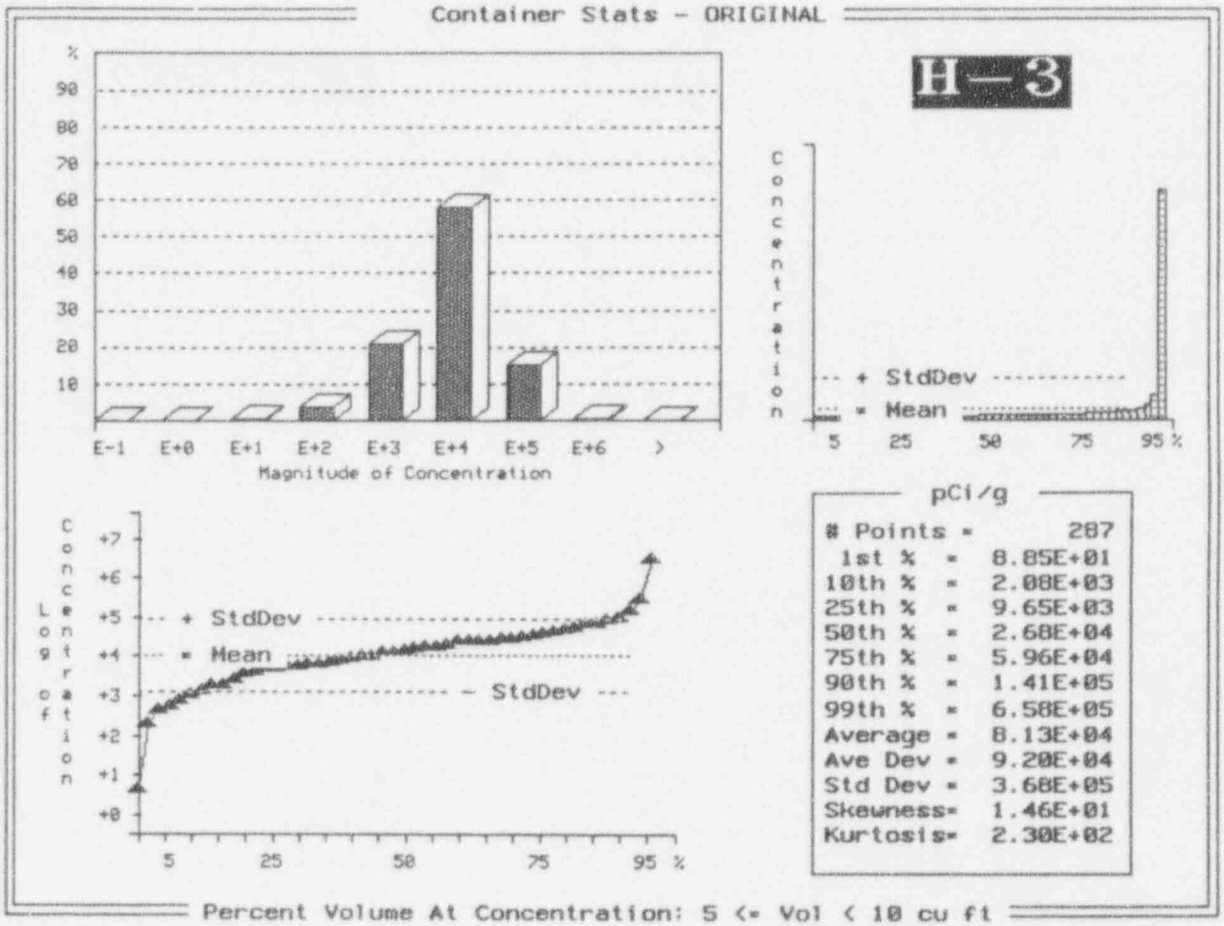

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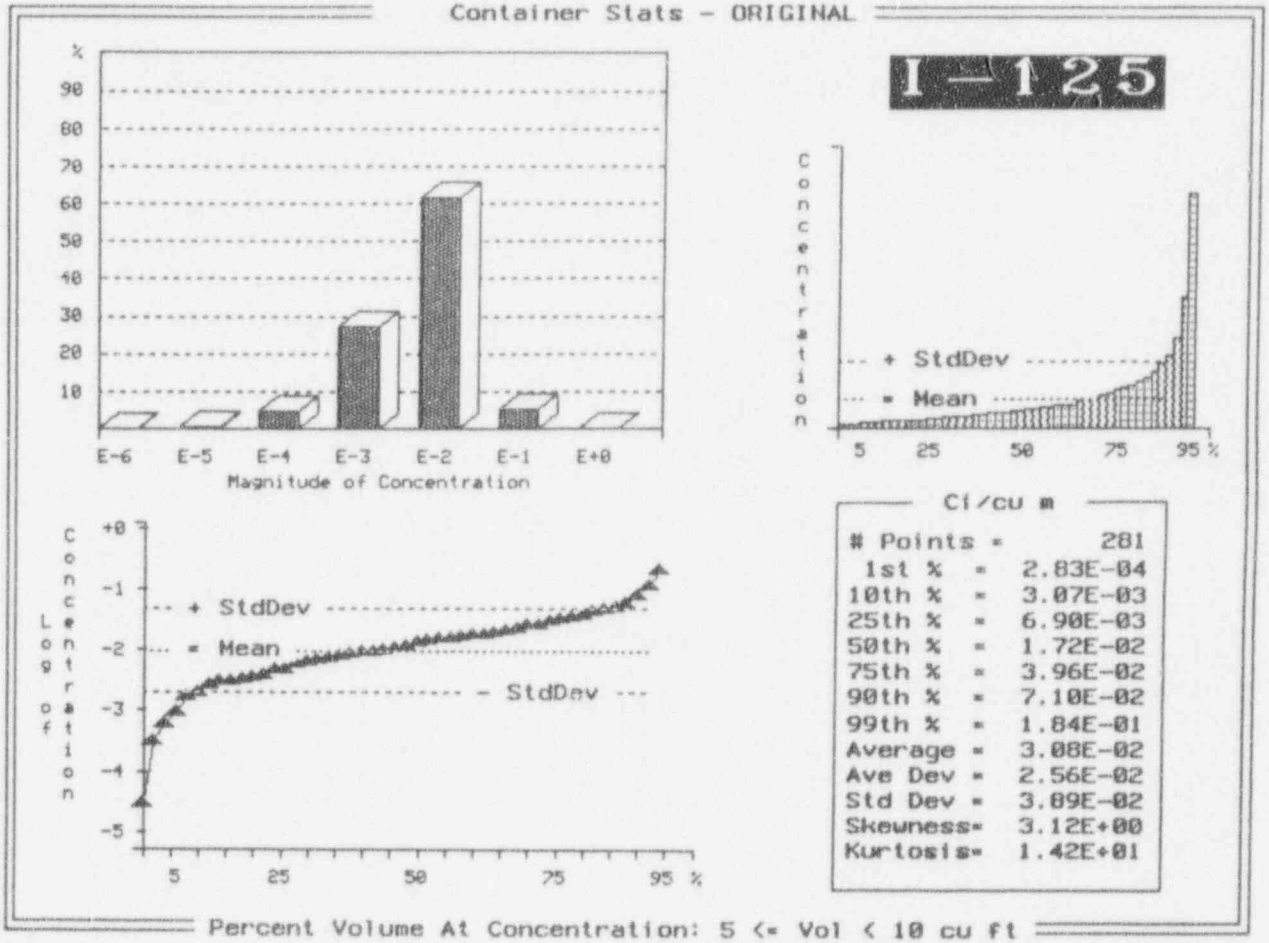

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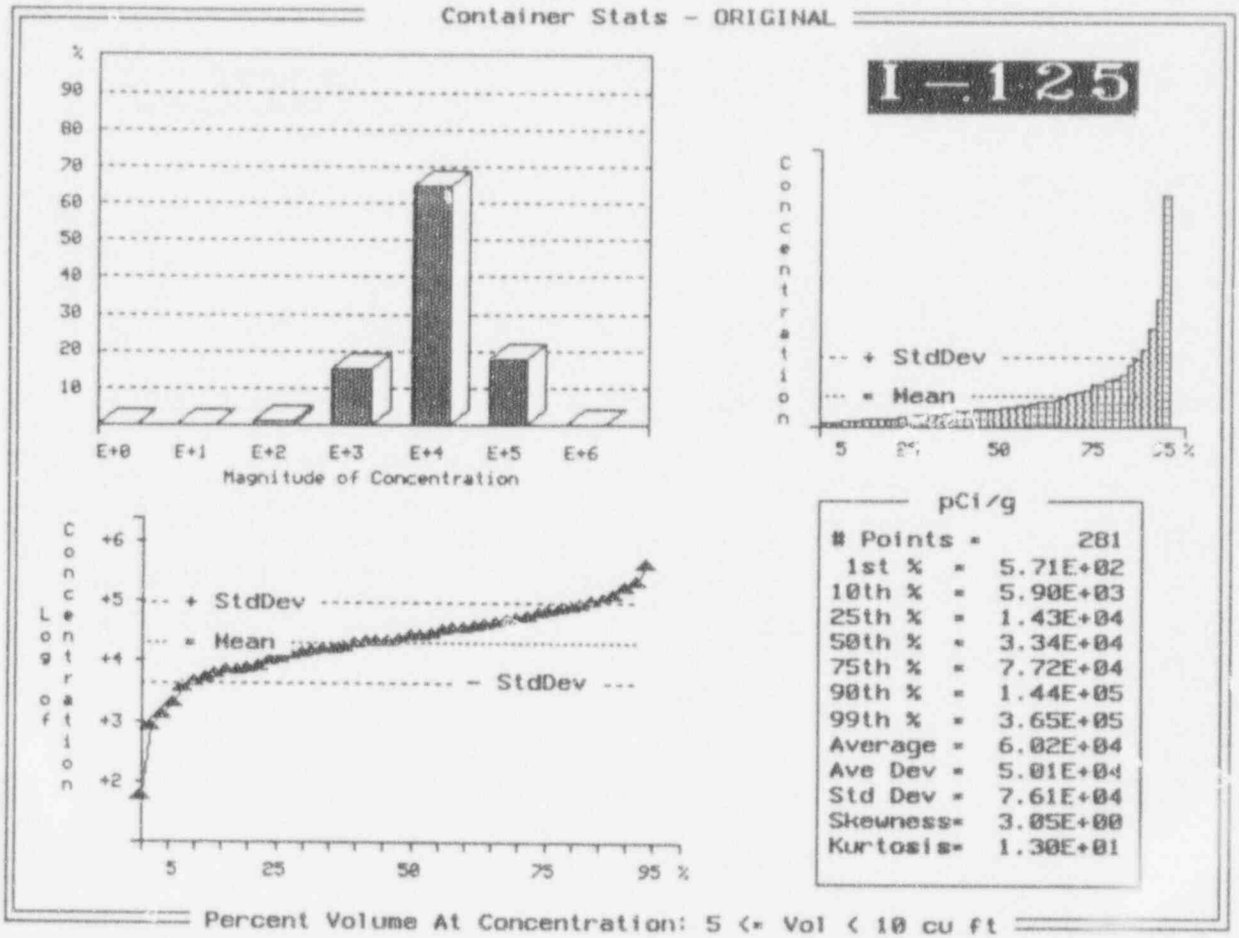

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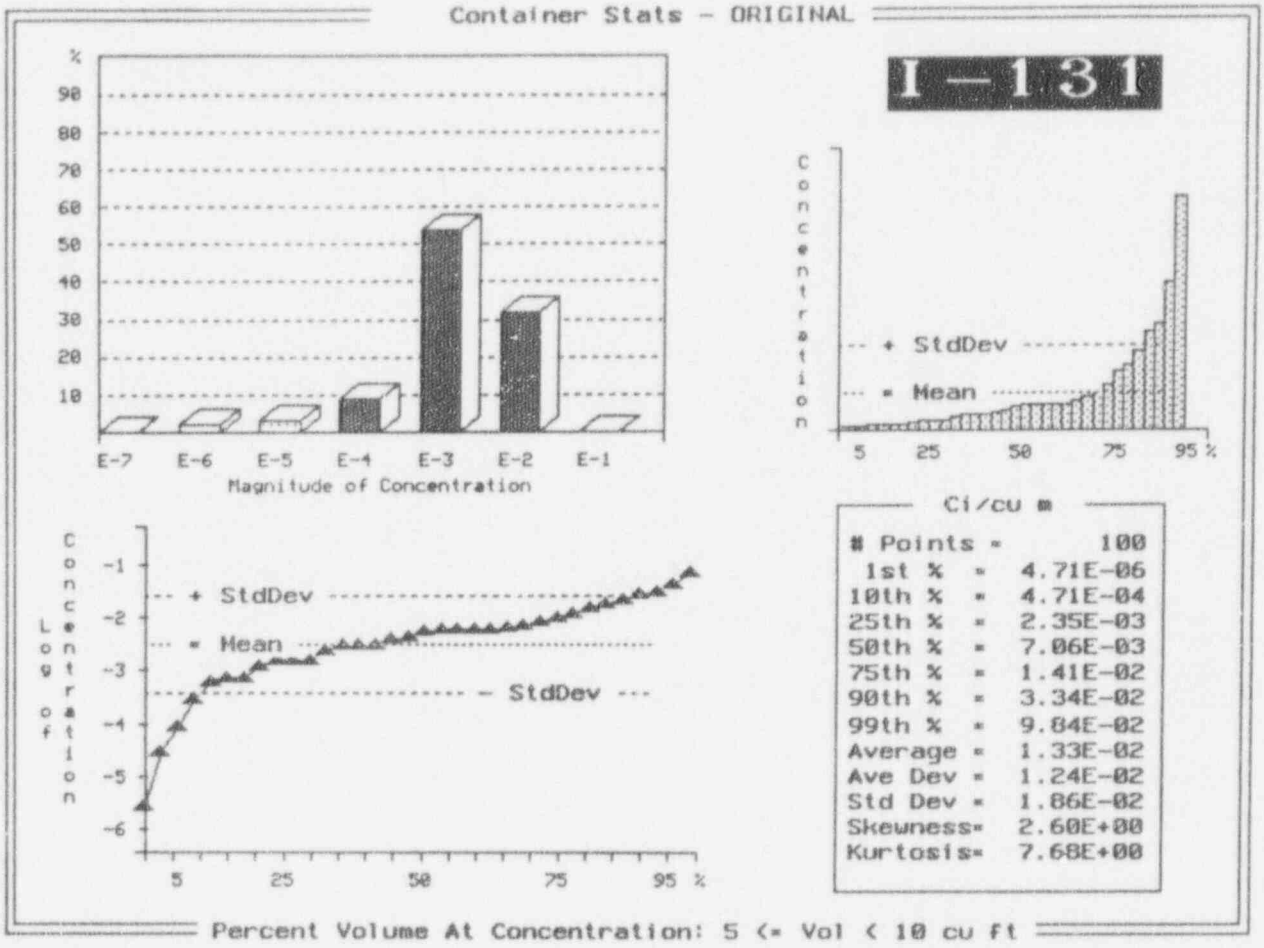

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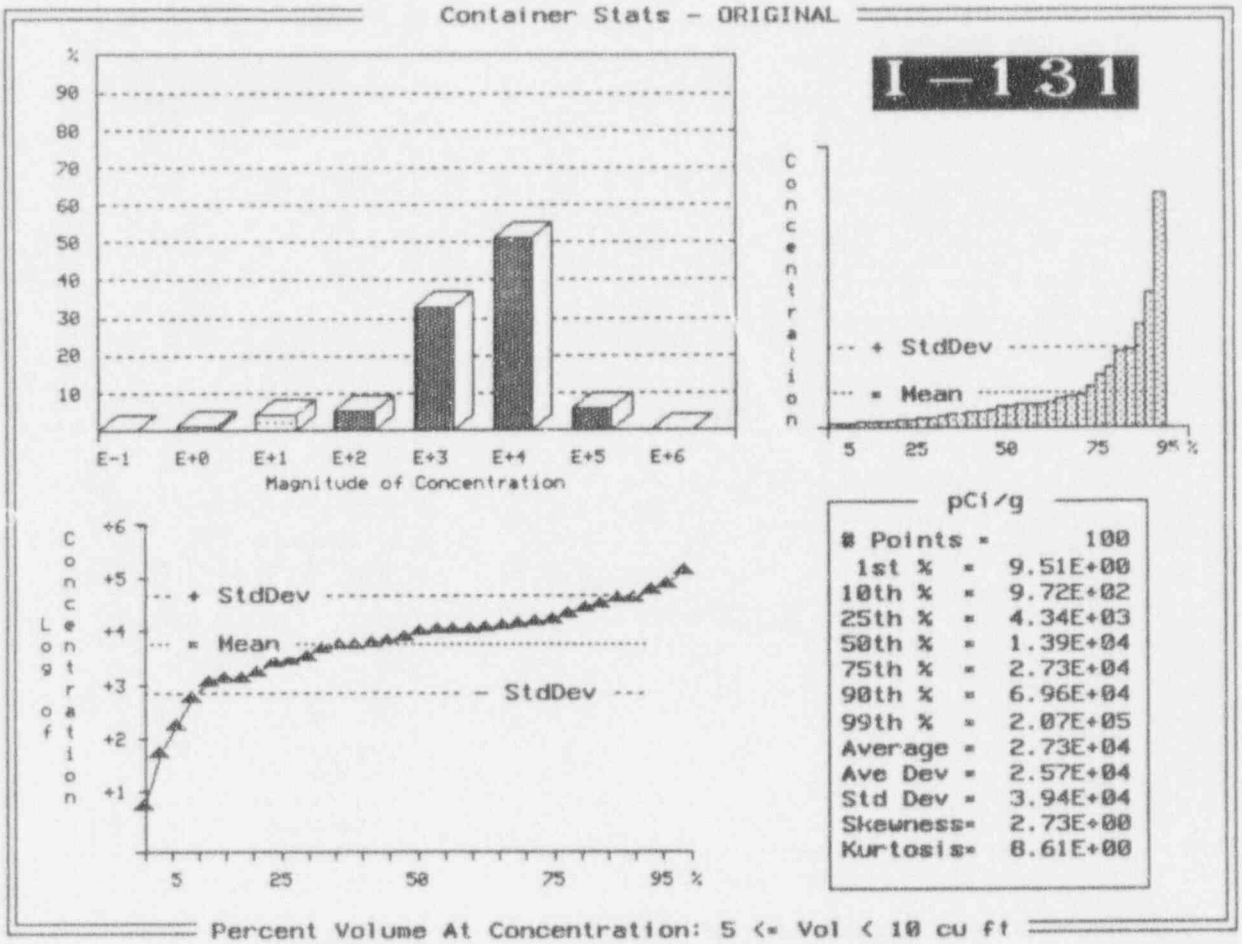

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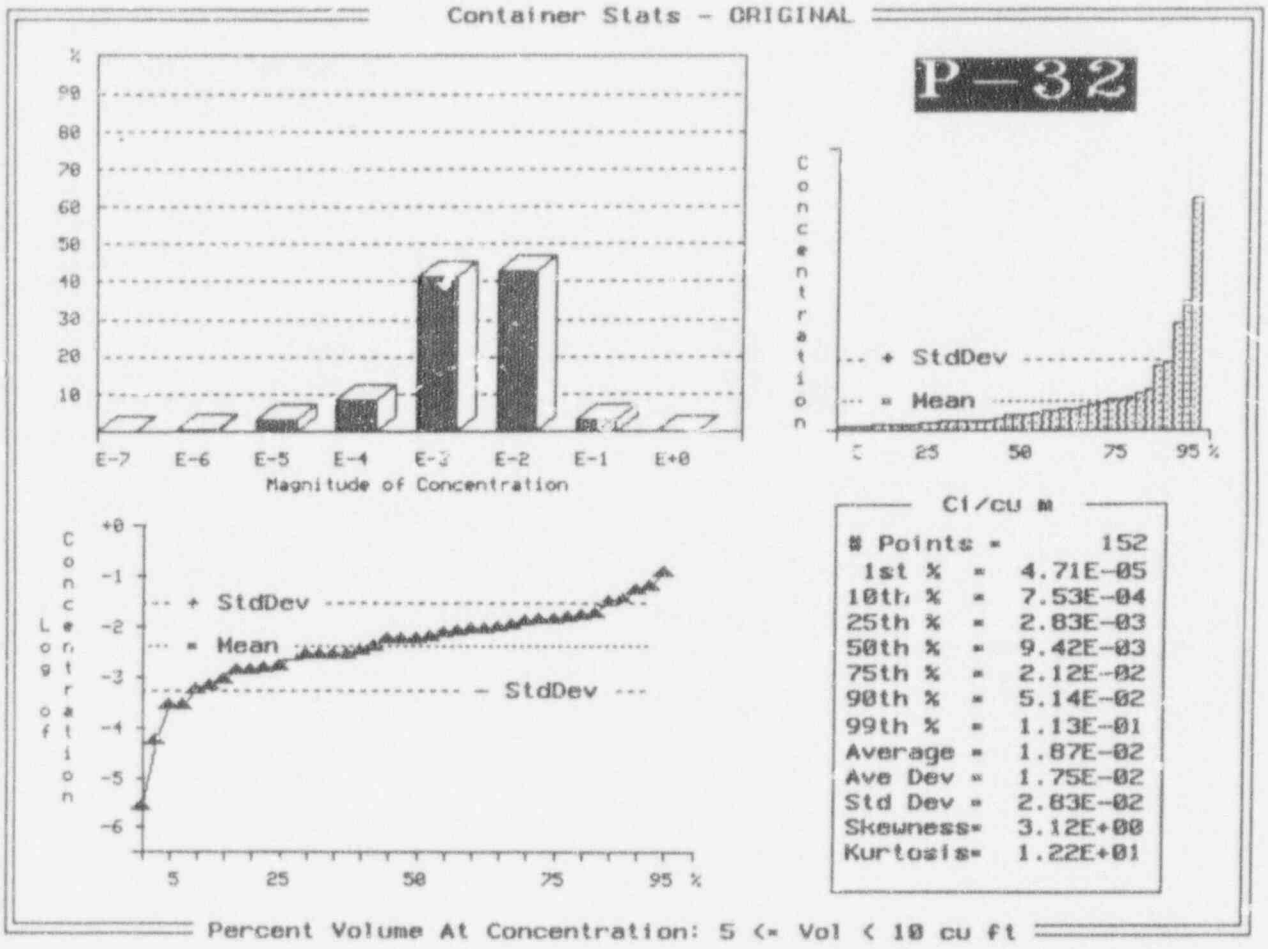

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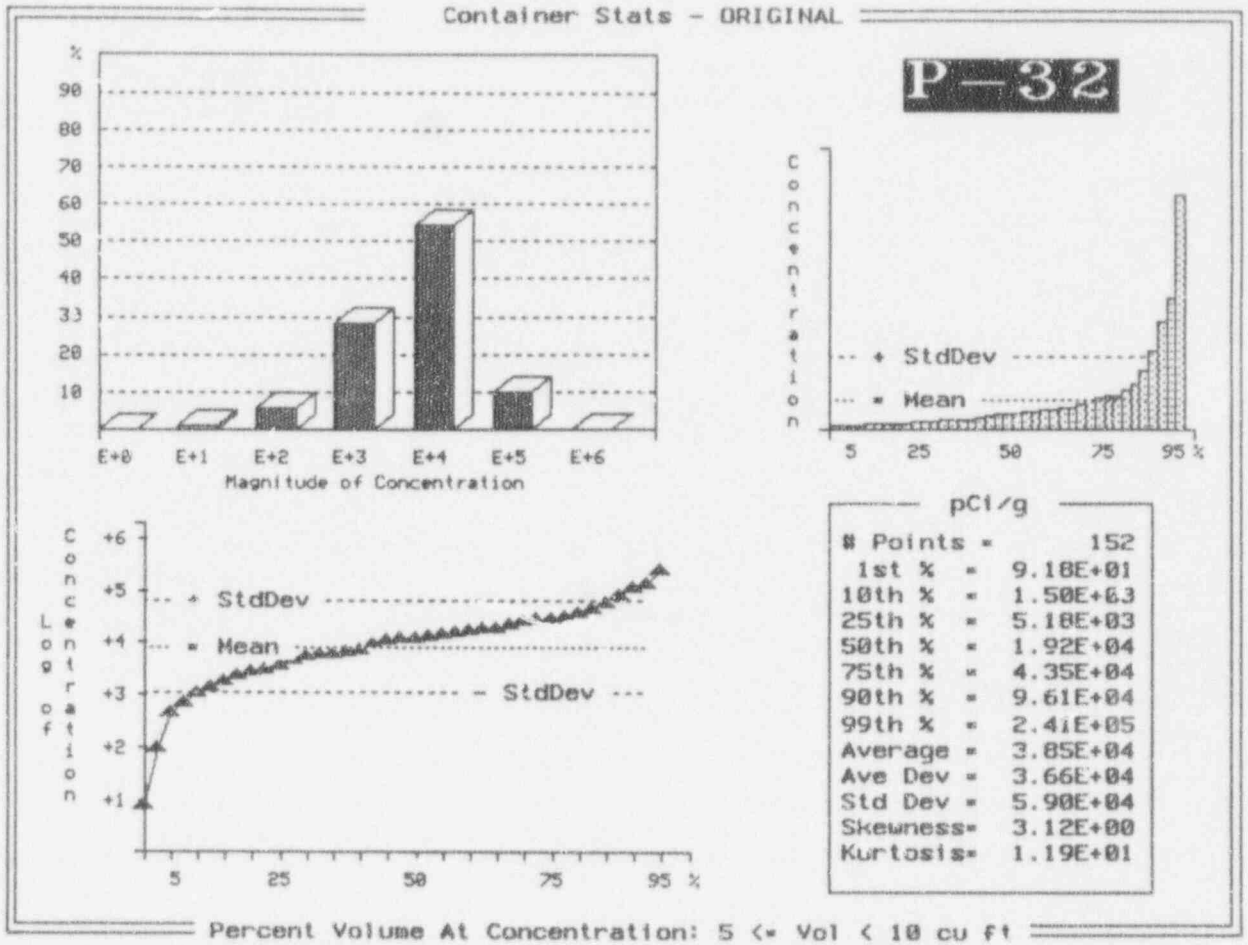

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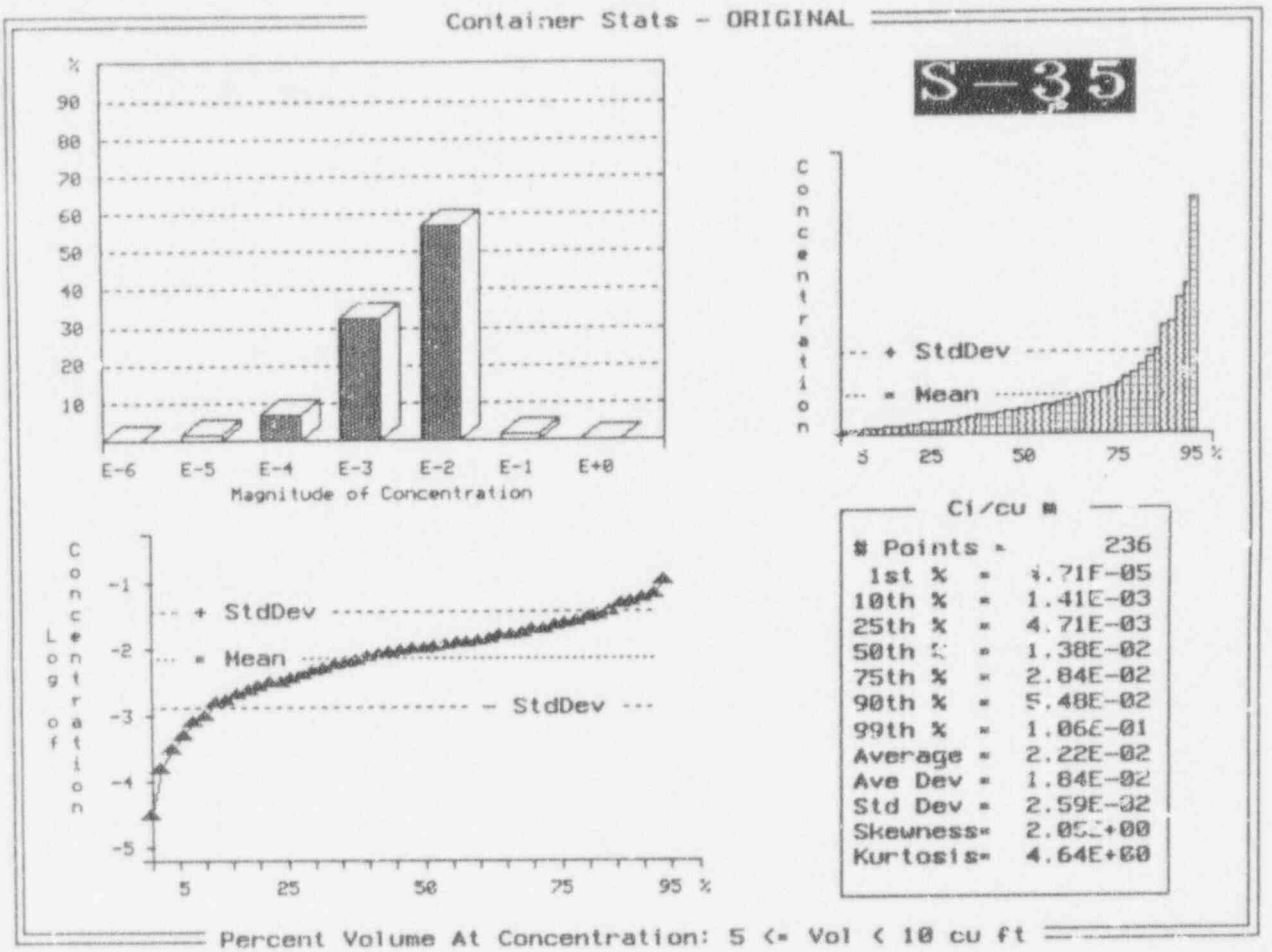

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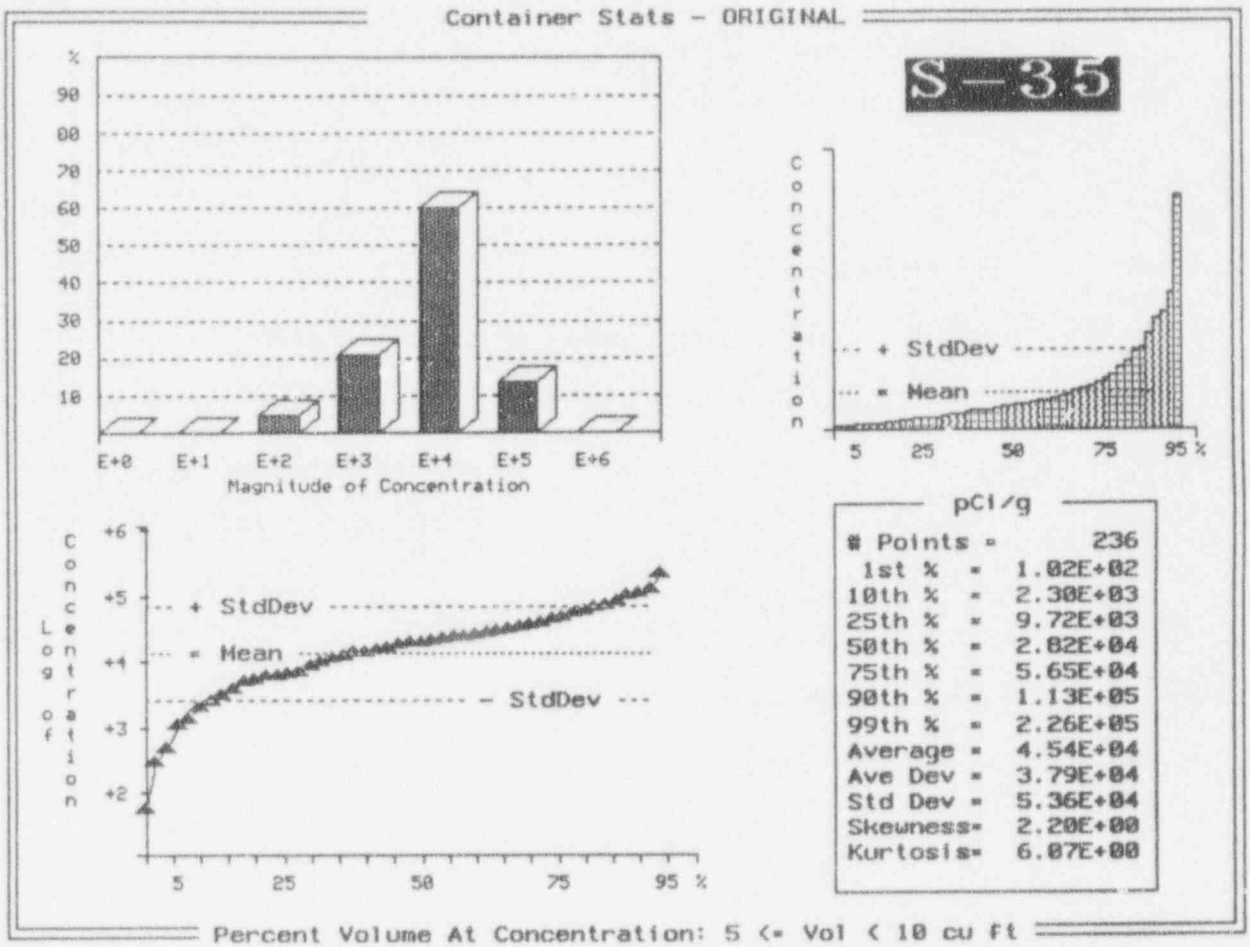
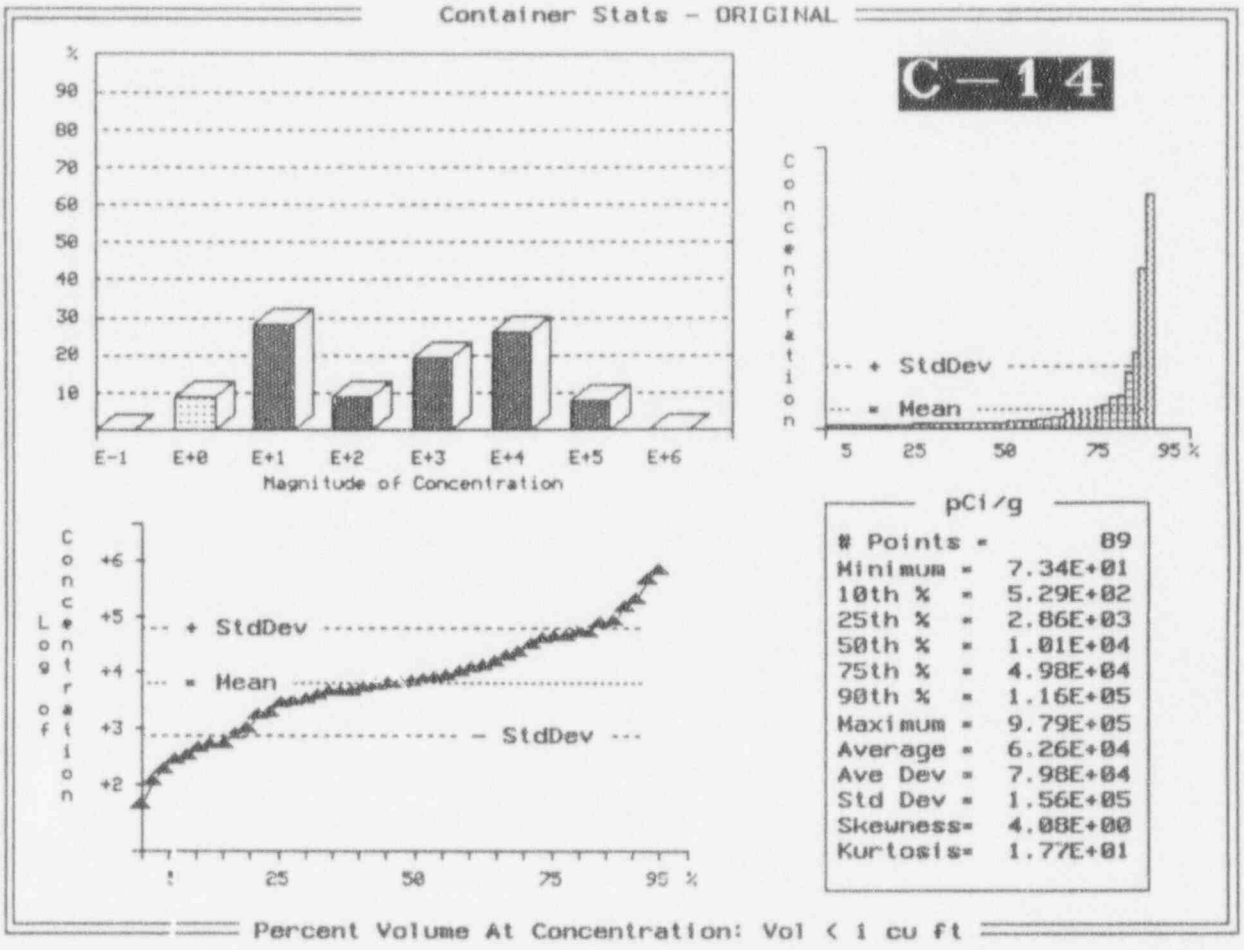


Exhibit D-5
Data Summary - Analyses at the Container Level
(Aggregate Practices for non-brokered waste: 1988 to 1990)
(Beatty and Richland Disposal Sites only)

	Data or Parameters
Waste generator class:	Academic
Compact or unaffiliated state:	all
Total associated waste volume (m^3):	7,290
Total associate waste activity (Ci):	5,300
Waste form:	Absorbed aqueous liquid
Waste class:	A-Unstable and A-Stable
Total number of shipping records:	9
Number of waste containers:	1,154
Weight of shipments (kg):	16,260
Total waste volume (m^3):	20.3
Fractional waste volume (%): (this analysis/total)	0.28
Total waste activity (Ci):	5.0
Fractional waste activity (%): (this analysis/total)	0.09

Exhibit D-5 (Continued)



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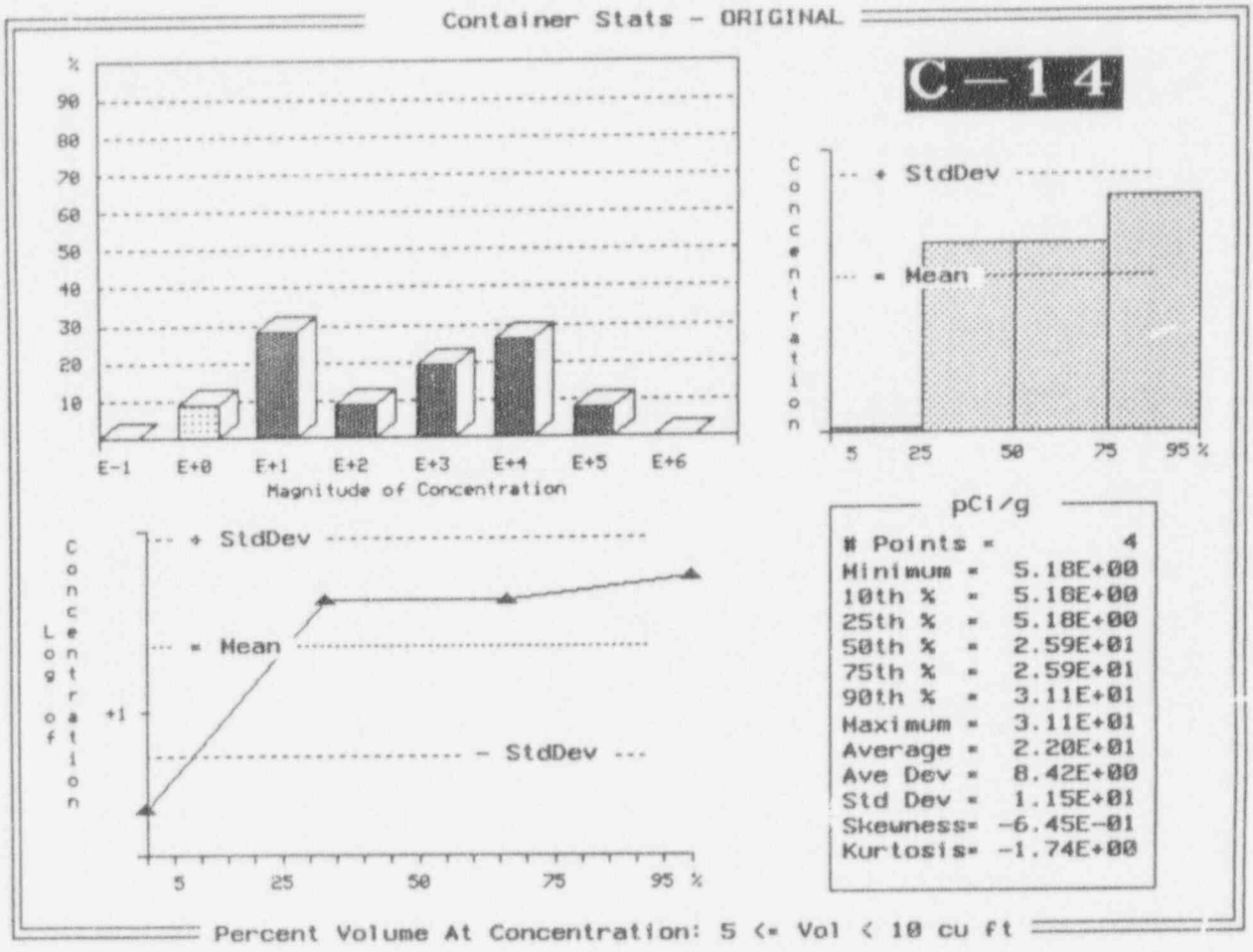

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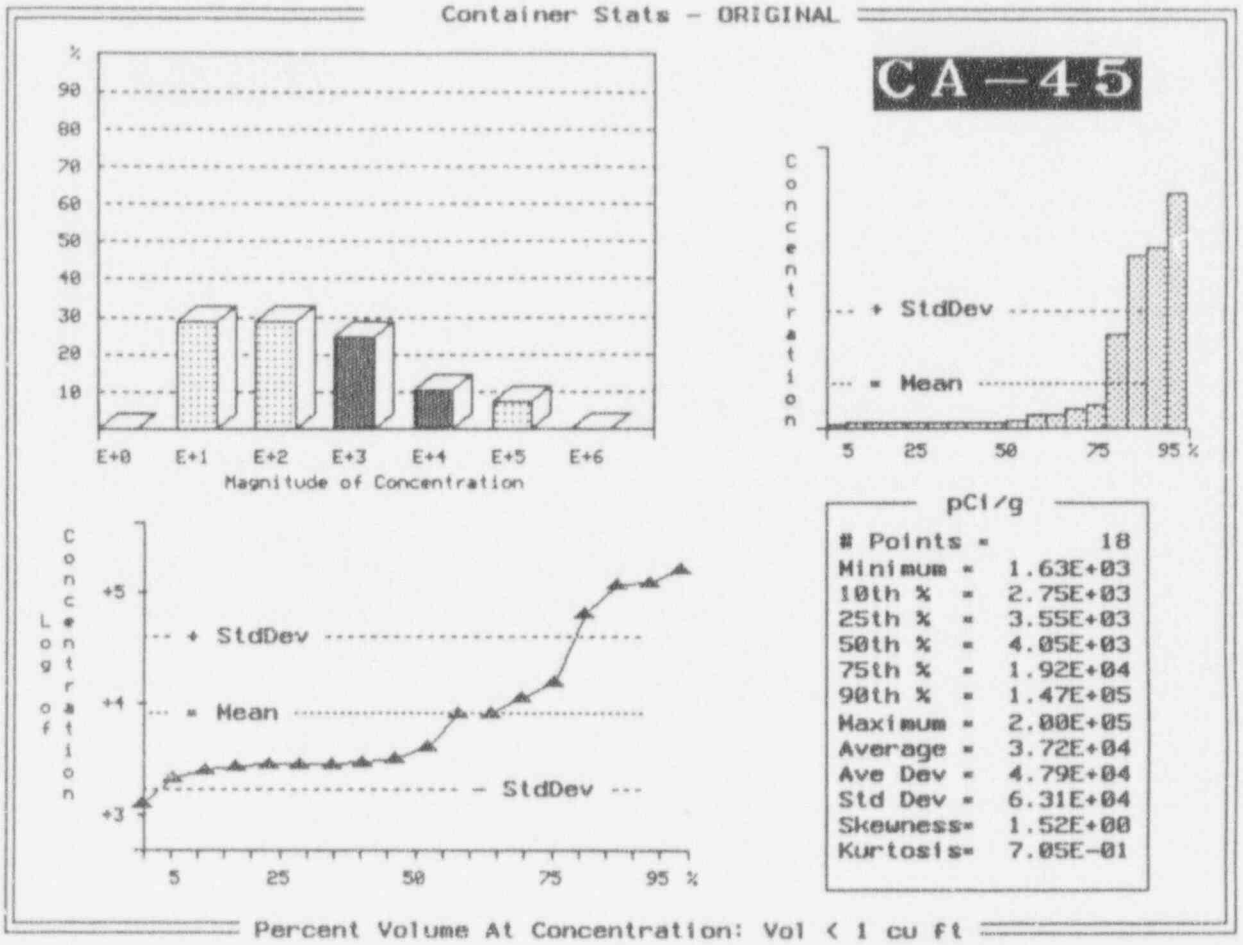

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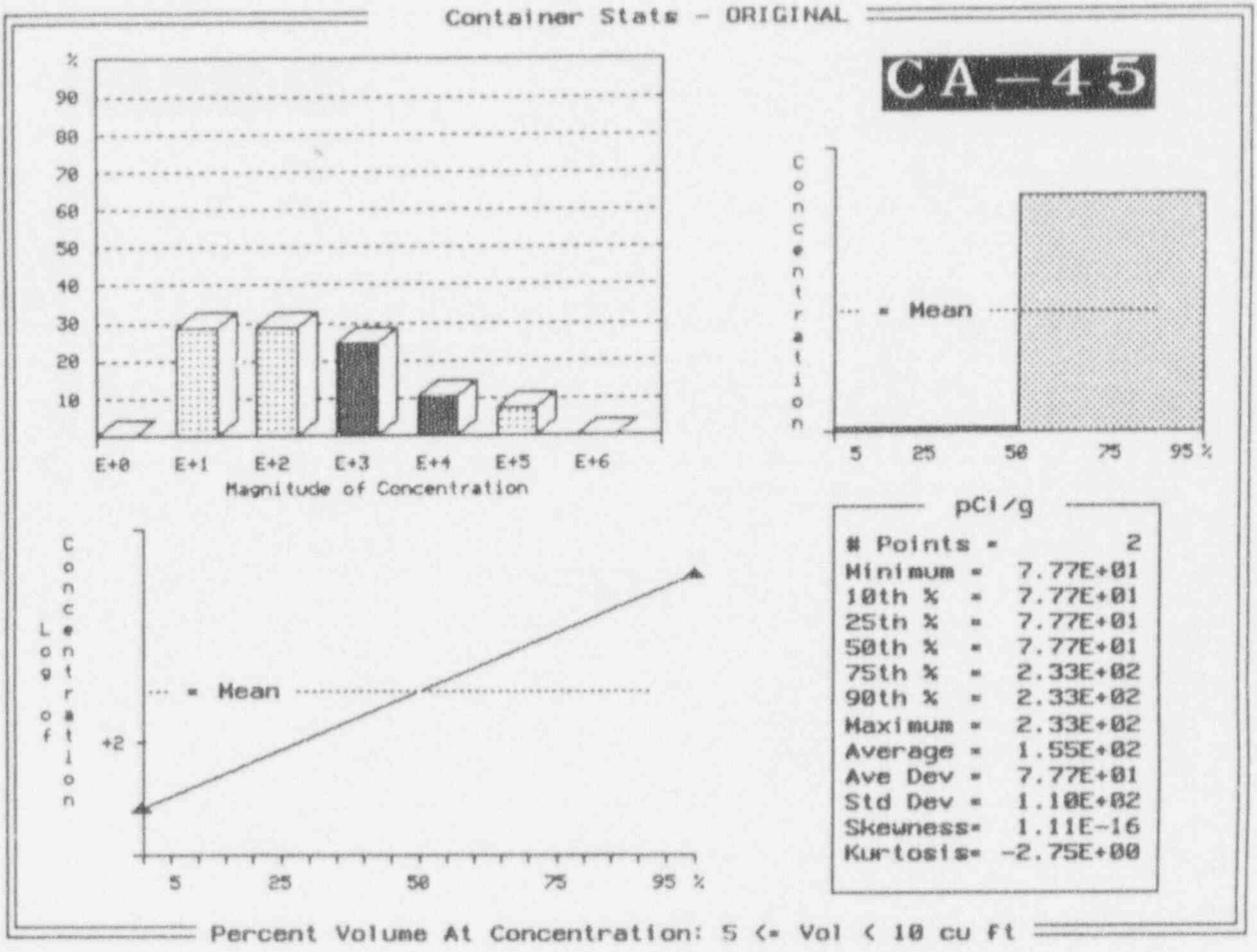

