Surplus Plutonium Disposition (SPD) Environmental Data Summary

by

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Environmental Monitoring Section

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1. Introduction

This document provides an overview of existing environmental and ecological information at areas identified as potential locations of the Savannah River Site's (SRS) Surplus Plutonium Disposition (SPD) facilities. This information is required to document existing environmental and baseline conditions from which SPD construction and operation impacts can be defined. It will be used in developing the required preoperational monitoring plan to be used at specific SPD facilities construction sites. In general, the report is divided on the basis of exposure pathways. It has five sections, as follows:

1. *General Information*, which provides information on the SPD project
2. *Radiological Monitoring*, which describes the effluent monitoring and environmental surveillance monitoring programs and presents source term inventory and monitoring results, including both historical and current information
3. *Nonradiological (Chemical) Monitoring*, which defines major contaminants released from facilities impacting the SPD project area and presents an overview of monitoring activities
4. *Groundwater Monitoring*, which describes groundwater conditions and contaminants underlying the SPD project area
5. *Other Considerations*, which describes other issues which may impact the environment in the SPD project area

2. General Information

2.1 Project Description

As a result of the end of the cold war in 1991, significant quantities of excess plutonium exist in both domestic and foreign stockpiles. As part of its stockpile stewardship responsibility, one mission of the U.S. Department of Energy (DOE) is to reduce the threat of nuclear weapons proliferation by disposing of surplus plutonium in the United States. This disposition must be completed in a timely and environmentally safe manner to ensure that surplus plutonium is converted into proliferation-resistant forms. DOE's disposition strategy allows for the immobilization of surplus plutonium and for its use as a mixed oxide fuel in existing domestic commercial power reactors.

The SPD project consists of the following types of facilities:

- A facility for disassembling pits (weapons components) and converting the recovered plutonium, as well as plutonium from other sources, into plutonium dioxide suitable for disposition. It is referred to as the Pit Disassembly and Conversion Facility (PDCF).

- A facility for immobilizing surplus plutonium for eventual disposal in a geologic repository, pursuant to the Nuclear Waste Policy Act. This facility will be able to convert nonpit plutonium materials into plutonium dioxide suitable for immobilization. It is referred to as the Plutonium Immobilization Plant (PIP).

- A facility for fabricating plutonium dioxide into a mixed oxide (MOX) fuel. This facility will be privately operated and licensed by the Nuclear Regulatory Commission. It is referred to as the MOX facility.

2.2 Area Description

The proposed sites for the SPD facilities are located along the existing F-Area perimeter, on the northeast and northwest sides. Six potential areas (including two supplemental areas) for facility construction have been identified for facility construction (figure 1, table 1). The PDCF will be located in Area X and the MOX fuel fabrication facility will be located in Areas 2 and 2A. The location of the PIP has not been determined.

The terrain of the areas under investigation is relatively level near the F-Area boundary. An unnamed tributary of Upper Three Runs originates in the general SPD project area. As the land descends to this tributary, fairly steep gradient drops are evident. Close to the F-Area boundary, the land is primarily cleared. Several areas include light industrial and administrative activities (office trailers, equipment storage areas, roads, and parking lots). Grass and shrubs are the primary vegetation in these areas. As the land approaches and drops to the Upper Three Runs tributary, the cover changes to thicker shrubs and forest.

2.3 Waste Units

Because of the SPD project's proximity to F-Area, areas of historical contamination may exist and are of interest. These could include both identified waste units and other areas of local increased contamination from facility operations and releases. In the SPD project area, a small number (12) of waste units and early construction and operation disposal (ECOD) sites have been identified. Table 2 and figure 2 provide details on these features.

2.4 Groundwater

Based on the groundwater flow patterns underlying the SPD site, the water table outcrops into Upper Three Runs and its tributaries (figure 3). The regional groundwater flow pattern for the deeper aquifers (Gordon and Dublin-Midville) is toward the Savannah River, and the overall pressure gradient in this area of the site is upward. As detailed elsewhere in this report, historical operations from E-Area and F-Area have resulted in groundwater contamination that impacts portions of the SPD project area.

2.5 Existing Monitoring Sites

A number of active and inactive sampling sites are located in the SPD project area. These include wells and sampling sites for liquid, soil, and/or vegetation. Tables 3 and 4 and figures 3 and 4 provide details on these monitoring points within the SPD project area.

Primary sources of historical monitoring information include the annual SRS environmental reports and quarterly SRS groundwater monitoring reports. A series of reports that details the release of radionuclides—such as tritium, plutonium, and cesium—to the environment has been published by the Savannah River Technology Center (SRTC) and represents a dependable source of historical release information.