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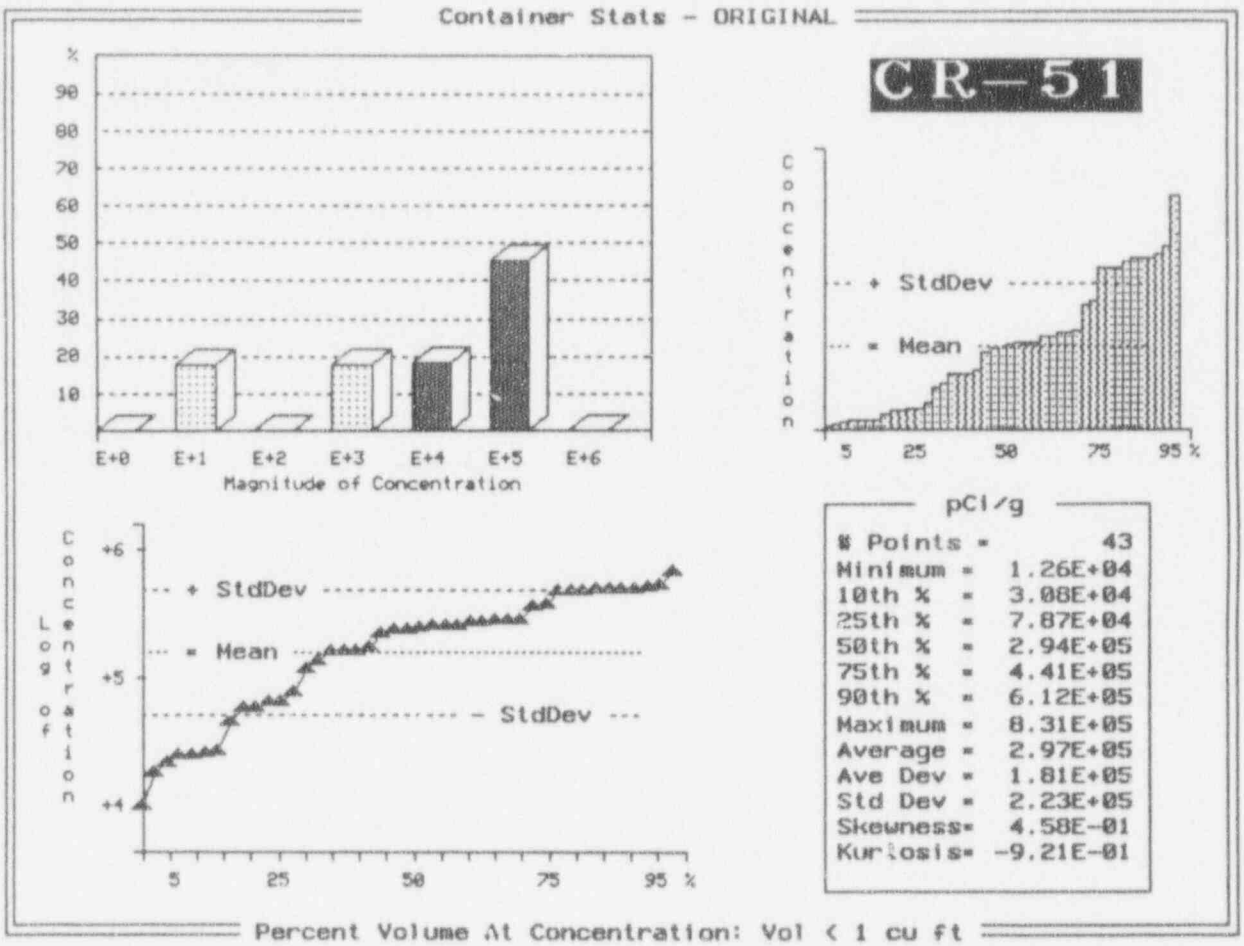

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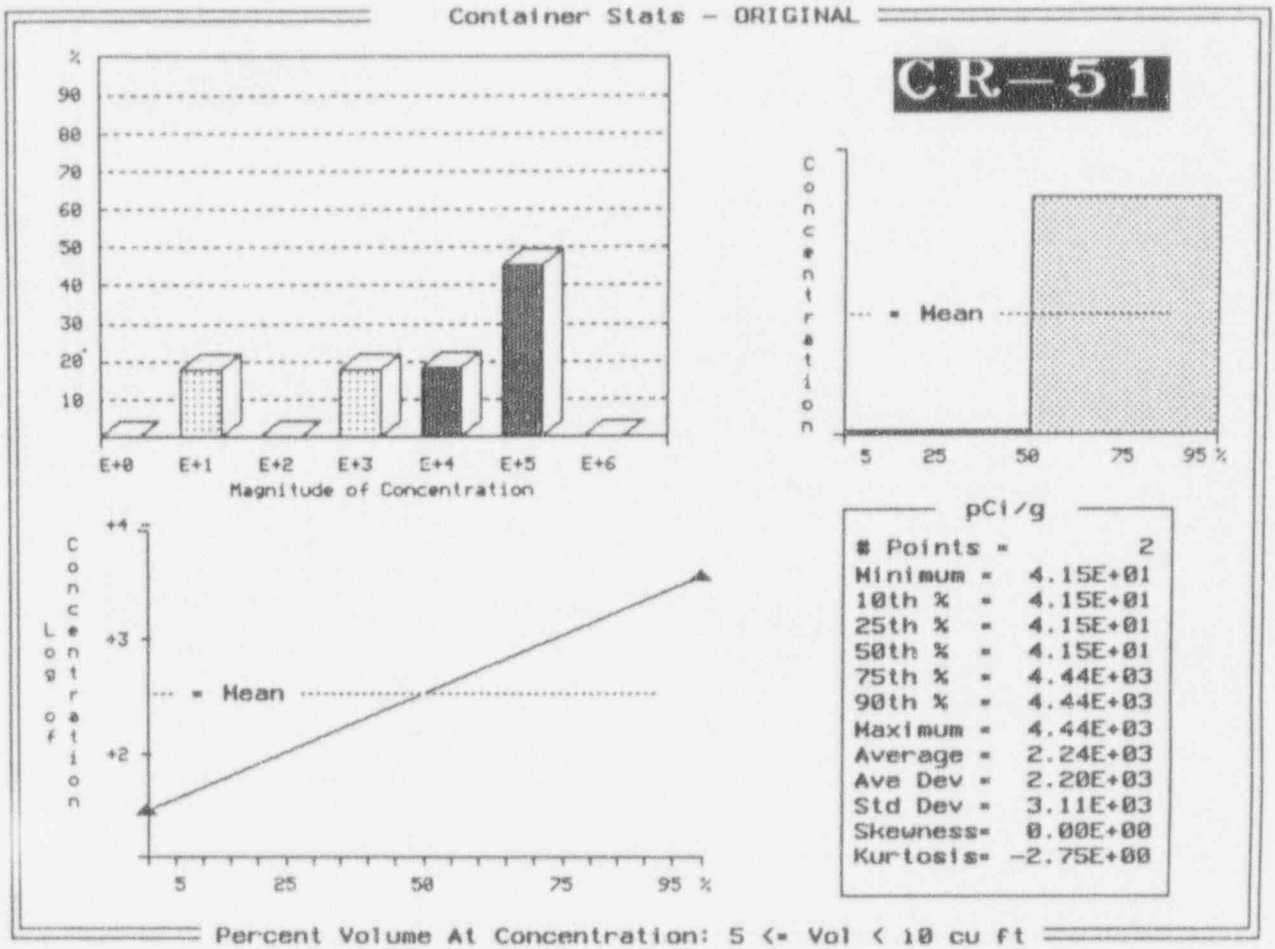

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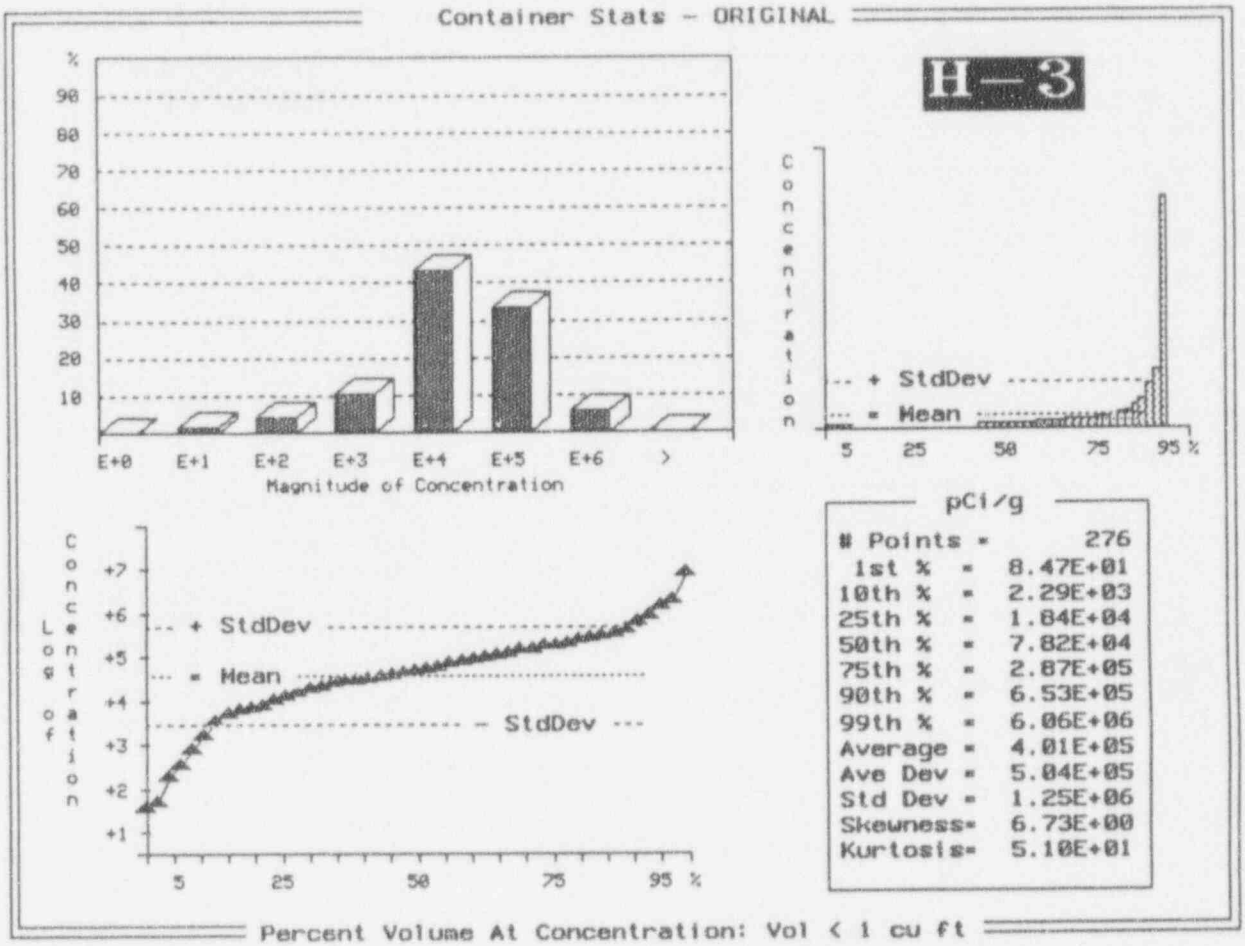

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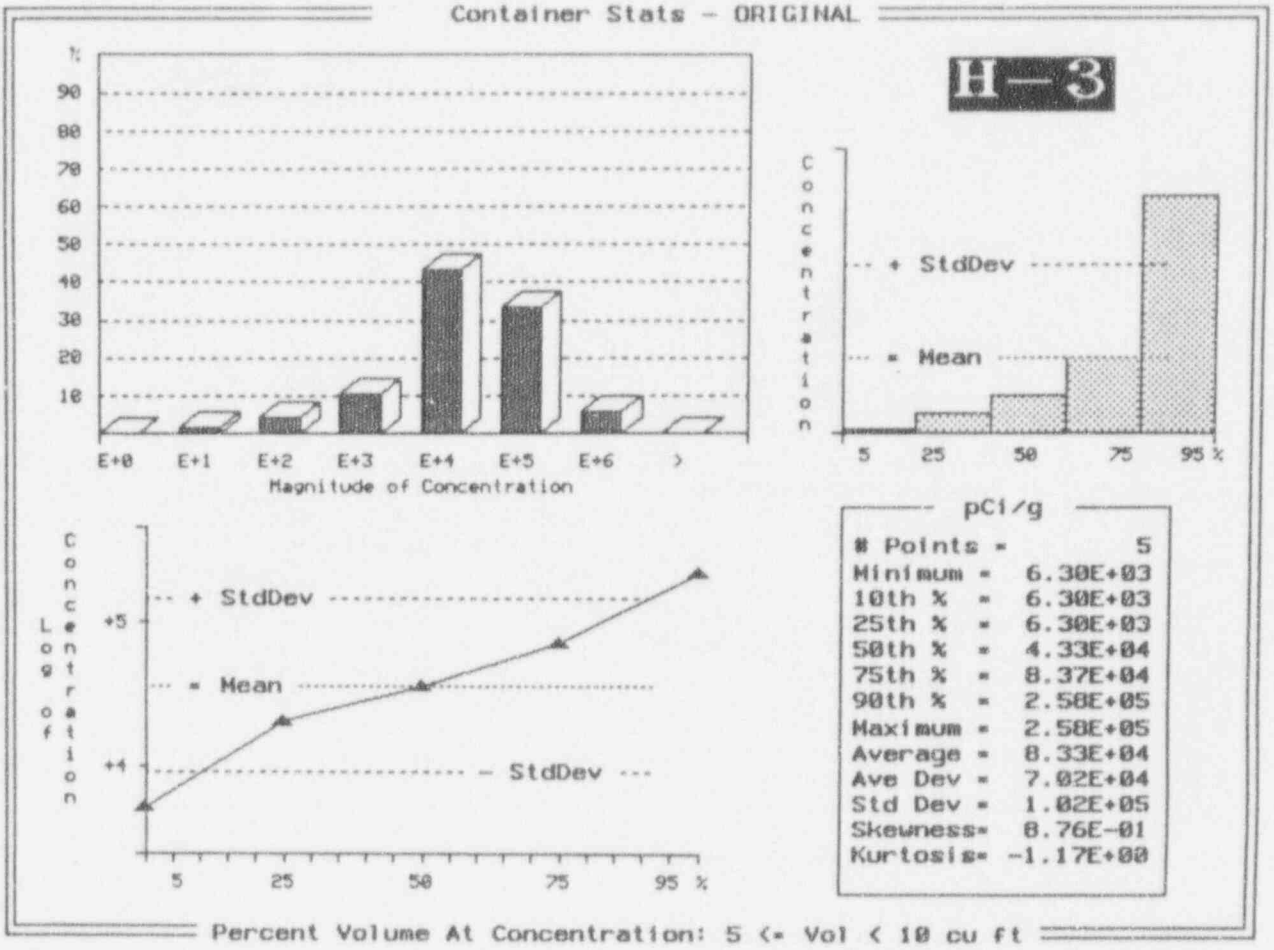

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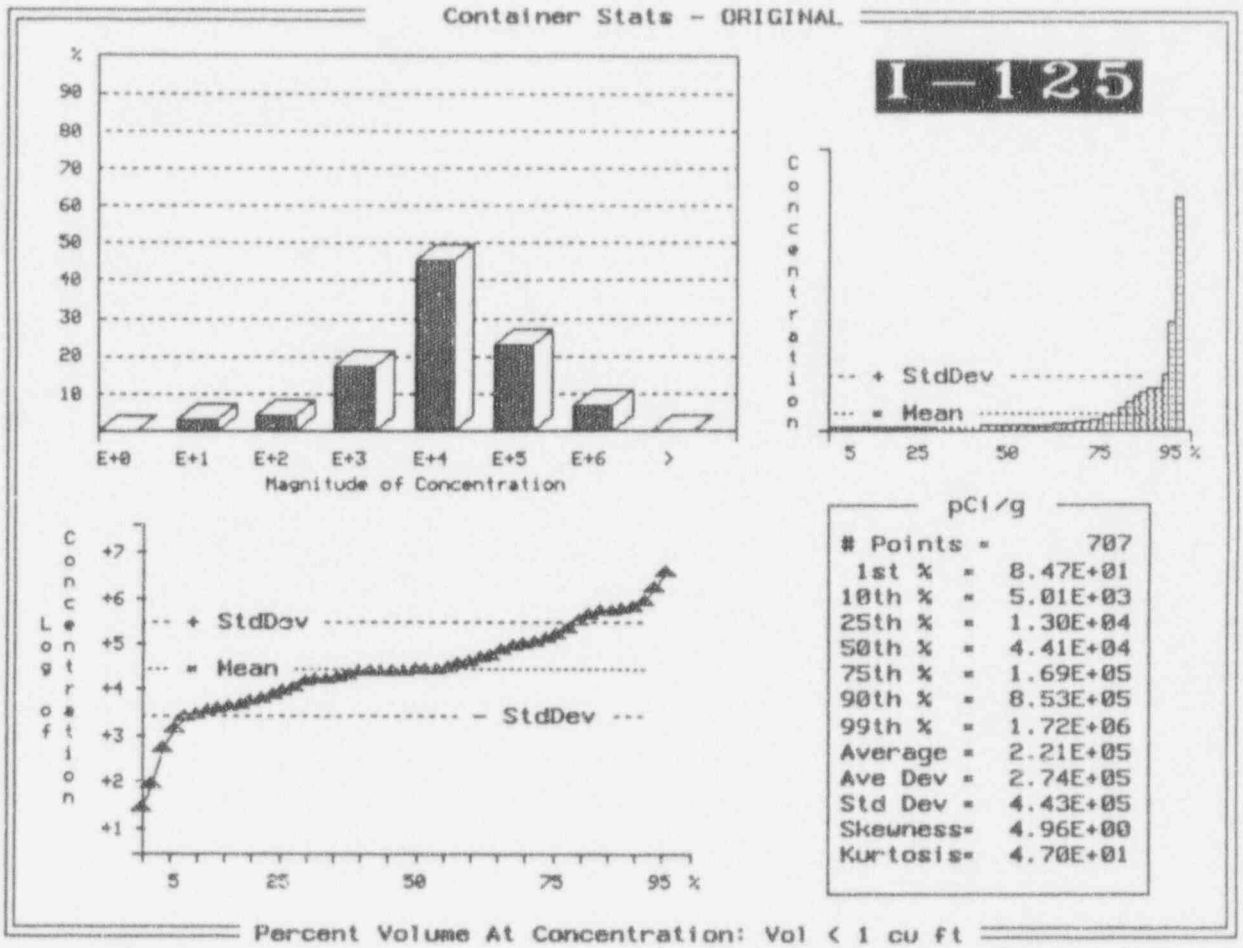

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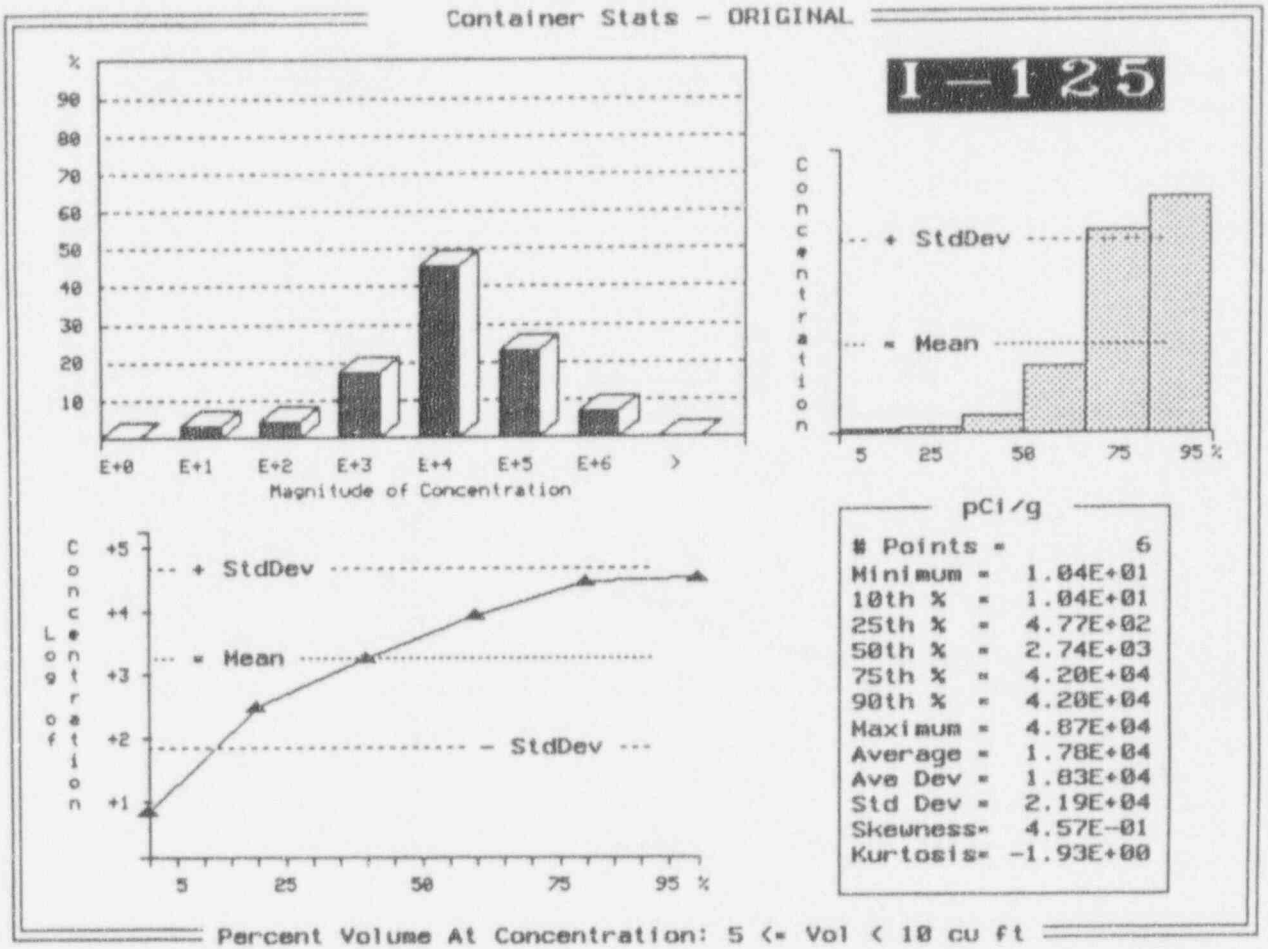

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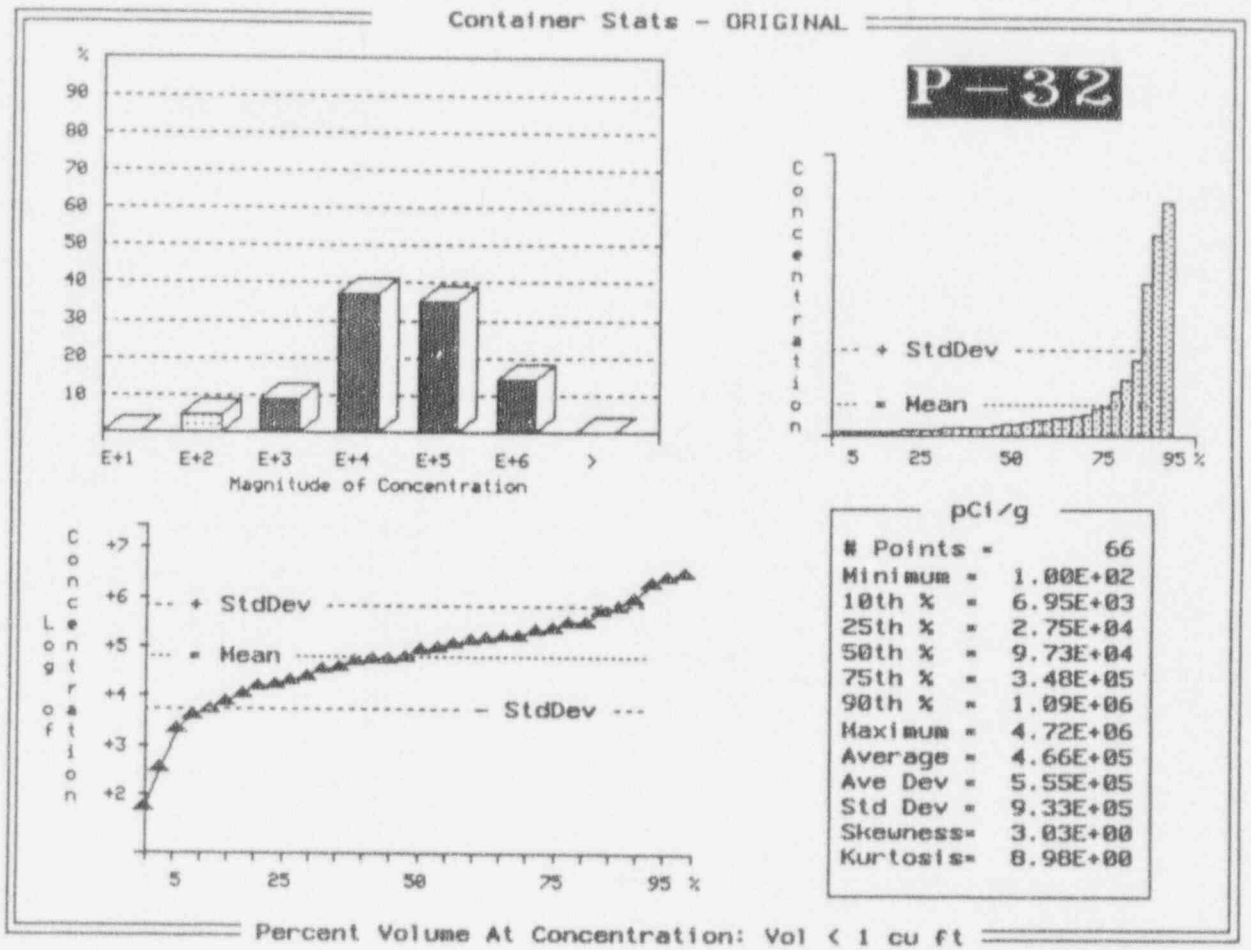

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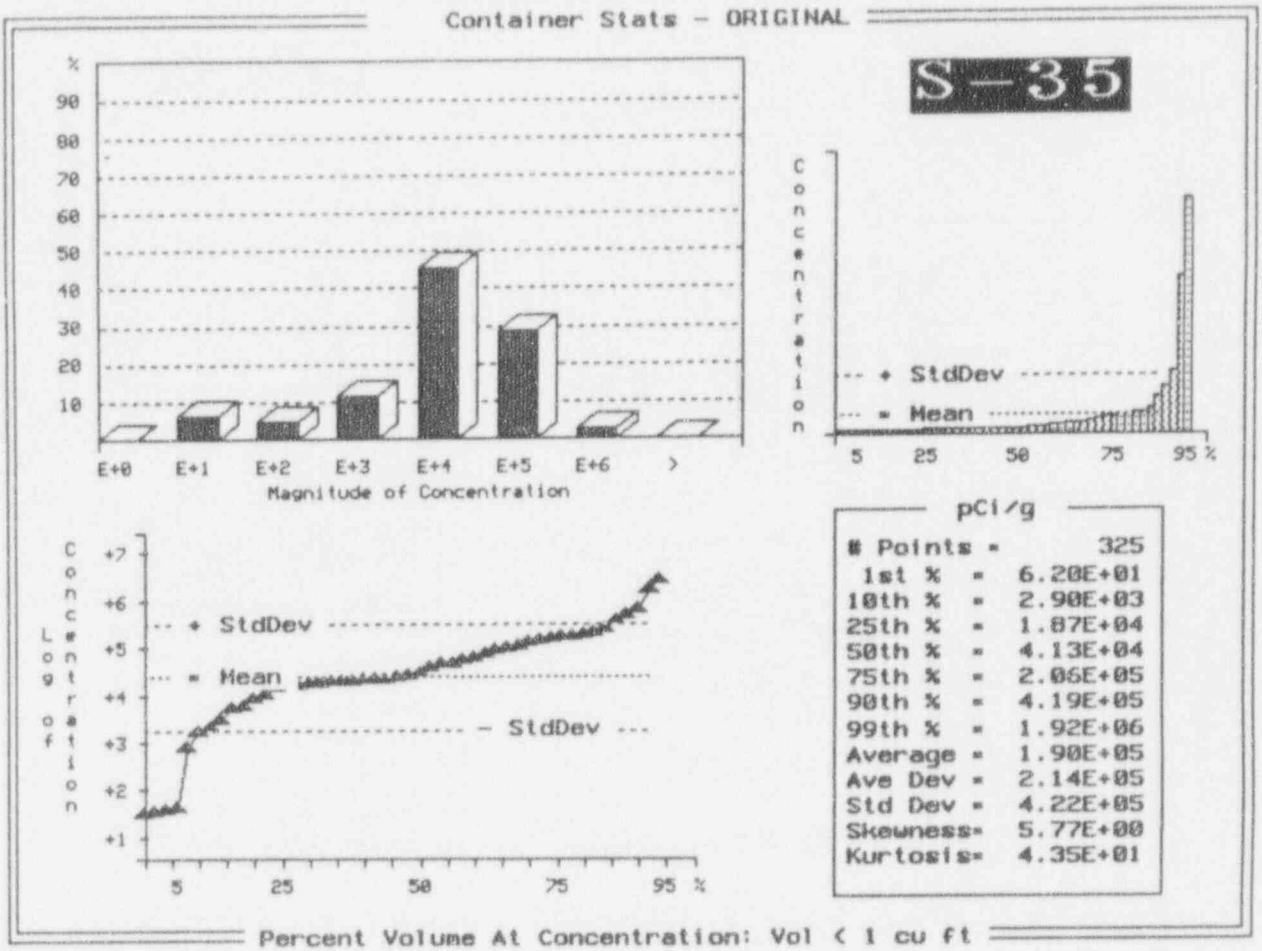

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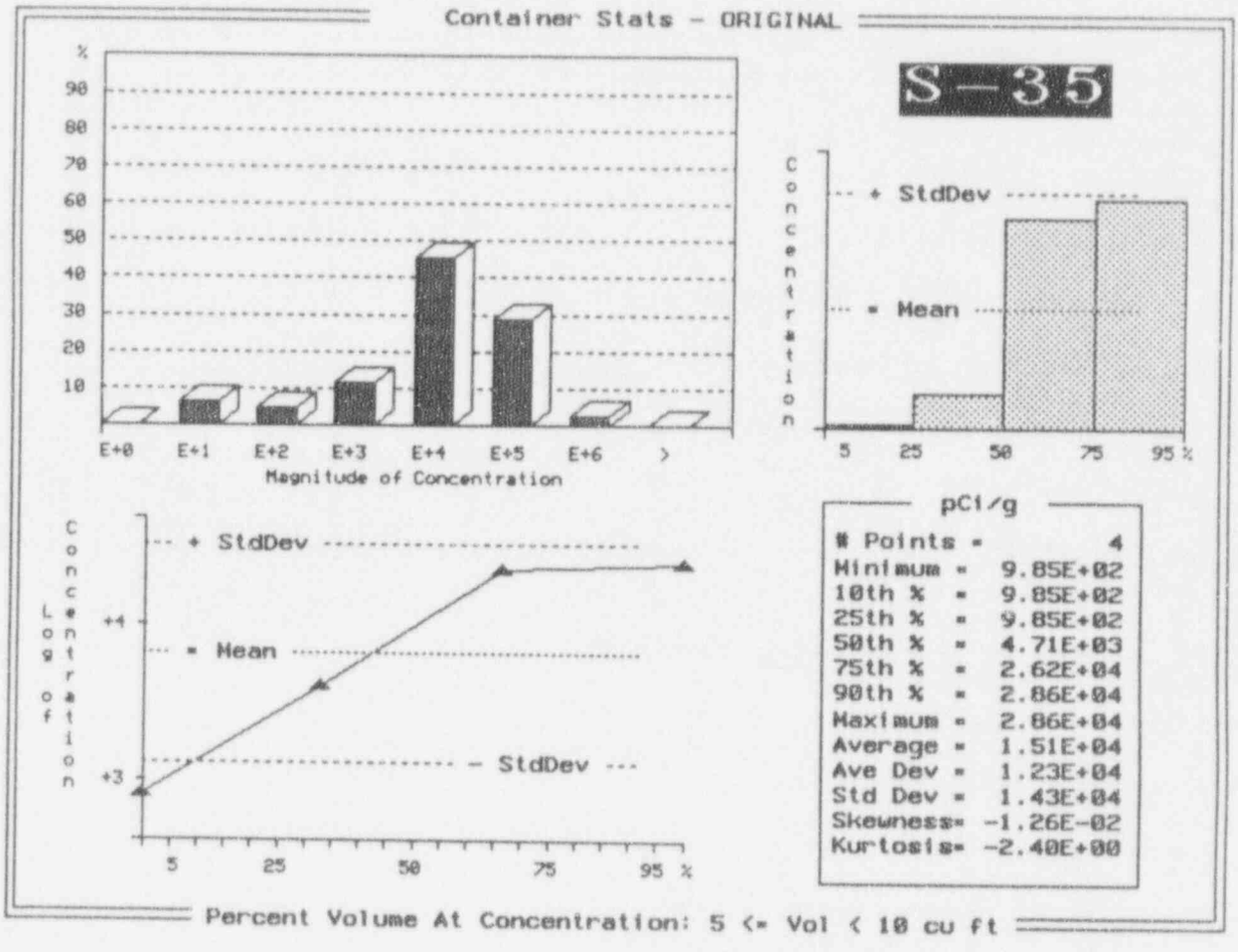
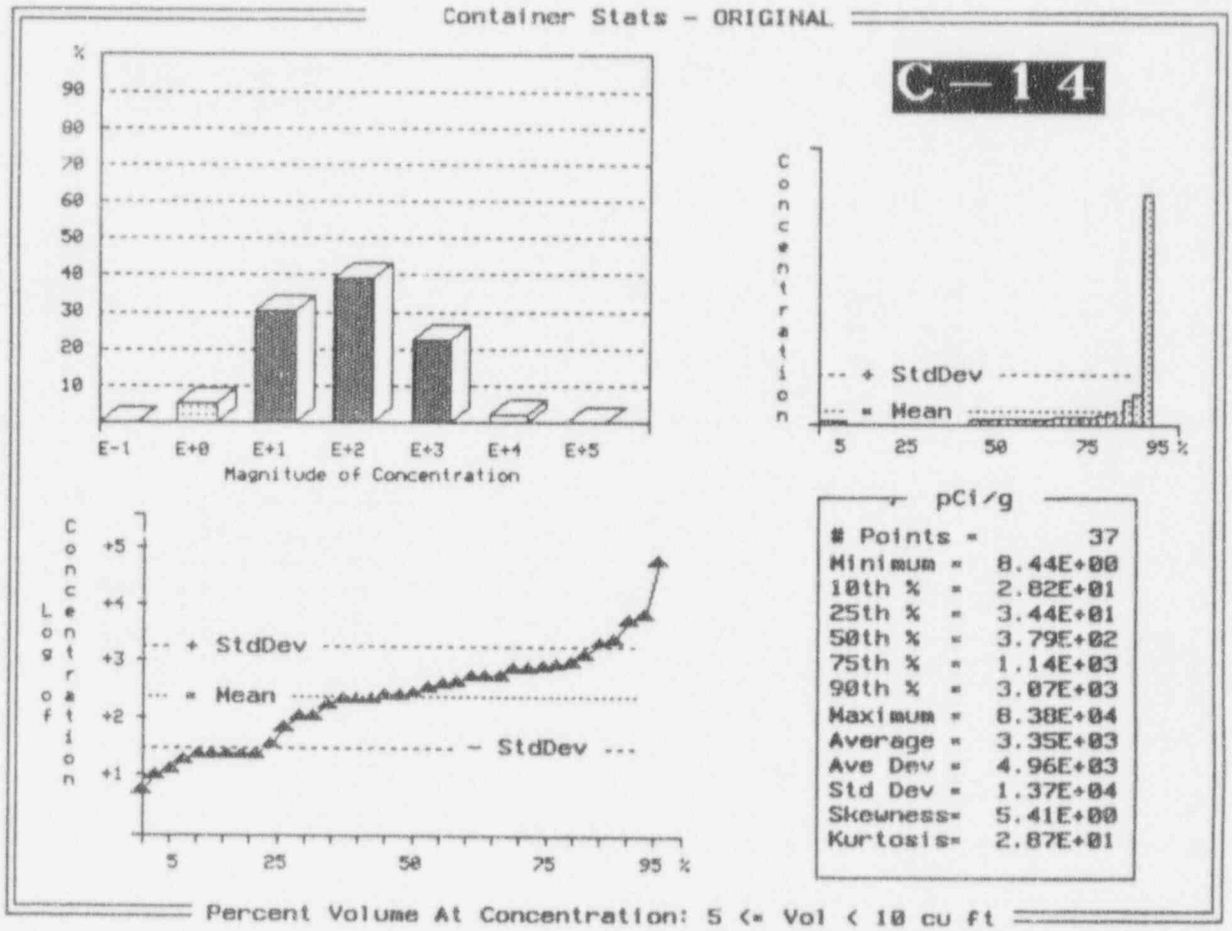


Exhibit D-6
Data Summary - Analyses at the Container Level
(Aggregate Practices for non-brokered waste: 1988 to 1990)
(Beatty and Richland Disposal Sites only)

	Data or Parameters
Waste generator class:	Academic
Compact or unaffiliated state:	all
Total associated waste volume (m^3):	7,290
Total associate waste activity (Ci):	5,300
Waste form:	Solidified liquid
Waste class:	A-Unstable and A-Stable
Total number of shipping records:	3
Number of waste containers:	53
Weight of shipments (kg):	14,850
Total waste volume (m^3):	12
Fractional waste volume (%): (this analysis/total)	0.17
Total waste activity (Ci):	0.71
Fractional waste activity (%): (this analysis/total)	0.013

Exhibit D-6 (Continued)



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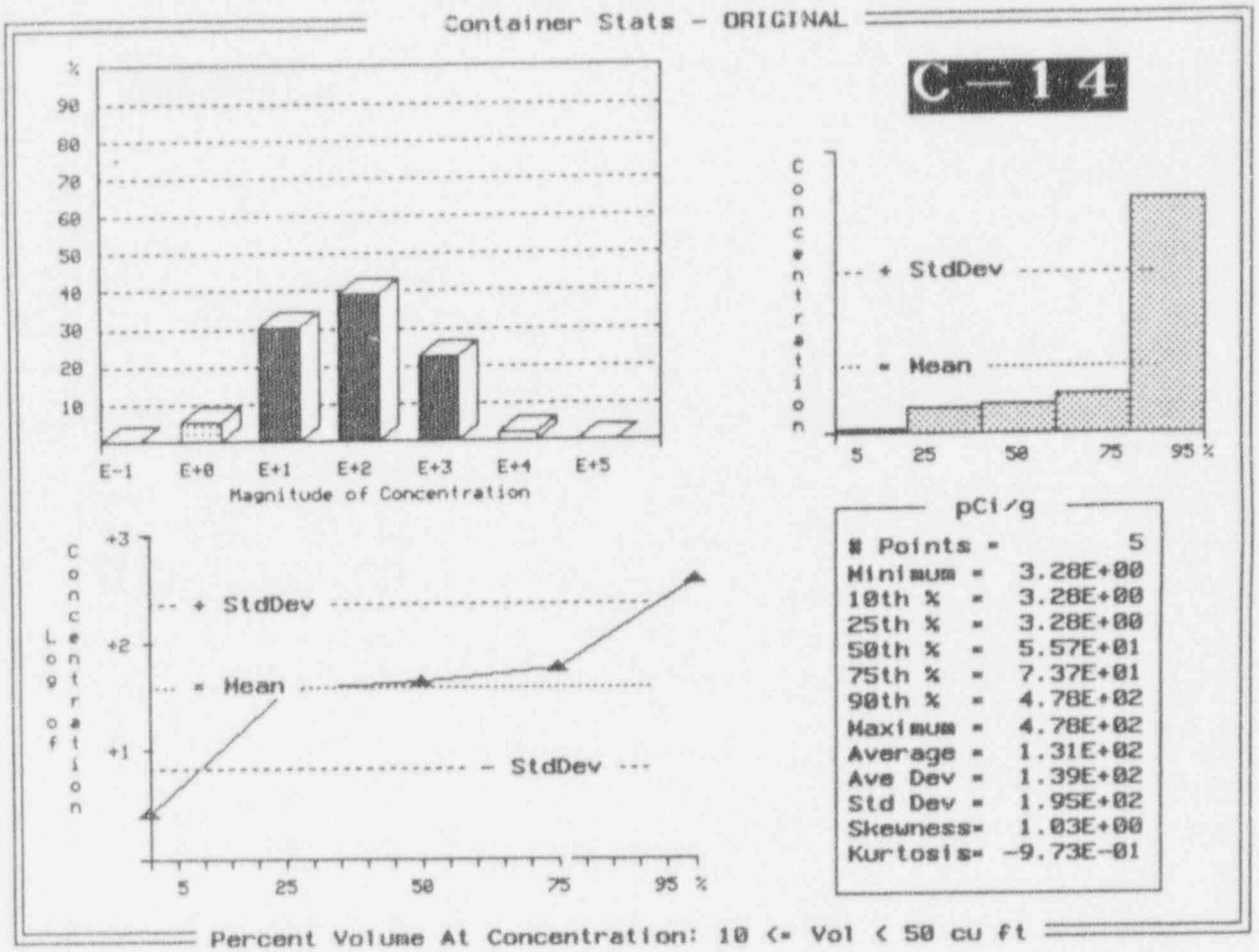

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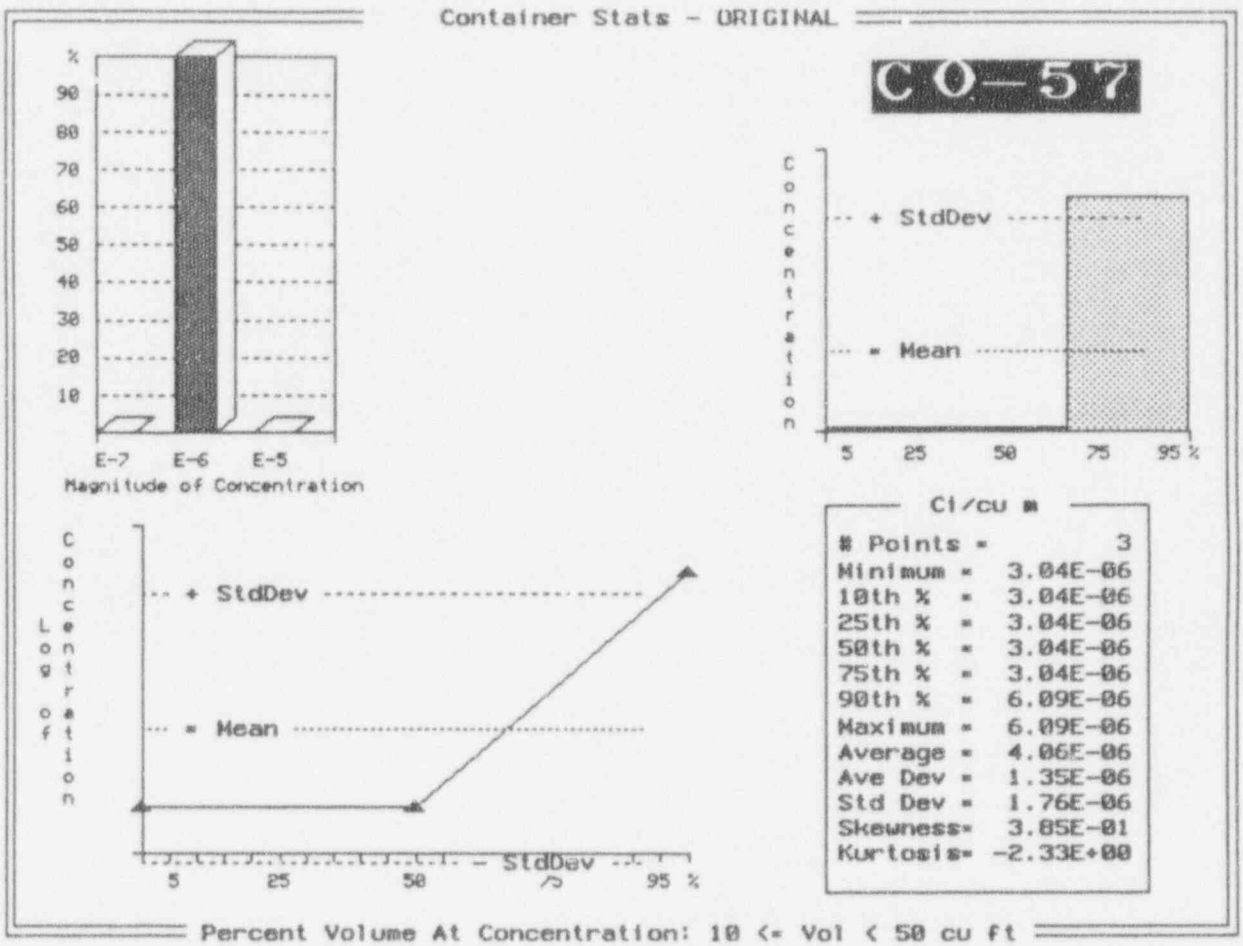

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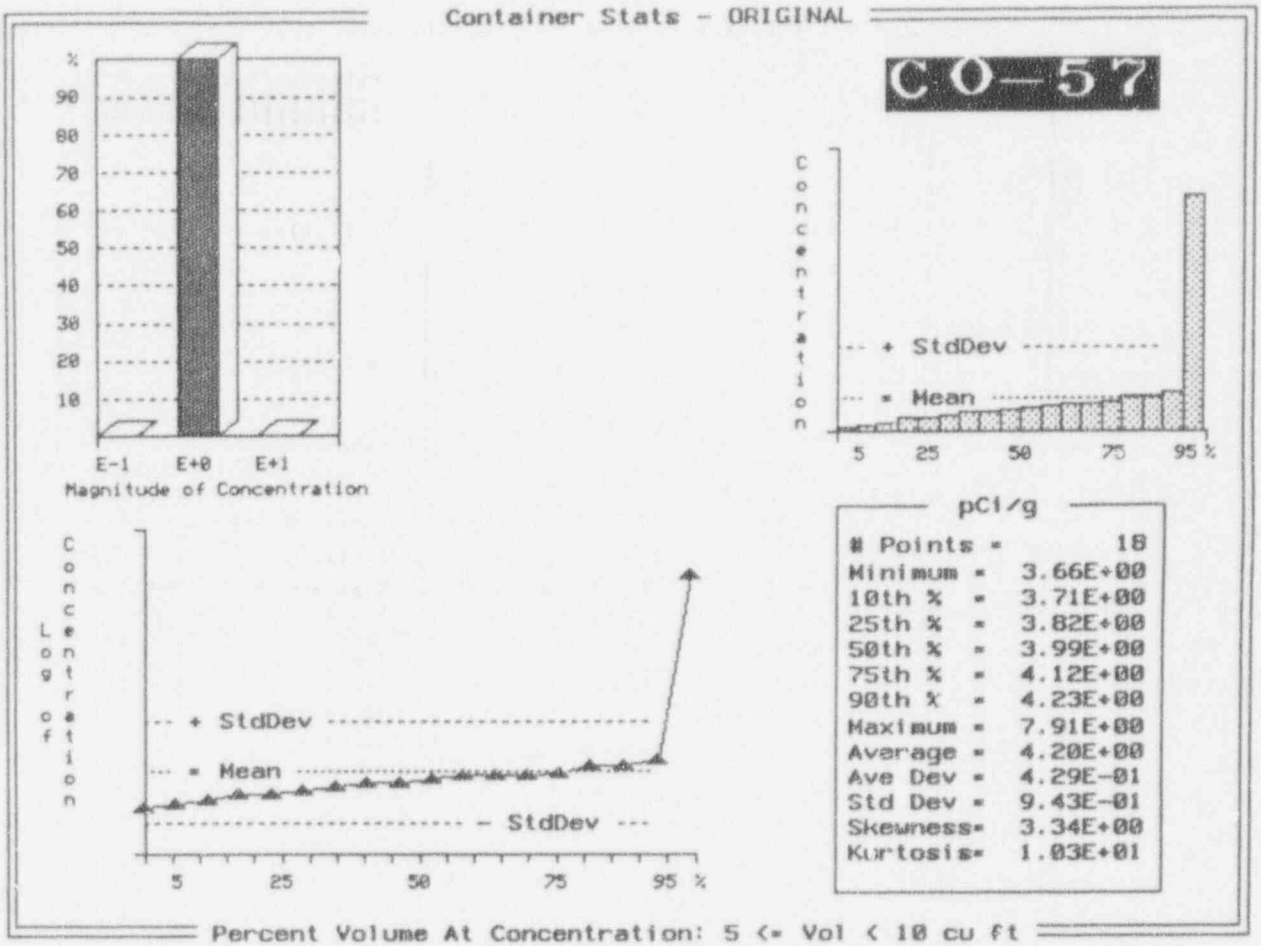

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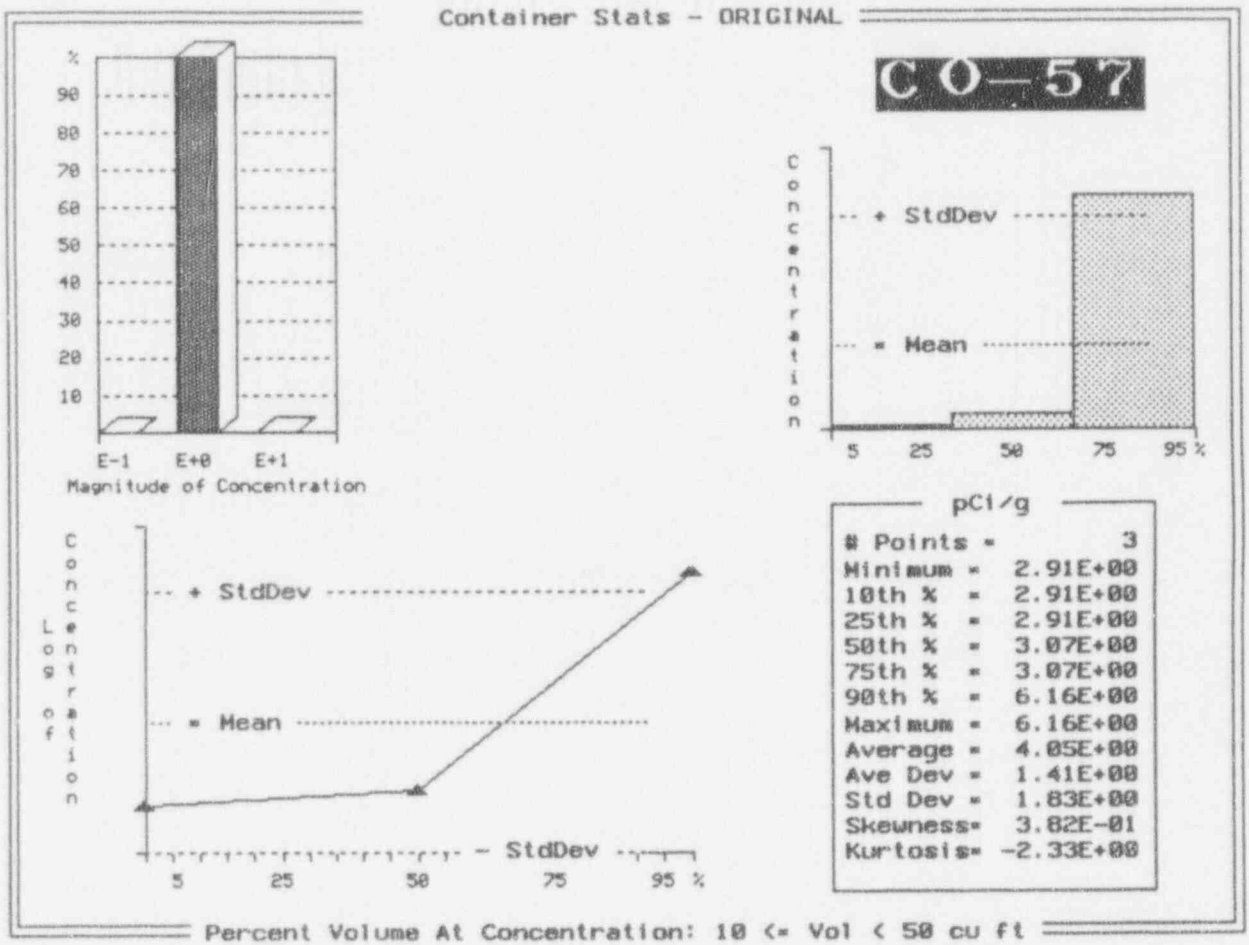

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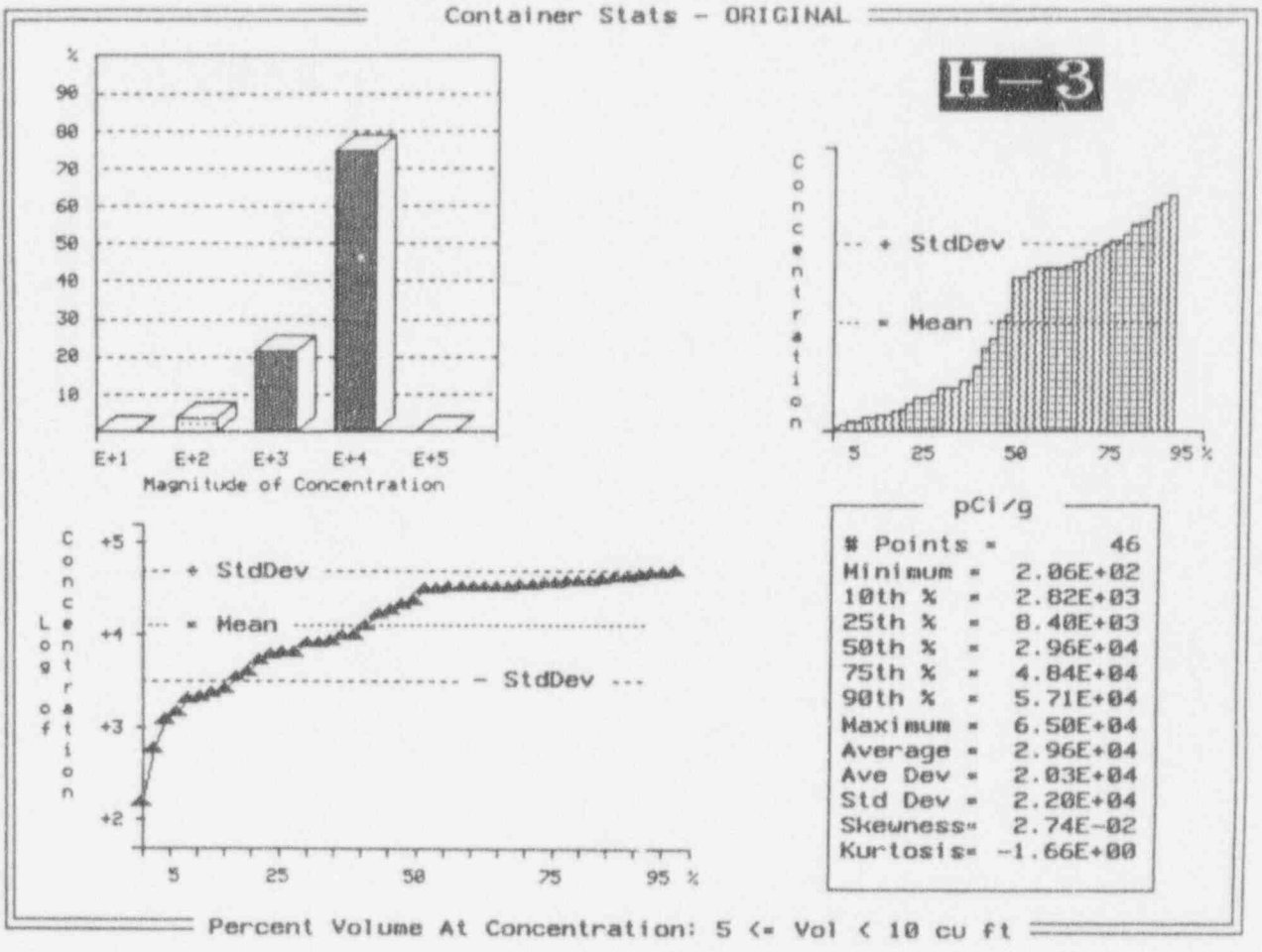

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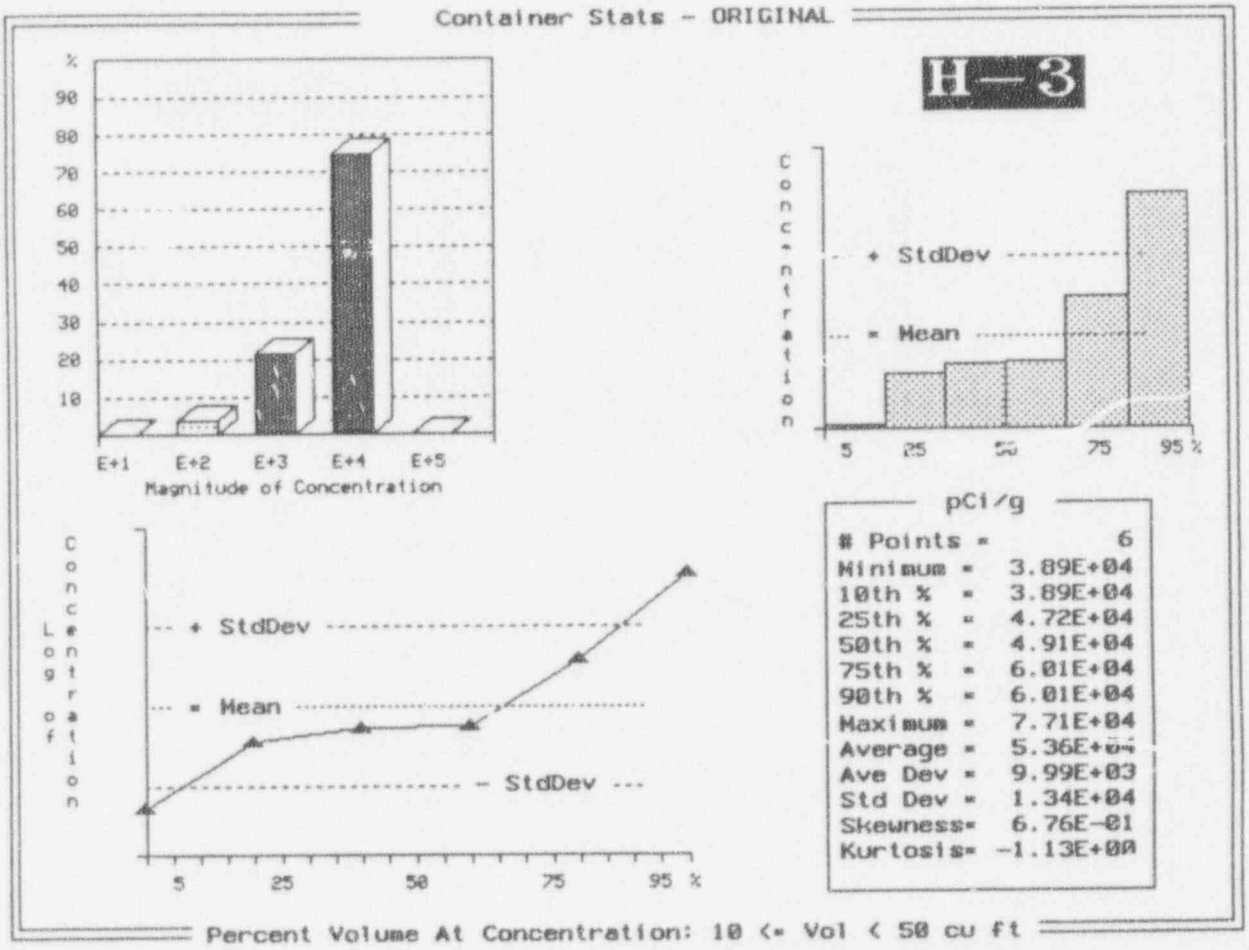

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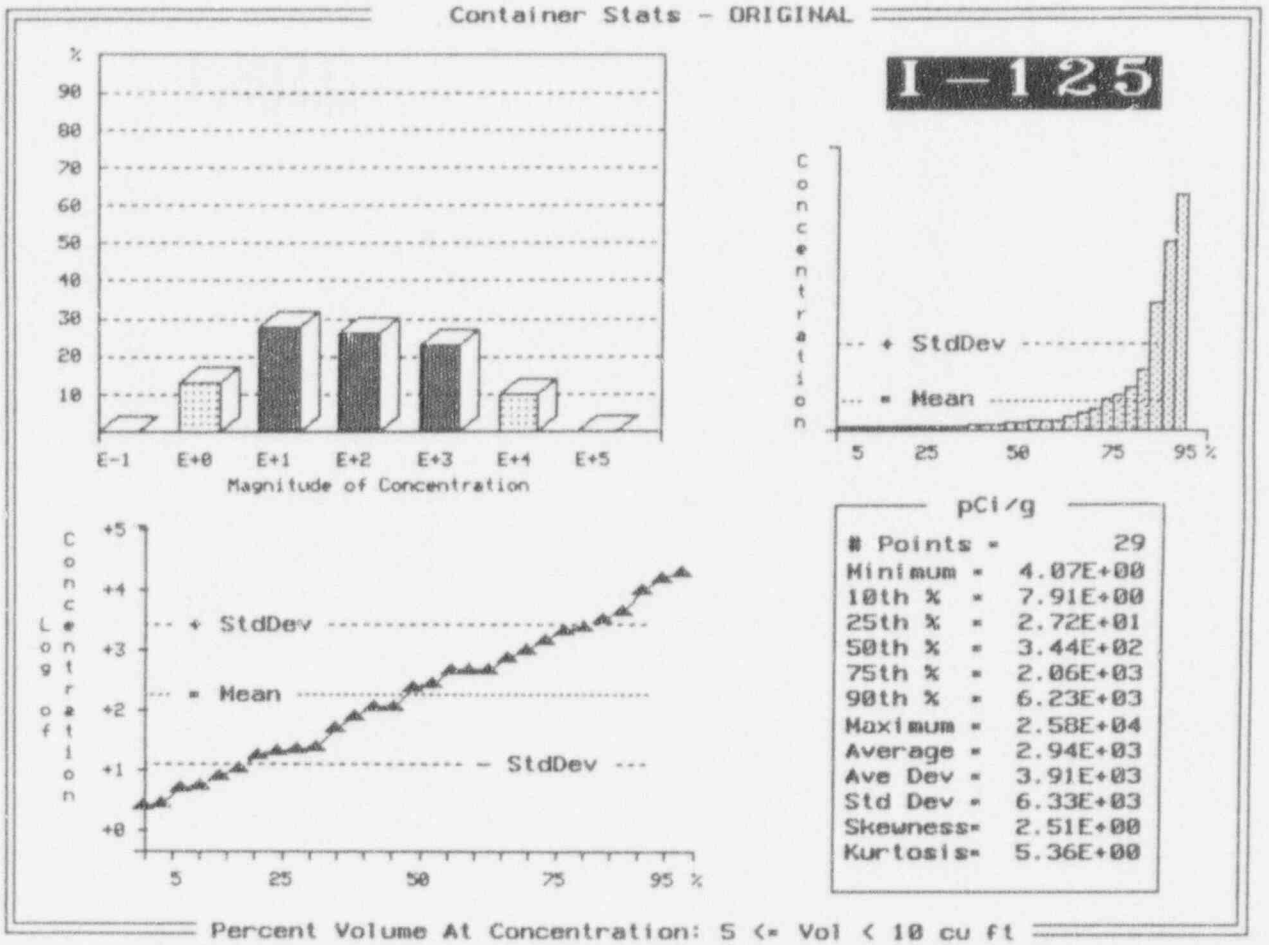

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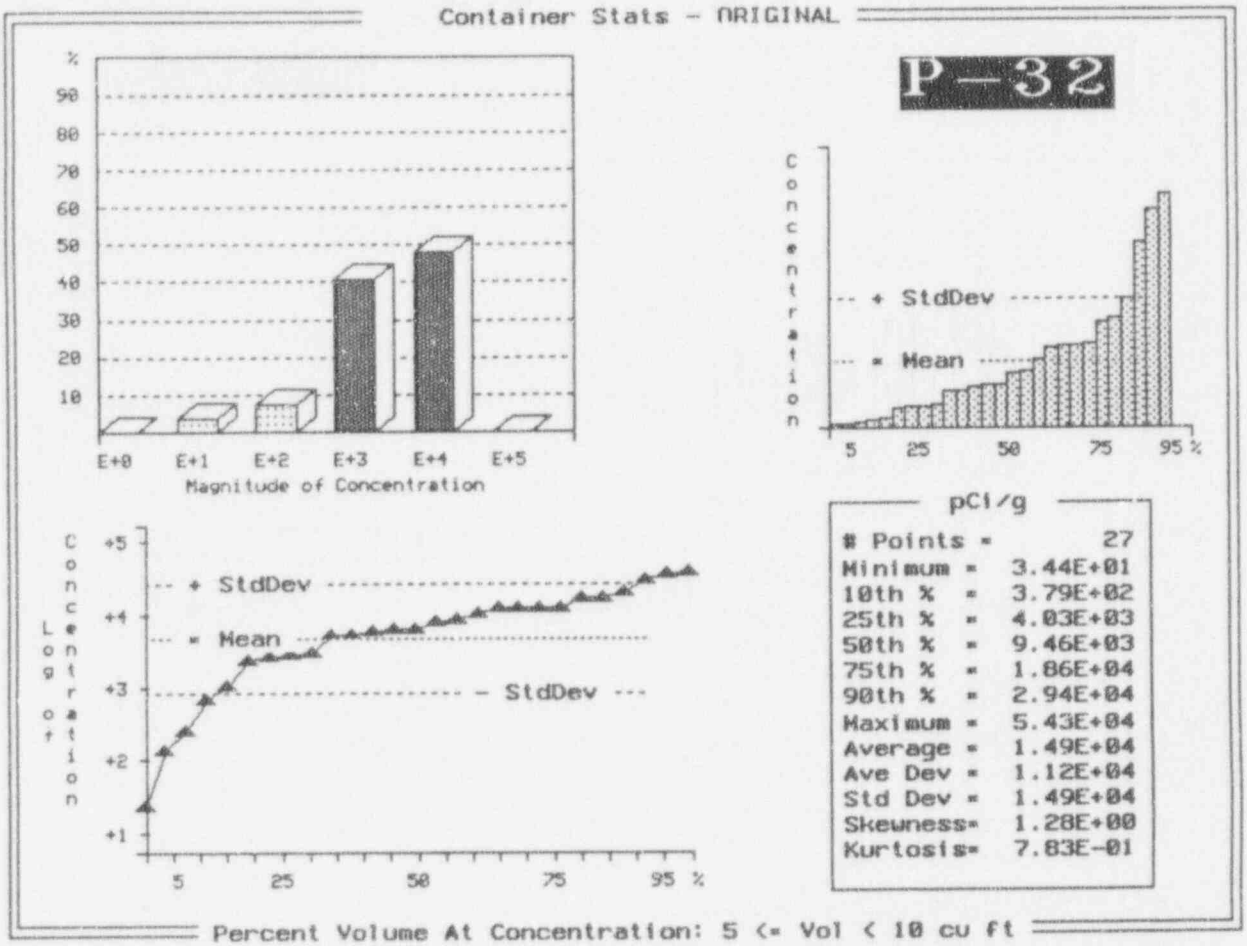

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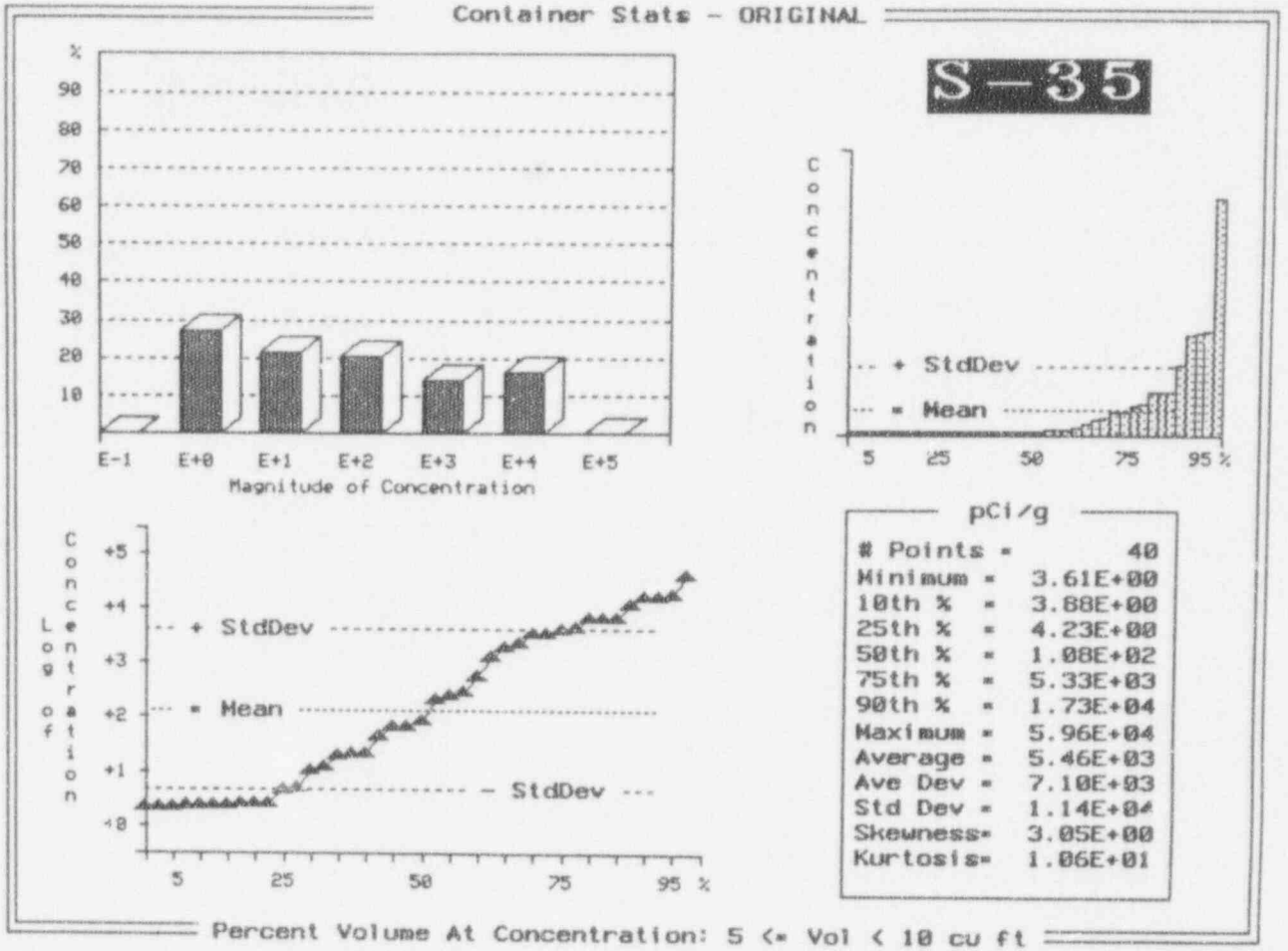

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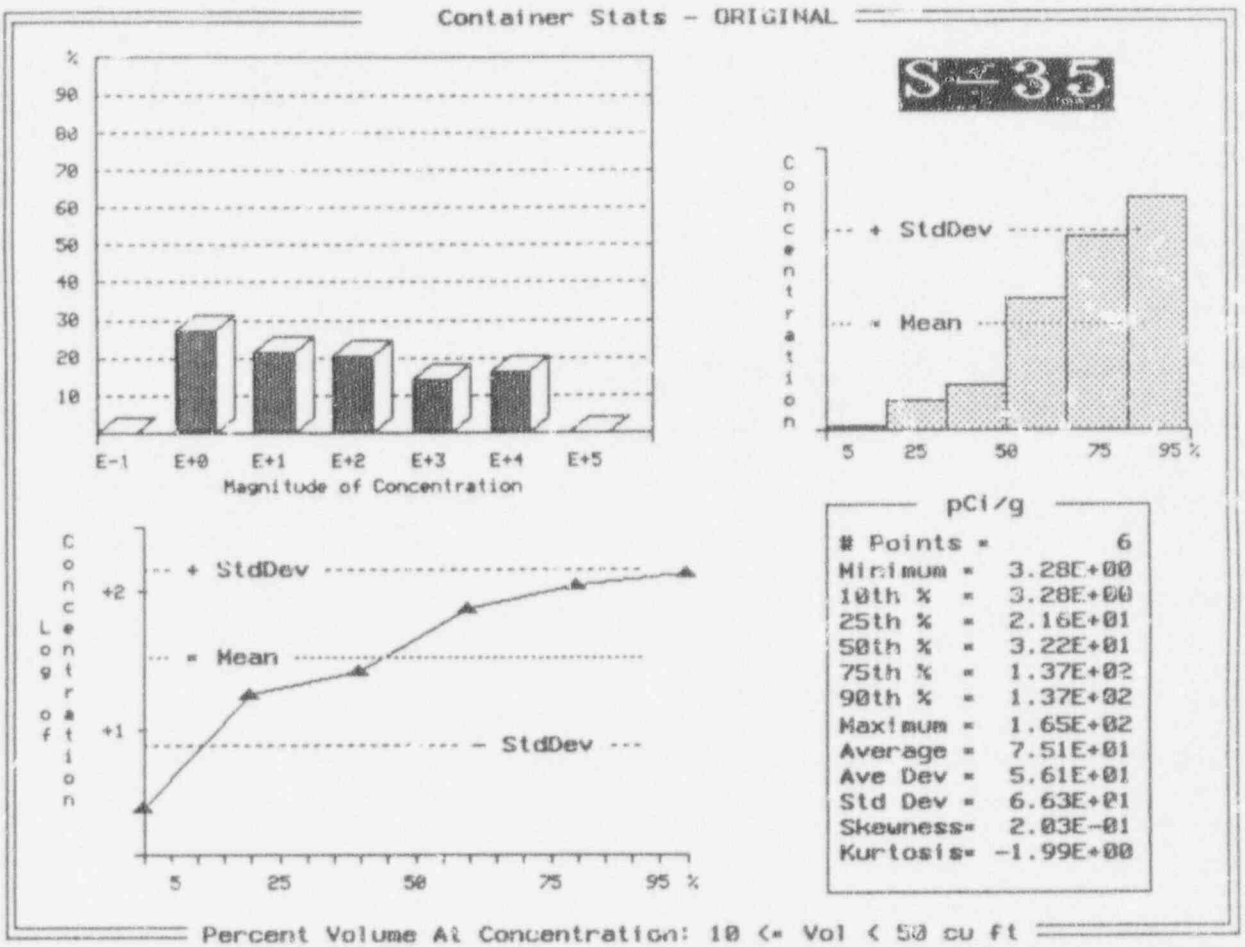
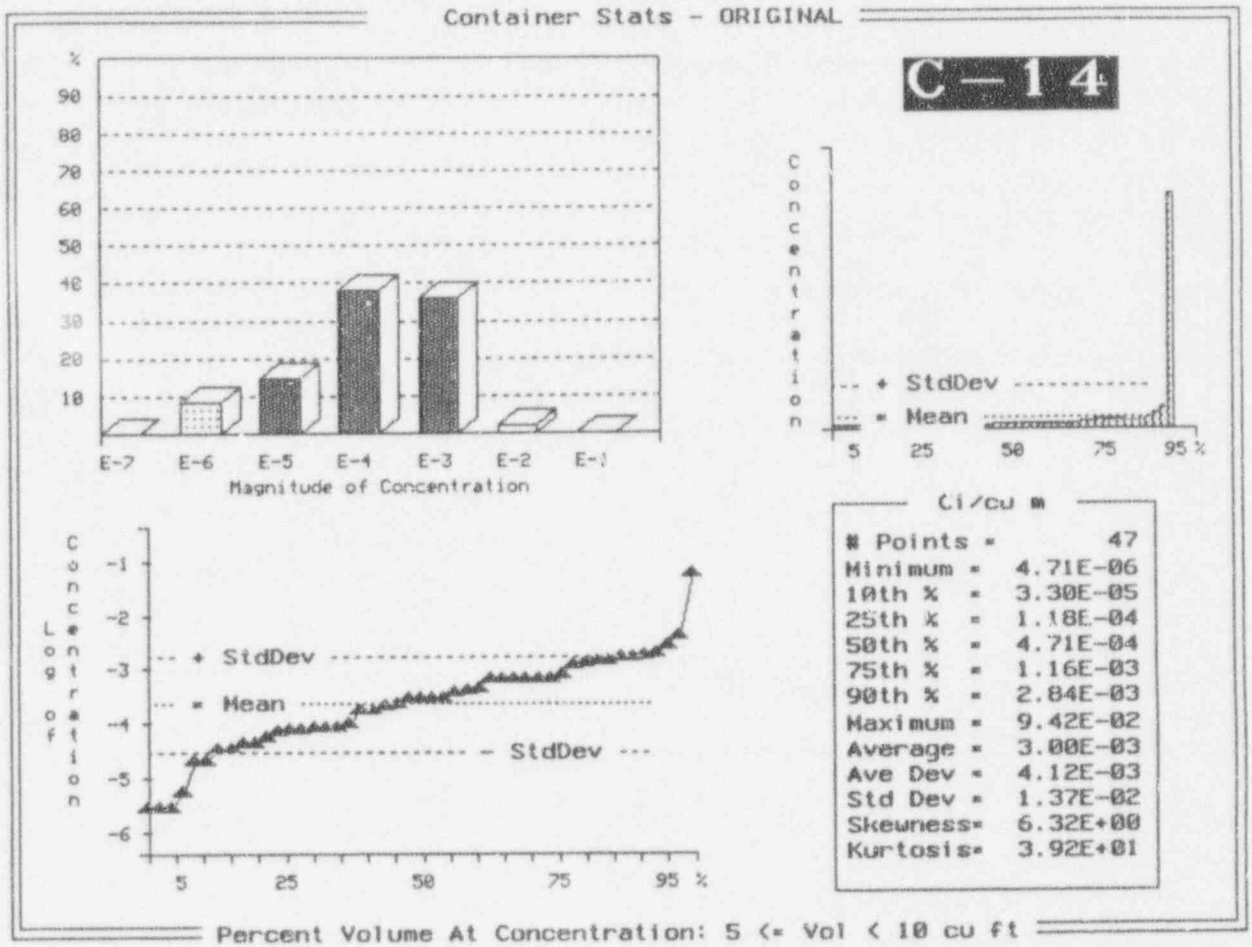


Exhibit D-7
Data Summary - Analyses at the Container Level
(Aggregate Practices for non-brokered waste: 1988 to 1990)
(Beatty and Richland Disposal Sites only)

	Data or Parameters
Waste generator class:	all
Compact or unaffiliated state:	all
Total associated waste volume (m^3):	na
Total associate waste activity (Ci):	na
Waste form:	Animal Carcasses in lime and sorbents
Waste class:	A-Unstable and A-Stable
Total number of shipping records:	12
Number of waste containers:	154
Weight of shipments (kg):	18,810
Total waste volume (m^3):	32.7
Fractional waste volume (%): (this analysis/total)	na
Total waste activity (Ci):	3.0
Fractional waste activity (%): (this analysis/total)	na

Exhibit D-7 (Continued)



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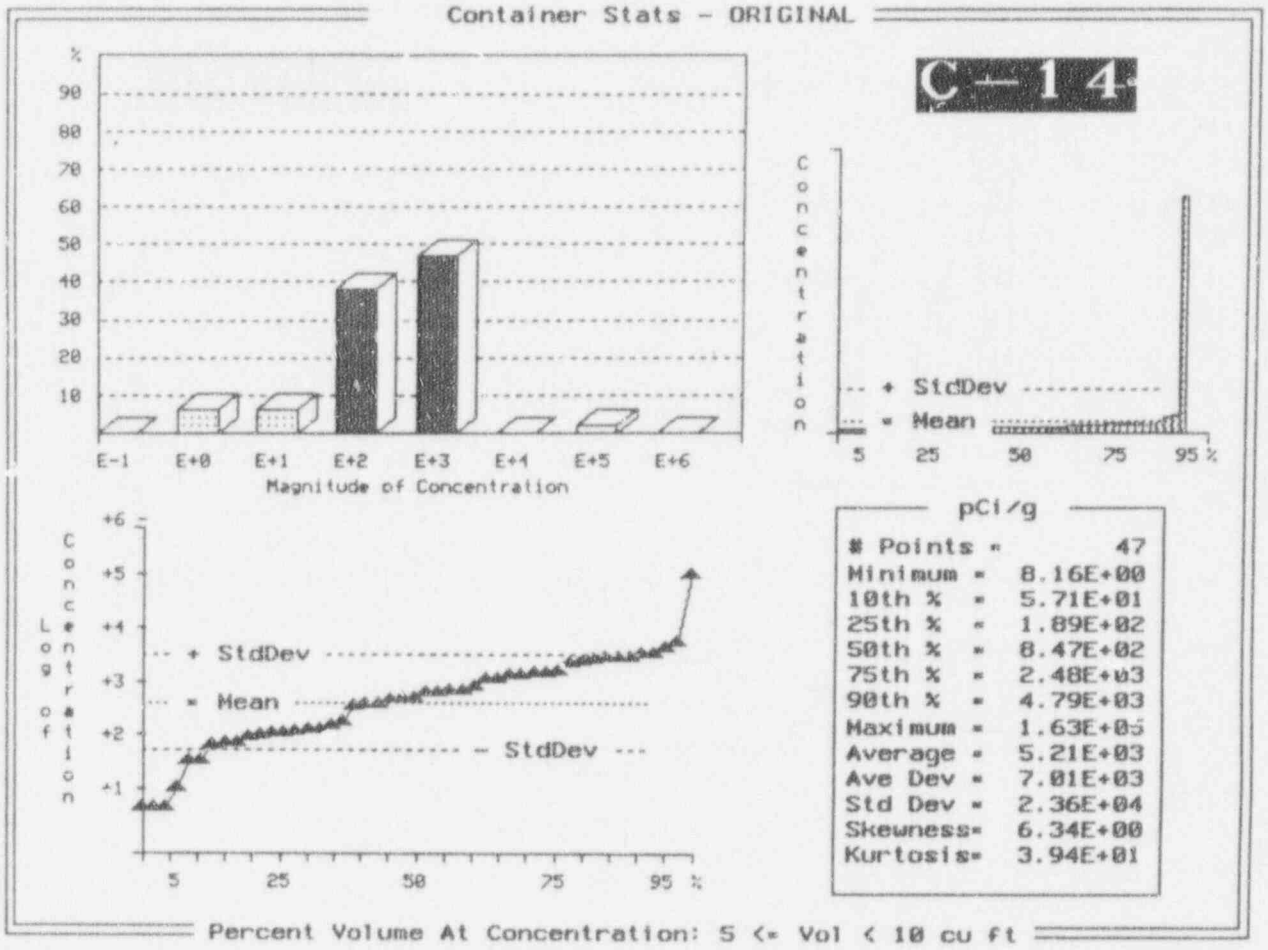

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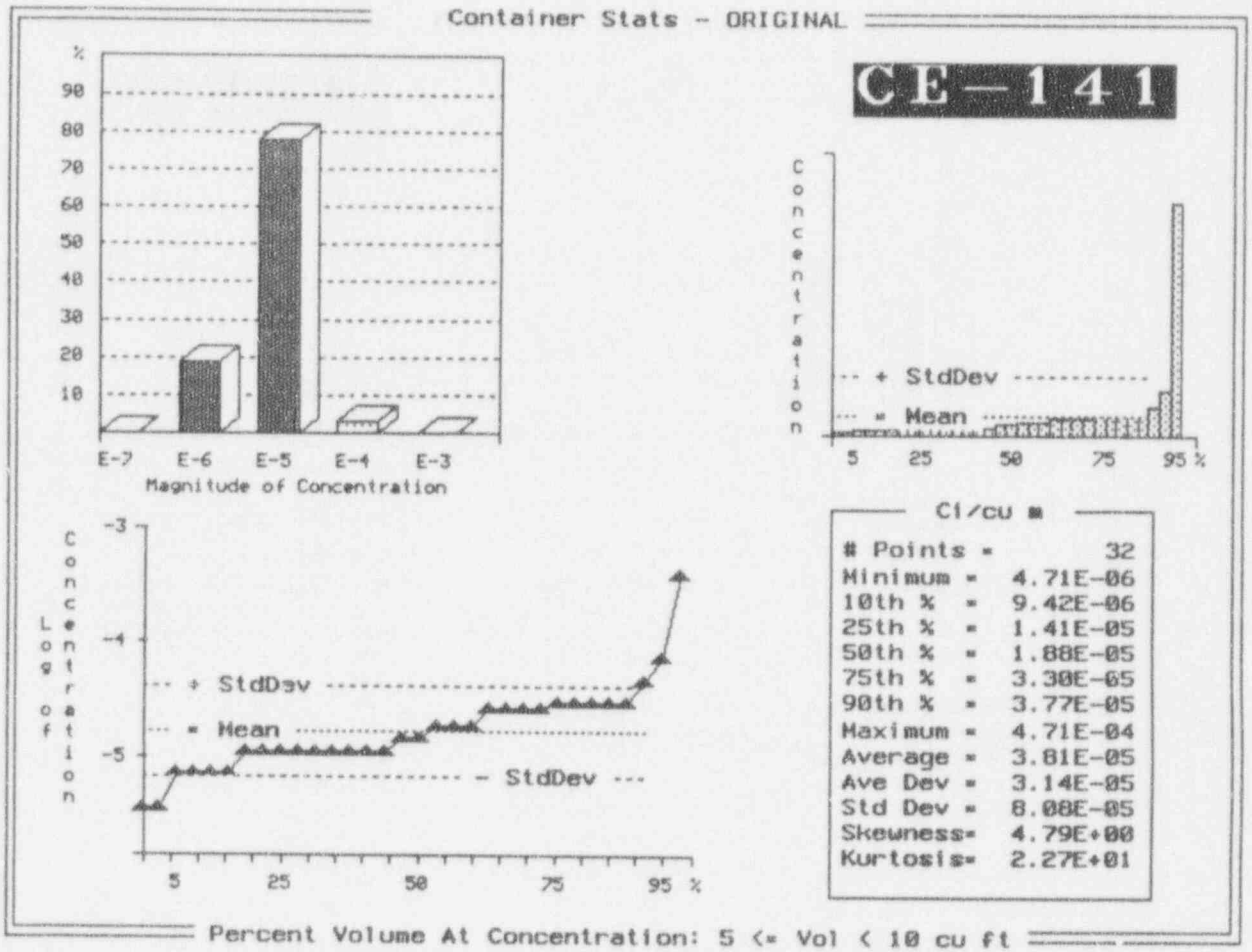

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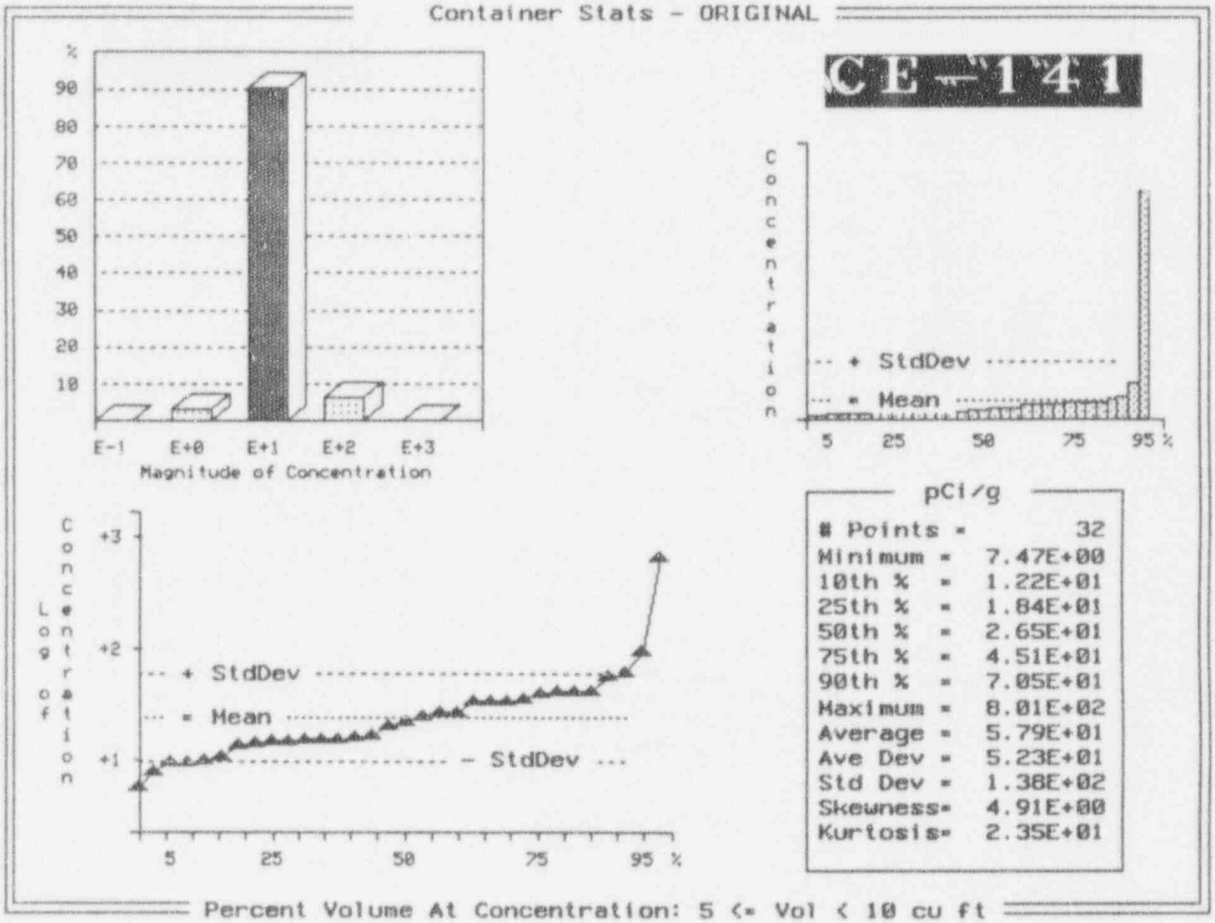

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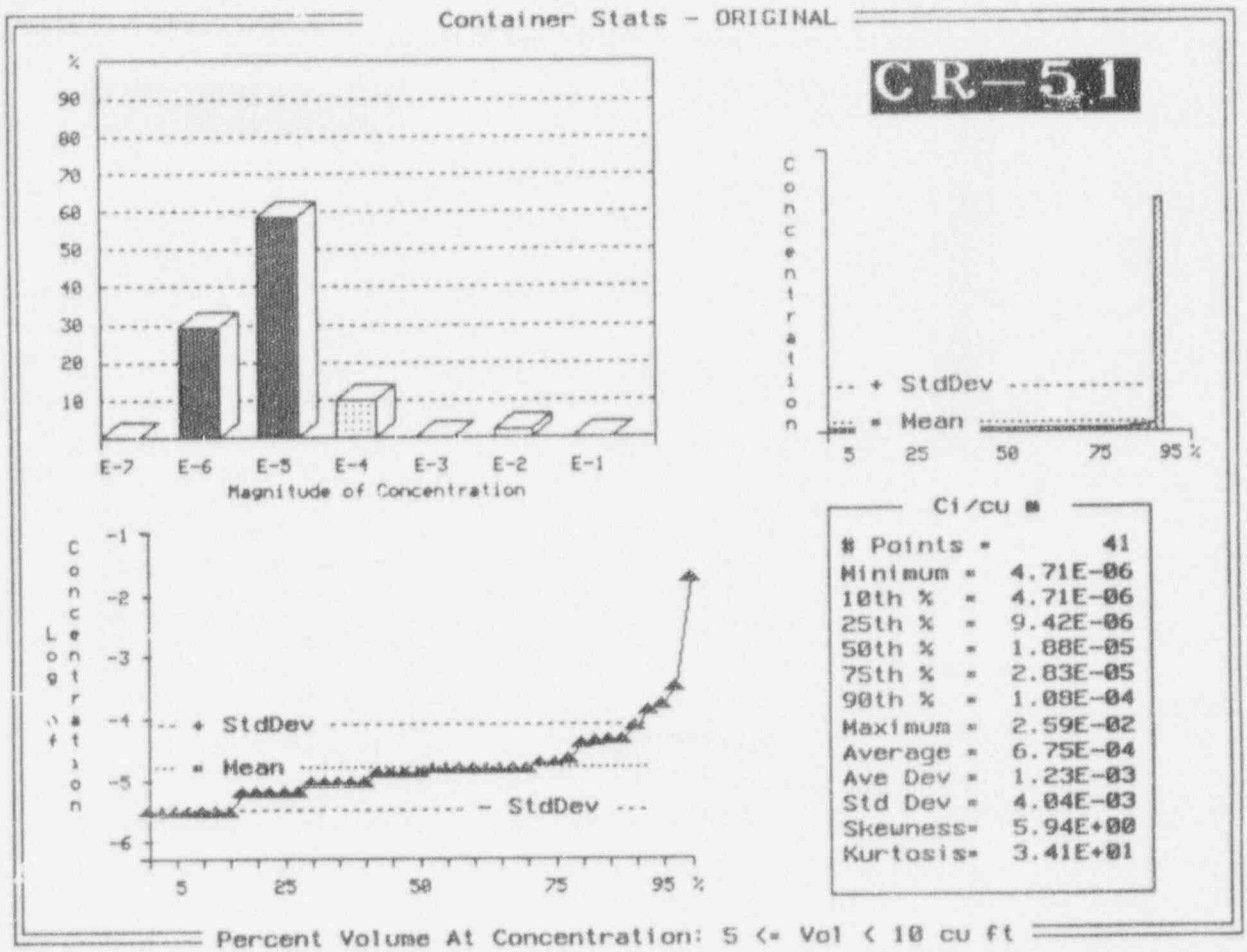

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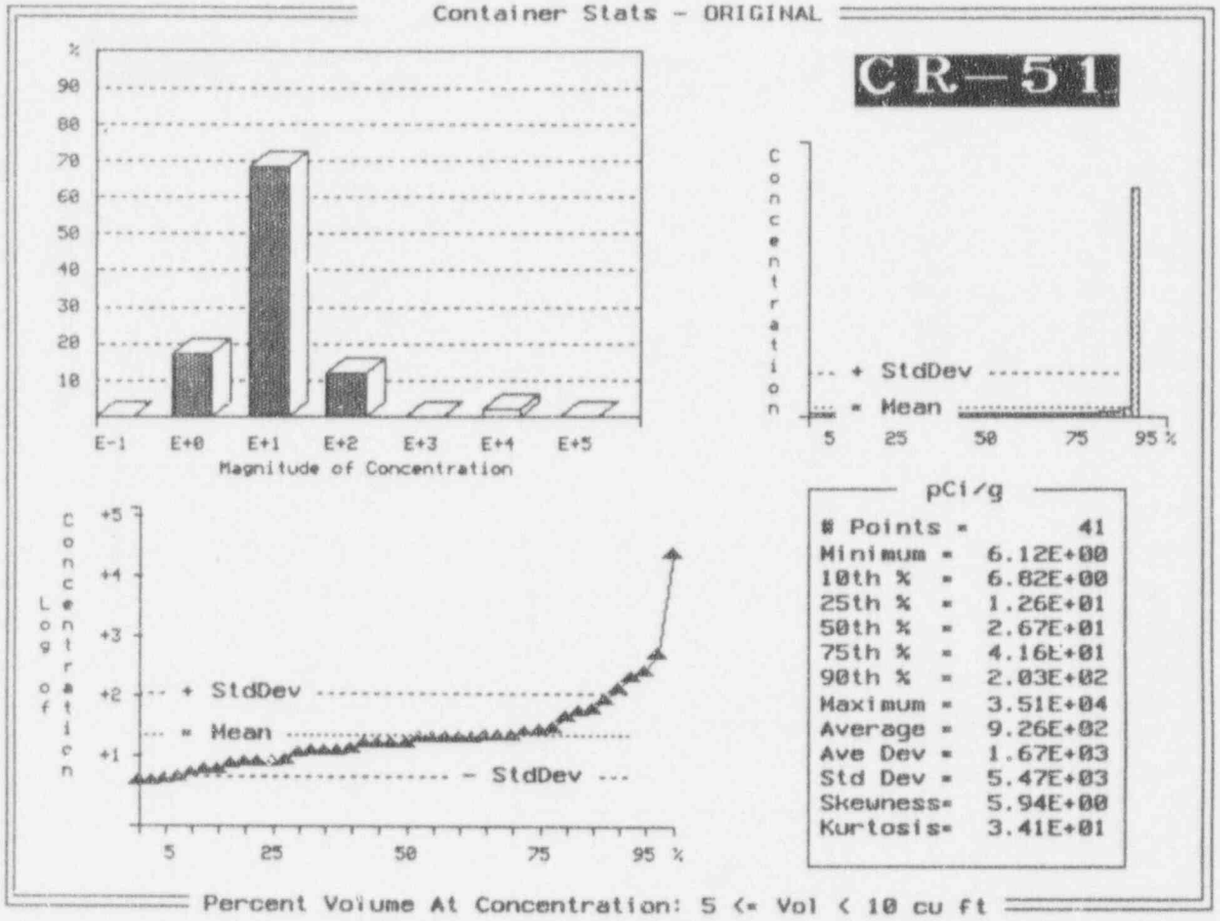

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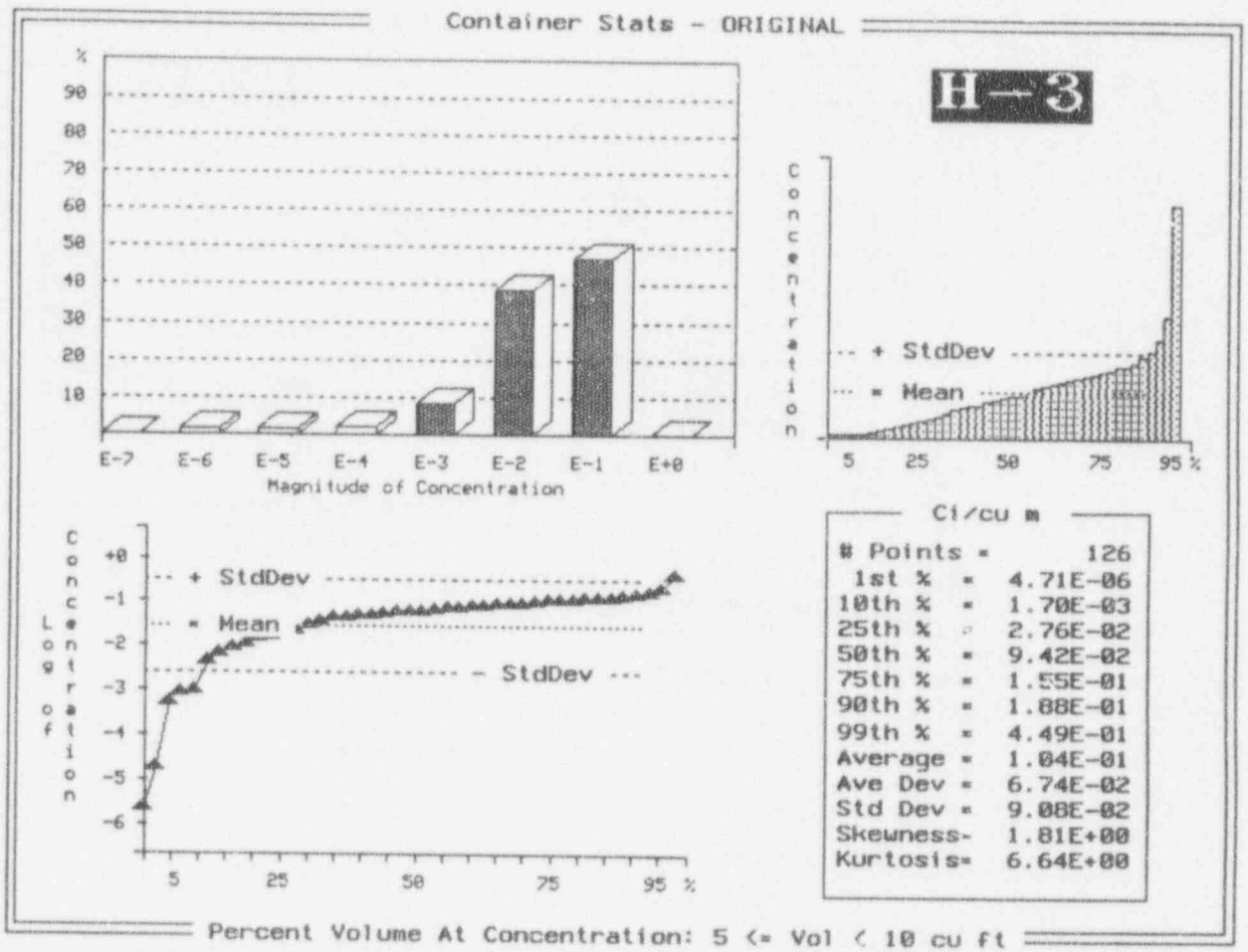

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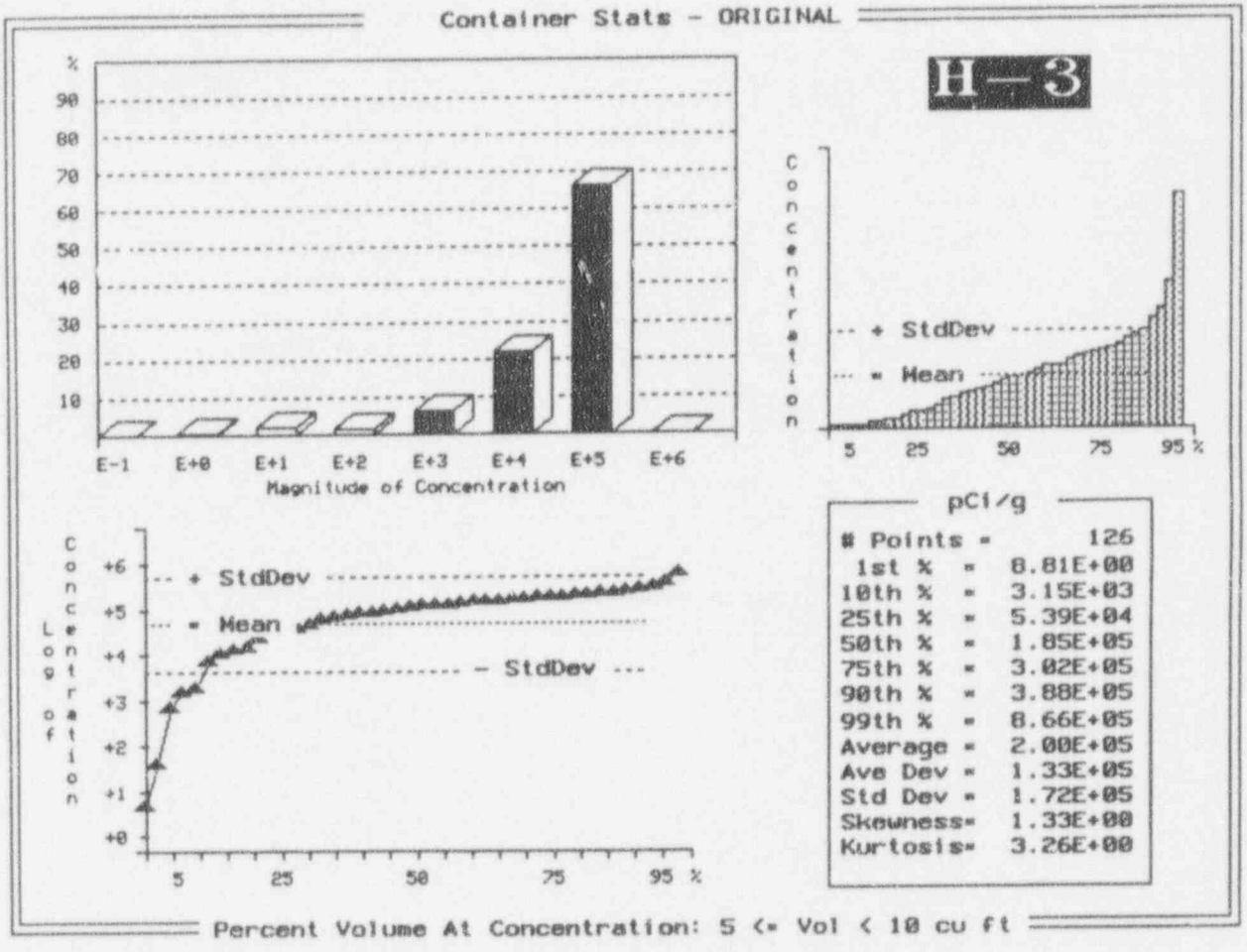

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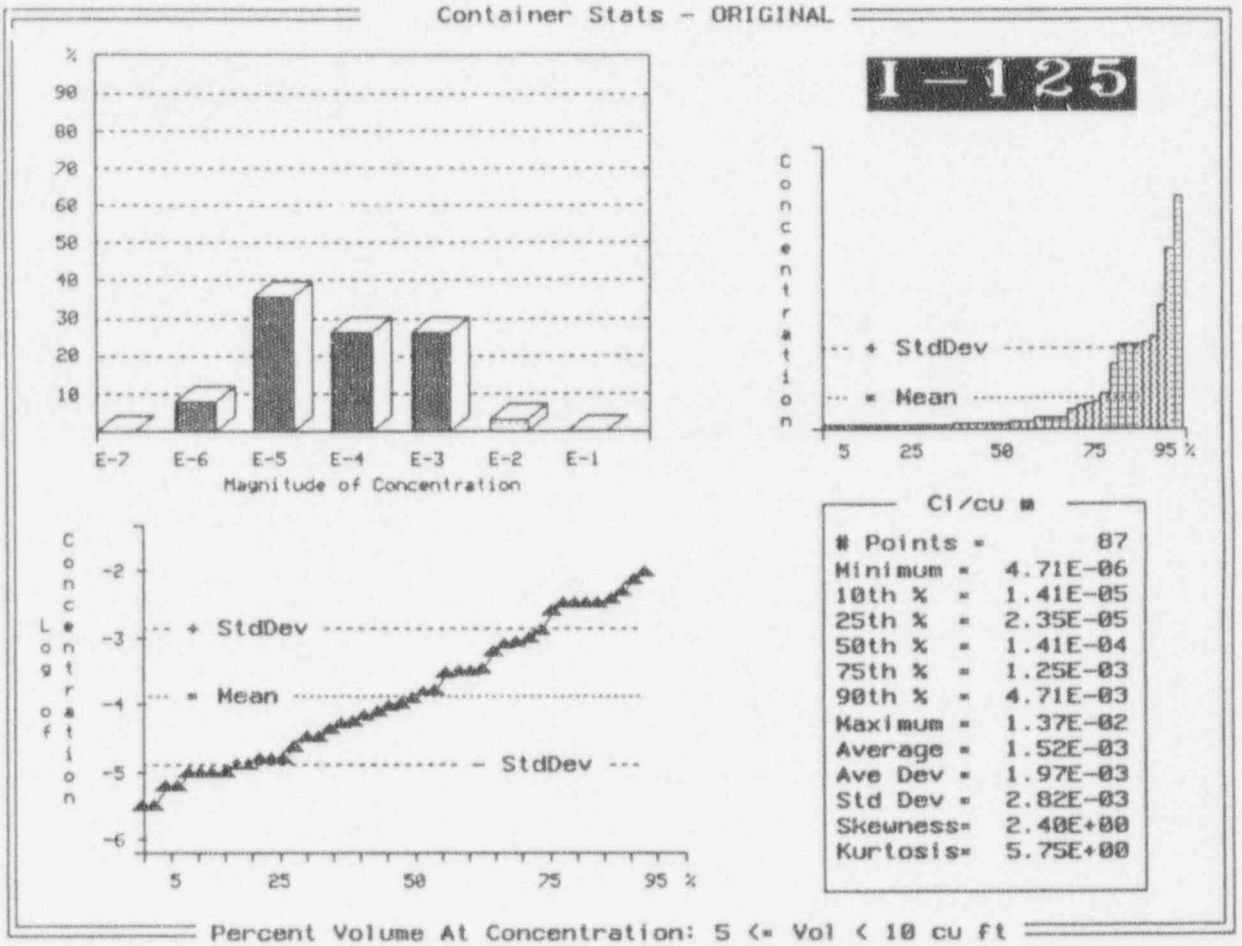

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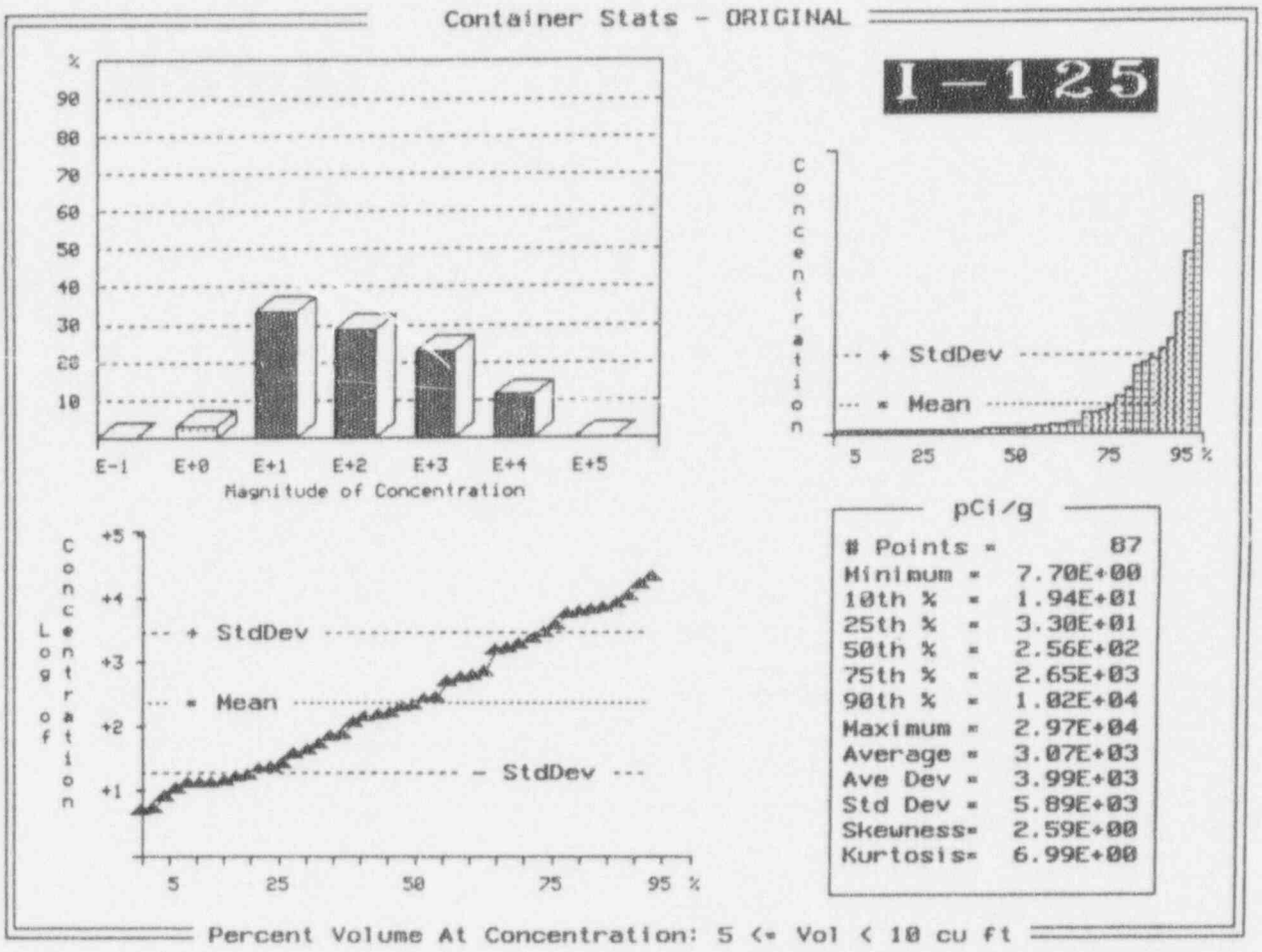

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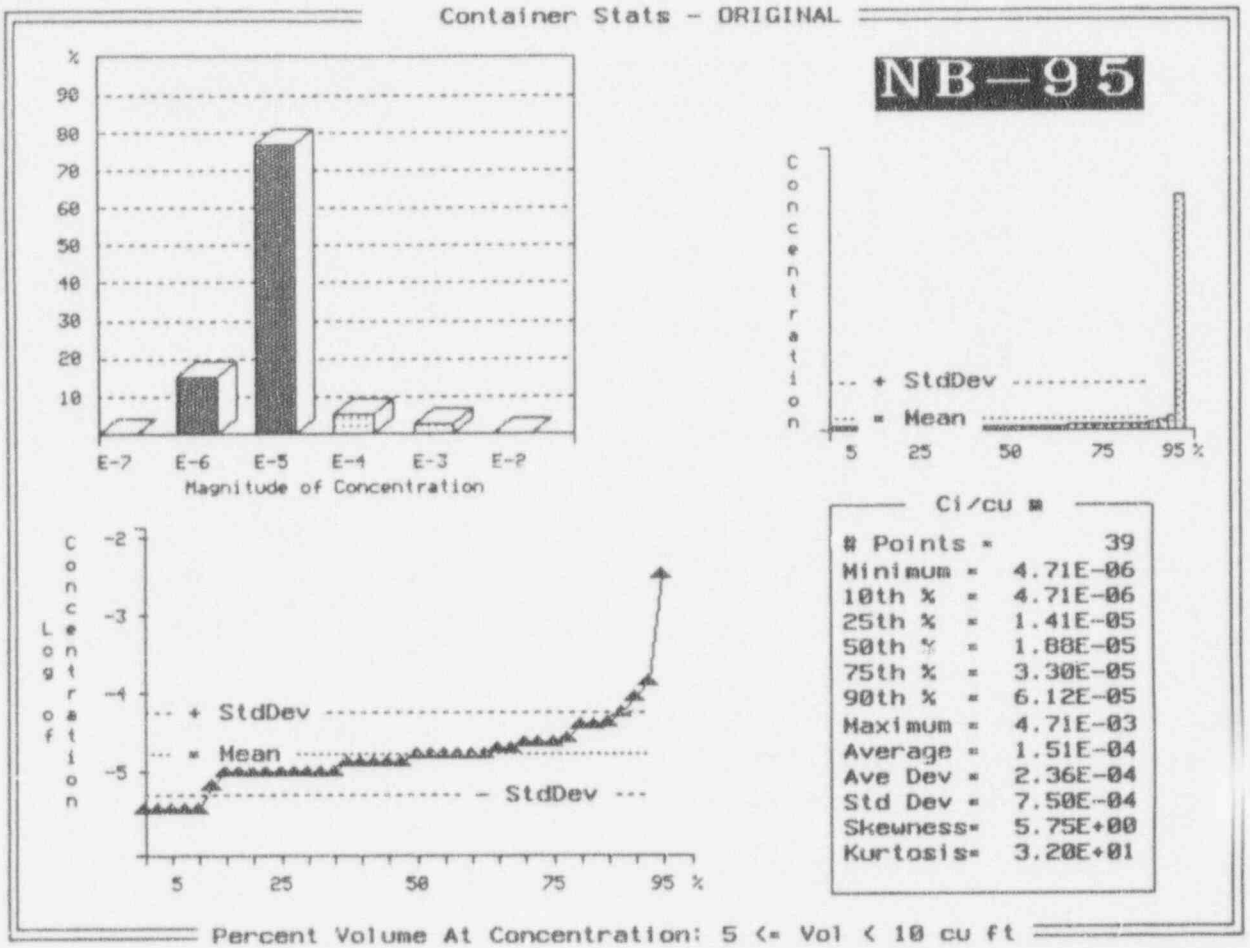

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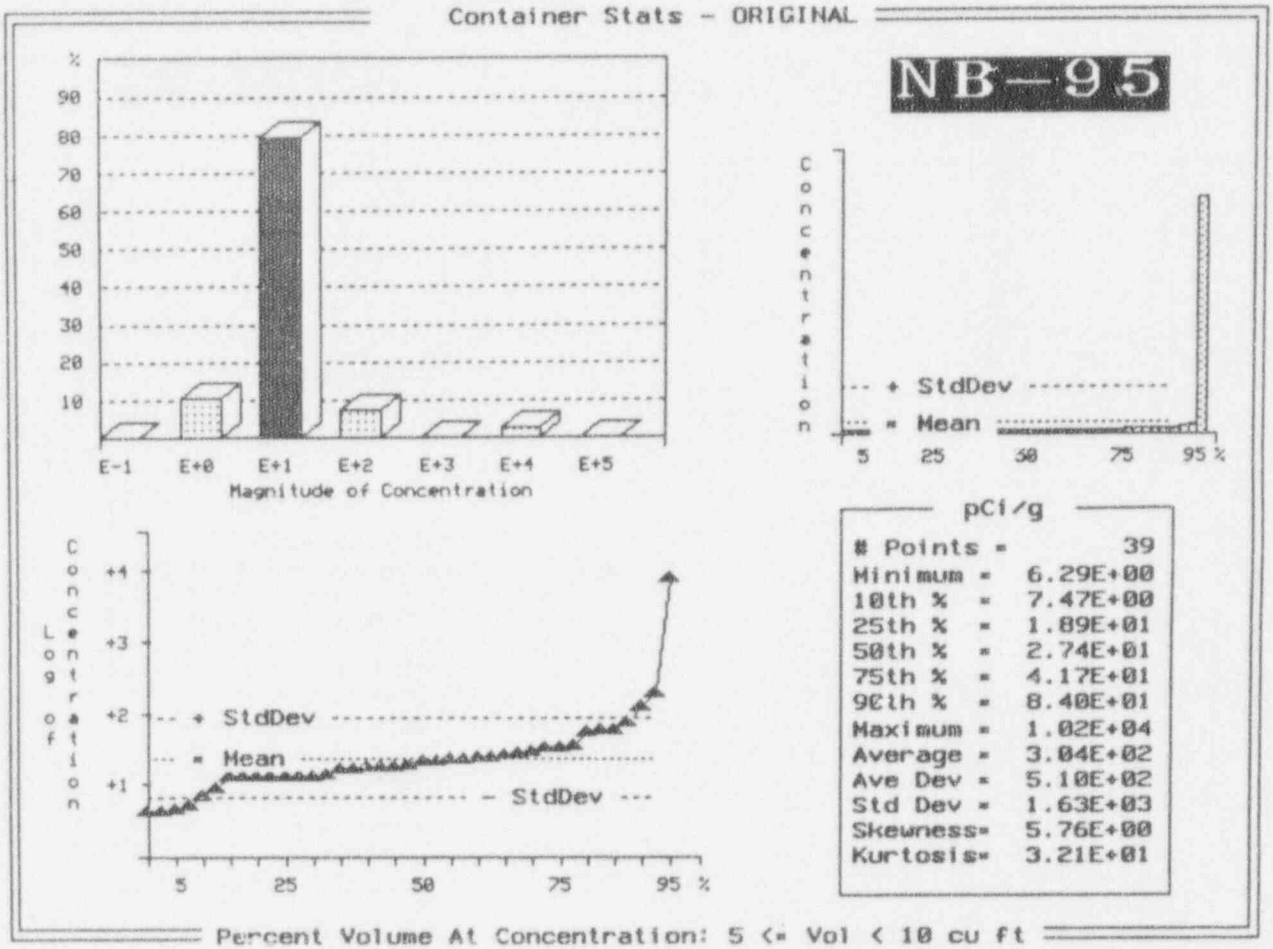

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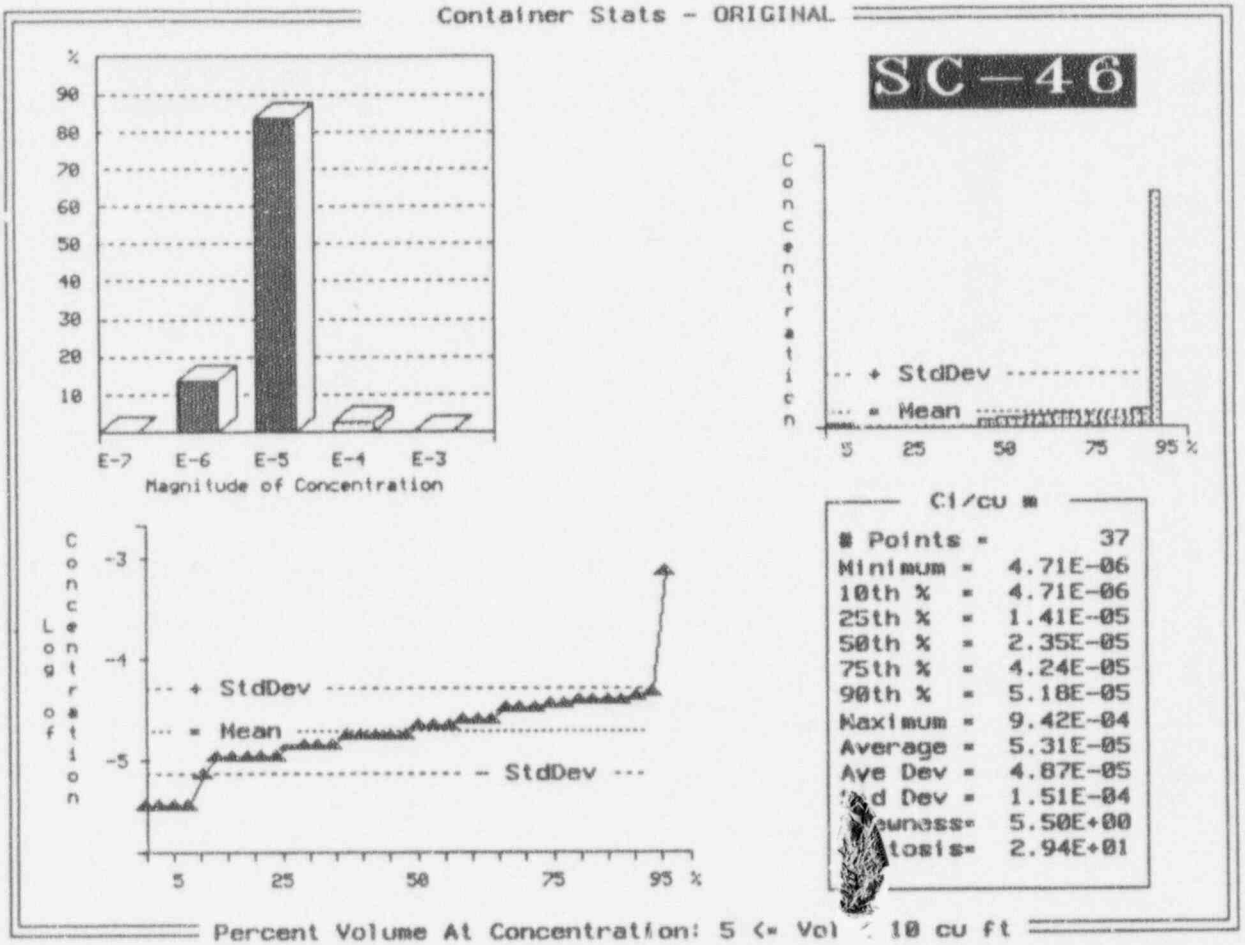

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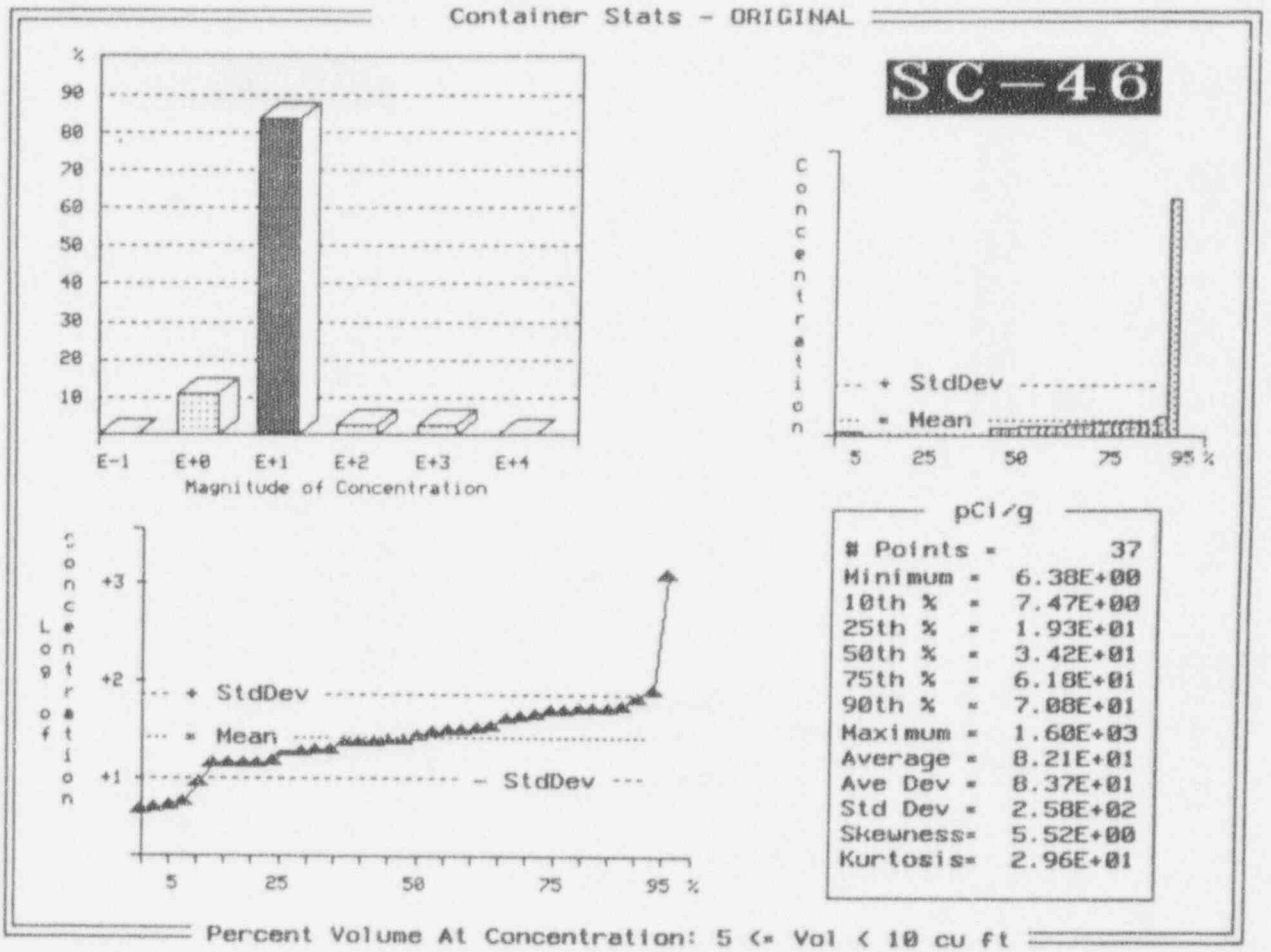


Exhibit D-7 (Continued)

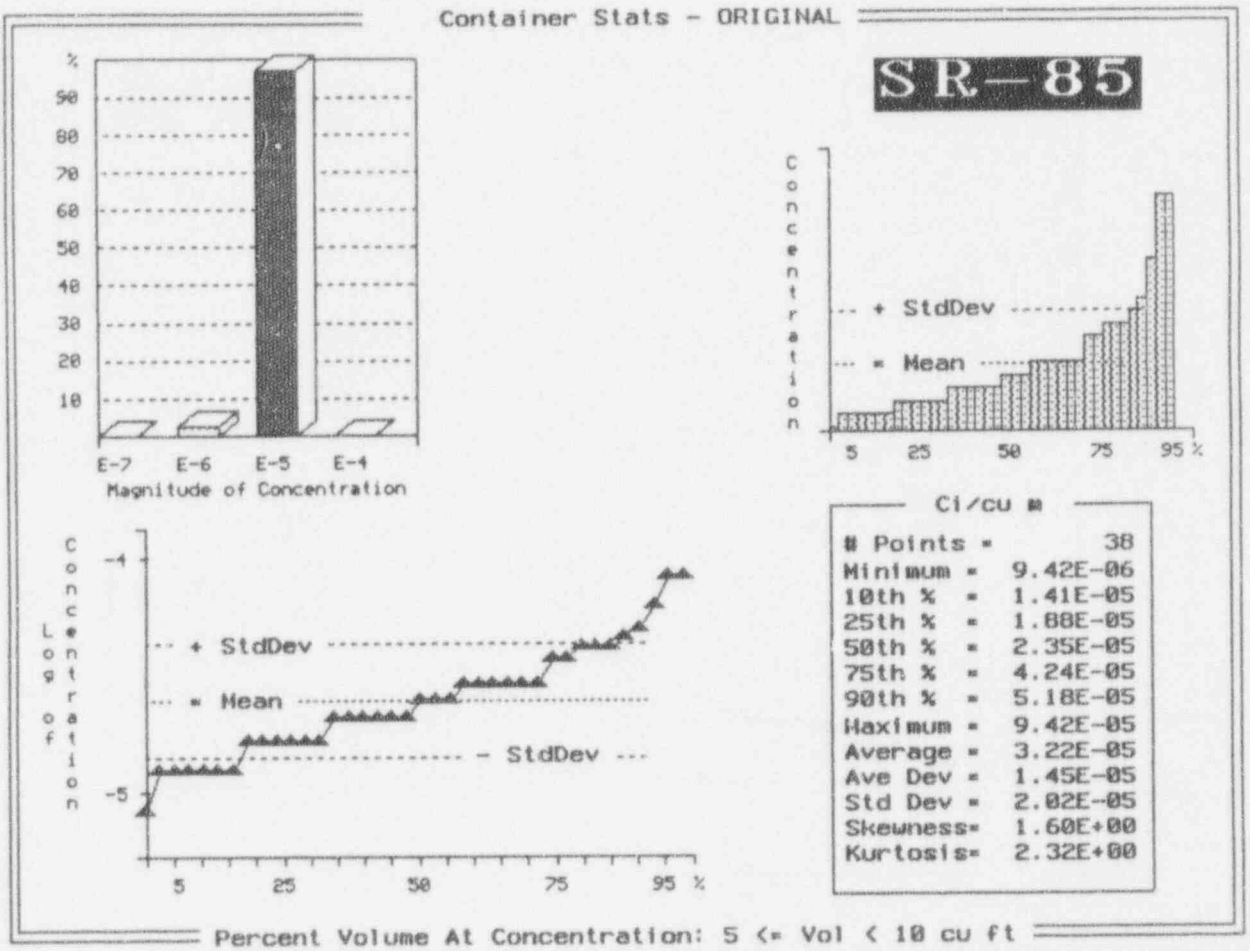
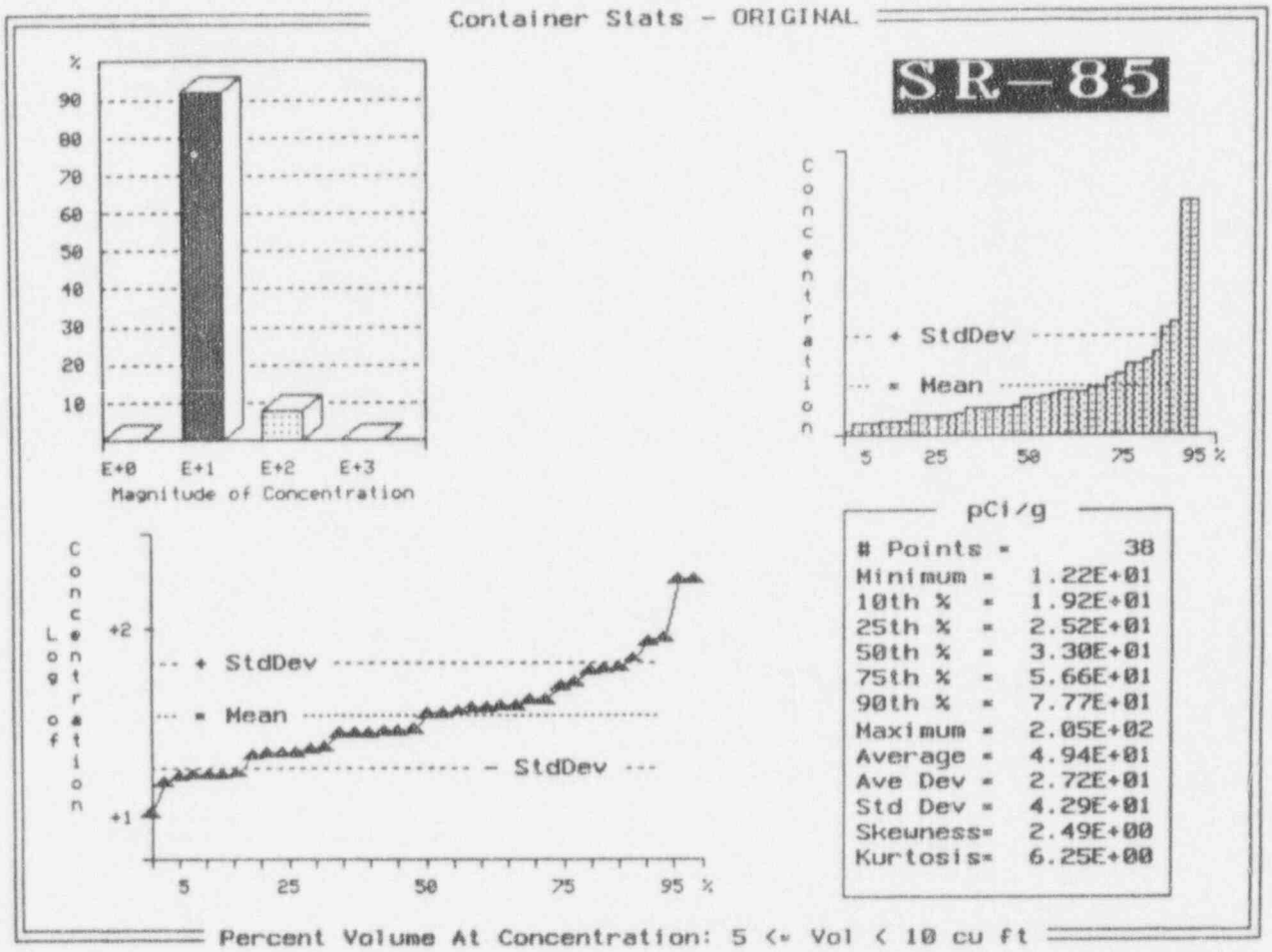


Exhibit D-7 (Continued)



APPENDIX E

Radionuclide Concentrations by Compact Regions and States
(Shipment Level Analyses - All Disposal Sites)
(Aggregate Practices 1986-1990)

Table E-1 Northwest Compact Government Waste Generators Biomedical Radionuclide Distributions - Shipment Level(a)

Waste Class: A-Unstable
Number of shipping records: 87
Number of shipping containers: 2,468
Total waste volume: 1,600 m^3
Total waste mass: 688,300 Kg
Average waste form density: 0.67 g/cm^3

Nuclide	Concentration Ranges - Ci/m^3 - 1st	50th	99th	Percentile - pCi/g - 1st	50th	99th
C-14	6.21E-07	3.37E-05	9.20E-04	8.86E-01	4.67E+01	2.23E+03
Co-58	1.52E-06	8.36E-05	2.30E-03	2.16E+01	1.12E+02	5.58E+03
Co-60	2.92E-05	1.67E-03	4.60E-02	4.17E+01	2.25E+03	1.12E+05
Fe-55	2.92E-05	1.67E-03	4.60E-02	4.17E+01	2.24E+03	1.12E+05
H-3	4.20E-08	3.76E-04	5.67E-03	5.99E-02	5.00E+02	8.10E+03
Mn-54	4.97E-06	2.84E-04	7.82E-03	7.08E+00	3.82E+02	1.90E+04
Ni-63	1.52E-06	8.36E-05	2.30E-03	2.16E+00	1.13E+02	5.58E+03

Waste Class: A-Stable
Number of shipping records: 8
Number of shipping containers: 6
Total waste volume: 39.1 m^3
Total waste mass: 36,470 kg
Average waste form density: 1.10 g/cm^3

Nuclide	Concentration Ranges - Ci/m^3 - 1st	50th	99th	Percentile - pCi/g - 1st	50th	99th
C-14	3.46E-03	2.80E-02	7.91E-02	4.94E+03	2.99E+04	5.31E+04
Co-58	8.64E-03	7.17E-02	1.97E-01	1.23E+04	7.65E+04	1.33E+05
Co-60	1.73E-01	1.43E+00	3.95E+00	2.47E+05	1.53E+06	2.65E+06
Fe-55	1.73E-01	1.43E+00	3.95E+00	2.47E+05	1.53E+06	2.65E+06
H-3	6.02E-04	6.64E-04	1.22E-03	4.04E+02	7.17E+02	1.05E+03
I-129	2.01E-07	3.50E-07	8.03E-07	1.30E-01	3.77E-01	5.39E-01
Mn-54	2.94E-02	2.45E-01	6.71E-01	4.20E+04	2.61E+05	4.51E+05
Ni-63	8.64E-03	7.17E-02	1.97E-01	1.23E+04	7.65E+04	1.33E+05
Tc-99	2.01E-07	3.50E-07	8.03E-07	1.30E-01	3.77E-01	5.39E-01

(a) Based on shipment data to all three disposal sites from 1986 to 1990.

Table E-2 Northwest Compact Medical Waste Generators Biomedical Radionuclide Distributions - Shipment Level(a)

Waste Class: A Stable and Unstable
Number of shipping records: 50
Number of shipping containers: no data
Total waste volume: 38.6 m^3
Total waste mass: 29,880 kg
Average waste form density: 0.78 g/cm^3

	Concentration Ranges - Percentile(b) - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
Au-195	1.18E-05	1.18E-05	1.18E-04	1.52E+01	1.52E+01	1.52E+02
C-14	1.18E-05	2.02E-04	3.92E-04	1.52E+01	2.61E+02	5.06E+02
Ca-45*	5.89E-03	5.89E-03	5.89E-03	7.59E+03	7.59E+03	7.59E+03
Ce-141	1.65E-04	4.73E-04	7.81E-04	2.13E+02	6.10E+02	1.01E+03
Co-57	9.42E-06	4.71E-05	2.39E-03	1.22E+01	6.08E+01	3.08E+03
Cr-51	3.92E-05	3.92E-05	9.02E-05	5.06E+01	5.06E+01	1.16E+02
Cs-137	9.42E-05	1.18E-04	1.51E-04	1.22E+02	1.52E+02	1.94E+02
Fe-59*	2.35E-05	2.35E-05	2.35E-05	3.04E+01	3.04E+01	3.04E+01
Gd-153	1.57E-05	1.57E-05	3.92E-05	2.03E+01	2.03E+01	5.06E+01
H-3	1.18E-04	4.25E-03	3.18E-02	1.52E+02	5.48E+03	4.10E+04
I-125	4.71E-04	9.42E-04	4.89E-02	6.08E+02	1.22E+03	6.31E+04
I-129*	7.85E-05	7.85E-05	7.85E-05	1.01E+02	1.01E+02	1.01E+02
I-131	3.92E-03	6.66E-03	1.18E-02	5.06E+03	8.60E+03	1.53E+04
In-111	1.96E-03	2.00E-03	1.18E-02	2.53E+03	2.58E+03	1.52E+04
Nb-95	8.71E-04	8.71E-04	1.18E-03	1.12E+03	1.12E+03	1.52E+03
P-32	9.42E-06	4.71E-04	3.53E-03	1.22E+01	6.08E+02	4.56E+03
P-33*	2.83E-04	2.83E-04	2.83E-04	3.65E+02	3.65E+02	3.65E+02
Po-210*	5.89E-04	5.89E-04	5.89E-04	7.59E+02	7.59E+02	7.59E+02
Ru-103	1.18E-05	1.88E-05	7.65E-04	1.52E+01	2.43E+01	9.87E+02
S-35	4.76E-04	6.16E-04	2.98E-03	6.14E+02	7.95E+02	3.85E+03
Sc-46	7.30E-04	8.00E-04	8.71E-04	9.42E+02	1.03E+03	1.12E+03
Sn-113	9.42E-05	9.42E-05	1.33E-03	1.22E+02	1.22E+02	1.72E+03
U-238*	4.71E-06	4.71E-06	4.71E-06	6.08E+00	6.08E+00	6.08E+00

(a) Based on shipment data to all three disposal sites from 1986 to 1990.
(b) The concentration of nuclides tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table E-3 Northwest Compact Academic Waste Generators Biomedical Radionuclide Distributions - Shipment Level(a)

Waste Class: A Stable and Unstable
Number of shipping records: 27
Number of shipping containers: 1,679
Total waste volume: 256.1 m^3
Total waste mass: 145,500 kg
Average waste form density: 0.57 g/cm^3

	Concentration Ranges - Percentile(b) - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
Ag-110m	6.32E-08	4.19E-07	7.05E-06	1.11E-01	7.37E-01	1.18E+01
Am-241	1.08E-07	8.84E-07	8.35E-05	1.98E-01	1.56E+00	1.39E+02
Ba-133	2.99E-07	8.10E-06	2.24E-05	5.26E-01	1.49E+01	3.75E+01
Br-82*	2.53E-07	2.53E-07	2.53E-07	4.51E-01	4.51E-01	4.51E-01
C-14	5.62E-04	2.94E-03	1.03E-02	7.92E+02	5.18E+03	1.80E+04
Ca-45	9.16E-05	2.80E-04	5.93E-04	1.53E+02	5.09E+02	1.04E+03
Cd-109	1.10E-07	1.72E-06	6.45E-05	1.94E-01	2.87E+00	1.53E+01
Ce-141	6.32E-08	1.23E-05	7.43E-05	1.11E-01	2.17E+01	1.36E+02
Cl-36	3.93E-07	7.57E-06	5.18E-05	6.91E-01	1.08E+01	9.12E+01
Co-57	9.21E-07	1.61E-06	5.60E-05	1.54E+00	2.70E+00	1.03E+02
Co-58	2.87E-06	4.42E-05	7.85E-05	5.05E+00	7.78E+01	1.38E+02
Co-60	2.05E-07	8.19E-07	9.59E-05	2.91E-01	1.44E+00	1.35E+02
Cr-51	1.25E-03	1.13E-02	1.49E-02	2.21E+03	1.98E+04	2.49E+04
Cs-134	5.50E-08	6.14E-07	1.31E-05	9.69E-02	1.02E+00	2.31E+01
Cs-137	7.21E-08	1.28E-06	2.19E-04	1.42E-01	1.81E+00	3.86E+02
Fe-55	8.10E-08	6.47E-05	1.54E-04	1.43E-01	9.19E+01	2.70E+02
Fe-59	9.80E-06	1.11E-05	1.76E-04	1.76E+01	2.04E+01	3.09E+02
Ga-68	3.78E-07	2.45E-05	3.71E-04	6.93E-01	4.58E+01	6.74E+02
Gd-153	5.40E-05	2.89E-04	5.24E-04	9.91E+01	5.11E+02	9.23E+02
Ge-68	5.50E-07	5.98E-06	7.05E-05	9.69E-01	1.05E+01	1.18E+02
H-3	3.92E-04	7.14E-02	3.53E-01	6.91E+02	1.26E+05	6.21E+05
I-121*	7.96E-05	7.96E-05	7.96E-05	1.40E+02	1.40E+02	1.40E+02
I-125	3.85E-03	1.53E-02	3.52E-02	5.46E+03	2.69E+04	6.76E+04
I-131	2.53E-07	1.83E-03	8.52E-03	4.45E-01	3.42E+03	1.50E+04
In-111	1.87E-06	5.40E-05	6.88E-04	3.13E+00	9.91E+01	1.21E+03
In-114m	3.98E-05	3.98E-05	1.96E-04	7.01E+01	7.01E+01	3.46E+02
Mn-54	2.58E-07	3.51E-06	4.62E-05	4.32E-01	6.44E+00	8.14E+01
Na-22	2.20E-06	4.01E-05	7.85E-05	3.87E+00	7.06E+01	1.38E+02
Na-24	1.55E-05	1.55E-05	1.55E-05	2.72E+01	2.72E+01	2.72E+01

Table E-3 Northwest Compact Academic Waste Generators Biomedical Radionuclide Distributions - Shipment Level[a], Cont'd

Nuclide	Concentration Ranges - Percentile(b) - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
Nb-95	5.16E-07	8.84E-06	7.44E-05	8.65E-01	1.48E+01	1.36E+02
Ni-63	6.28E-05	1.51E-04	1.05E-03	1.11E-02	2.66E+02	2.06E+03
P-32	6.09E-03	1.09E-02	1.55E-02	1.02E+04	1.92E+04	2.61E+04
P-33	9.42E-06	3.69E-05	6.45E-05	1.66E+01	6.23E+01	1.08E+02
Po-210	6.32E-07	6.32E-07	6.32E-07	1.11E+00	1.11E+00	1.11E+00
Ra-226	5.77E-07	5.78E-06	8.83E-06	9.63E-01	1.02E+01	1.55E+01
Rb-86	1.29E-05	1.21E-04	2.13E-04	2.16E+01	2.13E+02	3.74E+02
Ru-103	6.43E-06	1.24E-05	7.42E-05	1.20E+01	2.07E+01	1.36E+02
Ru-106*	1.08E-07	1.08E-07	1.08E-07	1.98E-01	1.98E-01	1.98E-01
S-35	1.67E-04	7.17E-03	2.33E-02	2.35E+02	1.26E+04	4.60E+04
Sc-46	3.14E-07	8.39E-06	6.41E-05	5.53E-01	1.48E+01	1.26E+02
Se-75	1.84E-06	1.84E-06	1.23E-05	2.62E+00	2.62E+00	1.73E+01
Sn-113	1.47E-06	2.65E-05	8.00E-05	2.46E+00	4.83E+01	1.47E+02
Sr-85	5.56E-06	5.64E-05	4.06E-04	1.02E+01	9.42E+01	7.59E+02
Sr-89*	8.25E-05	8.25E-05	8.25E-05	1.45E+02	1.45E+02	1.45E+02
Sr-90	8.10E-07	1.74E-04	5.20E-04	1.43E+00	3.07E+02	9.16E+02
Tc-99	6.32E-08	6.32E-08	1.84E-07	1.11E-01	1.11E-01	3.44E-01
Tc-99m*	5.50E-07	5.50E-07	5.50E-07	9.69E-01	9.69E-01	9.69E-01
Tl-201	4.95E-06	4.95E-06	1.78E-05	8.71E+00	8.71E+00	3.14E+01
U-238	1.90E-07	6.83E-07	1.18E-06	3.34E-01	1.20E+00	2.07E+00
Y-88*	7.96E-07	7.96E-07	7.96E-07	1.40E+00	1.40E+00	1.40E+00
Y-90*	5.98E-06	5.98E-06	5.98E-06	1.05E+01	1.05E+01	1.05E+01
Zn-65	2.91E-06	4.17E-05	6.62E-04	5.12E+00	7.65E+01	1.20E+03

(a) Based on shipment data to all three disposal sites from 1986 to 1990.

(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table E-4 Northwest Compact Industrial Waste Generators Biomedical Radionuclide Distributions - Shipment Level(a)

Waste Class: A Stable and Unstable
Number of shipping records: 220
Number of shipping containers: 1,181
Total waste volume: 1,364 m^3
Total waste mass: 1,395,000 kg
Average waste form density: 1.02 g/cm^3

	Concentration Ranges - Percentile(b) - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
Ag-110m	1.79E-05	1.84E-04	5.63E-04	4.27E+01	1.86E+02	5.51E+02
Am-241	6.73E-07	1.03E-05	1.99E-05	6.47E-01	2.42E+01	4.77E+01
Ca-14	1.57E-06	2.83E-05	7.85E-03	1.53E+00	3.07E+01	7.67E+03
Ca-45	9.97E-07	5.23E-06	1.28E-05	2.37E+00	5.11E+00	1.26E+01
Cd-109	6.60E-05	6.60E-05	3.93E-04	1.94E+02	1.94E+02	1.17E+03
Ce-139*	3.32E-06	3.32E-06	3.32E-06	3.40E+00	3.40E+00	3.40E+00
Co-57	3.65E-07	6.81E-05	9.19E-05	8.75E-01	6.66E+01	8.98E+01
Co-58	4.98E-07	4.98E-07	1.69E-05	1.19E+00	1.19E+00	1.65E+01
Co-60	4.14E-06	2.79E-05	2.53E-02	3.83E+00	3.78E+01	2.47E+04
Cr-51	9.53E-04	9.96E-03	1.58E-01	9.32E+02	9.74E+03	1.54E+05
Cs-134	6.73E-07	1.35E-06	5.08E-05	6.47E-01	1.05E+00	4.96E+01
Cs-137	4.14E-06	1.18E-05	1.26E-02	3.83E+00	3.15E+01	1.24E+04
Fe-55	4.14E-06	4.71E-06	1.29E-03	4.05E+00	2.20E+01	1.27E+03
Fe-59	2.57E-06	2.45E-06	3.32E-06	1.53E+00	2.47E+00	3.40E+00
Ga-67	4.32E-04	2.06E-03	5.54E-03	4.23E+02	2.01E+03	5.41E+03
Gd-153*	9.42E-05	9.42E-05	9.42E-05	5.01E+02	5.01E+02	5.01E+02
H-3	2.35E-06	5.37E-03	3.55E-01	2.30E+00	5.25E+03	4.84E+05
Hg-203*	3.32E-06	3.32E-06	3.32E-06	3.40E+00	3.40E+00	3.40E+00
I-123*	4.43E-05	4.43E-05	4.43E-05	4.33E+01	4.33E+01	4.33E+01
I-125	1.57E-06	1.77E-02	3.97E-01	1.53E+00	1.73E+04	3.88E+05
I-131	4.19E-05	1.01E-03	3.65E-02	4.09E+01	9.86E+02	3.57E+04
In-111	2.22E-04	2.22E-04	2.17E-03	2.17E+02	2.17E+02	2.12E+03
Kr-85	2.55E-02	2.77E-02	2.80E-02	2.50E+04	2.71E+04	7.80E+04
Mn-54	9.88E-07	1.56E-06	1.29E-04	8.54E-01	2.63E+00	1.27E+02
Na-22	6.73E-07	6.73E-07	1.99E-06	6.47E-01	6.47E-01	4.75E+00
Nb-95*	4.24E-04	4.24E-04	4.24E-04	4.14E+02	4.14E+02	4.14E+02
Ni-63	1.57E-06	4.71E-06	4.21E-03	1.53E+00	2.20E+01	4.12E+03
P-32	1.57E-06	9.77E-03	1.16E-01	1.53E+00	9.55E+03	1.14E+05
Po-210*	1.17E-05	1.17E-05	1.17E-05	3.48E+01	3.48E+01	3.48E+01

Table E-4 Northwest Compact Industrial Waste Generators Biomedical Radionuclide Distributions - Shipment Level[a], Cont'd

Nuclide	Concentration Ranges - Percentile(b) - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
Ra-226	2.27E-04	4.07E-04	1.04E-03	2.22E+02	4.10E+02	9.24E+02
Ru-103*	9.14E-06	9.14E-06	9.14E-06	8.93E+00	8.93E+00	8.93E+00
Ru-106*	9.88E-07	7.03E-05	2.63E-04	8.54E-01	7.41E+01	2.57E+02
S-35	4.98E-07	5.10E-03	8.00E-02	1.19E+00	4.98E+03	7.82E+04
Se-75	8.97E-06	8.97E-06	6.73E-04	2.14E+01	2.14E+01	6.58E+02
Sn-113	3.32E-06	1.62E-05	2.91E-05	3.40E+00	1.59E+01	2.84E+01
Sr-85	1.47E-06	1.47E-06	2.94E-06	4.32E+00	4.32E+00	8.71E+00
Sr-90	4.04E-06	3.01E-05	3.57E-05	3.16E+00	2.60E+01	3.43E+01
Tc-99	9.42E-06	9.42E-06	3.14E-05	9.21E+00	9.21E+00	3.07E+01
Tc-99m	4.71E-06	2.22E-02	4.43E-02	4.60E+00	2.17E+04	4.33E+04
Th-232	2.35E-06	3.53E-06	4.71E-06	6.29E+00	8.65E+00	1.10E+01
Tl-201*	2.22E-03	2.22E-03	2.22E-03	2.17E+03	2.17E+03	2.17E+03
U-238	9.21E-08	9.11E-05	6.71E-02	9.00E-02	8.91E+01	6.56E+04
[illegible]*	3.32E-06	3.32E-06	3.32E-06	3.40E+00	3.40E+00	3.40E+00
Zn-65	3.38E-05	3.38E-05	7.34E-05	9.93E+01	9.93E+01	2.18E+02

(a) Based on shipment data to all three disposal sites from 1986 to 1990.

(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table E-5 Rocky Mountain Compact Academic Waste Generators Biomedical Radionuclide Distributions - Shipment Level(a)

Waste Class: A Stable and Unstable
Number of shipping records: 3
Number of shipping containers: 167
Total waste volume: 64.2 m^3
Total waste mass: 45,000 kg
Average waste form density: 0.70 g/cm^3

	Concentration Ranges - Percentile(b) - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
Ca-14	1.24E-04	2.45E-04	3.74E-04	1.77E+02	5.40E+02	6.42E+02
Ca-45	3.22E-05	3.86E-05	4.57E-05	5.51E+01	7.10E+01	7.85E+01
Co-57	2.14E-06	2.50E-06	5.47E-06	3.56E+00	4.71E+00	9.39E+00
Co-60*	1.46E-06	1.46E-06	1.46E-06	2.09E+00	2.09E+00	2.09E+00
Cr-51	3.18E-06	4.12E-06	1.41E-04	5.45E+00	9.08E+00	2.01E+02
Cs-137*	6.96E-06	6.96E-06	6.96E-06	9.92E+00	9.92E+00	9.92E+00
Fe-55	3.13E-07	3.13E-07	1.00E-05	6.89E-01	6.89E-01	1.43E+01
Gd-153	1.06E-06	1.03E-05	2.67E-05	1.82E+00	2.27E+01	3.81E+01
H-3	1.51E-02	1.81E-02	3.88E-02	2.58E+04	3.33E+04	6.65E+04
I-125	5.57E-04	7.62E-04	1.00E-03	1.09E+03	1.23E+03	1.72E+03
I-131*	9.63E-07	9.63E-07	9.63E-07	1.37E+00	1.37E+00	1.37E+00
Nb-95*	1.02E-05	1.02E-05	1.02E-05	1.45E+01	1.45E+01	1.45E+01
Ni-63*	1.31E-05	1.31E-05	1.31E-05	1.86E+01	1.86E+01	1.86E+01
P-32	4.17E-07	4.17E-07	3.41E-05	9.19E-01	9.19E-01	4.87E+01
S-35	2.10E-04	2.53E-04	4.65E-04	3.62E+02	4.62E+02	7.97E+02
Zn-65*	3.03E-06	3.03E-06	3.03E-06	4.33E+00	4.33E+00	4.33E+00

(a) Based on shipment data to all three disposal sites from 1986 to 1990.
(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table E-6 Rocky Mountain Compact Industrial Waste Generators Biomedical Radionuclide Distributions - Shipment Level(a)

Waste Class: A Stable and Unstable
Number of shipping records: 6
Number of shipping containers: 84
Total waste volume: 54.8 m^3
Total waste mass: 56,050 kg
Average waste form density: 1.18 g/cm^3

Nuclide	Concentration Ranges - Percentile(b) - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
Co-60*	9.95E-04	9.95E-04	9.95E-04	8.42E+02	8.42E+02	8.42E+02
Cs-137	7.17E-04	4.71E-01	9.42E-01	6.07E+02	4.61E+05	9.21E+05
Kr-85	2.40E-02	2.55E-02	2.70E-02	2.35E+04	2.49E+04	2.64E+04
Ra-226	9.02E-06	3.86E-05	6.82E-05	8.82E+00	3.77E+01	6.66E+01
U-238	1.22E-05	4.27E-03	7.34E-03	1.03E+01	4.17E+03	7.18E+03

(a) Based on shipment data to all three disposal sites from 1986 to 1990.
(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table E-7 Central Compact Government Waste Generators Biomedical Radionuclide Distributions - Shipment Level(a)

Waste Class: A Stable and Unstable
Number of shipping records: 1
Number of shipping containers: no data
Total waste volume: 8.4 m^3
Total waste mass: 5,896 kg
Average waste form density: 0.70 g/cm^3

	Concentration Ranges - Percentile(b) - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
Th-232*	2.23E-03	2.23E-03	2.23E-03	3.19E+03	3.19E+03	3.19E+03

(a) Based on shipment data to all three disposal sites from 1986 to 1990.
(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table E-8 Central Compact Academic Waste Generators Biomedical Radionuclide Distributions - Shipment Level(a)

Waste Class: A Stable and Unstable
Number of shipping records: 1
Number of shipping containers: no data
Total waste volume: 1.9 m^3
Total waste mass: 1,086 kg
Average waste form density: 0.57 g/cm^3

Nuclide	Concentration Ranges - Ci/m^3 - 1st	50th	99th	Percentile(b) - pCi/g - 1st	50th	99th
C-14*	2.16E-03	2.16E-03	2.16E-03	3.80E+03	3.80E+03	3.80E+03
Ca-45*	1.14E-03	1.14E-03	1.14E-03	2.00E+03	2.00E+03	2.00E+03
H-3*	4.66E-03	4.66E-03	4.66E-03	8.21E+03	8.21E+03	8.21E+03
I-125*	1.09E-02	1.09E-02	1.09E-02	1.92E+04	1.92E+04	1.92E+04
P-32*	3.07E-03	3.07E-03	3.07E-03	5.41E+03	5.41E+03	5.41E+03
S-35*	7.59E-04	7.59E-04	7.59E-04	1.34E+03	1.34E+03	1.34E+03
Zn-65*	1.11E-03	1.11E-03	1.11E-03	1.95E+03	1.95E+03	1.95E+03

(a) Based on shipment data to all three disposal sites from 1986 to 1990.
(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table E-9 Central Compact Industrial Waste Generators Biomedical Radionuclide Distributions - Shipment Level(a)

Waste Class: A Stable and Unstable
Number of shipping records: 452
Number of shipping containers: 869
Total waste volume: 5,584 m^3
Total waste mass: 5,713,000 kg
Average waste form density: 1.06 g/cm^3

	Concentration Ranges - Percentile(b) - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
Am-241	6.98E-07	4.71E-06	2.62E-05	6.82E-01	4.60E+00	2.56E+01
Ba-133	2.56E-07	2.56E-07	1.83E-05	2.66E-01	2.66E-01	1.78E+01
C-14*	2.56E-04	2.56E-04	2.56E-04	2.51E+02	2.51E+02	2.51E+02
Cd-109*	1.02E-07	1.02E-07	1.02E-07	1.06E-01	1.06E-01	1.06E-01
Co-57*	5.12E-08	5.12E-08	5.12E-08	5.32E-02	5.32E-02	5.32E-02
Co-60	5.12E-08	5.12E-08	5.38E-04	5.32E-02	5.32E-02	5.26E+02
Cr-51*	9.60E-04	9.60E-04	9.60E-04	9.39E+02	9.39E+02	9.39E+02
Cs-137*	5.43E-02	5.43E-02	5.43E-02	5.31E+04	5.31E+04	5.31E+04
H-3*	1.00E+00	1.00E+00	1.00E+00	9.81E+05	9.81E+05	9.81E+05
Hg-203*	2.14E-06	2.14E-06	2.14E-06	2.09E+00	2.09E+00	2.09E+00
I-125*	8.20E-03	8.20E-03	8.20E-03	8.02E+03	8.02E+03	8.02E+03
Ir-192*	9.11E-04	9.11E-04	9.11E-04	8.90E+02	8.90E+02	8.90E+02
Kr-85*	1.10E-02	1.10E-02	1.10E-02	3.79E+04	3.79E+04	3.79E+04
P-32*	3.33E-04	3.33E-04	3.33E-04	3.26E+02	3.26E+02	3.26E+02
Ra-226*	5.53E-04	5.53E-04	5.53E-04	1.90E+03	1.90E+03	1.90E+03
S-35*	8.13E-05	8.13E-05	8.13E-05	7.95E+01	7.95E+01	7.95E+01
Th-228*	5.12E-08	5.12E-08	5.12E-08	5.32E-02	5.32E-02	5.32E-02
Th-232	5.23E-06	4.64E-04	2.18E-02	5.11E+00	4.54E+02	2.13E+04
U-238	1.11E-05	2.20E-04	2.12E-02	1.09E+01	2.15E+02	2.00E+04

(a) Based on shipment data to all three disposal sites from 1986 to 1990.
(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table E-10 Midwest Compact Government Waste Generators Biomedical Radionuclide Distributions - Shipment Level[a]

Waste Class: A Stable and Unstable
Number of shipping records: 4
Number of shipping containers: no data
Total waste volume: 43.5 m^3
Total waste mass: 30,490 kg
Average waste form density: 0.70 g/cm^3

Nuclide	Concentration Ranges - Ci/m^3 - 1st	50th	99th	Percentile[b] - pCi/g - 1st	50th	99th
C-14*	2.35E-03	5.69E-02	1.11E-01	3.35E+03	8.11E+04	1.59E+05
Cd-109*	6.40E-06	6.40E-06	6.40E-06	9.13E+00	9.13E+00	9.13E+00
Co-57*	5.12E-05	5.12E-05	5.12E-05	7.30E+01	7.30E+01	7.30E+01
Co-58*	4.54E-04	4.54E-04	4.54E-04	6.48E+02	6.48E+02	6.48E+02
Co-60*	7.89E-05	7.89E-05	7.89E-05	1.13E+02	1.13E+02	1.13E+02
Cr-51*	4.35E-04	4.35E-04	4.35E-04	6.21E+02	6.21E+02	6.21E+02
Cs-137*	3.11E-04	3.11E-04	3.11E-04	4.44E+02	4.44E+02	4.44E+02
Fe-55*	1.65E-04	1.65E-04	1.65E-04	2.36E+02	2.36E+02	2.36E+02
H-3	5.21E-03	4.03E-02	7.53E-02	7.44E+03	5.74E+04	1.07E+05
I-125*	3.07E-02	3.07E-02	3.07E-02	4.38E+04	4.38E+04	4.38E+04
P-32*	1.41E-02	1.41E-02	1.41E-02	2.01E+04	2.01E+04	2.01E+04
S-35*	1.15E-03	1.15E-03	1.15E-03	1.64E+03	1.64E+03	1.64E+03
Sr-90*	2.67E-04	2.67E-04	2.67E-04	3.80E+02	3.80E+02	3.80E+02
Th-228*	1.25E-05	1.25E-05	1.25E-05	1.78E+01	1.78E+01	1.78E+01
Th-232*	1.37E-03	1.37E-03	1.37E-03	1.95E+03	1.95E+03	1.95E+03

(a) Based on shipment data to all three disposal sites from 1986 to 1990.
(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table E-11 Midwest Compact Academic Waste Generators Biomedical Radionuclide Distributions - Shipment Level(a)

Waste Class: A Stable and Unstable
Number of shipping records: 9
Number of shipping containers: no data
Total waste volume: 38.7 m^3
Total waste mass: 21,960 kg
Average waste form density: 0.57 g/cm^3

Nuclide	Concentration Ranges - Percentile(b) - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
Am-241*	4.25E-07	4.25E-07	4.25E-07	7.49E-01	7.49E-01	7.49E-01
Ba-133*	8.26E-07	1.76E-05	2.85E-05	1.45E+00	3.10E+01	5.02E+01
C-14	5.33E-05	1.15E-04	1.55E-03	9.38E+01	2.03E+02	2.72E+03
Ca-45	2.94E-05	2.94E-05	8.63E-05	5.18E+01	5.18E+01	1.52E+02
Cd-109*	5.19E-05	5.19E-05	5.19E-05	9.14E+01	9.14E+01	9.14E+01
Ce-141	2.77E-07	9.07E-06	1.79E-05	4.88E-01	1.60E+01	3.15E+01
Cl-36	5.26E-06	9.86E-05	1.92E-04	2.60E+00	1.74E+02	3.38E+02
Co-57	7.59E-07	2.49E-06	6.77E-06	1.34E+00	4.39E+00	1.19E+01
Co-60	2.28E-06	3.20E-03	9.42E-03	4.01E+00	5.64E+03	1.66E+04
Cr-51	6.95E-04	9.66E-04	2.59E-03	1.22E+03	1.70E+03	4.56E+03
Cs-137	2.83E-04	1.06E-02	2.08E-02	4.97E+02	1.86E+04	3.67E+04
Fe-59*	1.40E-05	1.40E-05	1.40E-05	2.47E+01	2.47E+01	2.47E+01
Ga-67*	1.26E-06	1.26E-06	1.26E-06	2.21E+00	2.21E+00	2.21E+00
Gd-153*	1.28E-05	1.28E-05	1.28E-05	2.25E+01	2.25E+01	2.25E+01
Ge-68*	2.55E-06	2.55E-06	2.55E-06	4.49E+00	4.49E+00	4.49E+00
H-3	6.84E-06	1.76E-03	9.07E-03	1.20E+01	3.10E+03	1.60E+04
I-125	4.85E-04	1.45E-03	1.41E-02	8.53E+02	2.55E+03	2.48E+04
I-129*	1.15E-05	1.15E-05	1.15E-05	2.02E+01	2.02E+01	2.02E+01
Mn-54	7.59E-07	2.87E-05	5.66E-05	1.34E+00	5.05E+01	9.96E+01
Na-22	8.83E-05	8.83E-05	1.02E-04	1.55E+02	1.55E+02	1.80E+02
Ni-63	2.22E-05	2.22E-05	5.89E-05	3.90E+01	3.90E+01	1.04E+02
P-32	8.29E-04	1.09E-03	1.25E-02	1.46E+03	1.92E+03	2.20E+04
Ra-226	4.25E-07	2.36E-04	4.71E-04	7.49E-01	4.15E+02	8.29E+02
Rb-86	7.23E-06	7.23E-06	7.23E-06	1.27E+01	1.27E+01	1.27E+01
Ru-103*	4.41E-05	4.41E-05	4.41E-05	7.77E+01	7.77E+01	7.77E+01
S-35	6.28E-06	5.59E-05	1.81E-04	1.11E+01	9.84E+01	3.19E+02
Sc-46*	2.25E-04	2.25E-04	2.25E-04	3.97E+02	3.97E+02	3.97E+02
Se-75*	1.58E-04	1.58E-04	1.58E-04	2.79E+02	2.79E+02	2.79E+02

Table E-11 Midwest Compact Academic Waste Generators Biomedical Radionuclide Distributions - Shipment Level[a], Cont'd

Nuclide	Concentration Ranges - Percentile(b) - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
Sn-113*	2.27E-04	2.27E-04	2.27E-04	3.99E+02	3.99E+02	3.99E+02
Sr-85*	1.27E-04	1.27E-04	1.27E-04	2.23E+02	2.23E+02	2.23E+02
Sr-90*	4.26E-04	4.26E-04	4.26E-04	7.50E+02	7.50E+02	7.50E+02
Tc-99*	2.17E-05	2.17E-05	2.17E-05	3.82E+01	3.82E+01	3.82E+01
Th-232*	4.68E-06	4.68E-06	4.68E-06	8.24E+00	8.24E+00	8.24E+00
Tl-204*	2.35E-05	2.35E-05	2.35E-05	4.14E+01	4.14E+01	4.14E+01
U-238	1.55E-04	1.97E-04	2.39E-04	2.74E+02	3.47E+02	4.20E+02
Zn-65*	3.87E-05	3.87E-05	3.87E-05	6.81E+01	6.81E+01	6.81E+01

(a) Based on shipment data to all three disposal sites from 1986 to 1990.

(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table E-12 Midwest Compact Medical Waste Generators Biomedical Radionuclide Distributions - Shipment Level(a)

Waste Class: A Stable and Unstable
Number of shipping records: 11
Number of shipping containers: 109
Total waste volume: 157.4 m^3
Total waste mass: 122,000 kg
Average waste form density: 0.74 g/cm^3

	Concentration Ranges - Percentile(b) - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
Am-241	2.15E-06	3.43E-06	4.71E-06	2.78E+00	4.43E+00	6.08E+00
C-14	1.20E-03	1.35E-03	1.90E-03	1.55E+03	1.75E+03	2.45E+03
Ca-45	1.03E-04	1.06E-04	1.59E-04	1.33E+02	1.37E+02	2.05E+02
Ce-141	2.06E-07	1.56E-06	1.87E-06	2.66E-01	2.01E+00	2.41E+00
Cl-36	6.40E-05	6.40E-05	1.23E-04	8.26E+01	8.26E+01	1.66E+02
Co-57	3.56E-06	4.58E-06	6.34E-05	4.59E+00	5.90E+00	8.19E+01
Cr-51	1.04E-02	1.10E-02	1.50E-02	1.34E+04	1.42E+04	1.93E+04
Cs-137*	4.32E-07	4.32E-07	4.32E-07	5.84E-01	5.84E-01	5.84E-01
Fe-55	6.68E-06	1.14E-05	1.15E-05	8.62E+00	1.47E+01	1.48E+01
Fe-59	5.00E-07	2.00E-05	1.30E-04	6.46E-01	2.59E+01	1.67E+02
Ga-67	1.35E-05	1.47E-05	2.00E-05	1.75E+01	1.90E+01	2.59E+01
H-3	6.02E-03	1.99E-02	2.07E-02	7.77E+03	2.56E+04	2.67E+04
Hg-203	3.99E-05	3.99E-05	2.16E-04	5.15E+01	5.15E+01	2.92E+02
I-123	4.68E-06	6.18E-06	6.47E-06	6.03E+00	7.97E+00	8.35E+00
I-125	8.72E-03	8.80E-03	1.00E-02	1.13E+04	1.13E+04	1.29E+04
I-129	1.20E-06	1.20E-06	1.20E-06	1.54E+00	1.54E+00	1.54E+00
I-131	1.40E-04	3.00E-04	4.42E-04	1.80E+02	3.87E+02	5.71E+02
In-111	2.00E-04	2.73E-04	4.36E-04	2.58E+02	3.53E+02	5.63E+02
Mn-54	1.60E-07	2.47E-07	3.34E-07	2.06E-01	3.18E-01	4.31E-01
Na-22	1.36E-05	1.57E-05	3.82E-05	1.75E+01	2.02E+01	4.93E+01
Nb-95	2.09E-06	4.86E-06	6.78E-06	2.70E+00	6.27E+00	8.75E+00
Ni-63*	5.99E-04	5.99E-04	5.99E-04	7.72E+02	7.72E+02	7.72E+02
P-32	4.73E-03	5.62E-03	5.76E-03	6.10E+03	7.25E+03	7.43E+03
Po-210*	4.32E-08	4.32E-08	4.32E-08	5.84E-02	5.84E-02	5.84E-02
Ra-226*	2.94E-06	2.94E-06	2.94E-06	3.80E+00	3.80E+00	3.80E+00
Rb-86	4.53E-05	1.30E-04	2.18E-04	5.85E+01	1.67E+02	2.82E+02
S-35	3.13E-03	7.41E-03	7.72E-03	4.04E+03	9.56E+03	9.96E+03
Sc-46	2.35E-06	5.56E-06	1.10E-05	3.04E+00	7.18E+00	1.42E+01

Table E-12 Midwest Compact Medical Waste Generators Biomedical Radionuclide Distributions - Shipment Level(a), Cont'd

Nuclide	Concentration Ranges - Percentile(b) - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
Se-75*	1.67E-07	1.67E-07	1.67E-07	2.15E-01	2.15E-01	2.15E-01
Sn-113	2.09E-06	2.94E-06	3.50E-06	2.70E+00	3.79E+00	4.52E+00
Sr-85	2.38E-06	7.83E-06	1.24E-05	3.08E+00	1.01E+01	1.59E+01
Sr-89*	3.99E-08	3.99E-08	3.99E-08	5.15E-02	5.15E-02	5.15E-02
Sr-90	1.73E-06	1.73E-06	3.99E-05	2.34E+00	2.34E+00	5.15E+01
Tc-99m	1.77E-02	2.34E-02	2.44E-02	2.28E+04	3.02E+04	3.15E+04
Tl-201	9.12E-06	1.15E-05	1.44E-05	1.18E+01	1.48E+01	1.86E+01
U-238*	3.99E-08	3.99E-08	3.99E-08	5.15E-02	5.15E-02	5.15E-02
Xe-133	1.34E-06	7.06E-06	1.47E-05	1.72E+00	9.11E+00	1.90E+01
Y-90	3.24E-05	3.24E-05	3.24E-05	4.38E+01	4.38E+01	4.38E+01

(a) Based on shipment data to all three disposal sites from 1986 to 1990.
(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table E-13 Midwest Compact Industrial Waste Generators Biomedical Radionuclide Distributions - Shipment Level(a)

Waste Class: A Stable and Unstable
Number of shipping records: 284
Number of shipping containers: 1,435
Total waste volume: 3,588 m^3
Total waste mass: 3,670,000 kg
Average waste form density: 1.27 g/cm^3

	Concentration Ranges - Percentile(b) - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
Am-241	7.69E-08	7.69E-08	1.70E-03	1.52E-01	1.52E-01	1.66E+03
Ba-133	4.71E-06	1.77E-05	3.06E-05	4.60E+00	1.73E+01	2.99E+01
C-14	1.24E-05	1.53E-03	3.99E-02	2.45E+01	1.50E+03	7.14E+04
Ca-45	2.55E-04	8.45E-04	1.31E-03	2.49E+02	8.26E+02	1.28E+03
Ca-47	2.24E-06	2.24E-06	2.24E-06	2.19E+00	2.19E+00	2.19E+00
Cl-36	1.48E-04	1.48E-04	1.48E-04	1.89E+01	1.89E+01	1.89E+01
Co-57	4.48E-05	4.48E-05	7.17E-04	4.38E+01	4.38E+01	7.01E+02
Co-60	3.83E-03	3.83E-03	1.95E-02	3.75E+03	3.75E+03	1.91E+04
Cr-51	8.06E-04	8.06E-04	9.69E-04	7.88E+02	7.88E+02	9.47E+02
Cs-134*	1.61E-04	1.61E-04	1.61E-04	1.58E+02	1.58E+02	1.58E+02
Cs-137	3.68E-05	3.77E-05	1.62E-02	2.54E+01	2.60E+01	1.61E+04
Fe-55*	2.29E-02	2.29E-02	2.29E-02	2.24E+04	2.24E+04	2.24E+04
Fe-59	1.57E-05	9.48E-03	1.89E-02	1.53E+01	9.26E+03	1.85E+04
Ga-67*	1.88E-06	1.88E-06	1.88E-06	1.84E+00	1.84E+00	1.84E+00
Gd-153*	9.61E-04	9.61E-04	9.61E-04	9.39E+02	9.39E+02	9.39E+02
H-3	2.08E-04	9.59E-03	3.26E+01	2.03E+02	1.64E+04	3.19E+07
I-125	1.57E-03	1.24E-02	8.65E-02	1.54E+03	1.21E+04	8.46E+04
I-129	7.69E-08	3.33E-07	5.89E-07	1.52E-01	3.64E-01	5.75E-01
I-131	1.35E-04	1.35E-04	2.28E-02	1.32E+02	1.32E+02	2.23E+04
In-111	1.47E-04	6.95E-04	1.88E-03	1.44E+02	6.79E+02	1.84E+03
Kr-85	8.63E-05	3.80E-02	1.71E+00	8.44E+01	3.71E+04	1.67E+06
Mn-54*	5.57E-04	5.57E-04	5.57E-04	5.44E+02	5.44E+02	5.44E+02
Na-22	4.48E-06	4.71E-05	4.12E-04	4.38E+00	4.60E+01	4.03E+02
Nb-95*	9.61E-04	9.61E-04	9.61E-04	9.39E+02	9.39E+02	9.39E+02
Ni-63	8.34E-04	8.34E-04	1.56E-03	1.06E+03	1.06E+03	1.65E+03
P-32	4.35E-04	5.87E-03	2.44E-02	4.25E+02	5.73E+03	2.39E+04
Po-210*	1.50E-05	1.50E-05	1.50E-05	1.46E+01	1.46E+01	1.46E+01
Ra-226	4.52E-06	8.31E-05	3.42E-03	4.42E+00	1.13E+02	3.35E+03

Table E-13 Midwest Compact Industrial Waste Generators Biomedical Radionuclide Distributions - Shipment Level(a), Cont'd

Nuclide	Concentration Ranges - Percentile(b) - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
Rb-86	2.33E-05	2.33E-05	4.48E-05	2.27E+01	2.27E+01	4.38E+01
S-35	8.46E-04	3.98E-03	9.03E-03	8.27E+02	3.89E+03	8.83E+03
Sc-46*	1.93E-04	1.93E-04	1.93E-04	1.88E+02	1.88E+02	1.88E+02
Sn-113	2.20E-04	3.00E-04	3.80E-04	2.15E+02	2.93E+02	3.72E+02
Sr-90	2.80E-04	3.18E-03	7.36E-03	2.74E+02	3.23E+03	7.20E+03
Tc-99	1.54E-07	2.14E-03	5.44E-03	3.04E-01	2.09E+03	5.32E+03
Tc-99m	2.33E-04	2.33E-04	6.04E-04	2.27E+02	2.27E+02	5.90E+02
Th-232	1.41E-05	1.39E-03	2.12E-03	1.38E+01	1.34E+03	2.07E+03
Tl-204*	2.34E-08	2.34E-08	2.34E-08	2.29E-02	2.29E-02	2.29E-02
U-238	1.93E-05	4.78E-05	1.38E-01	1.88E+01	4.67E+01	1.35E+05
Xe-133*	1.41E-05	1.41E-05	1.41E-05	1.38E+01	1.38E+01	1.38E+01
Y-90*	1.11E-04	1.11E-04	1.11E-04	1.09E+02	1.09E+02	1.09E+02
Yb-169*	1.88E-06	1.88E-06	1.88E-06	1.84E+01	1.84E+01	1.84E+01
Zn-65*	1.08E-04	1.08E-04	1.08E-04	1.06E+02	1.06E+02	1.06E+02

(a) Based on shipment data to all three disposal sites from 1986 to 1990.
(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table E-14 Central Midwest Compact Government Waste Generators Biomedical Radionuclide Distributions - Shipment Level(a)

Waste Class: A Stable and Unstable
Number of shipping records: 7
Number of shipping containers: no data
Total waste volume: 61.3 m^3
Total waste mass: 42,990 kg
Average waste form density: 0.70 g/cm^3

	Concentration Ranges - Percentile(b) - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
Am-241*	2.14E-03	2.14E-03	2.14E-03	3.06E+03	3.06E+03	3.06E+03
C-14	7.46E-04	7.46E-04	4.79E-03	1.06E+03	1.06E+03	6.83E+03
Ca-45*	1.10E-03	1.10E-03	1.10E-03	1.57E+03	1.57E+03	1.57E+03
Ce-141*	3.36E-06	3.36E-06	3.36E-06	4.80E+00	4.80E+00	4.80E+00
Co-57*	5.92E-04	5.92E-04	5.92E-04	8.44E+02	8.44E+02	8.44E+02
Co-60*	5.93E-05	5.93E-05	5.93E-05	8.46E+01	8.46E+01	8.46E+01
Cr-51*	3.20E-06	3.20E-06	3.20E-06	4.56E+00	4.56E+00	4.56E+00
Cs-137	9.42E-07	3.93E-04	7.85E-04	1.34E+00	5.60E+02	1.12E+03
H-3	1.15E-03	1.15E-03	5.05E-02	1.65E+03	1.65E+03	7.20E+04
I-125	3.86E-04	5.24E-03	1.01E-02	5.51E+02	7.48E+03	1.44E+04
Kr-85*	1.26E-02	1.26E-02	1.26E-02	1.80E+04	1.80E+04	1.80E+04
Na-22*	1.77E-03	1.77E-03	1.77E-03	2.52E+03	2.52E+03	2.52E+03
Nb-95*	4.57E-03	4.57E-03	4.57E-03	6.52E+03	6.52E+03	6.52E+03
Ni-63*	6.50E-04	6.50E-04	6.50E-04	9.27E+02	9.27E+02	9.27E+02
P-32	1.18E-04	2.88E-03	5.64E-03	1.68E+02	4.11E+03	8.05E+03
Pm-147	1.90E-02	1.01E+00	2.00E+00	2.71E+04	1.44E+06	2.86E+06
Ra-226	2.21E-06	7.89E-04	1.19E-03	3.15E+00	1.13E+03	1.70E+03
S-35	1.30E-02	3.43E-02	5.56E-02	1.85E+04	4.89E+04	7.93E+04
Sc-46	3.20E-06	3.20E-06	2.05E-03	4.56E+00	4.56E+00	2.93E+03
Sr-85*	2.69E-06	2.69E-06	2.69E-06	3.84E+00	3.84E+00	3.84E+00
Sr-89*	7.06E-04	7.06E-04	7.06E-04	1.01E+03	1.01E+03	1.01E+03
U-238	8.48E-06	2.34E-05	3.83E-05	1.21E+01	3.34E+01	5.47E+01

(a) Based on shipment data to all three disposal sites from 1986 to 1990.
(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table E-15 Central Midwest Compact Academic Waste Generators Biomedical Radionuclide Distributions - Shipment Level(a)

Waste Class: A Stable and Unstable
Number of shipping records: 3
Number of shipping containers: no data
Total waste volume: 21.2 m^3
Total waste mass: 12,060 kg
Average waste form density: 0.57 g/cm^3

	Concentration Ranges - Percentile(b) - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
C-14	5.48E-06	6.33E-03	7.40E-03	9.65E+00	1.11E+04	1.30E+04
H-3	1.19E-02	1.19E-02	1.46E-02	2.10E+04	2.10E+04	2.57E+04
I-125	3.65E-03	3.65E-03	3.65E-03	6.43E+03	6.43E+03	8.73E+03
I-129*	1.10E-06	1.10E-06	1.10E-06	1.93E+00	1.93E+00	1.93E+00
P-32	1.62E-03	1.62E-03	5.89E-03	2.86E+03	2.86E+03	1.04E+04
Ra-226*	1.35E-04	1.35E-04	1.35E-04	2.38E+02	2.38E+02	2.38E+02
S-35	8.41E-04	8.41E-04	3.25E-03	4.56E+00	4.56E+00	4.56E+00
Th-232*	1.10E-06	1.10E-06	1.10E-06	1.93E+00	1.93E+00	1.93E+00
U-238*	1.10E-04	1.10E-04	1.10E-04	1.93E+02	1.93E+02	1.93E+02

(a) Based on shipment data to all three disposal sites from 1986 to 1990.
(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table E-16 Central Midwest Compact Medical Waste Generators Biomedical Radionuclide Distributions - Shipment Level(a)

Waste Class: A Stable and Unstable
Number of shipping records: 3
Number of shipping containers: no data
Total waste volume: 1.8 m^3
Total waste mass: 1,405 kg
Average waste form density: 0.78 g/cm^3

	Concentration Ranges - Percentile(b) - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
C-14*	8.81E-04	8.81E-04	8.81E-04	1.14E+03	1.14E+03	1.14E+03
Co-57*	1.48E-04	1.48E-04	1.48E-04	1.91E+02	1.91E+02	1.91E+02
Co-60*	1.62E-02	1.62E-02	1.62E-02	2.09E+04	2.09E+04	2.09E+04
I-125	4.71E-04	4.71E-04	5.51E-04	6.08E+02	6.08E+02	7.11E+02
Zn-65*	4.40E-04	4.40E-04	4.40E-04	5.68E+02	5.68E+02	5.68E+02

(a) Based on shipment data to all three disposal sites from 1986 to 1990.
(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table E-17 Central Midwest Compact Industrial Waste Generators Biomedical Radionuclide Distributions - Shipment Level(a)

Waste Class: A Stable and Unstable
Number of shipping records: 55
Number of shipping containers: 630
Total waste volume: 602.0 m^3
Total waste mass: 615,900 kg
Average waste form density: 1.41 g/cm^3

	Concentration Ranges - Percentile(b) - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
Au-195*	1.63E-04	1.63E-04	1.63E-04	1.59E+02	1.59E+02	1.59E+02
C-14	3.03E-05	2.42E-03	1.24E-02	2.96E+01	2.37E+03	1.22E+04
Ca-45*	1.84E-04	1.84E-04	1.84E-04	1.79E+02	1.79E+02	1.79E+02
Cd-109*	2.44E-06	2.44E-06	2.44E-06	2.39E+00	2.39E+00	2.39E+00
Ce-141*	3.45E-05	3.45E-05	3.45E-05	3.38E+01	3.38E+01	3.38E+01
Cl-36*	2.08E-07	2.08E-07	2.08E-07	2.03E-01	2.03E-01	2.03E-01
Co-57	1.82E-04	8.40E-04	1.50E-03	1.78E+02	8.21E+02	1.46E+03
Co-60	3.91E-06	9.64E-03	3.18E-02	3.82E+00	9.43E+03	3.11E+04
Cr-51	2.54E-06	1.75E-04	3.48E-04	2.48E+00	1.71E+02	3.40E+02
Cs-137	4.71E-06	1.39E-01	8.15E-01	4.60E+00	1.36E+05	7.96E+05
Fe-55*	7.62E-05	7.62E-05	7.62E-05	7.45E+01	7.45E+01	7.45E+01
Fe-59*	3.01E-06	3.01E-06	3.01E-06	2.94E+00	2.94E+00	2.94E+00
Ga-67*	1.04E-07	1.04E-07	1.04E-07	1.02E-01	1.02E-01	1.02E+01
Gd-153*	2.13E-06	2.13E-06	2.13E-06	2.08E+00	2.08E+00	2.08E+00
H-3	4.20E-06	6.28E-02	3.92E-01	4.11E+00	6.14E+04	3.83E+05
I-123*	1.04E-07	1.04E-07	1.04E-07	1.02E-01	1.02E-01	1.02E-01
I-125	2.54E-05	3.03E-03	6.03E-03	2.48E+01	2.96E+03	5.89E+03
I-129	1.29E-06	1.29E-06	6.76E-05	1.26E+00	1.26E+00	6.61E+01
I-131*	6.23E-06	6.23E-06	6.23E-06	6.09E+00	6.09E+00	6.09E+00
In-111*	4.68E-07	4.68E-07	4.68E-07	4.57E-01	4.57E-01	4.57E-01
In-114*	1.56E-06	1.56E-06	1.56E-06	1.52E+00	1.52E+00	1.52E+00
Kr-85	1.55E-02	1.76E-02	1.98E-02	1.51E+04	1.72E+04	1.93E+04
Mn-54*	1.04E-07	1.04E-07	1.04E-07	1.02E-01	1.02E-01	1.02E-01
Mo-99*	5.19E-08	5.19E-08	5.19E-08	5.08E-02	5.08E-02	5.08E-02
Na-22*	3.15E-05	3.15E-05	3.15E-05	3.08E+01	3.08E+01	3.08E+01
Nb-95*	5.33E-05	5.33E-05	5.33E-05	5.21E+01	5.21E+01	5.21E+01
Ni-63	1.64E-03	1.64E-03	4.19E-03	1.60E+03	1.60E+03	4.10E+03
P-32	4.63E-05	1.50E-04	2.54E-04	4.52E+01	1.47E+02	2.48E+02

Table E-17 Central Midwest Compact Industrial Waste Generators Biomedical Radionuclide Distributions - Shipment Level[a], Cont'd

Nuclide	Concentration Ranges - Percentile(b) - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
Ra-226	1.40E-04	2.52E-03	9.42E-03	1.37E+02	2.46E+03	9.21E+03
Rb-86*	2.08E-07	2.08E-07	2.08E-07	2.03E-01	2.03E-01	2.03E-01
Ru-103*	1.61E-06	1.61E-06	1.61E-06	1.57E+00	1.57E+00	1.57E+00
S-35	5.08E-04	9.47E-04	1.26E-03	4.97E+02	9.26E+02	1.24E+03
Sc-46	2.54E-06	6.06E-05	1.19E-04	2.48E+00	5.92E+01	1.16E+02
Se-75*	3.65E-05	3.65E-05	3.65E-05	3.57E+01	3.57E+01	3.57E+01
Sn-113*	8.74E-05	8.74E-05	8.74E-05	8.54E+01	8.54E+01	8.54E+01
Sr-85*	1.37E-04	1.37E-04	1.37E-04	1.34E+02	1.34E+02	1.34E+02
Sr-90	2.54E-05	5.81E-04	1.14E-03	2.48E+01	5.67E+02	1.11E+03
Tc-99	1.94E-06	5.73E-03	2.29E-02	1.90E+00	5.60E+03	2.24E+04
Tc-99m*	1.04E-07	1.04E-07	1.04E-07	1.02E-01	1.02E-01	1.02E-01
Th-232	4.71E-06	1.60E-03	2.44E-03	4.60E+00	1.56E+03	2.38E+03
Tl-201*	5.19E-08	5.19E-08	5.19E-08	5.08E-02	5.08E-02	5.08E-02
U-238	8.06E-04	9.38E-03	2.14E-02	7.88E+02	7.81E+03	2.10E+04
Xe-133*	3.64E-07	3.64E-07	3.64E-07	3.55E-01	3.55E-01	3.55E-01
Y-90*	2.07E-02	2.07E-02	2.07E-02	2.02E+04	2.02E+04	2.02E+04
Zn-65	2.54E-06	6.44E-06	1.03E-05	2.48E+00	6.29E+00	1.01E+01

(a) Based on shipment data to all three disposal sites from 1986 to 1990.
(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table E-18 Southeast Compact Government Waste Generators Biomedical Radionuclide Distributions - Shipment Level(a)

Waste Class: A Stable and Unstable
Number of shipping records: 183
Number of shipping containers: no data
Total waste volume: 3,534 m^3
Total waste mass: 2,478,000 kg
Average waste form density: 0.70 g/cm^3

	Concentration Ranges - Percentile(b) - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
Ag-110m	3.92E-05	9.44E-03	1.88E-02	5.60E+01	1.35E+04	2.69E+04
Ba-133	3.66E-07	4.73E-05	9.42E-05	5.22E-01	6.74E+01	1.34E+02
C-14	4.67E-07	1.66E-05	2.36E-01	6.66E-01	2.37E+01	3.36E+05
Ca-45	1.04E-03	2.41E-02	4.71E-02	1.49E+03	3.44E+04	6.72E+04
Cd-109	4.71E-05	3.98E-04	1.27E-03	6.72E+01	5.68E+02	1.81E+03
Ce-141*	2.50E-04	2.50E-04	2.50E-04	3.57E+02	3.57E+02	3.57E+02
Co-58	9.34E-07	4.97E-05	7.67E-03	1.33E+00	7.10E+01	1.09E+04
Co-60	3.72E-07	7.21E-04	1.12E-02	5.31E-01	1.03E+03	1.60E+04
Cr-51	4.71E-05	4.88E-03	1.42E-02	6.72E+01	6.95E+03	2.02E+04
Cs-137	3.66E-07	9.89E-04	4.76E-03	5.22E-01	1.41E+03	6.78E+03
Fe-55	7.65E-06	7.19E-04	1.49E-01	1.09E+01	1.03E+03	2.13E+05
Fe-59*	2.86E-05	2.86E-05	2.86E-05	4.08E+01	4.08E+01	4.08E+01
H-3	3.56E-07	1.40E-04	6.97E-04	5.08E-01	2.00E+02	2.06E+05
I-125	1.14E-04	2.57E-03	5.03E-03	1.62E+02	3.67E+03	7.18E+03
I-129*	6.52E-05	6.52E-05	6.52E-05	9.30E+01	9.30E+01	9.30E+01
Kr-85	2.58E-04	1.79E-02	4.71E-02	3.68E+02	2.55E+04	6.72E+04
Mn-54	7.44E-07	1.25E-04	6.04E-04	1.06E+00	1.78E+02	8.61E+02
Na-22*	4.71E-03	4.71E-03	4.71E-03	6.72E+03	6.72E+03	6.72E+03
Nb-95*	3.19E-04	3.19E-04	3.19E-04	4.55E+02	4.55E+02	4.55E+02
Ni-63	6.16E-07	4.50E-05	7.55E-03	8.79E-01	6.42E+01	1.08E+04
Pm-147	4.28E-06	8.65E-01	3.43E+00	6.11E+00	1.23E+06	4.89E+06

Table E-18 Southeast Compact Government Waste Generators Biomedical Radionuclide Distributions - Shipment Level[a], Cont'd

Nuclide	Concentration Ranges - Percentile(b) - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
Ra-226	1.89E-06	8.50E-06	4.91E-03	2.69E+00	1.21E+01	7.00E+03
Ru-103*	1.43E-04	1.43E-04	1.43E-04	2.04E+02	2.04E+02	2.04E+02
Sc-46*	7.32E-04	7.32E-04	7.32E-04	1.04E+03	1.04E+03	1.04E+03
Se-75*	4.24E-04	4.24E-04	4.24E-04	6.05E+02	6.05E+02	6.05E+02
Sn-113*	2.05E-04	2.05E-04	2.05E-04	2.92E+02	2.92E+02	2.92E+02
Th-232	2.55E-03	3.19E-03	3.63E-03	3.63E+03	4.56E+03	5.18E+03
U-238*	9.42E-05	9.42E-05	9.42E-05	1.34E+02	1.34E+02	1.34E+02

(a) Based on shipment data to all three disposal sites from 1986 to 1990.
(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table E-19 Southeast Compact Academic Waste Generators Biomedical Radionuclide Distributions - Shipment Level(a)

Waste Class: A Stable and Unstable
Number of shipping records: 140
Number of shipping containers: no data
Total waste volume: 907.7 m^3
Total waste mass: 515,600 kg
Average waste form density: 0.57 g/cm^3

	Concentration Ranges - Percentile(b) - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
Ag-110m*	1.64E-04	1.64E-04	1.64E-04	2.88E+02	2.88E+02	2.88E+02
Am-241	6.89E-06	5.18E-05	1.45E-04	1.21E+01	9.12E+01	2.56E+02
Au-198	4.30E-06	4.30E-06	1.43E-03	7.57E+00	7.57E+00	2.51E+03
C-14	6.73E-06	2.85E-04	2.56E-02	1.18E+01	5.02E+02	4.50E+04
Ca-45	5.61E-07	1.78E-04	4.13E-03	9.87E-01	3.14E+02	7.27E+03
Cd-109	7.24E-06	8.29E-05	2.39E-04	1.28E+01	1.46E+02	4.20E+02
Ce-141	2.35E-06	6.13E-05	2.94E-03	4.14E+00	1.08E+02	5.18E+03
Cl-36	9.23E-07	3.21E-05	1.23E-03	1.62E+00	5.65E+01	2.17E+03
Co-57	5.35E-07	2.54E-05	6.32E-03	9.42E-01	4.46E+01	1.11E+04
Co-58	9.42E-04	1.06E-03	1.18E-03	1.66E+03	1.87E+03	2.07E+03
Co-60	4.15E-06	3.28E-04	1.04E-01	7.31E+00	5.77E+02	1.83E+05
Cr-51	9.74E-06	1.26E-03	1.17E-02	1.72E+01	2.22E+03	2.07E+04
Cs-137	1.33E-05	2.41E-03	7.49E-03	2.33E+01	4.25E+03	1.32E+04
Fe-55	1.52E-06	1.92E-04	4.11E-04	2.67E+00	3.38E+02	7.24E+02
Fe-59	2.77E-06	1.41E-04	8.08E-04	4.88E+00	2.48E+02	1.42E+03
Ga-67	1.12E-05	4.09E-04	1.30E-03	1.97E+01	7.21E+02	2.29E+03
Gd-153	2.15E-06	1.20E-04	8.52E-04	3.79E+00	2.11E+02	1.50E+03
Ge-68*	1.12E-05	1.12E-05	1.12E-05	1.97E+01	1.97E+01	1.97E+01
H-3	6.77E-05	5.10E-03	2.51E-01	1.19E+02	8.98E+03	4.42E+05
I-125	2.05E-06	5.61E-03	4.32E-02	3.60E+00	9.87E+03	7.61E+04
I-131	6.14E-06	8.66E-04	8.00E+03	1.08E+01	1.53E+03	1.41E+04
In-111	2.05E-05	2.39E-04	9.67E-04	3.60E+01	4.20E+02	1.70E+03
Kr-85*	7.74E-05	7.74E-05	7.74E-05	1.36E+02	1.36E+02	1.36E+02
Mn-54	6.20E-05	2.94E-03	7.78E-03	1.09E+02	5.17E+03	1.37E+04
Mo-99*	4.11E-03	4.11E-03	4.11E-03	7.24E+03	7.24E+03	7.24E+03
Na-22	1.18E-06	5.48E-05	2.89E-03	2.07E+00	9.65E+01	5.08E+03
Nb-95	4.37E-06	8.41E-05	5.62E-03	7.70E+00	1.48E+02	9.89E+03
Ni-63	0.00E-00	4.43E-05	9.62E-03	0.00E+00	7.80E+01	1.69E+04

Table E-19 Southeast Compact Academic Waste Generators Biomedical Radionuclide Distributions - Shipment Level[a], Cont'd

Nuclide	Concentration Ranges - Percentile(b) - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
P-32	4.48E-06	8.91E-03	5.48E-02	7.89E+00	1.57E+04	9.64E+04
Po-210	7.24E-05	1.64E-04	2.31E-04	1.27E+02	2.89E+02	4.06E+02
Ra-226	2.46E-05	5.00E-05	9.23E-05	4.33E+01	8.80E+01	1.63E+02
Rb-86	2.60E-06	9.69E-06	3.27E-04	4.58E+00	1.71E+01	5.76E+02
Ru-103	3.61E-06	7.76E-05	2.13E-03	6.35E+00	1.37E+02	3.75E+03
Ru-106*	4.71E-03	4.71E-03	4.71E-03	8.29E+03	8.29E+03	8.29E+03
S-35	5.61E-06	3.16E-03	4.18E-02	9.87E+00	5.56E+03	7.35E+04
Sc-46	6.45E-06	5.78E-05	1.13E-03	1.14E+01	1.02E+02	1.99E+03
Se-75	1.04E-05	1.17E-04	2.99E-04	1.84E+01	2.07E+02	5.26E+02
Sn-113	2.62E-06	8.14E-05	1.82E-03	4.61E+00	1.43E+02	3.20E+03
Sr-85	5.61E-07	1.08E-04	2.94E-03	9.87E-01	1.89E+02	5.18E+03
Sr-89	3.73E-04	1.14E-03	2.71E-02	6.57E+02	2.01E+04	4.77E+04
Sr-90	2.05E-06	8.09E-04	3.02E-03	3.60E+00	1.43E+03	5.33E+03
Tc-99	5.15E-05	2.92E-03	1.30E-02	9.07E+01	5.14E+03	2.30E+04
Tc-99m*	7.28E-03	7.28E-03	7.28E-03	1.28E+04	1.28E+04	1.28E+04
Tl-201	7.59E-06	1.61E-05	2.47E-05	1.34E+01	2.84E+01	4.35E+01
U-238	8.19E-06	4.83E-05	8.84E-05	1.44E+01	8.50E+01	1.56E+02
Xe-133*	2.18E-03	2.18E-03	2.18E-03	3.83E+03	3.83E+03	3.83E+03
Yb-169*	4.71E-07	4.71E-07	4.71E-07	8.29E-01	8.29E-01	8.29E-01
Zn-65	3.77E-06	5.45E-05	8.44E-03	6.63E+00	9.60E+01	1.49E+04

(a) Based on shipment data to all three disposal sites from 1986 to 1990.

(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table E-20 Southeast Compact Medical Waste Generators Biomedical Radionuclide Distributions - Shipment Level(a)

Waste Class: A Stable and Unstable
Number of shipping records: 3
Number of shipping containers: 3
Total waste volume: 17.8 m^3
Total waste mass: 13,830 kg
Average waste form density: 0.78 g/cm^3

	Concentration Ranges - Percentile(b) - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
C-14*	1.70E-03	1.70E-03	1.70E-03	2.19E+03	2.19E+03	2.19E+03
Ce-141*	9.83E-04	9.83E-04	9.83E-04	1.27E+03	1.27E+03	1.27E+03
Cr-51	6.53E-03	1.33E-02	2.01E-02	8.43E+03	1.72E+04	2.59E+04
H-3	1.64E-03	2.48E-03	3.32E-03	2.12E+03	3.20E+03	4.29E+03
I-125	1.25E-03	2.22E-03	3.18E-03	1.62E+03	2.86E+03	4.11E+03
In-111*	1.98E-03	1.98E-03	1.98E-03	2.55E+03	2.55E+03	2.55E+03
Nb-95	9.70E-04	2.20E-03	3.42E-03	1.25E+03	2.83E+03	4.42E+03
P-32*	1.93E-03	1.93E-03	1.93E-03	2.49E+03	2.49E+03	2.49E+03
Ra-226*	4.59E-01	4.59E-01	4.59E-01	2.24E+05	2.24E+05	2.24E+05
Ru-103*	4.14E-05	4.14E-05	4.14E-05	5.35E+01	5.35E+01	5.35E+01
S-35*	2.49E-03	2.49E-03	2.49E-03	3.21E+03	3.21E+03	3.21E+03
Sc-46*	9.85E-04	9.85E-04	9.85E-04	1.27E+03	1.27E+03	1.27E+03
Sn-113	9.74E-04	1.20E-03	1.43E-03	1.26E+03	1.55E+03	1.85E+03

(a) Based on shipment data to all three disposal sites from 1986 to 1990.
(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table E-21 Southeast Compact Industrial Waste Generators Biomedical Radionuclide Distributions - Shipment Level(a)

Waste Class: A Stable and Unstable
Number of shipping records: 1,147
Number of shipping containers: 81
Total waste volume: 14,990 m^3
Total waste mass: 15,340,000 kg
Average waste form density: 1.02 g/cm^3

	Concentration Ranges - Percentile(b) - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
Ag-110m	5.75E-05	1.77E-03	1.35E-02	5.62E+01	1.73E+03	1.32E+04
Am-241	3.14E-07	7.88E-03	4.71E-02	3.07E-01	7.71E+03	4.60E+04
C-14	1.46E-04	1.79E-04	2.64E-01	1.43E+02	1.75E+02	2.58E+05
Ca-45	3.29E-04	4.92E-04	3.14E-03	3.22E+02	4.81E+02	3.07E+03
Cd-109*	3.86E-06	3.86E-06	3.86E-06	3.77E+00	3.77E+00	3.77E+00
Ce-141*	6.34E-04	6.34E-04	6.34E-04	6.20E+02	6.20E+02	6.20E+02
Cl-36	7.06E-05	2.55E-04	5.75E-04	6.90E+01	2.49E+02	5.63E+02
Co-57	0.00E-00	1.95E-02	1.17E-01	0.00E+00	1.91E+04	1.14E+05
Co-58	9.71E-07	9.43E-04	1.40E-01	9.49E-01	9.22E+02	1.37E+05
Co-60	8.72E-07	2.61E-03	1.84E-01	8.52E-01	2.55E+03	1.80E+05
Cr-51	4.30E-05	1.97E-04	4.28E-03	4.21E+01	1.93E+02	4.19E+03
Cs-134	3.98E-08	1.22E-04	1.79E-03	3.89E-02	1.19E+02	1.75E+03
Cs-137	3.98E-07	6.42E-04	5.01E-02	3.89E-01	6.28E+02	4.89E+04
Fe-55	4.46E-07	3.05E-04	1.38E-02	4.36E-01	2.98E+02	1.35E+04
Fe-59	4.38E-05	1.19E-04	3.33E-03	4.29E+01	1.17E+02	3.26E+03
H-3	8.95E-06	2.61E-03	5.31E+00	8.75E+00	2.55E+03	5.19E+06
I-125	7.85E-06	5.46E-03	1.18E+00	7.67E+00	5.34E+03	1.15E+06
I-129	1.04E-06	5.70E-04	6.05E-04	1.02E+00	5.58E+02	5.91E+02
I-131*	2.22E-06	2.22E-06	2.22E-06	2.17E+00	2.17E+00	2.17E+00
Kr-85	3.52E-02	5.58E+00	4.32E+01	3.45E+04	5.45E+06	4.22E+07
Mn-54	2.74E-05	7.27E-04	2.50E-02	2.68E+01	7.11E+02	2.44E+04
Na-22	1.34E-06	4.35E-05	7.17E-05	1.31E+00	4.25E+01	7.01E+01
Nb-95	7.72E-07	8.80E-05	6.34E-04	7.55E-01	8.60E+01	6.20E+02
Ni-63	2.15E-05	3.29E-04	3.98E-03	2.11E+01	3.22E+02	3.89E+03
P-32	1.66E-05	8.58E-04	2.48E-03	1.62E+01	8.39E+02	2.42E+03

Table E-21 Southeast Compact Industrial Waste Generators Biomedical Radionuclide Distributions - Shipment Level(a), Cont'd

Nuclide	Concentration Ranges - Percentile(b) - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
Pm-147	2.94E-01	6.06E-01	9.18E-01	2.88E+05	5.93E+05	8.98E+05
Po-210*	1.10E-06	1.10E-06	1.10E-06	1.08E+00	1.08E+00	1.08E+00
Ra-226	1.78E-05	5.99E-04	5.83E-03	1.74E+01	5.86E+02	5.70E+03
Rb-86	1.66E-05	5.69E-04	1.28E-03	1.62E+01	5.56E+02	1.25E+03
Ru-106*	2.15E-05	2.15E-05	2.15E-05	2.10E+01	2.10E+01	2.10E+01
S-35	5.75E-05	2.19E-03	4.19E-03	5.63E+01	2.14E+03	4.10E+03
Sc-46*	1.47E-04	1.47E-04	1.47E-04	1.44E+02	1.44E+02	1.44E+02
Sn-113*	1.54E-04	1.54E-04	1.54E-04	1.51E+02	1.51E+02	1.51E+02
Sr-90	3.13E-06	5.53E-04	1.13E-03	3.05E+00	5.41E+02	1.10E+03
Tc-99	4.28E-07	1.08E-04	6.03E-03	4.18E-01	1.05E+02	5.89E+03
Th-232	3.98E-03	4.20E-01	7.39E-01	3.89E+03	4.10E+05	7.22E+05
U-238	3.58E-06	5.76E-02	1.45E-01	3.49E+00	5.63E+04	1.42E+05
Y-90*	9.80E-05	9.80E-05	9.80E-05	9.58E+01	9.58E+01	9.58E+01
Zn-65	2.51E-05	8.28E-04	1.12E-02	2.46E+01	8.09E+02	1.09E+04

(a) Based on shipment data to all three disposal sites from 1986 to 1990.

(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table E-22 Northeast Compact Government Waste Generators Biomedical Radionuclide Distributions - Shipment Level(a)

Waste Class: A-Unstable and A-Stable
Number of shipping records: 6
Number of shipping containers: no data
Total waste volume: 74.2 m^3
Estimated waste mass: 52,010 kg
Assumed waste form density: 0.70 g/cm^3

Nuclide	Concentration Ranges - Percentile(b) - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
C-14	9.60E-06	5.18E-05	8.39E-05	1.37E+01	7.38E+01	1.20E+02
Co-58	7.94E-05	7.94E-05	2.01E-04	1.13E+02	1.13E+02	2.86E+02
Co-60	1.31E-06	1.91E-03	4.20E-03	1.87E+00	2.73E+03	5.99E+03
Cs-134	8.81E-06	2.62E-05	4.36E-05	1.26E+01	3.74E+01	6.22E+01
Fe-55	1.91E-03	1.91E-03	4.20E-03	2.73E+03	2.73E+03	5.99E+03
H-3	3.65E-04	3.65E-04	3.93E-04	5.20E+02	5.20E+02	5.60E+02
Mn-54	4.36E-07	3.29E-04	7.16E-04	6.22E-01	4.69E+02	1.02E+03
Ni-63	4.36E-07	7.94E-05	2.01E-04	6.23E-01	1.13E+02	2.86E+02
Pm-147*	2.63E-02	2.63E-02	2.63E-02	3.76E+04	3.76E+04	3.76E+04
Ra-226*	6.26E-03	6.26E-03	6.26E-03	8.93E+03	8.93E+03	8.93E+03
Sr-90*	4.36E-07	4.36E-07	4.36E-07	6.22E-01	6.22E-01	6.22E-01
Th-232*	1.31E-06	7.40E-04	1.48E-03	1.87E+00	1.06E+03	2.11E+03
U-238*	5.22E-03	5.22E-03	5.22E-03	7.45E+03	7.45E+03	7.45E+03

(a) Based on shipment data to all three disposal sites from 1986 to 1990.
(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table E-23 Northeast Compact Academic Waste Generators Biomedical Radionuclide Distributions - Shipment Level(a)

Waste Class: A-Unstable only
Number of shipping records: 127
Number of shipping containers: no data
Total waste volume: 518.3 m^3
Estimated waste mass: 294,400 kg
Assumed waste form density: 0.57 g/cm^3

	Concentration Ranges - Percentile(b) - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
Ba-133*	8.46E-07	8.46E-07	8.46E-07	1.49E+00	1.49E+00	1.49E+00
C-14	1.09E-06	4.80E-05	7.84E-03	1.92E+00	8.45E+01	1.38E+04
Ca-45	1.01E-06	3.83E-04	1.50E-03	1.78E+00	6.73E+02	2.63E+03
Cd-115	1.59E-05	1.59E-05	1.59E-05	2.81E+01	2.81E+01	2.81E+01
Ce-141	5.08E-06	7.03E-05	1.02E-03	8.95E+00	1.24E+02	1.80E+03
Cl-36	1.57E-07	2.08E-05	1.12E-03	3.14E+00	3.14E+00	1.42E+01
Co-57	9.31E-07	1.59E-06	3.09E-03	1.66E+00	1.88E+01	3.39E+03
Co-58*	5.69E-07	5.69E-07	5.69E-07	1.00E+00	1.00E+00	1.00E+00
Co-60	9.40E-08	2.20E-05	2.57E-03	1.66E-01	3.88E+01	4.53E+03
Cr-51	5.09E-06	2.97E-04	3.95E-03	8.96E+00	5.23E+02	6.95E+03
Cs-137	9.40E-08	9.40E-08	1.27E-07	1.66E-01	1.66E-01	2.24E-01
Fe-55*	5.84E-05	5.84E-05	5.84E-05	1.03E+02	1.03E+02	1.03E+02
Fe-59	3.92E-07	3.41E-06	9.30E-05	6.91E-01	6.01E+00	1.64E+02
Ga-67*	5.54E-06	5.54E-06	5.54E-06	9.75E+00	9.75E+00	9.75E+00
H-3	1.12E-06	1.90E-03	1.35E-01	1.97E+00	3.35E+03	2.38E+05
Hg-203*	4.71E-07	4.71E-07	4.71E-07	8.29E-01	8.29E-01	8.29E-01
I-123	9.61E-07	9.61E-07	2.13E-05	1.69E+00	1.69E+00	3.75E+01
I-125	5.16E-06	3.20E-03	2.71E-02	9.08E+00	5.64E+03	4.77E+04
I-129	2.24E-06	5.00E-05	5.89E-05	3.94E+00	8.81E+01	1.04E+02
I-131	5.23E-07	1.96E-03	2.57E-02	9.21E-01	3.45E+03	4.52E+04
In-111	2.77E-07	1.09E-04	2.30E-03	4.88E-01	1.93E+02	4.05E+03
In-114m*	4.71E-07	4.71E-07	4.71E-07	8.29E-01	8.29E-01	8.29E-01
K-42	9.87E-06	1.66E-05	9.57E-05	1.74E+01	2.92E+01	1.68E+02
Na-22	9.91E-08	3.88E-06	3.03E-02	1.74E-01	6.83E+00	5.34E+04
Na-24*	3.36E-05	3.36E-05	3.36E-05	5.92E+01	5.92E+01	5.92E+01
Ni-63	1.14E-06	1.14E-06	4.06E-04	2.00E+00	2.00E+00	7.15E+02
P-32	2.35E-06	4.08E-03	6.18E-02	4.14E+00	7.19E+03	1.09E+05
Po-210	7.05E-05	7.05E-05	7.05E-05	1.24E+02	1.24E+02	1.24E+02
Rb-86	1.27E-06	1.49E-04	1.34E-03	2.24E+00	2.62E+02	2.36E+03

Table E-23 Northeast Compact Academic Waste Generators Biomedical Radionuclide Distributions - Shipment Level[a], Cont'd

Nuclide	Concentration Ranges - Percentile[b] - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
Ru-103	7.76E-05	7.76E-05	5.89E-04	1.37E+02	1.37E+02	1.04E+03
S-35	2.23E-04	8.57E-04	1.96E-02	3.93E+02	1.51E+03	3.44E+04
Sc-46	9.30E-08	1.40E-04	1.12E-03	1.64E-01	2.46E+02	1.97E+03
Se-75	1.07E-05	5.63E-04	7.38E-04	1.88E+01	9.91E+02	1.30E+03
Sn-113	1.38E-05	1.38E-05	4.91E-05	2.43E+01	2.43E+01	8.64E+01
Sr-85	2.55E-06	2.32E-05	1.16E-03	4.48E+00	4.09E+01	2.05E+03
Sr-90*	1.57E-04	1.57E-04	1.57E-04	2.76E+02	2.76E+02	2.76E+02
Tc-99	1.12E-06	1.67E-05	2.00E-05	1.97E+00	2.94E+01	3.52E+01
Tc-99m*	3.36E-07	3.36E-07	3.36E-07	5.92E-01	5.92E-01	5.92E-01
Th-232	1.62E-07	1.62E-07	1.62E-07	2.86E-01	2.86E-01	1.22E+01
Tl-204*	4.71E-07	4.71E-07	4.71E-07	8.29E-01	8.29E-01	8.29E-01
U-238	1.53E-06	2.35E-06	4.60E-05	2.70E+00	4.14E+00	8.10E+01
Y-90	2.77E-07	2.77E-07	3.14E-05	4.88E-01	4.88E-01	5.53E+01
Zn-65	5.69E-07	5.69E-07	1.11E-03	1.00E+00	1.00E+00	1.95E+03

(a) Based on shipment data to all three disposal sites from 1986 to 1990.

(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table E-24 Northeast Compact Medical Waste Generators Biomedical Radionuclide Distributions - Shipment Level[a]

Waste Class: A-Unstable only
Number of shipping records: 121
Number of shipping containers: no data
Total waste volume: 131.1 m^3
Estimated waste mass: 101,600 kg
Assumed waste form density: 0.78 g/cm^3

Nuclide	Concentration Ranges - Percentile[b] - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
C-14	2.83E-05	1.88E-03	5.56E-03	3.65E+01	2.43E+03	7.17E+03
Ca-45*	2.94E-07	2.94E-07	2.94E-07	3.80E-01	3.80E-01	3.80E-01
Co-57	8.81E-06	2.20E-03	8.81E-03	1.14E+01	2.84E+03	1.14E+04
Co-58	4.40E-03	4.40E-03	4.40E-03	5.68E+03	5.68E+03	5.68E+03
Co-60	8.81E-05	8.81E-05	4.40E-04	1.14E+02	1.14E+02	5.68E+02
Cr-51	1.57E-06	2.30E-05	1.55E-04	2.03E+00	2.97E+01	2.00E+02
Cs-137*	3.14E-04	3.14E-04	3.14E-04	4.05E+02	4.05E+02	4.05E+02
Fe-59	8.81E-05	4.40E-03	4.40E-03	1.14E+02	5.68E+03	5.68E+03
Ga-67	8.81E-05	8.81E-03	8.81E-03	1.14E+02	1.14E+04	1.14E+04
Gd-153*	2.64E-03	2.64E-03	2.64E-03	3.41E+03	3.41E+03	3.41E+03
H-3	1.41E-05	7.53E-04	1.84E-02	1.82E+01	9.72E+02	2.38E+04
I-123	2.20E-05	8.81E-03	1.76E-02	2.84E+01	1.14E+04	2.27E+04
I-125	8.81E-06	8.81E-04	9.69E-03	1.14E+01	1.14E+03	1.25E+04
I-131	2.20E-05	4.40E-03	1.43E-02	2.84E+01	5.68E+03	1.84E+04
In-111	8.81E-05	4.40E-03	8.81E-03	1.14E+02	5.68E+03	1.14E+04
Mo-99*	1.26E-06	1.26E-06	1.26E-06	1.62E+00	1.62E+00	1.62E+00
Ni-63*	8.96E-01	8.96E-01	8.96E-01	1.16E+06	1.16E+06	1.16E+06
P-32	1.17E-04	1.49E-03	3.25E-02	1.50E+02	1.93E+03	4.19E+04
S-35	3.06E-04	5.49E-03	1.96E-02	3.95E+02	7.09E+03	2.53E+04
Se-75*	2.74E-04	2.74E-04	2.74E-04	3.53E+02	3.53E+02	3.53E+02

Table E-24 Northeast Compact Medical Waste Generators Biomedical Radionuclide Distributions - Shipment Level[a], Cont'd

Nuclide	Concentration Ranges - Percentile[b] - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
Sr-85*	4.86E-04	4.86E-04	4.86E-04	6.27E+02	6.27E+02	6.27E+02
Tc-99*	3.36E-03	3.36E-03	3.36E-03	4.34E+03	4.34E+03	4.34E+03
Tc-99m	8.81E-05	1.76E-02	8.81E-02	1.14E+02	2.27E+04	1.14E+05
Tl-201	8.81E-05	1.76E-02	3.52E-02	1.14E+02	2.27E+04	4.55E+04
U-238	7.13E-04	7.13E-04	1.22E-02	9.20E+02	9.20E+02	1.57E+04
Xe-133	4.71E-06	4.71E-06	4.71E-06	6.08E+00	6.08E+00	6.08E+00

(a) Based on shipment data to all three disposal sites from 1986 to 1990.
(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table E-25 Northeast Compact Industrial Waste Generators Biomedical Radionuclide Distributions - Shipment Level(a)

Waste Class: A-Unstable and A-Stable
Number of shipping records: 376
Number of shipping containers: 252
Total waste volume: 1,396 m^3
Estimated waste mass: 1,511,900 kg
Assumed waste form density: 1.08 g/cm^3

Nuclide	Concentration Ranges - Percentile(b) - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
Ag-110m*	4.65E-05	4.65E-05	4.65E-05	4.54E+01	4.54E+01	4.54E+01
Am-241	5.27E-03	5.27E-03	6.85E-03	5.15E+03	5.15E+03	6.70E+03
Ba-133	1.76E-06	1.76E-06	5.80E-03	1.72E+00	1.72E+00	5.67E+03
C-14	1.88E-06	9.20E-04	4.10E-01	4.60E+00	1.84E+03	5.29E+04
Ca-45	1.31E-06	1.66E-04	1.00E-02	1.28E+00	1.62E+02	9.77E+03
Cd-109	1.23E-04	1.23E-04	1.23E-04	1.21E+02	1.21E+02	1.21E+02
Ce-141	5.43E-05	5.43E-05	5.78E-05	5.31E+01	5.31E+01	5.65E+01
Co-57	2.35E-05	4.40E-04	2.94E-02	2.30E+01	4.30E+02	2.87E+04
Co-58	4.76E-05	1.62E-04	1.94E-03	4.66E+01	1.58E+02	1.89E+03
Co-60	3.27E-06	3.57E-05	1.31E-02	2.63E+00	3.48E+01	9.27E+03
Cr-51	2.35E-06	4.83E-04	1.95E-02	2.30E+00	4.72E+02	1.91E+04
Cs-134	1.78E-06	2.12E-05	1.39E-04	1.74E+00	2.08E+01	1.36E+02
Cs-137	9.28E-06	6.20E-05	3.70E-04	9.07E+00	6.06E+01	3.62E+02
Fe-55	1.18E-05	4.11E-05	2.33E-03	1.15E+01	4.01E+01	2.28E+03
Fe-59	1.76E-06	1.57E-04	2.33E-03	1.72E+00	1.53E+02	2.30E+03
Gd-153*	3.13E-03	3.13E-03	3.13E-03	3.03E+03	3.03E+03	3.03E+03
Ge-68	3.16E-05	3.16E-05	1.76E-04	3.09E+01	3.09E+01	1.72E+02
H-3	2.35E-06	3.10E-03	9.65E+00	2.30E+00	3.03E+03	9.44E+06
Hg-203*	4.71E-05	4.71E-05	4.71E-05	4.60E+01	4.60E+01	4.60E+01
I-123*	2.65E-06	2.65E-06	2.65E-06	2.59E+00	2.59E+00	2.59E+00
I-125	1.29E-05	1.84E-03	8.39E-02	1.27E+01	1.80E+03	8.20E+04
I-129	3.27E-06	4.71E-06	4.71E-06	2.63E+00	3.52E+00	4.00E+00
I-131	7.67E-05	1.57E-03	3.32E-03	7.50E+01	1.53E+03	3.25E+03
In-111	5.22E-07	2.62E-05	6.28E-05	5.10E-01	2.56E+01	6.14E+01
In-114m*	1.76E-02	1.76E-02	1.76E-02	1.72E+04	1.72E+04	1.72E+04
Kr-85	1.88E-03	2.35E-03	1.10E-02	1.84E+03	2.30E+03	3.79E+04
Mn-54	6.78E-06	7.37E-05	2.19E-03	6.63E+00	7.20E+01	2.14E+03
Na-22	1.88E-05	3.53E-04	3.63E-03	1.84E+01	3.45E+02	3.55E+03

Table E-25 Northeast Compact Industrial Waste Generators Biomedical Radionuclide Distributions - Shipment Level[a], Cont'd

Nuclide	Concentration Ranges - Percentile[b] - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
Nb-95	9.24E-07	1.16E-04	2.51E-04	9.03E-01	1.13E+02	2.46E+02
Ni-63	2.35E-06	4.58E-03	3.77E-02	2.30E+00	4.48E+03	3.68E+04
P-32	2.35E-06	2.12E-03	4.44E-02	2.30E+00	2.07E+03	4.34E+04
P-33*	4.71E-06	4.71E-06	4.71E-06	4.60E+00	4.60E+00	4.60E+00
Pm-147	7.03E-03	4.89E-02	1.14E-00	6.87E+03	4.78E+04	1.12E+06
Po-210*	1.82E-06	1.82E-06	1.82E-06	1.78E+00	1.78E+00	1.78E+00
Ra-226	2.64E-04	1.53E-03	1.40E-02	2.58E+02	1.49E+03	1.37E+04
Rb-86	1.33E-05	1.33E-05	4.12E-04	1.30E+01	1.30E+01	4.03E+02
Ru-103*	6.81E-05	6.81E-05	6.81E-05	6.65E+01	6.65E+01	6.65E+01
Ru-106	1.73E-04	1.73E-04	2.89E-04	1.69E+02	1.69E+02	2.82E+02
S-35	2.35E-06	2.08E-04	7.25E-03	2.30E+00	2.03E+02	7.09E+03
Sc-46*	6.20E-06	6.20E-06	6.20E-06	6.06E+06	6.06E+06	6.06E+06
Se-75	2.17E-05	2.17E-05	2.20E-04	2.13E+01	2.13E+01	2.15E+02
Sn-113	1.65E-05	2.65E-05	2.44E-04	1.61E+01	2.59E+01	2.39E+02
Sr-85	5.43E-05	5.43E-05	5.78E-05	5.31E+01	5.31E+01	5.65E+01
Sr-89*	2.35E-06	2.35E-06	2.35E-06	2.30E+00	2.30E+00	2.30E+00
Sr-90	2.35E-06	8.81E-06	3.69E-02	2.30E+00	8.61E+00	3.61E+04
Tc-99	3.27E-06	4.71E-06	4.71E-06	2.63E+00	3.52E+00	4.00E+00
Tc-99m*	9.42E-04	9.42E-04	9.42E-04	9.21E+02	9.21E+02	9.21E+02
Th-228	1.59E-05	2.27E-05	3.86E-05	1.56E+01	2.22E+01	3.78E+01
Th-232	5.27E-05	3.46E-03	6.15E-03	5.15E+01	3.38E+03	6.01E+03
Tl-204	3.51E-03	3.51E-03	6.60E-03	3.43E+03	3.43E+03	6.46E+03
U-238	1.11E-05	4.00E-05	8.17E-04	1.08E+01	3.91E+01	7.99E+02
Zn-65	7.06E-06	7.06E-06	9.51E-05	6.90E+00	6.90E+00	9.30E+01

(a) Based on shipment data to all three disposal sites from 1986 to 1990.

(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table E-26 Appalachian Compact Government Waste Generators Biomedical Radionuclide Distributions - Shipment Level[a]

Waste Class: A-Unstable and A-Stable
Number of shipping records: 41
Number of shipping containers: no data
Total waste volume: 410.8 m^3
Estimated waste mass: 287,900 kg
Assumed waste form density: 0.70 g/cm^3

Nuclide	Concentration Ranges - Percentile[b] - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
Ag-110m	2.02E-05	4.48E-04	8.76E-04	2.88E+01	6.39E+02	1.25E+03
Am-241*	3.14E-06	3.14E-06	3.14E-06	4.48E+00	4.48E+00	4.48E+00
C-14	6.59E-05	6.20E-04	3.46E-03	9.40E+01	8.85E+02	4.94E+03
Ca-45	8.12E-06	2.14E-04	1.07E-03	1.16E+01	3.05E+02	1.53E+03
Cd-109	8.26E-07	1.20E-06	1.57E-06	1.18E+00	1.71E+00	2.24E+00
Ce-141	5.72E-05	1.38E-04	5.99E-03	5.20E+02	5.20E+02	5.60E+02
Cl-36	2.01E-05	8.94E-05	1.73E-04	2.87E+01	1.28E+02	2.46E+02
Co-57	3.44E-04	1.01E-03	1.76E-03	4.91E+02	1.45E+03	2.52E+03
Co-58	1.57E-06	2.36E-05	4.57E-05	2.24E+00	3.37E+01	6.51E+01
Co-60	4.71E-06	1.85E-03	7.33E-03	6.72E+00	2.64E+03	1.05E+04
Cr-51	2.46E-05	2.95E-03	2.05E-02	3.51E+01	4.21E+03	2.93E+04
Cs-134*	1.57E-06	1.57E-06	1.57E-06	2.24E+00	2.24E+00	2.24E+00
Cs-137	1.57E-06	3.18E-03	6.36E-03	2.24E+00	4.54E+03	9.07E+03
Fe-59	1.57E-06	7.19E-05	2.04E-04	2.24E+00	1.03E+02	2.91E+02
Gd-153*	3.43E-03	3.43E-03	3.43E-03	4.89E+03	4.89E+03	4.89E+03
H-3	2.57E-04	7.40E-03	2.54E-01	3.67E+02	1.05E+04	3.63E+05
Hg-203*	4.92E-05	4.92E-05	4.92E-05	7.02E+01	7.02E+01	7.02E+01
I-125	2.54E-04	4.52E-03	1.40E-02	3.62E+02	6.45E+03	1.99E+04
I-131	7.78E-05	8.77E-04	3.37E-03	1.11E+02	1.25E+03	4.81E+03
In-111	2.92E-04	3.93E-04	9.17E-04	4.17E+02	5.60E+02	1.31E+02
Mn-54*	1.57E-06	1.57E-06	1.57E-06	2.24E+00	2.24E+00	2.24E+00
Na-22	4.34E-05	5.08E-04	2.57E-03	6.19E+01	7.25E+02	3.66E+03
Nb-95	1.11E-05	3.99E-04	1.71E-03	1.59E+01	5.69E+02	2.43E+03
Ni-63	7.03E-07	1.03E-05	1.52E-03	1.00E+00	1.47E+01	2.16E+03
P-32	1.90E-05	5.11E-03	3.13E-02	2.71E+01	7.29E+03	4.46E+04

Table E-26 Appalachian Compact Government Waste Generators Biomedical Radionuclide Distributions - Shipment Level[a], Cont'd

Nuclide	Concentration Ranges - Percentile[b] - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
Ra-226	1.57E-06	1.57E-06	1.84E-05	2.24E+00	2.24E+00	2.63E+01
Rb-86	2.07E-06	3.23E-05	5.62E-05	2.95E+00	4.61E+01	8.02E+01
Ru-103*	2.86E-03	2.86E-03	2.86E-03	4.07E+03	4.07E+03	4.07E+03
S-35	3.86E-06	1.16E-02	3.48E-02	5.51E+00	1.66E+04	4.96E+04
Sc-46	2.72E-05	2.89E-04	5.90E-04	3.88E+01	4.12E+02	8.42E+02
Se-75*	2.53E-05	2.53E-05	3.70E-04	3.61E+01	3.61E+01	5.28E+02
Sn-113	2.86E-06	2.73E-04	1.77E-03	4.08E+00	3.89E+02	2.53E+03
Sr-85	5.85E-05	2.78E-04	4.54E-03	8.35E+01	3.96E+02	6.48E+03
Sr-89*	1.06E-04	1.06E-04	1.06E-04	1.51E+02	1.51E+02	1.51E+02
Sr-90*	3.86E-06	3.86E-06	3.86E-06	5.51E+00	5.51E+00	5.51E+00
Tc-99m*	1.20E-03	1.20E-03	1.20E-03	1.71E+03	1.71E+03	1.71E+03
Th-232	7.21E-06	1.63E-02	3.27E-02	1.03E+01	2.33E+04	4.66E+04
Tl-201*	2.94E-04	2.94E-04	2.94E-04	4.20E+02	4.20E+02	4.20E+02
Zn-65	1.57E-06	6.20E-04	2.46E-03	2.24E+00	8.84E+02	3.51E+03

(a) Based on shipment data to all three disposal sites from 1986 to 1990.

(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table E-27 Appalachian Compact Academic Waste Generators Biomedical Radionuclide Distributions - Shipment Level[a]

Waste Class: A-Unstable and A-Stable
Number of shipping records: 31
Number of shipping containers: no data
Total waste volume: 55.9 m^3
Estimated waste mass: 31,760 kg
Assumed waste form density: 0.57 g/cm^3

Nuclide	Concentration Ranges - Percentile[b] - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
Ba-133*	4.71E-05	4.71E-05	4.71E-05	8.29E+01	8.29E+01	8.29E+01
C-14	2.39E-05	3.30E-03	1.24E-02	4.21E+01	5.80E+03	2.18E+04
Ca-45	6.59E-05	4.53E-04	1.00E-02	1.16E+02	8.06E+02	1.76E+04
Ce-141	8.88E-08	2.48E-07	1.41E-05	1.56E-01	4.36E-01	2.49E+01
Cl-36	1.96E-07	4.61E-06	1.24E-05	3.45E-01	8.12E+00	2.18E+01
Co-57	3.58E-06	1.14E-05	9.85E-04	6.30E+00	2.01E+01	1.73E+03
Co-60	1.18E-06	4.88E-05	9.81E-05	2.07E+00	8.59E+01	1.73E+02
Cr-51	5.23E-04	3.47E-03	5.58E-03	9.20E+02	6.11E+03	9.83E+03
Cs-137	1.26E-05	8.65E-05	2.51E-04	2.21E+01	1.52E+02	4.42E+02
Fe-55*	4.71E-05	4.71E-05	4.71E-05	8.29E+01	8.29E+01	8.29E+01
Fe-59*	1.18E-06	1.18E-06	1.18E-06	2.07E+00	2.07E+00	2.07E+00
Ge-68	4.04E-06	4.04E-06	1.78E-05	7.11E+00	7.11E+00	3.13E+01
H-3	6.85E-04	4.01E-03	6.25E-02	1.21E+03	7.07E+03	1.97E+04
I-125	5.17E-03	1.56E-02	4.11E-02	9.10E+03	2.75E+04	7.24E+04
I-131	8.88E-08	8.88E-08	2.82E-04	1.56E-01	1.56E-01	4.96E+02
Mn-54	1.18E-06	2.41E-05	4.71E-05	2.07E+00	4.25E+01	8.29E+01
Mo-99	2.62E-04	1.13E-03	2.35E-03	4.61E+02	2.00E+03	4.14E+03
Na-22	2.29E-05	5.65E-05	1.22E-04	4.04E+01	9.95E+01	2.15E+02
Nb-95*	1.07E-05	1.07E-05	1.07E-05	1.88E+01	1.88E+01	1.88E+01
Ni-63	2.35E-06	2.54E-04	8.10E-04	4.14E+00	4.46E+02	1.43E+03
P-32	7.55E-06	3.99E-02	7.15E-02	1.33E+01	7.03E+04	1.26E+05
Pm-147	4.71E-05	4.71E-05	2.35E-03	8.29E+01	8.29E+01	4.14E+03
Po-210	4.44E-06	6.20E-06	1.10E-04	7.82E+00	1.09E+01	1.93E+02
Ra-226*	1.18E-04	1.18E-04	1.18E-04	2.07E+02	2.07E+02	2.07E+02
Rb-86	1.35E-07	1.60E-06	2.85E-06	2.37E-01	2.82E+00	5.02E+00

Table E-27 Appalachian Compact Academic Waste Generators Biomedical Radionuclide Distributions - Shipment Level[a], Cont'd

Nuclide	Concentration Ranges - Percentile[b] - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
Ru-103	5.89E-06	5.89E-06	1.79E-05	1.04E+01	1.04E+01	3.16E+01
Ru-106	3.53E-06	6.94E-05	1.35E-04	6.22E+00	1.22E+02	2.38E+02
S-35	4.64E-04	4.93E-03	2.47E-02	7.85E+02	8.67E+03	4.34E+04
Sc-46	2.60E-06	3.36E-06	5.21E-05	4.58E+00	5.92E+00	9.18E+01
Se-75*	1.08E-04	1.08E-04	1.08E-04	1.89E+02	1.89E+02	1.89E+02
Sn-113	9.42E-07	1.98E-06	5.69E-05	1.66E+00	3.49E+00	1.00E+02
Sr-85	1.86E-06	3.63E-06	7.97E-05	3.27E+00	6.39E+00	1.40E+02
Sr-90	1.18E-06	7.86E-03	2.35E-02	2.07E+00	1.38E+04	4.14E+04
Tc-99*	4.71E-05	4.71E-05	4.71E-05	8.29E+01	8.29E+01	8.29E+01
Tl-201*	1.35E-07	1.35E-07	1.35E-07	2.37E-01	2.37E-01	2.37E-01
Tl-204*	1.18E-06	1.18E-06	1.18E-06	8.29E+01	8.29E+01	8.29E+01
U-238	7.85E-07	5.28E-06	1.26E-05	1.38E+00	9.29E+00	2.21E+01
Xe-127*	1.88E-07	1.88E-07	1.88E-07	3.32E-01	3.32E-01	3.32E-01
Zn-65	1.18E-06	2.41E-05	4.71E-05	2.07E+00	4.25E+01	8.29E+01

(a) Based on shipment data to all three disposal sites from 1986 to 1990.
(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table E-28 Appalachian Compact Medical Waste Generators Biomedical Radionuclide Distributions - Shipment Level[a]

Waste Class: A-Unstable and A-Stable
Number of shipping records: 193
Number of shipping containers: no data
Total waste volume: 122.8 m^3
Estimated waste mass: 95,210 kg
Assumed waste form density: 0.78 g/cm^3

Nuclide	Concentration Ranges - Percentile[b] - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
C-14	1.53E-05	2.64E-04	1.53E-02	1.98E+01	3.41E+02	1.97E+04
Ca-45	1.88E-06	31310-05	9.16E-05	2.43E+00	1.42E+01	1.18E+02
Ce-141	1.18E-06	2.35E-05	7.06E-05	1.52E+00	3.04E+01	9.11E+01
Cl-36	1.06E-05	2.66E-05	5.41E-05	1.35E+00	3.43E+01	6.98E+01
Co-57	2.08E-06	1.17E-05	4.72E-04	2.68E+00	1.52E+01	6.09E+02
Cr-51	2.28E-06	1.05E-03	4.24E-02	2.94E+00	1.36E+03	5.48E+04
Cs-134	2.20E-03	2.20E-03	4.40E-03	2.84E+03	2.84E+03	5.68E+03
Fe-59	2.28E-06	1.26E-03	9.93E-03	2.94E+00	1.62E+03	1.28E+04
Ga-67	5.23E-06	4.32E-04	8.81E-04	6.75E+00	5.58E+02	1.14E+03
H-3	1.57E-06	7.93E-04	8.14E-02	2.03E+00	1.02E+03	1.05E+05
I-123	8.81E-05	5.04E-04	8.81E-04	1.14E+02	6.51E+02	1.14E+03
I-125	4.55E-06	8.07E-04	7.50E-02	5.87E+00	1.04E+03	9.68E+04
I-131	2.78E-04	6.06E-03	2.83E-02	3.58E+02	7.82E+03	3.65E+04
In-111	2.63E-04	2.85E-04	1.24E-03	3.39E+02	3.68E+02	1.60E+03
Mn-54	1.10E-07	1.10E-07	5.13E-06	1.41E-01	1.41E-01	6.62E+00
Mo-99	8.72E-05	4.14E-02	8.81E-02	1.13E+02	5.34E+04	1.14E+05
Na-22	1.05E-06	6.82E-04	3.07E-03	1.35E+00	8.80E+02	3.97E+03
Ni-63*	8.43E-01	8.43E-01	8.43E-01	1.09E+06	1.09E+06	1.09E+06
P-32	1.88E-05	1.14E-02	2.22E-02	2.43E+01	1.47E+04	2.86E+04
Ra-226*	1.53E-05	1.53E-05	1.53E-05	1.97E+01	1.97E+01	1.97E+01
Rb-86	2.83E-06	1.79E-04	4.40E-04	3.65E+00	2.31E+02	5.68E+02
S-35	9.42E-07	4.61E-04	2.02E-02	1.22E+00	5.95E+02	2.60E+04
Sc-46	1.57E-05	2.35E-05	7.06E-05	2.03E+01	3.04E+01	9.11E+01
Se-75	2.19E-07	1.26E-06	4.50E-04	2.83E-01	1.62E+00	5.81E+02
Sn-113	5.75E-05	6.91E-05	2.46E-04	7.43E+01	8.92E+01	3.17E+02

Table E-28 Appalachian Compact Medical Waste Generators Biomedical Radionuclide Distributions - Shipment Level(a), Cont'd

Nuclide	Concentration Ranges - Percentile(b) - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
Sr-85	1.57E-05	2.83E-05	4.71E-05	2.03E+01	3.65E+01	6.08E+01
Sr-89*	6.81E-05	6.81E-05	6.81E-05	8.79E+01	8.79E+01	8.79E+01
Tc-99m	8.81E-05	4.73E-02	8.81E-02	1.14E+02	6.11E+04	1.14E+05
Tl-201	8.81E-04	7.59E-03	1.76E-02	1.14E+03	9.80E+03	2.27E+04

(a) Based on shipment data to all three disposal sites from 1986 to 1990.
(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table E-29 Appalachian Compact Industrial Waste Generators Biomedical Radionuclide Distributions - Shipment Level[a]

Waste Class: A-Unstable and A-Stable
Number of shipping records: 420
Number of shipping containers: 208
Total waste volume: 3,032 m^3
Estimated waste mass: 3,101,000 kg
Assumed waste form density: 1.02 g/cm^3

	Concentration Ranges - Percentile[b] - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
Ag-110m	2.71E-05	1.11E-03	8.41E-03	2.65E+01	1.19E+03	8.22E+03
Am-241	3.65E-08	3.40E-06	4.24E-05	3.56E-02	3.33E+00	9.22E+01
Au-195	6.73E-07	7.06E-06	1.18E-04	6.58E-01	6.90E+00	1.16E+02
C-14	9.42E-07	5.90E-04	1.32E-01	9.21E-01	5.77E+02	1.29E+05
Ca-45	1.28E-06	2.93E-03	1.05E-02	1.25E+00	2.87E+03	1.03E+04
Cd-109	5.51E-05	3.23E-03	9.02E-03	5.38E+01	5.85E+03	1.96E+04
Ce-141	5.96E-05	1.88E-04	7.21E-04	5.83E+01	1.84E+02	7.05E+02
Cl-36	2.48E-07	2.28E-04	9.10E-03	2.42E-01	2.23E+02	8.89E+03
Co-57	1.18E-06	1.75E-04	7.29E-02	1.15E+00	1.71E+02	7.12E+04
Co-58	2.09E-05	1.83E-03	7.69E-03	2.04E+01	1.79E+03	8.83E+03
Co-60	1.47E-06	4.65E-04	1.22E+00	1.44E+00	4.55E+02	1.19E+06
Cr-51	1.18E-06	1.38E-03	1.04E+00	1.15E+00	1.35E+03	1.01E+06
Cs-134	2.21E-06	8.74E-05	3.50E-03	2.16E+00	8.55E+01	3.42E+03
Cs-137	7.29E-08	3.78E-04	2.56E-02	7.13E-02	3.70E+02	2.50E+04
Fe-55	3.44E-05	6.38E-03	1.82E-01	3.37E+01	7.62E+03	1.78E+05
Fe-59	5.89E-06	2.35E-05	1.77E-01	5.75E+00	2.30E+01	1.73E+05
Ga-67	2.75E-06	1.61E-05	3.88E-05	2.69E+00	1.57E+01	3.79E+01
Ge-68*	7.76E-04	7.76E-04	7.76E-04	7.58E+02	7.58E+02	7.58E+02
H-3	2.08E-07	1.02E-04	5.25E+00	2.03E-01	9.92E+01	5.13E+06
Hg-203	7.85E-06	8.89E-05	3.14E-04	7.67E+00	8.69E+01	3.07E+02
I-125	1.57E-06	2.57E-03	7.29E-01	1.53E+00	2.51E+03	7.12E+05
I-129	9.76E-08	6.61E-07	4.18E-04	9.54E-02	6.46E-01	4.09E+02
I-131	2.62E-07	2.71E-05	1.54E-02	2.56E-01	2.65E+01	1.50E+04
In-111	3.54E-06	2.20E-04	7.85E-04	3.46E+00	2.15E+02	7.67E+02
Mn-54	1.06E-06	4.12E-04	1.31E-02	1.15E+00	4.03E+02	2.85E+04

Table E-29 Appalachian Compact Industrial Waste Generators Biomedical Radionuclide Distributions - Shipment Level[a], Cont'd

Nuclide	Concentration Ranges - Percentile[b] - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
Na-22	6.28E-07	4.56E-05	3.91E-04	6.14E-01	4.46E+01	3.83E+02
Na-24*	6.77E-07	6.77E-07	6.77E-07	6.61E-01	6.61E-01	6.61E-01
Nb-95	5.61E-07	7.01E-05	1.27E-03	5.48E-01	6.85E+01	1.24E+03
Ni-63	1.21E-05	8.16E-04	1.14E-02	1.19E+01	7.98E+02	1.12E+04
P-32	7.85E-07	3.97E-03	1.52E-01	7.67E-01	3.88E+03	1.48E+05
Pm-147*	2.64E-02	2.64E-02	2.64E-02	2.58E+04	2.58E+04	2.58E+04
Po-210*	1.05E-03	1.05E-03	1.05E-03	1.03E+03	1.03E+03	1.03E+03
Ra-226	4.77E-07	3.65E-04	1.76E-03	4.66E-01	3.57E+02	1.72E+03
Ra-228*	4.77E-07	4.77E-07	4.77E-07	4.66E-01	4.66E-01	4.66E-01
Rb-86	1.12E-06	3.88E-06	6.10E-05	1.10E+00	3.79E+00	5.96E+01
Ru-103	6.28E-05	1.41E-04	3.30E-04	6.14E+01	1.38E+02	3.22E+02
Ru-106	9.20E-05	4.64E-04	1.64E-03	9.00E+01	4.53E+02	1.60E+03
S-35	7.85E-05	2.35E-03	3.14E-02	7.67E+01	2.30E+03	3.07E+04
Sc-46	9.80E-07	5.72E-05	1.29E-04	9.58E-01	5.59E+01	1.26E+02
Se-75	2.24E-06	1.39E-04	4.47E-04	2.19E+00	1.36E+02	4.37E+02
Sn-113	6.28E-05	1.57E-04	3.30E-04	6.14E+01	1.53E+02	3.22E+02
Sr-85	9.42E-06	4.08E-05	1.32E-04	9.21E+00	3.99E+01	1.29E+02
Sr-89	1.00E-05	1.13E-04	2.17E-04	9.81E+00	1.86E+02	3.63E+02
Sr-90	2.08E-07	2.83E-05	4.88E-04	2.03E-01	1.82E+01	4.77E+02
Tc-99	1.51E-07	4.71E-06	1.57E-03	1.68E-01	4.60E+00	1.53E+03
Tc-99m*	3.30E-02	3.30E-02	3.30E-02	3.22E+04	3.22E+04	3.22E+04
Th-232	7.93E-05	6.32E-04	4.80E-03	7.75E+01	6.18E+02	4.69E+03
Tl-201*	1.69E-06	1.69E-06	1.69E-06	1.65E+00	1.65E+00	1.65E+00
U-238	4.68E-06	1.67E-04	7.04E-04	4.58E+00	1.63E+02	6.88E+02
Y-88	2.71E-06	1.68E-05	6.56E-05	2.65E+00	1.64E+01	6.41E+01
Y-90	2.74E-07	2.06E-06	3.85E-06	2.68E-01	2.01E+00	3.76E+00
Zn-65	5.41E-08	6.60E-04	3.19E-03	5.29E-02	8.48E+02	5.35E+03

(a) Based on shipment data to all three disposal sites from 1986 to 1990.

(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table E-30 Southwest Compact Government Waste Generators Biomedical Radionuclide Distributions - Shipment Level(a)

Waste Class: A-Unstable and A-Stable
Number of shipping records: 52
Number of shipping containers: 827
Total waste volume: 828.9 m^3
Estimated waste mass: 581,100 kg
Assumed waste form density: 0.70 g/cm^3

	Concentration Ranges - Percentile(b) - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
Ag-110m	3.84E-04	6.43E-04	5.57E-03	2.85E+02	9.45E+02	8.56E+03
C-14	7.41E-07	2.76E-05	2.25E-04	1.06E+00	3.86E+01	3.05E+02
Ce-141	2.24E-06	2.24E-06	1.99E-05	3.19E+00	3.19E+00	2.84E+01
Co-57*	2.54E-03	2.54E-03	2.54E-03	3.63E+03	3.63E+03	3.63E+03
Co-58	1.88E-06	6.95E-05	5.71E-04	2.68E+00	9.65E+01	7.73E+02
Co-60	3.76E-05	1.39E-03	1.14E-02	5.36E+01	1.93E+03	1.54E+04
Cr-51	6.31E-05	4.53E-04	4.20E-02	9.00E+01	6.47E+02	6.00E+04
Cs-134	2.24E-05	3.23E-05	4.20E-04	3.20E+01	4.96E+01	6.00E+02
Cs-137	5.61E-06	5.67E-04	3.56E-03	8.24E+00	8.72E+02	2.64E+03
Fe-55	3.76E-05	1.39E-03	1.14E-02	5.36E+01	1.93E+03	1.54E+04
Fe-59	2.01E-04	1.76E-03	1.63E-02	2.95E+02	2.40E+03	2.32E+04
H-3	2.10E-05	1.15E-04	6.01E-04	3.00E+01	1.31E+02	8.57E+02
I-125*	1.26E-04	1.26E-04	1.26E-04	1.80E+02	1.80E+02	1.80E+02
I-129*	3.32E-06	3.32E-06	3.32E-06	4.74E+00	4.74E+00	4.74E+00
I-131	2.80E-07	1.79E-05	3.64E-04	4.00E-01	1.33E+01	5.20E+02
Kr-85*	5.43E-03	5.43E-03	5.43E-03	7.75E+03	7.75E+03	7.75E+03
Mn-54	6.27E-06	2.36E-04	1.91E-03	8.94E+00	3.28E+02	2.59E+03
Na-22*	1.33E-04	1.33E-04	1.33E-04	1.89E+02	1.89E+02	1.89E+02
Nb-95	1.39E-04	4.01E-04	1.73E-03	1.98E+02	2.98E+02	2.66E+03
Ni-63	1.88E-06	6.95E-05	5.71E-04	2.68E+00	9.65E+01	7.73E+02
Ra-226	7.24E-06	1.77E-03	4.71E-03	1.03E+01	2.52E+03	6.72E+03
Ru-103*	1.66E-05	1.66E-05	1.66E-05	2.37E+01	2.37E+01	2.37E+01
S-35*	8.63E-05	8.63E-05	8.63E-05	1.23E+02	1.23E+02	1.23E+02
Sc-46*	9.96E-06	9.96E-06	9.96E-06	1.42E+01	1.42E+01	1.42E+01
Sn-113	2.80E-04	2.80E-04	2.94E-04	4.00E+02	4.00E+02	4.51E+02

Table E-30 Southwest Compact Government Waste Generators Biomedical Radionuclide Distributions - Shipment Level[a], Cont'd

Nuclide	Concentration Ranges - Percentile[b] - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
Sr-90	6.17E-06	8.28E-06	1.12E-05	8.80E+00	1.27E+01	1.60E+01
Th-232*	6.34E-03	6.34E-03	6.34E-03	9.04E+03	9.04E+03	9.04E+03
Zn-65	3.59E-05	2.57E-03	1.23E-02	4.12E+01	3.96E+03	1.90E+04

(a) Based on shipment data to all three disposal sites from 1986 to 1990.
(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table E-31 Southwest Compact Academic Waste Generators Biomedical Radionuclide Distributions - Shipment Level[a]

Waste Class: A-Unstable and A-Stable
Number of shipping records: 88
Number of shipping containers: 643
Total waste volume: 497.4 m^3
Estimated waste mass: 282,500 kg
Assumed waste form density: 0.57 g/cm^3

	Concentration Ranges - Percentile[b] - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
Am-241	5.61E-08	5.68E-07	1.40E-06	9.87E-02	1.00E+00	2.47E+00
Ba-133	5.61E-08	2.52E-06	2.13E-05	9.87E-02	5.81E+00	3.75E+01
C-14	1.40E-05	7.22E-04	1.07E-02	2.46E+01	1.32E+03	1.88E+04
Ca-45	2.41E-06	2.66E-04	1.38E-03	4.25E+00	4.68E+02	2.43E+03
Cd-109	5.61E-08	2.45E-05	1.03E-04	9.87E-02	4.31E+01	1.81E+02
Ce-141	1.41E-05	2.60E-04	4.45E-04	2.49E+01	4.58E+02	7.83E+02
Cl-36	1.05E-07	3.53E-06	1.33E-03	1.84E-01	6.22E+00	2.34E+03
Co-57	1.12E-07	6.24E-06	1.60E-04	2.41E-01	1.10E+01	2.82E+02
Co-58*	6.17E-07	6.17E-07	6.17E-07	1.32E+00	1.32E+00	1.32E+00
Co-60	3.92E-07	1.57E-05	9.43E-02	8.92E-01	2.76E+01	1.66E+05
Cr-51	2.94E-06	3.19E-04	1.60E-02	5.18E+00	5.61E+02	2.81E+04
Cs-134	6.28E-06	6.28E-06	3.13E-04	1.11E+01	1.11E+01	1.22E+02
Cs-137	3.14E-07	1.98E-06	3.26E-05	5.53E-01	3.49E+00	5.75E+01
Cu-64	6.45E-08	4.26E-07	7.85E-07	1.14E-01	7.50E-01	1.38E+00
Fe-55*	3.14E-07	3.14E-07	3.14E-07	5.53E-01	5.53E-01	5.53E-01
Fe-59	5.61E-08	4.48E-07	4.71E-06	1.26E-01	7.89E-01	1.10E+01
Ga-67	6.73E-06	2.37E-04	6.54E-04	1.18E+01	4.17E+02	1.15E+03
Gd-153	1.57E-05	1.53E-04	9.20E-04	2.76E+01	2.70E+02	1.62E+03
Ge-68	5.61E-08	5.70E-05	6.46E-04	9.87E-02	1.00E+02	1.50E+03
H-3	5.43E-05	9.27E-03	9.44E-01	9.56E+01	1.69E+04	1.66E+06
I-123	1.88E-06	1.88E-06	6.73E-06	3.32E+00	3.32E+00	1.18E+01
I-125	6.73E-05	4.67E-03	6.41E-02	1.18E+02	8.23E+03	1.13E+05
I-131	1.77E-06	2.35E-04	8.04E-04	3.11E+00	4.14E+02	1.42E+03
In-111	2.77E-07	1.68E-04	3.05E-03	4.88E-01	2.96E+02	5.36E+03
In-113m*	4.08E-04	4.08E-04	4.08E-04	7.19E+02	7.19E+02	7.19E+02

Table E-31 Southwest Compact Academic Waste Generators Biomedical Radionuclide Distributions - Shipment Level[a], Cont'd

Nuclide	Concentration Ranges - Percentile[b] - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
In-114m	1.41E-05	2.50E-04	4.26E-04	2.49E+01	4.41E+02	7.51E+02
Mn-54	7.29E-07	1.31E-04	7.66E-04	1.28E+00	8.20E+01	2.99E+02
Na-22	2.48E-07	1.04E-05	3.77E-04	4.36E-01	1.83E+01	6.63E+02
Na-24	8.75E-06	8.75E-06	1.35E-05	1.54E+01	1.54E+01	2.37E+01
Nb-95	1.68E-04	2.73E-04	5.79E-04	2.95E+02	4.80E+02	1.02E+03
Ni-63	1.88E-06	1.27E-02	5.00E-02	3.32E+00	2.24E+04	8.80E+04
P-32	1.97E-04	1.17E-02	7.72E-02	3.47E+02	2.06E+04	1.36E+05
P-33	5.23E-07	5.24E-04	1.57E-03	9.21E-01	9.22E+02	2.76E+03
Po-210	5.61E-08	4.14E-05	1.24E-04	9.87E-02	7.29E+01	2.18E+02
Ra-226	5.61E-07	3.88E-01	1.94E+00	9.87E-01	1.48E+05	7.41E+05
Rb-86	1.21E-07	6.87E-07	4.04E-04	2.13E-01	1.56E+00	7.11E+02
Ru-103	1.60E-04	2.88E-04	6.73E-04	2.81E+02	5.08E+02	1.18E+03
Ru-106*	3.14E-07	3.14E-07	3.14E-07	5.53E-01	5.53E-01	5.53E-01
S-35	1.16E-05	2.98E-03	3.15E-02	2.04E+01	5.25E+03	5.54E+04
Sc-46	1.12E-07	1.12E-06	4.25E-06	2.53E-01	1.97E+00	9.89E+00
Se-75	2.07E-06	1.60E-05	4.53E-05	4.45E+00	2.81E+01	7.97E+01
Sn-113	6.34E-07	2.15E-04	6.86E-04	1.12E+00	3.79E+02	1.21E+03
Sr-85	5.61E-08	3.14E-05	1.00E-04	1.26E-01	5.52E+01	1.76E+02
Sr-89	4.00E-04	4.15E-04	8.43E-04	7.04E+02	7.31E+02	1.48E+03
Sr-90	5.61E-08	4.26E-07	9.42E-07	9.87E-02	8.00E-01	1.66E+00
Tc-99	5.61E-08	3.36E-07	9.00E-07	9.87E-02	7.22E-01	1.59E+00
Tc-99m	6.54E-05	1.26E-03	2.81E-03	1.15E+02	2.22E+03	4.94E+03
Th-228*	6.20E-06	6.20E-06	6.20E-06	1.09E+01	1.09E+01	1.09E+01
Tl-201*	6.73E-06	6.73E-06	6.73E-06	1.18E+01	1.18E+01	1.18E+01
U-238	1.80E-07	1.33E-02	2.67E-02	3.17E-01	2.35E+04	4.69E+04
Yb-169*	1.09E-05	1.09E-05	1.09E-05	1.92E+01	1.92E+01	1.92E+01
Zn-65	5.61E-08	1.96E-06	2.34E-04	9.87E-02	4.50E+00	4.12E+02

(a) Based on shipment data to all three disposal sites from 1986 to 1990.

(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table E-32 Southwest Compact Medical Waste Generators Biomedical Radionuclide Distributions - Shipment Level[a]

Waste Class: A-Unstable and A-Stable
Number of shipping records: 135
Number of shipping containers: no data
Total waste volume: 241.8 m^3
Estimated waste mass: 187,400 kg
Assumed waste form density: 0.78 g/cm^3

Nuclide	Concentration Ranges - Percentile[b] - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
Am-241	1.83E-06	4.15E-04	1.29E-03	2.36E+00	5.35E+02	1.67E+03
Ba-133	3.62E-06	3.53E-03	7.06E-03	4.67E+00	4.56E+03	9.11E+03
Bi-207*	3.53E-03	3.53E-03	3.53E-03	4.56E+03	4.56E+03	4.56E+03
C-14	2.35E-06	2.26E-04	5.35E-03	3.04E+00	2.92E+02	6.91E+03
Ca-45	7.24E-06	1.32E-04	3.98E-03	9.35E+00	1.70E+02	5.14E+03
Cd-109*	3.30E-02	3.30E-02	3.30E-02	4.25E+04	4.25E+04	4.25E+04
Ce-141	4.71E-07	7.77E-04	2.23E-03	6.08E-01	1.00E+03	2.88E+03
Ce-144*	1.18E-04	1.18E-04	1.18E-04	1.52E+02	1.52E+02	1.52E+02
Co-57	1.57E-06	1.41E-05	1.26E-02	2.03E+00	1.82E+01	1.63E+04
Co-58*	1.18E-04	1.18E-04	1.18E-04	1.52E+02	1.52E+02	1.52E+02
Co-60*	4.71E-04	4.71E-04	4.71E-04	6.08E+02	6.08E+02	6.08E+02
Cr-51	3.62E-07	5.43E-04	2.07E-02	4.67E-01	7.01E+02	2.68E+04
Cs-137	2.54E-06	1.16E-02	2.85E-02	3.27E+00	1.50E+04	3.68E+04
Fe-55*	3.30E-06	3.30E-06	3.30E-06	4.25E+00	4.25E+00	4.25E+00
Fe-59	4.71E-05	1.00E-03	4.71E-03	6.08E+01	1.29E+03	6.08E+03
Ga-67	1.35E-05	6.09E-03	1.88E-02	1.74E+01	7.86E+03	2.43E+04
Ge-68*	1.79E-03	1.79E-03	1.79E-03	2.31E+03	2.31E+03	2.31E+03
H-3	3.06E-05	1.89E-03	1.83E-01	3.95E+01	2.44E+03	2.36E+05
I-125	1.18E-06	2.35E-03	4.63E-02	1.52E+00	3.04E+03	5.97E+04
I-129*	3.62E-07	3.62E-07	3.62E-07	4.67E-01	4.67E-01	4.67E-01
I-131	3.92E-07	1.22E-04	2.83E-03	5.06E-01	1.58E+02	3.65E+03
In-111	2.77E-05	1.18E-04	3.33E-04	3.57E+01	1.52E+02	4.30E+02
Ir-192	5.89E-04	5.89E-04	5.89E-04	7.59E+02	7.59E+02	7.59E+02
Na-22	7.85E-07	1.18E-04	9.42E-04	1.01E+00	1.52E+02	1.22E+03
Nb-95	1.41E-06	2.64E-04	5.89E-04	1.82E+00	3.41E+02	7.59E+02

Table E-32 Southwest Compact Academic Waste Generators Biomedical Radionuclide Distributions - Shipment Level[a], Cont'd

Nuclide	Concentration Ranges - Percentile[b] - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
Ni-63*	8.56E-04	8.56E-04	8.56E-04	1.10E+03	1.10E+03	1.10E+03
P-32	7.85E-04	4.71E-03	1.61E-02	1.01E+03	6.08E+03	2.08E+04
Pb-210	1.81E-04	3.61E-04	5.89E-04	2.34E+02	4.66E+02	7.59E+02
Pm-147*	2.35E-02	2.35E-02	2.35E-02	3.04E+04	3.04E+04	3.04E+04
Po-210*	2.35E-04	2.35E-04	2.35E-04	3.04E+02	3.04E+02	3.04E+02
Ra-226*	2.59E-04	2.59E-04	2.59E-04	3.34E+02	3.34E+02	3.34E+02
Rb-86	2.62E-05	2.14E-04	3.92E-04	3.38E+01	2.76E+02	5.06E+02
Ru-103	1.77E-05	2.54E-04	4.88E-04	2.28E+01	3.27E+02	6.30E+02
Ru-106*	3.53E-04	3.53E-04	3.53E-04	4.56E+02	4.56E+02	4.56E+02
S-35	3.62E-07	5.55E-03	2.31E-02	4.67E-01	7.16E+03	2.98E+04
Sb-125*	5.89E-03	5.89E-03	5.89E-03	7.59E+03	7.59E+03	7.59E+03
Sc-46	4.12E-05	2.00E-04	3.77E-04	5.32E+01	2.58E+02	4.86E+02
Se-75	1.09E-06	1.06E-04	2.28E-04	1.40E+00	1.37E+02	2.94E+02
Sn-113	6.47E-05	2.19E-04	4.31E-04	8.35E+01	2.82E+02	5.56E+02
Sr-85	1.86E-03	1.86E-03	4.71E-03	2.40E+03	2.40E+03	6.08E+03
Sr-90*	1.91E-02	1.91E-02	1.91E-02	2.47E+04	2.47E+04	2.47E+04
Ta-182*	1.18E-03	1.18E-03	1.18E-03	1.52E+03	1.52E+03	1.52E+03
Tc-99m	5.43E-05	1.18E-02	2.35E-02	7.01E+01	1.52E+04	3.04E+04
Th-228*	1.18E-04	1.18E-04	1.18E-04	1.52E+02	1.52E+02	1.52E+02
Tl-201	1.35E-05	3.58E-03	9.42E-03	1.74E+01	4.62E+03	1.22E+04
U-238*	3.92E-06	3.92E-06	3.92E-06	5.06E+00	5.06E+00	5.06E+00
Xe-133	2.35E-02	4.98E-02	7.60E-02	3.04E+04	6.42E+04	9.81E+04
Y-88*	4.71E-03	4.71E-03	4.71E-03	6.08E+03	6.08E+03	6.08E+03
Y-90*	1.17E-04	1.17E-04	1.17E-04	1.51E+02	1.51E+02	1.51E+02
Zn-65	9.42E-07	1.95E-05	3.71E-05	1.22E+00	2.52E+01	4.78E+01

(a) Based on shipment data to all three disposal sites from 1986 to 1990.

(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table E-33 Southwest Compact Industrial Waste Generators Biomedical Radionuclide Distributions - Shipment Level(a)

Waste Class: A-Unstable and A-Stable
Number of shipping records: 381
Number of shipping containers: 1,777
Total waste volume: 3,039 m^3
Estimated waste mass: 3,109,000 kg
Assumed waste form density: 1.02 g/cm^3

	Concentration Ranges - Percentile(b) - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
Ac-228*	2.02E-06	2.02E-06	2.02E-06	1.98E+00	1.98E+00	1.98E+00
Ag-110	1.06E-07	1.71E-06	3.32E-06	1.64E-01	3.33E+00	6.49E+00
Ag-110m	1.47E-07	1.04E-06	1.76E-06	1.44E-01	1.07E+00	1.72E+00
Al-26*	9.24E-04	9.24E-04	9.24E-04	9.03E+02	9.03E+02	9.03E+02
Am-241	4.90E-08	2.93E-05	1.41E-04	4.79E-02	2.86E+01	1.38E+02
Au-195*	3.27E-06	3.27E-06	3.27E-06	3.20E+00	3.20E+00	3.20E+00
Ba-133	2.00E-07	4.32E-06	1.42E-05	1.95E-01	4.68E+00	1.39E+01
Ba-140*	3.52E-08	3.52E-08	3.52E-08	5.48E-02	5.48E-02	5.48E-02
Be-7	1.92E-06	7.14E-06	1.24E-05	1.87E+00	6.98E+00	1.21E+01
C-14	1.88E-06	1.20E-04	7.06E-03	1.84E+00	1.17E+02	6.90E+03
Ca-45	9.26E-05	2.00E-04	4.10E-03	9.05E+01	3.68E+02	9.66E+03
Cd-109	3.57E-07	1.69E-05	5.35E-03	7.55E-01	1.65E+01	5.23E+03
Cd-113m*	8.02E-03	8.02E-03	8.02E-03	1.57E+04	1.57E+04	1.57E+04
Ce-139	1.28E-07	1.28E-07	5.40E-07	1.59E-01	1.59E-01	5.27E-01
Ce-141*	3.99E-08	3.99E-08	3.99E-08	3.90E-02	3.90E-02	3.90E-02
Ce-144	1.96E-07	3.45E-06	6.74E-04	1.92E-01	4.56E+00	6.58E+02
Cl-36	3.79E-07	1.84E-05	7.82E-05	4.27E-01	3.59E+01	1.84E+02
Co-57	3.99E-08	3.01E-04	3.85E-03	3.90E-02	2.94E+02	3.77E+03
Co-58	7.04E-08	2.65E-05	1.87E-04	1.10E-01	6.30E+01	5.20E+02
Co-60	8.72E-06	1.41E-01	3.06E+02	1.59E+01	1.47E+05	2.99E+08
Cr-51	3.53E-05	4.61E-03	1.73E-02	3.45E+01	4.51E+03	1.69E+04
Cs-134	8.51E-07	2.05E-05	4.04E-03	1.06E+00	4.33E+01	3.95E+03
Cs-137	8.40E-05	8.10E-03	9.60E+00	1.53E+02	7.92E+03	9.39E+06
Eu-152	1.95E-07	9.28E-06	1.62E-05	1.90E-01	1.39E+01	2.33E+01
Eu-154	2.85E-07	1.20E-06	7.51E-05	4.79E-01	1.17E+00	7.34E+01

Table E-33 Southwest Compact Industrial Waste Generators Biomedical Radionuclide Distributions - Shipment Level[a], Cont'd

Nuclide	Concentration Ranges - Percentile[b] - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
Eu-155	3.57E-08	5.99E-07	2.21E-05	4.79E-02	5.85E-01	2.16E+01
Fe-59	2.35E-04	5.23E-04	7.40E-04	2.30E+02	5.11E+02	7.23E+02
Ge-68*	2.62E-05	2.62E-05	2.62E-05	2.56E+01	2.56E+01	2.56E+01
H-3	6.28E-05	5.30E-03	1.73E-01	6.14E+01	5.18E+03	1.69E+05
Hf-181*	1.20E-07	1.20E-07	1.20E-07	1.17E-01	1.17E-01	1.17E-01
I-125	3.53E-06	2.35E-02	6.22E-01	3.45E+00	2.30E+04	6.08E+05
I-129	9.48E-08	5.40E-07	1.87E-06	1.07E-01	5.27E-01	1.83E+00
I-131	1.41E-07	1.49E-03	8.73E-03	2.19E-01	1.45E+03	8.54E+03
In-111*	2.62E-04	2.62E-04	2.62E-04	2.56E+02	2.56E+02	2.56E+02
In-114m	2.79E-07	9.81E-07	5.23E-06	2.73E-01	9.59E-01	5.11E+00
K-40*	1.79E-04	1.79E-04	1.79E-04	1.75E+02	1.75E+02	1.75E+02
K-42*	2.98E-04	2.98E-04	2.98E-04	2.91E+02	2.91E+02	2.91E+02
Kr-85	4.29E-03	1.45E-02	2.99E-02	4.19E+03	1.42E+04	2.93E+04
La-140*	5.59E-06	5.59E-06	5.59E-06	5.47E+00	5.47E+00	5.47E+00
Mn-54	9.81E-08	5.51E-07	2.91E-04	9.59E-02	7.30E+01	2.85E+02
Na-22	4.71E-06	4.81E-04	1.14E-03	4.60E+00	4.70E+02	1.11E+03
Na-24	9.18E-07	9.18E-07	1.83E-06	8.97E-01	8.97E-01	2.28E+00
Nb-94	7.04E-08	2.94E-04	1.47E-03	1.10E-01	4.21E+02	2.10E+03
Nb-95	2.77E-08	1.26E-05	3.83E-05	7.68E-02	1.23E+01	3.74E+01
Ni-63	4.74E-07	4.90E-05	9.82E-04	5.33E-01	4.79E+01	9.60E+02
Np-237*	3.63E-06	3.63E-06	3.63E-06	1.01E+01	1.01E+01	1.01E+01
P-32	5.79E-06	4.67E-03	2.37E-01	5.66E+00	4.57E+03	2.31E+05
Pa-233	7.79E-08	7.79E-08	2.00E-07	7.61E-02	7.61E-02	1.95E-01
Pb-212	8.51E-08	8.51E-08	2.30E-06	1.06E-01	1.06E-01	2.25E+00
Pu-236*	4.74E-07	4.74E-07	4.74E-07	5.33E-01	5.33E-01	5.33E-01
Pu-238*	1.13E-04	1.13E-04	1.13E-04	1.11E+02	1.11E+02	1.11E+02
Pu-239	4.74E-08	4.88E-06	9.71E-06	5.33E-02	4.77E+00	9.49E+00
Pu-242*	9.48E-08	9.48E-08	9.48E-08	1.07E-01	1.07E-01	1.07E-01
Ra-226	7.85E-07	5.01E-04	8.05E-02	7.67E-01	4.90E+02	7.87E+04
Ra-228	3.49E-04	3.49E-04	3.71E-04	3.41E+02	3.41E+02	1.00E+03
Rb-86	1.18E-05	4.19E-05	7.19E-05	1.15E+01	4.09E+01	7.03E+01
Ru-103	3.99E-08	3.99E-08	3.12E-07	3.90E-02	3.90E-02	3.04E-01
Ru-106	3.77E-06	6.39E-05	1.34E-04	5.86E+00	6.29E+01	1.31E+02
S-35	9.42E-06	1.96E-03	1.10E-01	9.21E+00	1.92E+03	1.07E+05
Sb-124	1.96E-07	6.31E-06	7.78E-05	1.92E-01	6.17E+00	7.61E+01

Table E-33 Southwest Compact Industrial Waste Generators Biomedical Radionuclide Distributions - Shipment Level[a], Cont'd

Nuclide	Concentration Ranges - Percentile[b] - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
Sb-125	1.06E-07	7.72E-06	3.45E-05	1.64E-01	8.12E+00	3.37E+01
Sc-46	7.79E-08	1.20E-06	3.93E-06	7.61E-02	1.75E+00	5.54E+00
Se-75	3.60E-08	2.35E-04	5.41E-04	3.52E-02	2.30E+02	5.29E+02
Si-32*	2.00E-07	2.00E-07	2.00E-07	1.95E-01	1.95E-01	1.95E-01
Sn-113	3.99E-08	2.35E-07	9.34E-07	3.90E-02	2.47E-01	9.13E-01
Sr-85*	8.13E-08	8.13E-08	8.13E-08	2.30E-01	2.30E-01	2.30E-01
Sr-89*	7.74E-07	7.74E-07	7.74E-07	7.57E-01	7.57E-01	7.57E-01
Sr-90	7.27E-06	4.92E-03	4.80E+00	7.11E+00	5.08E+03	4.69E+06
Sr-91*	1.34E-03	1.34E-03	1.34E-03	1.31E+03	1.31E+03	1.31E+03
Ta-182	7.13E-08	1.09E-05	6.49E-05	1.51E-01	1.06E+01	6.34E+01
Ta-183*	1.49E-05	1.49E-05	1.49E-05	3.04E+01	3.04E+01	3.04E+01
Tc-99	5.19E-07	6.42E-07	1.82E-05	5.07E-01	1.36E+00	2.04E+01
Th-228	1.20E-07	1.45E-04	3.71E-04	1.17E-01	2.70E+02	1.00E+03
Th-230	7.74E-07	1.10E-06	1.43E-06	1.17E-01	2.70E+02	1.00E+03
Th-232	3.33E-05	5.06E-04	2.35E-03	3.25E+01	4.95E+02	2.30E+03
Th-Nat	3.21E-07	2.92E-05	4.22E-02	6.68E-01	3.28E+01	5.58E+04
Tl-204	4.71E-06	4.71E-06	5.28E-03	4.60E+00	4.60E+00	5.17E+03
Tl-208	1.70E-07	1.70E-07	3.00E-06	2.12E-01	2.12E-01	2.93E+00
U-233*	4.06E-03	4.06E-03	4.06E-03	5.83E+03	5.83E+03	5.83E+03
U-234	4.90E-08	5.65E-03	2.23E-02	4.79E-02	1.01E+04	4.37E+04
U-235	4.46E-06	1.10E-04	9.58E-04	9.43E+00	1.24E+02	1.91E+03
U-238	3.98E-08	1.56E-04	5.58E-02	3.81E-02	3.34E+02	5.45E+04
U-Dep	7.77E-03	7.77E-03	7.77E-03	1.49E+04	1.49E+04	1.49E+04
U-Nat	3.43E-08	3.57E-04	1.66E-03	5.69E-02	3.49E+02	1.62E+03
Y-90	1.70E-06	3.45E-04	7.58E-04	2.12E+00	3.37E+02	7.41E+02
Zn-65	1.46E-07	1.05E-06	1.03E-04	1.42E-01	1.92E+00	2.01E+02
Zr-95	9.48E-08	5.76E-06	1.74E-05	1.07E-01	5.63E+00	1.70E+01

(a) Based on shipment data to all three disposal sites from 1986 to 1990.

(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table E-34 District of Columbia Academic Waste Generators Biomedical Radionuclide Distributions - Shipment Level(a)

Waste Class: A-Unstable and A-Stable
Number of shipping records: 6
Number of shipping containers: no data
Total waste volume: 4.7 m^3
Estimated waste mass: 2,654 kg
Assumed waste form density: 0.57 g/cm^3

Nuclide	Concentration Ranges - Percentile(b) - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
Ca-14	2.35E-04	7.85E-04	1.33E-03	4.14E+02	1.38E+03	2.35E+03
Cd-109	6.24E-05	3.77E-04	1.57E-03	1.10E+02	6.63E+02	2.76E+03
Co-58*	1.02E-04	1.02E-04	1.02E-04	1.80E+02	1.80E+02	1.80E+02
Co-60*	1.66E-04	1.66E-04	1.66E-04	2.82E+02	2.82E+02	2.82E+02
Cr-51	2.06E-04	1.77E-03	2.35E-03	3.63E+02	3.11E+03	4.14E+03
Cs-134*	1.76E-04	1.76E-04	1.76E-04	3.09E+02	3.09E+02	3.09E+02
Cs-137*	1.76E-04	1.76E-04	1.76E-04	3.09E+02	3.09E+02	3.09E+02
H-3	2.12E-03	2.18E-03	7.89E-01	3.73E+03	3.83E+03	1.39E+06
I-125	2.12E-03	2.83E-03	3.54E-03	3.73E+03	4.97E+03	6.23E+03
Na-22*	1.57E-05	1.57E-05	1.57E-05	2.76E+01	2.76E+01	2.76E+01
P-32	7.85E-04	7.85E-04	1.18E-03	1.38E+03	1.38E+03	2.07E+03
S-35	2.94E-04	1.77E-03	2.35E-03	5.18E+02	3.11E+03	4.14E+03
Th-nat*	8.55E-05	8.55E-05	8.55E-05	1.51E+02	1.51E+02	1.51E+02
U-dep*	5.49E-06	5.49E-06	5.49E-06	9.67E+00	9.67E+00	9.67E+00

(a) Based on shipment data to all three disposal sites from 1986 to 1990.
(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table E-35 District of Columbia Medical Waste Generators Biomedical Radionuclide Distributions - Shipment Level[a]

Waste Class: A-Unstable and A-Stable
Number of shipping records: 1
Number of shipping containers: no data
Total waste volume: 2.1 m^3
Estimated waste mass: 1,646 kg
Assumed waste form density: 0.78 g/cm^3

	Concentration Ranges - Percentile[b] - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
Ce-141*	3.81E-04	3.81E-04	3.81E-04	4.92E+02	4.92E+02	4.92E+02
Cr-51*	5.06E-04	5.06E-04	5.06E-04	6.53E+02	6.53E+02	6.53E+02
H-3*	4.76E-04	4.76E-04	4.76E-04	6.02E+02	6.02E+02	6.02E+02
Sr-85*	5.43E-04	5.43E-04	5.43E-04	7.01E+02	7.01E+02	7.01E+02
Zn-65*	4.02E-04	4.02E-04	4.02E-04	5.18E+02	5.18E+02	5.18E+02

(a) Based on shipment data to all three disposal sites from 1986 to 1990.
(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table E-36 District of Columbia Industrial Waste Generators Biomedical Radionuclide Distributions - Shipment Level[a]

Waste Class: A-Unstable and A-Stable
Number of shipping records: 4
Number of shipping containers: no data
Total waste volume: 3.5 m^3
Estimated waste mass: 3,607 kg
Assumed waste form density: 1.02 g/cm^3

Nuclide	Concentration Ranges - Percentile[b] - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
Au-195*	2.94E-03	2.94E-03	2.94E-03	2.87E+03	2.87E+03	2.87E+03
C-14	1.53E-04	7.09E-04	2.87E-03	1.49E+02	6.93E+02	2.81E+03
Cd-109*	4.71E-04	4.71E-04	4.71E-04	4.60E+02	4.60E+02	4.60E+02
Fe-55*	9.42E-07	9.42E-07	9.42E-07	9.21E-01	9.21E-01	9.21E-01
H-3	1.35E-03	1.53E-03	2.40E-03	1.32E+03	1.49E+03	2.35E+03
I-125*	2.83E-05	2.83E-05	2.83E-05	2.76E+01	2.76E+01	2.76E+01
Ir-192*	4.82E+01	4.82E+01	4.82E+01	4.71E+07	4.71E+07	4.71E+07
P-32	9.42E-07	1.13E-03	1.98E-03	9.21E-01	1.10E+03	1.93E+03
S-35	2.01E-04	2.01E-04	9.51E-04	1.96E+02	1.96E+02	9.30E+02

(a) Based on shipment data to all three disposal sites from 1986 to 1990.
(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table E-37 Maine Government Waste Generators Biomedical Radionuclide Distributions - Shipment Level[a]

Waste Class: A-Unstable and A-Stable
Number of shipping records: 17
Number of shipping containers: no data
Total waste volume: 286.9 m^3
Estimated waste mass: 201,100 kg
Assumed waste form density: 0.70 g/cm^3

Nuclide	Concentration Ranges - Percentile[b] - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
C-14	3.79E-06	1.28E-05	5.25E-04	5.41E+00	1.83E+01	7.49E+02
Co-58	6.69E-07	4.54E-05	6.35E-03	9.54E-01	6.48E+01	9.07E+03
Co-60	1.47E-05	5.60E-04	2.53E-02	2.10E+01	7.99E+02	3.60E+04
Cr-51*	5.71E-05	5.71E-05	5.71E-05	8.15E+01	8.15E+01	8.15E+01
Fe-55	1.47E-05	4.63E-04	2.30E-02	2.10E+01	6.60E+02	3.28E+04
H-3	3.18E-04	4.36E-04	6.48E-04	4.53E+02	6.22E+02	9.25E+02
Mn-54	2.01E-06	8.63E-05	3.60E-03	2.86E+00	1.23E+02	5.14E+03
Ni-63	6.69E-07	4.54E-05	2.02E-03	9.54E-01	6.48E+01	2.89E+03

(a) Based on shipment data to all three disposal sites from 1986 to 1990.
(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table E-38 Maine Academic Waste Generators Biomedical Radioruclide Distributions - Shipment Level[a]

Waste Class: A-Unstable and A-Stable
Number of shipping records: 1
Number of shipping containers: no data
Total waste volume: 3.6 m^3
Estimated waste mass: 2,051 kg
Assumed waste form density: 0.57 g/cm^3

	Concentration Ranges - Percentile[b] - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
C-14*	1.06E-02	1.06E-02	1.06E-02	1.87E+04	1.87E+04	1.87E+04
Ca-45*	8.31E-06	8.31E-06	8.31E-06	1.46E+01	1.46E+01	1.46E+01
Fe-59*	1.38E-03	1.38E-03	1.38E-03	2.44E+03	2.44E+03	2.44E+03
H-3*	1.26E-02	1.26E-02	1.26E-02	2.22E+04	2.22E+04	2.22E+04
S-35*	1.10E-03	1.10E-03	1.10E-03	1.93E+03	1.93E+03	1.93E+03

(a) Based on shipment data to all three disposal sites from 1986 to 1990.
(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table E-39 Maine Industrial Waste Generators Biomedical Radionuclide Distributions - Shipment Level[a]

Waste Class: A-Unstable and A-Stable
Number of shipping records: 4
Number of shipping containers: no data
Total waste volume: 8.3 m^3
Estimated waste mass: 8,508 kg
Assumed waste form density: 1.02 g/cm^3

Nuclide	Concentration Ranges - Percentile[b] - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
C-14	6.59E-05	1.23E-04	1.81E-04	6.44E+01	1.21E+02	1.77E+02
Cl-36*	1.23E-04	1.23E-04	1.23E-04	1.20E+02	1.20E+02	1.20E+02
Co-57*	7.85E-06	7.85E-06	7.85E-06	7.67E+00	7.67E+00	7.67E+00
Cr-51	7.76E-07	1.68E-03	3.35E-03	7.58E-01	1.64E+03	3.28E+03
Fe-59*	4.01E-06	4.01E-06	4.01E-06	3.92E+00	3.92E+00	3.92E+00
H-3	6.08E-03	7.41E-03	9.77E-03	5.94E+03	7.25E+03	9.55E+03
I-125*	2.04E-05	2.82E-02	7.91E-02	1.99E+01	2.75E+04	7.74E+04
I-129*	7.76E-07	7.76E-07	7.76E-07	7.58E-01	7.58E-01	7.58E-01
Kr-85*	1.05E+01	1.05E+01	1.05E+01	1.03E+07	1.03E+07	1.03E+07
Na-22*	1.09E-03	1.09E-03	1.09E-03	1.06E+03	1.06E+03	1.06E+03
P-32*	1.43E-02	1.43E-02	1.43E-02	1.40E+04	1.40E+04	1.40E+04
Rb-86*	1.41E-04	1.41E-04	1.41E-04	1.38E+02	1.38E+02	1.38E+02
S-35	9.79E-04	1.13E-03	1.28E-03	9.57E+02	1.10E+03	1.25E+03

(a) Based on shipment data to all three disposal sites from 1986 to 1990.
(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table E-40 Massachusetts Government Waste Generators Biomedical Radionuclide Distributions - Shipment Level[a]

Waste Class: A-Unstable and A-Stable
Number of shipping records: 13
Number of shipping containers: no data
Total waste volume: 168 m^3
Estimated waste mass: 117,800 kg
Assumed waste form density: 0.70 g/cm^3

	Concentration Ranges - Percentile[b] - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
C-14*	3.57E-04	3.57E-04	3.57E-04	5.09E+02	5.09E+02	5.09E+02
Co-60	1.58E-05	2.68E-04	5.19E-04	2.25E+01	3.82E+02	7.41E+02
Dep-U	7.89E-04	1.54E-03	2.31E-03	1.13E+03	2.20E+03	3.29E+03
H-3*	3.01E-02	3.01E-02	3.01E-02	4.30E+04	4.30E+04	4.30E+04
S-35*	5.61E-05	5.61E-05	5.61E-05	8.00E+01	8.00E+01	8.00E+01

(a) Based on shipment data to all three disposal sites from 1986 to 1990.
(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table E-41 Massachusetts Academic Waste Generators Biomedical Radionuclide Distributions - Shipment Level[a]

Waste Class: A-Unstable and A-Stable
Number of shipping records: 25
Number of shipping containers: no data
Total waste volume: 28.7 m^3
Estimated waste mass: 16,290 kg
Assumed waste form density: 0.57 g/cm^3

Nuclide	Concentration Ranges - Ci/m^3 - 1st	50th	99th	Percentile[b] - pCi/g - 1st	50th	99th
Ba-133	3.14E-04	3.59E-04	4.71E-04	5.53E+02	6.32E+02	8.29E+02
C-14	1.32E-05	2.68E-04	2.59E-02	2.33E+01	4.71E+02	4.56E+04
Ca-45	1.06E-04	4.71E-03	4.71E-03	1.86E+02	8.29E+03	8.29E+03
Cd-109	2.35E-03	3.14E-03	4.71E-03	4.14E+03	5.53E+03	8.29E+03
Cl-36*	3.53E-03	3.53E-03	3.53E-03	6.22E+03	6.22E+03	6.22E+03
Co-57	4.89E-04	5.81E-04	6.73E-04	8.61E+02	1.02E+03	1.18E+03
Co-58*	6.73E-04	6.73E-04	6.73E-04	1.18E+03	1.18E+03	1.18E+03
Cr-51	4.71E-03	4.71E-03	7.06E-03	8.29E+03	8.29E+03	1.24E+04
H-3	4.05E-05	1.16E-02	5.41E+00	7.13E+01	2.04E+04	9.53E+06
I-125	1.76E-06	1.26E-04	9.42E-02	3.10E+00	2.21E+02	1.66E+05
Na-22	1.47E-06	4.71E-03	4.71E-03	2.58E+00	8.29E+03	8.29E+03
P-32	1.76E-06	5.89E-02	9.42E-02	3.10E+00	1.04E+05	1.66E+05
Rb-86	3.52E-06	9.39E-05	2.35E-03	6.20E+00	1.65E+02	4.14E+03
S-35	2.94E-06	9.42E-02	9.42E-02	5.17E+00	1.66E+05	1.66E+05
U-238*	1.01E-04	1.01E-04	1.01E-04	1.78E+02	1.78E+02	1.78E+02

(a) Based on shipment data to all three disposal sites from 1986 to 1990.
(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table E-42 Massachusetts Medical Waste Generators Biomedical Radionuclide Distributions - Shipment Level[a]

Waste Class: A-Unstable and A-Stable
Number of shipping records: 20
Number of shipping containers: no data
Total waste volume: 34.3 m^3
Estimated waste mass: 26,610 kg
Assumed waste form density: 0.78 g/cm^3

Nuclide	Concentration Ranges - Percentile[b] - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
C-14	4.71E-06	7.79E-04	4.71E-03	6.08E+00	1.01E+03	6.08E+03
Ca-45	1.09E-06	4.81E-05	2.35E-04	1.40E+00	6.21E+02	3.04E+02
Ca-47*	3.36E-05	3.36E-05	3.36E-05	4.43E+01	4.34E+01	4.34E+01
Ce-141	1.57E-06	1.57E-06	5.33E-06	2.03E+00	2.03E+00	6.88E+00
Cl-36	7.44E-07	7.42E-06	1.49E-05	9.59E-01	9.57E+00	1.92E+01
Co-57	1.54E-05	3.30E-05	6.34E-05	1.99E+01	4.26E+01	8.18E+01
Cr-51	5.89E-05	6.99E-04	2.28E-03	7.59E+01	9.02E+02	2.94E+03
Fe-59*	1.68E-05	1.68E-05	1.68E-05	2.17E+01	2.17E+01	2.17E+01
Ga-67*	8.81E-06	8.81E-06	8.81E+06	1.14E+01	1.14E+01	1.14E+01
H-3	6.13E-05	8.43E-04	5.77E-03	7.91E+01	1.09E+03	7.44E+03
I-123	8.81E-06	2.52E-04	4.96E-04	1.14E+01	3.25E+02	6.40E+02
I-125	8.84E-04	3.04E-03	3.67E-03	1.14E+03	3.92E+03	4.73E+03
I-131	8.81E-06	5.07E-05	1.35E-04	1.14E+01	6.54E+01	1.74E+02
In-111	1.68E-06	1.25E-04	4.46E-04	2.17E+00	1.61E+02	5.76E+02
Na-22	1.98E-05	3.04E-04	9.98E-04	2.56E+01	3.92E+02	1.29E+03
Nb-95	1.57E-06	1.57E-06	6.66E-06	2.03E+00	2.03E+00	8.59E+00
P-32	2.86E-03	1.33E-02	3.81E-02	3.69E+03	1.72E+04	4.92E+04
Rb-86	4.96E-06	1.35E-05	1.99E-05	6.40E+00	1.74E+01	2.57E+01
Ru-103*	1.33E-05	1.33E-05	1.33E-05	1.72E+01	1.72E+01	1.72E+01
S-35	4.51E-04	2.70E-03	9.42E-03	5.82E+02	3.48E+03	1.22E+04
Sc-46	6.66E-05	6.66E-05	1.24E-04	8.59E+01	8.59E+01	1.60E+02
Sn-113	2.83E-05	2.83E-05	9.19E-05	3.65E+01	3.65E+01	1.19E+02
Tc-99m*	8.81E-06	8.81E-06	8.81E-06	1.14E+01	1.14E+01	1.14E+01
Tl-201*	8.81E-06	8.81E-06	8.81E-06	1.14E+01	1.14E+01	1.14E+01

(a) Based on shipment data to all three disposal sites from 1986 to 1990.
(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table E-43 Massachusetts Industrial Waste Generators Biomedical Radionuclide Distributions - Shipment Level(a)

Waste Class: A-Unstable and A-Stable
Number of shipping records: 462
Number of shipping containers: 3,770
Total waste volume: 3,707 m^3
Estimated waste mass: 3,792,000 kg
Assumed waste form density: 1.02 g/cm^3

Nuclide	Concentration Ranges - Percentile(b) - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
Ag-110*	4.61E-07	4.61E-07	4.61E-07	5.50E-01	5.50E-01	5.50E-01
Ag-110m	4.90E-08	1.84E-05	3.73E-03	6.09E-02	2.01E+01	3.65E+03
Am-241	1.18E-06	2.69E-05	5.27E-05	1.16E+00	2.63E+01	5.15E+01
Au-195	1.22E-06	4.92E-05	1.56E-03	1.71E+00	4.81E+01	1.52E+03
Ba-133	5.89E-08	5.52E-05	1.50E-02	5.75E-02	7.63E+01	2.17E+04
Be-7	7.27E-05	7.27E-05	8.71E-04	7.10E+01	7.10E+01	8.51E+02
Bi-207*	2.45E-07	2.45E-07	2.45E-07	3.05E-01	3.05E-01	3.05E-01
C-14	1.90E-01	4.43E-01	7.38E-01	1.66E+05	6.09E+05	1.02E+06
Ca-45	3.45E-07	1.14E-03	4.63E-02	3.37E-01	1.30E+03	5.67E+04
Cd-109	6.25E-06	5.60E-04	5.09E-03	6.11E+00	6.34E+02	6.23E+03
Cd-115m*	2.32E-05	2.32E-05	2.32E-05	2.27E+01	2.27E+01	2.27E+01
Ce-139	8.70E-08	3.58E-07	6.14E-06	1.22E-01	3.50E-01	7.38E+0
Ce-141	1.01E-06	6.91E-06	1.70E-03	1.13E+00	8.30E+00	1.67E+0
Ce-144	3.14E-06	1.38E-05	7.32E-04	3.07E+00	1.34E+01	7.16E+0
Cl-36	9.93E-06	2.39E-04	5.15E-03	9.70E+00	3.13E+02	6.19E+03
Co-56*	4.57E-05	4.57E-05	4.57E-05	6.60E+01	6.60E+01	6.60E+01
Co-57	1.93E-06	3.69E-03	5.27E-02	3.56E+00	4.33E+03	6.37E+04
Co-58	2.30E-07	2.76E-05	1.50E-03	2.25E-01	3.32E+01	1.47E+03
Co-60	9.25E-07	5.31E-04	6.93E-03	9.04E-01	5.19E+02	6.78E+03
Cr-51	7.71E-06	2.06E-04	2.90E-02	7.53E+00	2.96E+02	2.83E+04
Cs-134	4.35E-08	1.98E-05	5.53E-04	6.64E-02	1.94E+01	6.77E+02
Cs-137	2.91E-06	1.74E-04	1.36E-02	3.25E+00	1.89E+02	1.96E+04
Eu-154	4.54E-06	5.64E-06	1.03E-04	6.46E+00	7.00E+00	1.23E+02
Eu-155	4.71E-05	4.71E-05	1.80E-04	5.66E+01	5.66E+01	3.42E+02
Fe-55	1.01E-05	1.64E-03	1.30E-02	9.88E+00	1.60E+03	1.85E+04
Fe-59	6.38E-07	2.96E-05	1.85E-03	7.92E-01	3.00E+01	1.81E+03
Ga-67	1.57E-07	6.24E-07	2.28E-03	1.53E-01	6.10E-01	3.30E+0
Ga-68*	3.79E-06	3.79E-06	3.79E-06	4.53E+00	4.53E+00	4.53E+00

Table E-43 Massachusetts Industrial Waste Generators Biomedical Radionuclide Distributions - Shipment Level(a), Cont'd

Nuclide	Concentration Ranges - Percentile(b) - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
Gd-153	4.00E-06	1.72E-04	9.14E-02	7.61E+00	1.68E+02	1.32E+05
Ge-68	3.99E-06	9.43E-05	1.62E-03	4.94E+00	1.66E+02	2.47E+03
H-3	3.06E-01	8.67E+00	3.53E+02	5.81E+05	9.81E+06	3.45E+08
Hg-203	2.00E-06	3.12E-05	1.82E-03	2.40E+00	3.69E+01	2.26E+03
I-125	5.10E-06	1.45E-02	2.99E-01	4.99E+00	1.42E+04	2.93E+05
I-129	3.92E-08	2.18E-06	2.20E-04	5.98E-02	2.13E+00	3.36E+02
I-131	5.21E-08	9.40E-05	3.71E-04	5.09E-02	9.19E+01	3.62E+02
In-111	1.21E-07	8.25E-05	4.04E-04	1.18E-01	1.02E+02	5.01E+02
In-114*	1.94E-06	1.94E-06	1.94E-06	2.32E+00	2.32E+00	2.32E+00
In-114m	3.92E-08	7.93E-06	1.20E-03	5.98E-02	7.75E+00	1.27E+03
Kr-85	2.84E-07	7.52E-06	6.25E-04	2.77E-01	8.99E+00	8.90E+02
Mn-54	2.35E-06	3.09E-05	1.57E-03	2.83E+00	3.84E+01	1.77E+03
Mo-99*	1.51E-04	1.51E-04	1.51E-04	1.85E+02	1.85E+02	1.85E+02
Na-22	2.49E-06	7.90E-04	7.27E-03	4.60E+00	9.67E+02	9.69E+03
Nb-95	8.83E-07	3.45E-05	3.13E-04	8.63E-01	3.38E+01	4.46E+02
Ni-59*	6.93E-06	6.93E-06	6.93E-06	6.78E+00	6.78E+00	6.78E+00
Ni-63	5.47E-06	1.65E-02	1.37E-01	5.35E+00	1.94E+04	1.98E+05
P-32	4.40E-08	1.38E-05	4.21E-02	4.30E-02	1.65E+01	5.21E+04
P-33	1.68E-07	6.81E-06	8.95E-05	1.88E-01	6.65E+00	8.75E+01
Pb-202	6.03E-04	1.76E-03	2.56E-03	5.89E+02	1.72E+03	2.50E+03
Pb-210	3.92E-08	3.92E-08	4.24E-08	5.98E-02	5.98E-02	6.04E-02
Pm-147	1.02E-07	6.37E-05	1.30E-03	1.27E-01	7.66E+01	1.90E+03
Po-210	3.14E-06	1.92E-05	3.53E-05	3.07E+00	1.88E+01	3.45E+01
Ra-226	4.40E-08	4.93E-04	7.43E-04	4.30E-02	4.82E+02	7.26E+02
Rb-86	6.14E-07	1.98E-05	1.77E-03	6.17E-01	2.22E+01	1.73E+03
Ru-103	8.70E-07	1.58E-05	1.33E-03	9.21E-01	2.02E+01	1.30E+03
S-35	4.40E-06	2.70E-01	4.49E+00	4.30E+00	3.15E+05	6.35E+06
Sb-124*	5.12E-05	5.12E-05	5.12E-05	6.34E+01	6.34E+01	6.34E+01
Sb-125	5.12E-08	7.69E-06	2.97E-05	6.12E-02	1.04E+01	4.32E+01
Sc-46	1.13E-06	4.09E-05	2.52E-03	1.11E+00	4.00E+01	2.46E+03
Se-75	5.12E-08	2.41E-05	5.83E-03	5.00E-02	2.86E+01	5.70E+03
Sn-113	1.09E-04	4.27E-04	7.11E-03	1.07E+02	4.18E+02	6.95E+03
Sn-117m*	5.12E-06	5.12E-06	5.12E-06	6.34E+00	6.34E+00	6.34E+00
Sn-119	1.77E-06	5.20E-05	4.19E-04	1.73E+00	5.08E+01	5.01E+02
Sn-119m	4.12E-06	7.85E-05	8.53E-03	6.34E+00	1.20E+02	1.06E+04

Table E-43 Massachusetts Industrial Waste Generators Biomedical Radionuclide Distributions - Shipment Level(a), Cont'd

Nuclide	Concentration Ranges - Percentile(b) - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
Sr-85	2.51E-07	1.54E-05	3.50E-03	2.46E+01	1.90E+01	3.42E+03
Sr-90	5.12E-08	1.72E-06	7.55E-04	5.09E-02	2.51E+00	7.38E+02
Ta-182*	3.48E-06	3.48E-06	3.48E-06	4.16E+00	4.16E+00	4.16E+00
Tc-99	5.74E-06	2.20E-04	4.76E-03	5.61E+00	2.57E+02	6.78E+03
Tc-99m	4.35E-08	7.97E-04	2.70E-03	6.64E-02	8.20E+02	2.64E+03
Th-232	2.54E-04	9.83E-04	1.71E-03	2.49E+02	9.60E+02	1.67E+03
Tl-201	9.81E-08	8.24E-07	2.56E-04	1.22E-01	1.13E+00	3.14E+02
Tl-202	3.52E-07	4.61E-05	3.21E-04	3.44E-01	5.70E+01	3.13E+02
Tl-204	1.59E-05	5.53E-05	1.54E-04	1.55E+01	6.77E+01	2.04E+02
Tm-170*	1.79E-01	1.79E-01	1.79E-01	1.75E+05	1.75E+05	1.75E+05
U-235*	3.45E-03	3.45E-03	3.45E-03	3.37E+03	3.37E+03	3.37E+03
U-238	1.12E-03	4.23E-01	1.68E+00	1.10E+03	3.96E+05	1.64E+06
Y-88	4.73E-08	9.38E-06	2.80E-04	4.62E-02	9.16E+00	2.73E+02
Y-90*	5.03E-06	5.03E-06	5.03E-06	6.15E+00	6.15E+00	6.15E+00
Yb-169	3.78E-07	3.78E-07	4.90E-06	3.70E-01	3.70E-01	4.79E+00
Zn-65	1.61E-07	5.04E-04	8.33E-02	2.97E-01	5.97E+02	8.14E+04
Zr-95	1.18E-06	1.49E-05	5.08E-04	1.21E+00	2.18E+01	4.96E+02

(a) Based on shipment data to all three disposal sites from 1986 to 1990.
(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table E-44 New Hampshire Academic Waste Generators Biomedical Radionuclide Distributions - Shipment Level[a]

Waste Class: A-Unstable and A-Stable
Number of shipping records: 1
Number of shipping containers: no data
Total waste volume: 1.3 m^3
Estimated waste mass: 723.8 kg
Assumed waste form density: 0.57 g/cm^3

Nuclide	Concentration Ranges - Percentile[b] - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
Ca-14*	2.35E-04	2.35E-04	2.35E-04	4.13E+02	4.13E+02	4.13E+02
H-3*	5.74E-04	5.74E-04	5.74E-04	1.01E+03	1.01E+03	1.01E+03
I-125*	1.79E-04	1.79E-04	1.79E-04	3.15E+02	3.15E+02	3.15E+02

(a) Based on shipment data to all three disposal sites from 1986 to 1990.
(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table E-45 New Hampshire Industrial Waste Generators Biomedical Radionuclide Distributions - Shipment Level(a)

Waste Class: A-Unstable and A-Stable
Number of shipping records: 6
Number of shipping containers: 15
Total waste volume: 73.3 m^3
Estimated waste mass: 75,000 kg
Assumed waste form density: 1.02 g/cm^3

Nuclide	Concentration Ranges - Percentile(b) - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
Co-60*	3.63E-03	3.63E-03	3.63E-03	1.46E+03	1.46E+03	1.46E+03
H-3*	4.12E+00	4.12E+00	4.12E+00	4.03E+06	4.03E+06	4.03E+06
Ra-226	8.32E-04	8.32E-04	8.32E-04	8.13E+02	8.13E+02	8.13E+02
Th-nat	5.88E-04	1.40E-02	5.15E-02	5.75E+02	1.38E+04	5.04E+04

(a) Based on shipment data to all three disposal sites from 1986 to 1990.
(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table E-46 New York Government Waste Generators Biomedical Radionuclide Distributions - Shipment Level[a]

Waste Class: A-Unstable and A-Stable
Number of shipping records:
Number of shipping containers:
Total waste volume: 73.3 m^3
Estimated waste mass: 75,000 kg
Assumed waste form density: 1.02 g/cm^3

	Concentration Ranges - Percentile[b] - Ci/m^3 -			- pCi/g -		
Nuclide	1st	50th	99th	1st	50th	99th
Am-241*	9.42E-06	9.42E-06	9.42E-06	1.34E+01	1.34E+01	1.34E+01
C-14*	1.18E-05	1.18E-05	1.18E-05	1.68E+01	1.68E+01	1.68E+01
Co-60	1.18E-05	4.19E-05	7.21E-05	1.68E+01	5.98E+01	1.03E+02
Cr-51*	5.95E-03	5.95E-03	5.95E-03	8.48E+03	8.48E+03	8.48E+03
Cs-137*	3.53E-05	3.53E-05	3.53E-05	5.04E+01	5.04E+01	5.04E+01
Dep-U	4.58E-05	4.58E-05	5.65E-05	6.54E+01	6.54E+01	8.05E+01
H-3*	1.18E-04	1.18E-04	1.18E-04	1.68E+02	1.68E+02	1.68E+02
I-125*	6.57E-02	6.57E-02	6.57E-02	9.37E+04	9.37E+04	9.37E+04
Po-210*	2.35E-06	2.35E-06	2.35E-06	3.36E+00	3.36E+00	3.36E+00
Ra-226	4.26E-04	6.18E-02	1.23E-01	6.08E+02	8.82E+04	1.76E+05
Sr-90	9.42E-06	9.42E-06	2.35E-02	1.34E+01	1.34E+01	3.36E+04
Th-232*	5.37E-04	5.37E-04	5.37E-04	7.66E+02	7.66E+02	7.66E+02
Tl-201*	4.71E-05	4.71E-05	4.71E-05	6.72E+01	6.72E+01	6.72E+01
Tl-204*	1.88E-04	1.88E-04	1.88E-04	2.69E+02	2.69E+02	2.69E+02
U-235*	1.55E-06	1.55E-06	1.55E-06	2.20E+00	2.20E+00	2.20E+00
U-238*	3.16E-03	3.16E-03	3.13E-06	4.51E+03	4.51E+03	4.51E+03
U-nat*	2.88E-03	2.88E-03	2.88E-03	4.03E+03	4.03E+03	4.03E+03

(a) Based on shipment data to all three disposal sites from 1986 to 1990.
(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table E-47 New York Academic Waste Generators Biomedical Radionuclide Distributions - Shipment Level[a]

Waste Class: A-Unstable and A-Stable
Number of shipping records: 89
Number of shipping containers: no data
Total waste volume: 58.7 m^3
Estimated waste mass: 33,370 kg
Assumed waste form density: 0.57 g/cm^3

Nuclide	Concentration Ranges - Percentile[b] - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
Am-241*	2.35E-06	2.35E-06	2.35E-06	4.14E+00	4.14E+00	4.14E+00
Ba-133*	4.25E-05	4.24E-05	4.24E-05	7.46E+01	7.46E+01	7.46E+01
Bi-207*	1.32E-01	1.32E-01	1.32E-01	2.32E+05	2.32E+05	2.32E+05
Bi-210*	1.41E-05	1.41E-05	1.41E-05	2.49E+01	2.49E+01	2.49E+01
C-14	3.77E-06	2.04E-03	1.58E-01	6.63E+00	3.60E+03	2.78E+05
Ca-45	2.64E-05	4.09E-04	9.88E-04	4.64E+01	7.21E+02	1.74E+03
Ce-141*	2.35E-06	2.35E-06	2.35E-06	4.14E+00	4.14E+00	4.14E+00
Ce-144*	2.35E-06	2.35E-06	2.35E-06	4.14E+00	4.14E+00	4.14E+00
Cl-36*	4.71E-06	4.71E-06	4.71E-06	8.29E+00	8.29E+00	8.29E+00
Co-57	4.71E-06	2.66E-04	1.18E-03	8.29E+00	4.68E+02	2.07E+03
Co-60	2.35E-06	6.67E-04	1.57E-03	4.14E+00	1.17E+03	2.76E+03
Cr-51	8.48E-04	2.35E-03	1.57E-02	1.49E+03	4.14E+03	2.76E+04
Cs-134*	2.35E-06	2.35E-06	2.35E-06	4.14E+00	4.14E+00	4.14E+00
Cs-137	2.35E-06	2.03E-03	7.91E-03	4.14E+00	3.58E+03	1.39E+04
Fe-55	4.71E-06	4.71E-06	2.64E-03	8.29E+00	8.29E+00	4.64E+03
Fe-59	1.45E-04	8.63E-04	1.18E-03	2.55E+02	1.52E+03	2.07E+03
Ga-67	8.81E-04	2.64E-03	2.64E-03	1.55E+03	4.65E+03	4.65E+03
H-3	2.35E-05	8.85E-03	7.83E+00	4.14E+01	1.56E+04	1.38E+07
I-125	6.28E-06	1.41E-02	6.81E-02	1.11E+01	2.47E+04	1.20E+05
I-131	8.81E-04	8.81E-04	2.64E-03	1.55E+03	1.55E+03	4.65E+03
Mn-54*	2.35E-06	2.35E-06	2.35E-06	4.14E+00	4.14E+00	4.14E+00
Na-22	9.42E-06	2.27E-04	6.42E-04	1.66E+01	3.99E+02	1.13E+03
Ni-63	4.71E-05	2.05E-03	4.05E-03	8.29E+01	3.61E+03	7.13E+03
P-32	2.12E-05	3.40E-02	8.05E-02	3.73E+01	5.99E+04	1.42E+05
Pb-210	1.88E-04	1.88E-04	2.45E-03	3.32E+02	3.32E+02	4.31E+03
Pm-147*	3.77E-05	3.77E-05	3.77E-05	6.63E+01	6.63E+01	6.63E+01
Po-210*	3.77E-05	3.77E-05	3.77E-05	6.63E+01	6.63E+01	6.63E+01
Ra-226*	9.42E-06	9.42E-06	9.42E-06	1.66E+01	1.66E+01	1.66E+01

Table E-47 New York Academic Waste Generators Biomedical Radionuclide Distributions - Shipment Level[a], Cont'd

Nuclide	Concentration Ranges - Percentile[b] - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
S-35	3.04E-06	5.51E-03	6.65E-02	8.29E+02	1.91E+03	1.76E+05
Sr-90	4.71E-06	4.71E-06	3.50E-03	8.29E+00	8.29E+00	6.17E+03
Tc-99*	4.71E-06	4.71E-06	4.71E-06	8.29E+00	8.29E+00	8.29E+00
Tc-99m*	4.40E-03	4.40E-03	5.28E-03	7.75E+03	7.75E+03	9.30E+03
Th-232*	2.35E-04	2.35E-04	2.35E-04	4.14E+02	4.14E+02	4.14E+02
Th-nat*	4.60E-04	4.60E-04	4.60E-04	8.10E+02	8.10E+02	8.10E+02
Tl-204	4.71E-06	1.93E-04	3.81E-04	8.29E+00	4.40E+02	6.71E+02
U-238*	4.71E-06	4.71E-06	4.71E-06	8.29E+00	8.29E+00	8.29E+00
Zn-65*	4.71E-06	4.71E-06	4.71E-06	8.29E+00	8.29E+00	8.29E+00

(a) Based on shipment data to all three disposal sites from 1986 to 1990.
(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table E-48 New York Medical Waste Generators Biomedical Radionuclide Distributions - Shipment Level(a)

Waste Class: A-Unstable and A-Stable
Number of shipping records: 474
Number of shipping containers: no data
Total waste volume: 495.2 m^3
Estimated waste mass: 383,800 kg
Assumed waste form density: 0.78 g/cm^3

Nuclide	Concentration Ranges - Percentile(b) - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
Ag-110m*	4.71E-05	4.71E-05	4.71E-05	6.08E+01	6.08E+01	6.08E+01
Am-241*	1.96E-05	1.96E-05	1.96E-05	2.53E+01	2.53E+01	2.53E+01
Ba-133*	1.88E-04	1.88E-04	1.88E-04	2.42E+02	2.42E+02	2.42E+02
C-14	1.18E-06	1.88E-04	9.56E-03	1.52E+00	2.43E+02	1.23E+04
Ca-47*	9.42E-05	9.42E-05	9.42E-05	1.22E+02	1.22E+02	1.22E+02
Ce-141	2.83E-06	3.56E-04	2.21E-03	3.65E+00	4.60E+02	2.86E+03
Cl-36	1.18E-06	1.18E-04	7.06E-04	1.52E+00	1.52E+02	9.11E+02
Co-57	1.57E-06	7.06E-05	3.53E-03	2.03E+00	9.11E+01	4.56E+03
Co-60*	4.71E-06	4.71E-06	4.71E-06	6.08E+00	6.08E+00	6.08E+00
Cr-51	9.42E-07	3.92E-03	5.21E-02	1.22E+00	5.06E+03	6.72E+04
Cs-137	4.71E-06	8.44E-03	3.32E-02	6.08E+00	1.09E+04	4.28E+04
Eu-152*	3.85E-04	3.85E-04	3.85E-04	4.97E+02	4.97E+02	4.97E+02
Fe-55	1.28E-06	3.36E-04	1.88E-03	1.66E+00	4.34E+02	2.43E+02
Fe-59	1.18E-05	4.71E-05	2.21E-03	1.52E+01	6.08E+01	2.86E+03
Ga-67	1.02E-05	6.28E-04	3.15E-03	1.32E+01	8.11E+02	4.06E+03
Gd-153	7.85E-07	5.35E-05	1.41E-04	1.01E+00	6.91E+01	1.82E+02
H-3	1.18E-06	3.53E-03	8.00E-02	1.52E+00	4.55E+03	1.03E+05
I-123	1.16E-06	5.58E-04	9.42E-04	1.49E+00	7.21E+02	1.22E+03
I-125	9.42E-06	3.41E-03	1.16E-01	1.22E+01	4.40E+03	1.50E+05
I-129*	1.16E-04	1.16E-04	1.16E-04	1.49E+02	1.49E+02	1.49E+02
I-131	2.28E-06	2.71E-04	6.04E-03	2.94E+00	3.49E+02	7.80E+03
In-111	5.89E-06	2.35E-04	1.53E-03	7.59E+00	3.04E+02	1.97E+03
In-114m*	3.92E-06	3.92E-06	3.92E-06	5.06E+00	5.06E+00	5.06E+00
Ir-192	1.41E-05	1.75E+00	5.24E+00	1.82E+01	2.26E+06	6.77E+06
Mn-54*	4.71E-06	4.71E-06	4.71E-06	6.08E+00	6.08E+00	6.08E+00
Mo-99	2.47E-04	9.70E-04	7.01E-03	3.19E+02	1.25E+03	9.04E+03
Na-22	2.35E-06	4.71E-05	5.29E-04	3.04E+00	6.08E+01	6.82E+02
Nb-95	3.92E-07	1.33E-04	1.41E-03	5.06E-01	1.72E+02	1.82E+03

Table E-48 New York Medical Waste Generators Biomedical Radionuclide Distributions - Shipment Level(a), Cont'd

Nuclide	Concentration Ranges - Percentile(b) - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
P-32	7.85E-07	3.11E-03	2.40E-01	1.01E+00	4.01E+03	3.10E+05
Pb-210	1.04E-06	1.04E-06	1.31E-06	1.34E+00	1.34E+00	1.69E+00
Rb-86	6.25E-06	4.41E-05	3.00E-03	8.06E+00	5.69E+01	3.87E+03
Ru-103	1.41E-06	1.20E-04	1.41E-03	1.82E+00	1.55E+02	1.82E+03
S-35	1.18E-06	1.87E-03	4.24E-02	1.52E+00	2.41E+03	5.47E+04
Sc-46	9.42E-06	1.07E-04	1.57E-03	1.22E+01	1.38E+02	2.03E+03
Se-75	1.41E-05	3.05E-04	1.35E-03	1.82E+01	3.94E+02	1.74E+03
Sn-113	3.14E-06	1.07E-04	1.57E-03	4.05E+00	1.38E+02	2.03E+03
Sr-85	4.71E-07	3.34E-05	1.71E-03	6.08E-01	4.31E+01	2.21E+03
Sr-90*	4.71E-06	4.71E-06	4.71E-06	6.08E+00	6.08E+00	6.08E+00
Tc-99m	6.14E-05	1.75E-03	4.67E-03	7.92E+02	2.25E+03	6.03E+03
Th-228*	7.81E-05	7.81E-05	7.81E-05	1.01E+02	1.01E+02	1.01E+02
Tl-201	9.42E-06	8.81E-04	4.40E-02	1.22E+01	1.14E+03	5.68E+04
U-238	3.97E-05	9.70E-05	1.71E-04	5.12E+01	1.25E+02	2.21E+02
Xe-133	4.40E-05	8.81E-04	8.81E-04	5.68E+01	1.14E+03	1.14E+03
Zn-65	4.71E-05	5.89E-05	2.87E-03	6.08E+01	7.59E+01	3.71E+03

(a) Based on shipment data to all three disposal sites from 1986 to 1990.
(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table E-49 New York Industrial Waste Generators Biomedical Radionuclide Distributions - Shipment Level[a]

Waste Class: A-Unstable and A-Stable
Number of shipping records: 298
Number of shipping containers: no data
Total waste volume: 1,279 m^3
Estimated waste mass: 1,308,000 kg
Assumed waste form density: 1.02 g/cm^3

Nuclide	Concentration Ranges - Percentile[b] - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
Ag-110*	4.23E-04	4.23E-04	4.23E-04	4.13E+02	4.13E+02	4.13E+02
Ag-110m	1.09E-04	2.34E-04	1.97E-03	1.07E+02	2.29E+02	1.93E+03
Am-241	1.22E-07	1.38E-04	5.46E-04	1.91E-01	1.35E+02	5.34E+02
Au-193*	9.89E-07	9.89E-07	9.89E-07	9.66E-01	9.66E-01	9.66E-01
Au-195*	3.53E-06	3.53E-06	3.53E-06	3.45E+00	3.45E+00	3.45E+00
Ba-133	2.74E-07	3.40E-05	1.22E-04	2.68E-01	3.32E+01	1.20E+02
C-14	7.18E-07	1.93E-03	1.77E-01	7.02E-01	1.89E+03	1.73E+05
C-14am*	2.35E-02	2.35E-02	2.35E-02	2.30E+04	2.30E+04	2.30E+04
Ca-45	4.77E-05	1.33E-04	7.92E-04	4.66E+01	1.30E+02	7.74E+02
Cd-109	2.21E-06	2.45E-05	4.93E-05	2.17E+00	2.39E+01	4.82E+01
Ce-141	9.35E-07	2.07E-05	1.35E-02	9.14E-01	2.02E+01	1.32E+04
Ce-144	4.65E-04	3.52E+01	5.84E+01	4.54E+02	3.44E+07	5.71E+07
Cl-36	1.20E-07	1.36E-06	4.97E-05	1.17E-01	1.33E+00	4.86E+01
Co-57	2.52E-06	1.01E-04	1.75E-03	2.46E+00	9.90E+01	1.71E+03
Co-58	2.35E-06	4.50E+00	7.39E+00	2.29E+00	4.40E+06	7.23E+06
Co-60	1.22E-07	2.43E-05	7.50E-04	1.20E-01	2.38E+01	7.33E+02
Cr-51	1.29E-05	2.69E-04	7.53E-03	1.27E+01	2.63E+02	7.36E+03
Cs-134	2.40E-08	2.40E-08	1.24E-04	2.34E-02	2.34E-02	1.21E+02
Cs-136*	2.54E-07	2.54E-07	2.54E-07	2.48E-01	2.48E-01	2.48E-01
Cs-137	1.90E-04	4.07E-04	1.14E-03	1.86E+02	3.98E+02	1.12E+03
Cu-64*	4.94E-07	4.94E-07	4.94E-07	4.83E-01	4.83E-01	4.83E-01
Eu-152*	2.40E-08	2.40E-08	2.40E-08	2.34E-02	2.34E-02	2.34E-02
Fe-55	2.35E-08	2.74E-06	2.58E-05	2.30E-02	2.68E+00	2.53E+01
Fe-59	2.35E-08	1.96E-05	6.66E-04	2.30E-02	1.91E+01	6.51E+02
Ga-67	1.52E-05	6.07E-05	1.20E-04	1.49E+01	5.94E+01	1.17E+02
Gd-153	5.89E-05	1.88E-04	1.00E-03	5.75E+01	1.84E+02	9.78E+02
H-3	2.12E-05	1.73E-03	4.26E-02	2.07E+01	1.69E+03	4.16E+04
Hg-203	2.43E-08	9.81E-05	1.96E-04	2.38E-02	9.59E+01	1.92E+02

Table E-49 New York Industrial Waste Generators Biomedical Radionuclide Distributions - Shipment Level[a], Cont'd

Nuclide	Concentration Ranges - Percentile[b] - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
I-123	2.34E-06	3.89E-06	2.48E-05	2.28E+00	3.80E+00	2.42E+01
I-125	7.18E-07	8.59E-04	1.21E-01	7.02E-01	8.40E+02	1.18E+03
I-131	5.66E-06	1.57E-04	5.22E-04	5.53E+00	1.54E+02	5.10E+02
In-111	2.39E-07	4.79E-05	7.66E-05	2.33E-01	4.68E+01	7.49E+01
Ir-192	3.92E-05	4.30E-04	8.54E-04	2.42E+00	1.16E+02	1.03E+03
Kr-85	1.13E-02	3.02E-02	6.78E-02	1.10E+04	2.95E+04	6.63E+04
La-140	2.36E-04	8.38E-04	1.38E-03	2.31E+02	8.19E+02	1.35E+03
Mn-54	2.34E-08	7.47E-01	3.27E+00	2.28E-02	7.30E+05	3.20E+06
Mo-99	2.94E-04	1.03E-03	1.90E-03	2.87E+02	1.01E+03	1.86E+03
Na-22	3.45E-06	6.62E-05	6.04E-04	3.37E+00	6.47E+01	5.90E+02
Nb-95	2.99E-03	6.42E-03	2.73E-02	2.92E+03	6.27E+03	2.67E+04
Ni-63	4.94E-07	4.77E-01	1.94E+00	4.83E-01	4.67E+05	1.89E+06
P-32	9.42E-07	2.35E-04	6.14E-02	9.21E-01	2.30E+02	6.00E+04
P-33*	7.27E-06	7.27E-06	7.27E-06	7.10E+00	7.10E+00	7.10E+00
Pb-203*	2.34E-08	2.34E-08	2.34E-08	2.29E-02	2.29E-02	2.29E-02
Pb-210	2.34E-08	2.40E-08	2.46E-05	2.29E-02	2.34E-02	2.41E+01
Pm-147	6.14E-06	2.79E+00	1.07E+01	6.00E+00	2.73E+06	1.05E+07
Po-210	1.38E-07	1.51E-04	3.53E-04	1.35E-01	1.45E+02	3.45E+02
Ra-226	2.83E-04	7.13E-04	4.87E-02	2.76E+02	6.97E+02	4.76E+04
Rb-86	5.48E-08	1.10E-06	2.43E-05	5.36E-02	1.08E+00	2.38E+01
Ru-103	1.80E-04	9.25E-04	2.85E-03	1.75E+02	9.04E+02	2.78E+03
Ru-106	7.04E-07	6.61E-01	2.58E+00	6.88E-01	6.51E+05	2.52E+06
S-35	7.06E-05	2.08E-03	8.81E-02	6.90E+00	2.03E+03	8.61E+04
Sb-125	2.40E-08	2.10E-05	6.10E-05	2.34E-02	2.06E+01	5.96E+01
Sc-46	9.65E-07	2.36E-05	1.36E-02	9.44E-01	2.31E+01	1.33E+04
Se-75	2.35E-08	2.69E-06	1.05E-03	2.29E-02	2.63E+00	1.03E+03
Si-32*	9.89E-07	9.89E-07	9.89E-07	9.66E-01	9.56E-01	9.66E-01
Sn-113	2.47E-06	1.61E-05	1.05E-03	2.42E+00	1.58E+01	1.03E+03
Sn-119*	7.04E-07	7.04E-07	7.04E-07	6.88E-01	6.88E-01	6.68E-01
Sr-85	3.95E-07	8.92E-06	1.23E-02	3.86E-01	8.72E+00	1.20E+04
Sr-89	1.47E-04	1.10E+01	2.43E+01	1.43E+02	1.07E+07	2.37E+07
Sr-90	1.90E-04	4.08E-04	1.14E-03	1.86E+02	3.99E+02	1.11E+03
Tc-99m	4.77E-07	1.24E-04	4.95E-04	4.66E-01	1.22E+02	4.84E+02
Th-228	2.31E-07	2.31E-07	2.34E-06	2.26E-01	2.26E-01	2.28E+00
Th-232	4.71E-06	1.50E-04	3.08E-03	4.60E+00	1.46E+02	3.01E+03

Table E-49 New York Industrial Waste Generators Biomedical Radionuclide Distributions - Shipment Level(a), Cont'd

Nuclide	Concentration Ranges - Percentile(b) - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
Th-Nat	5.27E-05	5.27E-05	7.05E-04	5.15E+01	5.15E+01	6.89E+02
Tl-201	2.46E-08	3.06E-06	2.35E-05	2.41E-02	2.99E+00	2.29E+01
Tl-204	2.40E-08	1.05E-03	2.11E-03	2.34E-02	1.03E+03	2.06E+03
U-235	1.07E-06	4.97E-04	2.12E-03	1.05E+00	4.86E+02	2.07E+03
U-238	2.31E-08	5.07E-04	3.53E-03	2.26E-02	4.95E+02	3.45E+03
U-nat	5.27E-05	1.44E-04	2.35E-04	5.15E+01	1.41E+02	2.30E+02
Xe-133	2.34E-08	6.60E-06	5.16E-05	2.28E-02	6.45E+00	5.05E+01
Y-90*	4.69E-06	4.59E-06	4.69E-06	4.59E+00	4.59E+00	4.59E+00
Y-91	3.12E+01	3.12E+01	3.87E+01	3.05E+07	3.05E+07	3.78E+07
Yb-169	2.34E-06	2.34E-06	2.35E-06	2.28E+00	2.28E+00	2.29E+00
Zn-65	2.43E-06	2.74E-05	1.91E-03	2.38E+00	2.68E+01	1.87E+03
Zr-95	1.67E-03	3.58E-03	1.54E-02	1.63E+03	3.50E+03	1.50E+04

(a) Based on shipment data to all three disposal sites from 1986 to 1990.
(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table E-50 Rhode Island Government Waste Generators Biomedical Radionuclide Distributions - Shipment Level(a)

Waste Class: A-Unstable and A-Stable
Number of shipping records: 1
Number of shipping containers: no data
Total waste volume: 0.8 m^3
Estimated waste mass: 595.5 kg
Assumed waste form density: 0.70 g/cm^3

Nuclide	Concentration Ranges - Percentile(b) - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
C-14*	4.50E-03	4.50E-03	4.50E-03	6.42E+03	6.42E+03	6.42E+03

(a) Based on shipment data to all three disposal sites from 1986 to 1990.
(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table E-51 Rhode Island Academic Waste Generators Biomedical Radionuclide Distributions - Shipment Level[a]

Waste Class: A-Unstable and A-Stable
Number of shipping records: 9
Number of shipping containers: no data
Total waste volume: 8.9 m^3
Estimated waste mass: 5,083 kg
Assumed waste form density: 0.57 g/cm^3

Nuclide	Concentration Ranges - Percentile[b] - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
C-14	1.82E-05	9.02E-05	6.90E-01	3.20E+01	1.59E+02	1.22E+06
Ca-45	1.57E-05	8.11E-05	1.66E-04	2.76E+01	1.43E+02	2.91E+02
Ce-141*	1.96E-05	1.96E-05	1.96E-05	3.45E+01	3.45E+01	3.45E+01
Co-57	5.52E-06	8.25E-05	2.52E-04	9.71E+00	1.45E+02	4.43E+02
Cr-51*	3.22E-04	3.22E-04	3.22E-04	5.66E+02	5.66E+02	5.66E+02
H-3	1.64E-04	1.04E-03	1.27E-02	2.88E+02	1.84E+03	2.24E+04
I-125	3.92E-06	1.49E-05	3.90E-05	6.91E+00	2.62E+01	6.87E+01
Na-22	3.92E-06	1.70E-04	6.63E-04	6.91E+00	3.00E+02	1.17E+03
Nb-95*	7.61E-05	7.61E-05	7.61E-05	1.34E+02	1.34E+02	1.34E+02
P-32	9.42E-05	9.42E-05	2.27E-04	1.66E+02	1.66E+02	3.99E+02
Ru-103*	1.33E-04	1.33E-04	1.33E-04	2.33E+02	2.33E+02	2.33E+02
S-35	7.83E-05	5.41E-03	2.62E-02	1.38E+02	9.52E+03	4.61E+04
Sc-46*	4.79E-05	4.79E-05	4.79E-05	8.43E+01	8.43E+01	8.43E+01

(a) Based on shipment data to all three disposal sites from 1986 to 1990.
(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table E-52 Rhode Island Medical Waste Generators Biomedical Radionuclide Distributions - Shipment Level[a]

Waste Class: A-Unstable and A-Stable
Number of shipping records: 20
Number of shipping containers: no data
Total waste volume: 12.2 m^3
Estimated waste mass: 9,446 kg
Assumed waste form density: 0.78 g/cm^3

Nuclide	Concentration Ranges - Percentile[b] - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
C-14	2.52E-06	1.18E-04	1.60E-02	3.25E+00	1.52E+02	2.07E+04
Co-57	3.77E-06	1.57E-05	4.76E-04	4.87E+00	2.03E+01	6.14E+02
Cr-51	4.71E-05	6.32E-04	1.15E-02	6.08E+01	8.15E+02	1.48E+04
Fe-59	1.33E-05	1.33E-05	1.49E-04	1.72E+01	1.72E+01	1.92E+02
Ga-67	2.35E-05	2.83E-04	3.53E-03	3.04E+01	3.65E+02	4.56E+03
H-3	1.01E-05	1.20E-03	2.17E-02	1.30E+01	1.55E+03	2.80E+04
I-123	2.35E-05	2.35E-04	3.53E-03	3.04E+01	3.04E+02	4.56E+03
I-125	2.79E-04	1.20E-03	9.90E-02	3.60E+02	1.55E+03	1.28E+05
I-131	1.76E-06	9.29E-04	1.35E-02	2.27E+00	1.20E+03	1.74E+04
In-111*	2.35E-04	2.35E-04	2.35E-04	3.04E+02	3.04E+02	3.04E+02
In-114m	3.14E-05	8.48E-05	3.77E-04	4.05E+01	1.09E+02	4.86E+02
Ir-192*	6.47E-03	6.47E-03	6.47E-03	8.35E+03	8.35E+03	8.35E+03
Nb-95	2.92E-04	3.06E-04	2.67E-03	3.77E+02	3.95E+02	3.44E+03
P-32	1.23E-04	8.47E-03	1.57E-01	1.59E+02	1.09E+04	2.02E+05
Ru-103	2.59E-04	2.98E-04	2.64E-03	3.34E+02	3.85E+02	3.40E+03
S-35	1.26E-05	2.35E-04	1.63E-02	1.62E+01	3.04E+02	2.10E+04
Sc-46	1.49E-04	2.92E-04	1.98E-03	1.92E+02	3.77E+02	2.55E+03
Sn-133	7.06E-05	2.51E-04	2.12E-03	9.11E+01	3.24E+02	2.73E+03
Tc-99m	2.35E-05	2.35E-04	2.35E-03	3.04E+01	3.04E+02	3.04E+03
Tl-201*	1.26E-06	1.26E-06	1.26E-06	1.62E+00	1.62E+00	1.62E+00
Xe-131m*	1.26E-06	1.26E-06	1.26E-06	1.62E+00	1.62E+00	1.62E+00

Table E-52 Rhode Island Medical Waste Generators Biomedical Radionuclide Distributions - Shipment Level[a], Cont'd

Nuclide	Concentration Ranges - Percentile[b] - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
Xe-133	1.26E-06	3.72E-03	6.66E-03	1.62E+00	4.79E+03	8.59F+03
Yb-169	1.86E-04	1.86E-04	2.66E-04	2.40E+02	2.40E+02	3.44l 02
Yb-175*	6.29E-04	6.29E-04	6.29E-04	8.12E+02	8.12E+02	8.12E+02

(a) Based on shipment data to all three disposal sites from 1986 to 1990.
(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table E-53 Rhode Island Industrial Waste Generators Biomedical Radionuclide Distributions - Shipment Level(a)

Waste Class: A-Unstable and A-Stable
Number of shipping records: 4
Number of shipping containers: no data
Total waste volume: 1.8 m^3
Estimated waste mass: 1,861 kg
Assumed waste form density: 1.02 g/cm^3

Nuclide	Concentration Ranges - Percentile(b) - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
Ag-110m*	8.06E-05	8.06E-05	8.06E-05	7.88E+01	7.88E+01	7.88E+01
Ba-133*	2.24E-06	2.24E-06	2.24E-06	2.19E+00	2.19E+00	2.19E+00
Co-60	1.66E-04	1.66E-04	5.17E-04	1.62E+02	1.62E+02	5.05E+02
Cr-51	2.35E-06	2.35E-06	2.13E-05	2.30E+00	2.30E+00	2.08E+01
Cs-134	2.35E-06	2.35E-06	1.68E-05	2.30E+00	2.30E+00	1.64E+01
Eu-152	1.18E-06	1.18E-06	4.70E-05	1.15E+00	1.15E+00	4.59E+01
Eu-154*	4.92E-05	4.92E-05	4.92E-05	4.81E+01	4.81E+01	4.81E+01
Fe-59	2.24E-06	2.24E-06	2.12E-05	2.19E+00	2.19E+00	2.07E+01
Kr-85	1.12E+02	1.12E+02	1.32E+02	1.10E+08	1.10E+08	1.29E+08
Mn-54	1.18E-06	1.18E-06	9.96E-05	1.15E+00	1.15E+00	9.73E+01
Na-24*	2.94E-05	2.94E-05	2.94E-05	2.88E+01	2.88E+01	2.88E+01
Pm-147*	1.97E+00	1.97E+00	1.97E+00	1.92E+06	1.92E+06	1.92E+06
Sb-124	7.83E-05	7.83E-05	3.30E-04	7.66E+01	7.66E+01	3.22E+02
Sb-125*	3.36E-06	3.36E-06	3.36E-06	3.28E+00	3.28E+00	3.28E+00
Sc-46	2.24E-06	2.24E-06	4.71E-06	2.19E+00	2.19E+00	4.60E+00
Se-75*	1.12E-06	1.12E-06	1.12E-06	1.09E+00	1.09E+00	1.09E+00
Zn-65	2.94E-05	2.94E-05	9.73E-05	2.88E+01	2.88E+01	9.52E+01

(a) Based on shipment data to all three disposal sites from 1986 to 1990.
(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table E-54 Texas Government Waste Generators Biomedical Radionuclide Distributions - Shipment Level[a]

Waste Class: A-Unstable and A-Stable
Number of shipping records: 128
Number of shipping containers: 2
Total waste volume: 1,743 m^3
Estimated waste mass: 1,222,000 kg
Assumed waste form density: 0.70 g/cm^3

Nuclide	Concentration Ranges - Percentile[b] - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
Am-241m	3.03E-06	2.86E-03	1.05E-02	4.33E+00	2.00E+03	6.61E+03
Ba-140*	4.44E-06	4.44E-06	4.44E-06	6.33E+00	6.33E+00	6.33E+00
C-14	9.39E-08	8.08E-02	1.62E-01	1.34E-01	5.10E+04	1.02E+05
Cd-109	1.06E-07	1.06E-07	8.45E-07	1.51E-01	1.51E-01	1.21E+00
Ce-141*	4.44E-06	4.44E-06	4.44E-06	6.33E+00	6.33E+00	6.33E+00
Ce-144*	4.34E-06	4.34E-06	4.34E-06	6.18E+00	6.18E+00	6.18E+00
Cl-36*	4.01E-06	4.01E-06	4.01E-06	2.53E+00	2.53E+00	2.53E+00
Co-57	2.89E-06	9.52E-02	3.38E-01	4.13E+00	6.87E+04	2.13E+05
Co-60	1.06E-07	1.58E-03	5.59E-03	1.51E-01	2.20E+03	7.98E+03
Cs-134	1.06E-07	2.06E-06	4.01E-06	1.51E-01	1.34E+00	2.53E+00
Cs-135*	4.34E-06	4.34E-06	4.34E-06	6.19E+00	6.19E+00	6.19E+00
Cs-137	4.86E-06	8.79E-04	2.11E-02	6.94E+00	1.25E+03	3.01E+04
Eu-152	5.26E-04	5.27E-04	5.29E-04	3.32E+02	5.43E+02	7.54E+02
Eu-154*	5.22E-04	5.22E-04	5.22E-04	3.29E+02	3.29E+02	3.29E+02
Ga-67*	1.97E-05	1.97E-05	1.97E-05	2.81E+01	2.81E+01	2.81E+01
H-3	4.70E-06	3.94E-03	1.06E-02	6.70E+00	5.26E+03	1.51E+04
I-125	2.10E-04	6.07E-04	1.33E-03	3.00E+02	8.66E+02	1.89E+03
I-129*	4.55E-06	4.55E-06	4.55E-06	6.49E+00	6.49E+00	6.49E+00
I-131*	4.44E-06	4.44E-06	4.44E-06	6.33E+00	6.33E+00	6.33E+00
Kr-85	1.37E-06	1.82E-02	3.64E-02	1.96E+00	1.15E+04	2.29E+04
Mn-54*	1.06E-07	1.06E-07	1.06E-07	1.51E-01	1.51E-01	1.51E-01
Mo-99*	4.41E-05	4.41E-05	4.41E-05	6.30E+01	6.30E+01	6.30E+01
Nb-95*	2.12E-04	2.12E-04	2.12E-04	3.02E+02	3.02E+02	3.02E+02
Nd-147*	4.44E-06	4.44E-06	4.44E-06	6.33E+00	6.33E+00	6.33E+00
Ni-63*	6.01E-05	6.01E-05	6.01E-05	8.57E+01	8.57E+01	8.57E+01
Pa-233*	1.06E-07	1.06E-07	1.06E-07	1.51E-01	1.51E-01	1.51E-01
Pb-210*	5.62E-05	5.62E-05	5.62E-05	3.54E+01	3.54E+01	3.54E+01
Pm-147*	4.01E-06	6.45E-06	8.88E-06	2.53E+00	7.60E+00	1.27E+01

Table E-54 Texas Government Waste Generators Biomedical Radionuclide Distributions - Shipment Level[a], Cont'd

Nuclide	Concentration Ranges - Percentile[b] - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
Pr-143*	4.34E-06	4.34E-06	4.34E-06	6.18E+00	6.18E+00	6.18E+00
Pu-238*	9.39E-08	9.39E-08	9.39E-08	1.34E-01	1.34E-01	1.34E-01
Pu-239	9.39E-08	4.47E-04	1.48E-03	1.34E-01	6.34E+02	2.12E+03
Ra-226	9.39E-08	9.76E-06	2.68E-05	1.34E-01	1.15E-01	3.83E+01
Ru-103	4.44E-06	1.43E-04	2.83E-04	6.33E+00	2.05E+02	4.03E+02
Ru-106	4.55E-06	1.02E-05	1.58E-05	6.49E+00	1.45E+01	2.25E+01
Sb-125*	1.06E-07	1.06E-07	1.06E-07	1.51E-01	1.51E-01	1.51E-01
Sc-46	3.16E-06	1.43E-04	2.83E-04	4.51E+00	2.04E+02	4.03E+02
Sn-113	2.20E-04	2.51E-04	2.83E-04	3.14E+02	3.58E+02	4.03E+02
Sr-85*	4.34E-04	4.34E-04	4.34E-04	6.19E+02	6.19E+02	6.19E+02
Sr-89*	4.44E-06	4.44E-06	4.44E-06	6.33E+00	6.33E+00	6.33E+00
Sr-90	4.44E-06	3.51E-03	1.05E-02	6.33E+00	2.24E+03	6.60E+03
Tc-99	4.44E-06	4.44E-06	3.94E-05	6.33E+00	6.33E+00	5.63E+01
Te-125m*	4.44E-06	4.44E-06	4.44E-06	6.33E+00	6.33E+00	6.33E+00
Te-127m*	4.44E-06	4.44E-06	4.44E-06	6.33E+00	6.33E+00	6.33E+00
Te-129m*	4.44E-06	4.44E-06	4.44E-06	6.33E+00	6.33E+00	6.33E+00
Th-232	2.72E-05	1.68E-04	1.35E-02	3.87E+01	2.39E+02	1.93E+04
Tl-201*	2.63E-05	2.63E-05	2.63E-05	3.75E+01	3.75E+01	3.75E+01
U-233*	4.01E-06	4.01E-06	4.01E-06	2.53E+00	2.53E+00	2.53E+00
U-235	2.12E-07	2.11E-06	4.01E-06	3.02E-01	1.42E+00	2.52E+00
U-238	1.06E-07	7.82E-04	2.34E-03	1.51E-01	1.12E+03	3.34E+03
Xe-133*	1.90E-06	1.90E-06	1.90E-06	2.71E+00	2.71E+00	2.71E+00
Y-91*	4.55E-06	4.55E-06	4.55E-06	6.49E+00	6.49E+00	6.49E+00
Zr-95	4.44E-06	4.44E-06	4.44E-06	6.33E+00	6.33E+00	6.33E+00

(a) Based on shipment data to all three disposal sites from 1986 to 1990.

(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table E-55 Texas Industrial Waste Generators Biomedical Radionuclide Distributions - Shipment Level[a]

Waste Class: A-Unstable and A-Stable
Number of shipping records: 51
Number of shipping containers: 540
Total waste volume: 656.3 m^3
Estimated waste mass: 671,400 kg
Assumed waste form density: 1.02 g/cm^3

Nuclide	Concentration Ranges - Percentile[b] - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
Am-241m	8.81E-08	1.14E-04	1.34E-02	6.34E-02	1.11E+02	5.42E+03
C-14	1.15E-02	4.29E-02	1.13E-01	5.38E+03	3.54E+04	1.10E+05
Ca-45	6.28E-06	1.68E-03	4.92E-03	2.54E+00	1.62E+03	4.81E+03
Cd-109	8.19E-03	8.19E-03	1.48E-02	3.31E-03	3.31E-03	5.98E+03
Cl-36	8.19E-06	8.19E-06	2.73E-05	3.31E+00	3.31E+00	1.10E+01
Co-57	5.15E-05	5.15E-05	3.81E-04	2.08E+01	2.08E+01	1.54E+02
Co-60	2.84E-03	1.61E-01	9.31E+02	3.38E+03	1.15E+05	2.89E+08
Cr-51*	4.78E-05	4.78E-05	4.78E-05	1.93E+01	1.93E+01	1.93E+01
Cs-137	4.41E-05	2.94E-04	5.34E+01	2.59E+01	2.18E+02	5.00E+07
Fe-55	1.94E-01	3.04E-01	5.23E-01	7.83E+04	2.23E+05	5.11E+05
Gd-153	2.18E-03	2.18E-03	2.44E-03	8.80E+02	8.80E+02	2.91E+03
H-3	4.98E-01	9.24E-01	1.31E+00	2.19E+05	7.03E+05	1.28E+06
I-125	2.92E-05	4.83E-02	1.90E-01	1.18E+01	4.67E+04	1.86E+05
I-131	2.48E-05	3.12E-05	3.82E-05	1.54E+01	2.96E+01	3.05E+01
Ir-192	7.68E-04	1.23E-02	1.80E+00	2.88E+02	1.21E+04	1.08E+06
Kr-85	9.93E-05	1.65E-02	3.67E-02	1.18E+02	1.20E+04	3.59E+04
Kr-87*	4.23E-06	4.23E-06	4.23E-06	1.71E+00	1.71E+00	1.71E+00
Kr-89*	1.42E-03	1.42E-03	1.42E-03	5.74E+02	5.74E+02	5.74E+02
Na-22*	2.73E-06	2.73E-06	2.73E-06	1.10E+00	1.10E+00	1.10E+00
Ni-63	3.19E-02	1.41E-01	2.99E-01	1.29E+04	7.43E+04	1.21E+05
P-32*	3.10E-03	3.10E-03	3.10E-03	1.25E+03	1.25E+03	1.25E+03
Pb-210	2.15E-03	2.15E-03	4.34E-03	8.71E+02	8.71E+02	1.75E+03
Pm-147	3.99E-02	1.68E-01	3.67E-01	1.61E+04	1.38E+05	3.59E+05
Po-210	1.84E-04	1.84E-04	7.30E-04	7.43E+01	7.43E+01	2.95E+02
Ra-226	1.14E-01	3.22E-01	4.65E-01	4.26E+04	1.30E+05	1.88E+05
S-35	2.48E-05	2.36E-02	7.89E-02	2.96E+01	2.16E+04	7.71E+04
Sn-113*	5.46E-06	5.46E-06	5.46E-06	2.21E+00	2.21E+00	2.21E+00
Sr-90	4.25E-02	4.25E-02	1.68E-01	1.72E+04	1.72E+04	6.80E+04

Table E-55 Texas Industrial Waste Generators Biomedical Radionuclide Distributions - Shipment Level[a], Cont'd

Nuclide	Concentration Ranges - Percentile[b] - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
Tc-99*	5.46E-03	5.46E-03	5.46E-03	2.21E+03	2.21E+03	2.21E+03
U-238	3.46E-02	5.17E-02	6.18E-02	3.39E+04	5.06E+04	6.04E+04

(a) Based on shipment data to all three disposal sites from 1986 to 1990.
(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table E-56 Vermont Academic Waste Generators Biomedical Radionuclide Distributions - Shipment Level(a)

Waste Class: A-Unstable and A-Stable
Number of shipping records: 5
Number of shipping containers: no data
Total waste volume: 18.0 m^3
Estimated waste mass: 10,250 kg
Assumed waste form density: 0.57 g/cm^3

Nuclide	Concentration Ranges - Percentile(b) - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
C-14	1.26E-04	4.33E-04	7.01E-04	2.21E+02	7.62E+02	1.23E+03
Ca-45	7.85E-07	1.52E-04	5.42E-04	1.38E+00	2.67E+02	9.54E+02
Cd-109*	4.04E-07	4.04E-07	4.04E-07	7.11E-01	7.11E-01	7.11E-01
Ce-141*	1.57E-06	1.57E-06	1.57E-06	2.76E+00	2.76E+00	2.76E+00
Cr-51	9.21E-05	7.55E-04	1.66E-03	1.62E+02	1.33E+03	2.92E+03
Cs-137*	7.85E-07	7.85E-07	7.85E-07	1.38E+00	1.38E+00	1.38E+00
Fe-55	4.35E-06	6.13E-04	1.22E-03	7.65E+00	1.08E+03	2.15E+03
Fe-59	6.18E-06	6.44E-05	6.54E-05	1.09E+01	1.13E+02	1.15E+02
H-3	3.04E-03	3.35E-02	1.01E-01	5.35E+03	5.89E+04	1.79E+05
I-125	1.23E-03	3.69E-03	7.34E-03	2.17E+03	6.50E+03	1.29E+04
Na-22	1.57E-06	5.98E-05	1.18E-04	2.76E+00	1.05E+02	2.08E+02
Nb-95*	1.57E-06	1.57E-06	1.57E-06	2.76E+00	2.76E+00	2.76E+00
Ni-63*	1.35E-07	1.35E-07	1.35E-07	2.37E-01	2.37E-01	2.37E-01
P-32	1.90E-06	5.57E-04	1.94E-03	1.91E+00	9.81E+02	3.42E+03
S-35	6.28E-07	1.53E-04	5.37E-04	1.11E+00	2.70E+02	9.46E+02
Se-75	3.45E-05	4.14E-05	4.82E-05	6.08E+01	7.28E+01	8.48E+01
Sr-85	3.14E-07	3.14E-07	4.84E-06	5.53E-01	5.53E-01	8.53E+00

(a) Based on shipment data to all three disposal sites from 1986 to 1990.
(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table E-57 Vermont Medical Waste Generators Biomedical Radionuclide Distributions - Shipment Level(a)

Waste Class: A-Unstable and A-Stable
Number of shipping records: 1
Number of shipping containers: no data
Total waste volume: 0.4 m^3
Estimated waste mass: 329.2 kg
Assumed waste form density: 0.78 g/cm^3

Nuclide	Concentration Ranges - Percentile(b) - Ci/m^3 - 1st	50th	99th	- pCi/g - 1st	50th	99th
C-14*	1.01E-03	1.01E-03	1.01E-03	1.31E+03	1.31E+03	1.31E+03
H-3*	2.45E-02	2.45E-02	2.45E-02	3.16E+04	3.16E+04	3.16E+04

(a) Based on shipment data to all three disposal sites from 1986 to 1990.
(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

Table E-58 Vermont Industrial Waste Generators Biomedical Radionuclide Distributions - Shipment Level(a)

Waste Class: A-Unstable and A-Stable
Number of shipping records: 2
Number of shipping containers: no data
Total waste volume: 0.1 m^3
Estimated waste mass: 138.2 kg
Assumed waste form density: 1.02 g/cm^3

Nuclide	Concentration Ranges - Ci/m^3 - 1st	50th	99th	Percentile(b) - pCi/g - 1st	50th	99th
Kr-85*	1.63E-03	1.63E-01	1.63E-01	1.59E+05	1.59E+05	1.59E+05
Th-232*	1.42E-03	1.42E-03	1.42E-03	1.39E+03	1.39E+03	1.39E+03
U-238*	8.43E-04	8.43E-04	8.43E-04	8.24E+02	8.24E+02	8.24E+02

(a) Based on shipment data to all three disposal sites from 1986 to 1990.
(b) Radionuclide concentrations tagged with an asterisk are based on a single value. In such instances, the percentile distribution does not apply.

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11. ABSTRACT *(200 words or less)*

This report describes the physical, chemical, and radiological properties of Class A low-level radioactive waste using data contained in the Manifest Information Management System (MIMS). Other sources of information include reports prepared by the NRC, DOE, low-level waste Compacts and States, and trade industries. The database characterizes low-level waste shipped for disposal from 1986 to 1990. A computer program was developed to analyze the data, with the results summarized in tables, histograms, and cumulative distribution curves presenting radionuclide concentration distributions in Class A waste as a function of waste streams, waste generators, and by regions.

The report also provides information characterizing the methods and facilities used to treat and dispose of non-radioactive waste, including industrial, municipal, and hazardous waste regulated under Subparts C and D of RCRA. The information includes a list of disposal options, the geographical locations of such facilities, and a description of such processing and disposal facilities.

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