3. RADIOLOGICAL MONITORING

3.1 Inventory

Routine manufacturing operations in F-Area have released quantities of material since operations began there in late 1954. Releases are documented in a series of technical reports issued by SRTC, in an EMS compilation of release data from 1954 to 1988, and in site environmental reports. Major contaminants released from operations include moderately- to long-lived fission products (primarily Cs-137 and Sr-89,90), isotopes of uranium (U-234, U-235, and U-238), plutonium (Pu-238 and Pu-239), and other actinides (Am-241 and Cm-244). Only those radionuclides with a half-life greater than one year have been considered for this report; likewise, noble gasses have been excluded. Except for tritium, airborne releases through 1999 totaled approximately 739 Ci, and direct liquid releases to streams totaled approximately 768 Ci. Because of changes in F-Area operation requirements, release rates vary both by radionuclide and by year. The majority of activity was released before 1970; although actual release rates vary with radionuclide. Table 5 details the quantities of materials released from F-Area.

3.2 Air Pathway

Exposure vectors considered in the air pathway include the airborne release of material from F-Area and the deposition of airborne material. Air and soil samples collected and analyzed through EMS's air surveillance and soil surveillance programs represent the environmental media that indicate the impact of this material.

3.2.1 Program Descriptions

The SRS air surveillance program consists of monitoring locations in and around the site at which ambient air samples are collected. Changes in the program requirements have resulted in both the addition and the elimination of certain monitoring sites. Historically, the monitoring stations have been divided into four networks: on site, at the site perimeter, at the 25-mile radius and at distant locations in major population centers. The media sampled by the air surveillance program consists of airborne particulates, volatiles, and atmospheric moisture.

In support of the SPD project, three monitoring sites are of particular interest--the F-Area, Burial Ground North, and Highway 301 stations. The F-Area site is located inside the F-Area fenceline on the northwest side. It is fairly close to SPD Area 1 and was operational until 1998. The Burial Ground North site is located along the outside of the old radioactive waste burial ground fenceline on the northwest side. It is fairly close to SPD Area 4 and has been operational since 1982. The Highway 301 site is located near the U.S. Highway 301 bridge across the Savannah River. It is in the least prevalent wind direction from SRS and represents the regional control site. It has been operational since 1965. Additional information about the SRS air surveillance program appears in the WSRC Environmental Monitoring Program document.

The SRS soil (deposition) program consists of monitoring locations in and around the site at which the deposition of airborne activity is measured. Changes in program requirements have resulted in both the addition and the elimination of certain monitoring sites. Historically, the media sampled has consisted of soil and/or rainwater.

In support of the SPD project, four soil monitoring locations are of particular interest—the F-Area 2000 E (F-E), F-Area 2000 W (F-W), F-Area 2000 N (F-N), and F-Area 2000 S (F-S) sites. Also, soil sampling for a consistent regional background characterization was begun in 1997 at the U.S. Highway 301 station. The F-E soil site is located in SPD Area 2, approximately 2000 feet east of the F-Area main stack. It was operational from 1976 to 1995. The F-N soil site is located in SPD Area 5, approximately 2000 feet north of the F-Area main stack. It also was operational from 1976-1995. The F-W soil site is located approximately 2000 feet west of the F-Area main stack. It has been operational since 1976. The F-S soil site is located approximately 2000 feet south of the F-Area main stack. It was operational from 1976 to 1996. Although the F-W and F-S sites are not located in the SPD project area, they provide additional information on soil radionuclide concentrations in the vicinity of F-Area that resulted from F-Area operations. Additional information about the SRS soil surveillance program appears in the WSRC Environmental Monitoring Program document.

3.2.2 Analytical Results

Analytical results from the air and soil surveillance programs from 1965 through 1999 were examined. These results are presented in figures 6 through 65. As with the numbers and locations of monitoring sites, changing program requirements and laboratory analytical capabilities have resulted in analytical protocols that vary from year to year. Based on the source term, environmental behavior, and exposure potential, key radionuclides are Sr-89,90, Cs-137, Pu-238, and Pu-239; where available, gross alpha and gross beta results are useful in providing general trending information.

A special one-time survey of soil in F-Area was conducted in 1973, during which 10 locations were sampled. Although the exact locations of the samples cannot be determined, the survey provides additional information on radionuclide levels in soil in and around F-Area. Results of this survey are presented in table 6.

3.3 Surface Water Pathway

Exposure vectors considered in the surface water pathway include the direct liquid release of material from F-Area and the deposition of this material in stream beds. Liquid samples quantify the release and transport of the material, while sediment samples represent the indicating environmental media for long-term changes. These samples are collected and analyzed through EMS's liquid effluent, liquid surveillance, and sediment surveillance programs.

3.3.1 Program Descriptions

Overall, the liquid effluent program consists of a number of SRS monitoring sites at which samples of process discharge (effluent) water are collected. From these samples, the quantity of material directly released to the environment is determined. The liquid surveillance program consists of a number of monitoring sites located in and around SRS at which samples of stream and Savannah River water are collected. Generally, these sites are located downstream of a facility's process effluents, downstream of groundwater seeps, and downstream of the confluence of streams or tributaries with other tributaries, major streams, and/or the Savannah River. Changes in program requirements have resulted in both the addition and the elimination of certain monitoring.

In support of the SPD project, three monitoring sites are of particular interest—the Upper Three Runs-2 (U3R-2), Upper Three Runs-F3 (U3R-F3), and F-05 stations. Upper Three Runs-2 is an effluent monitoring site located in SPD Area 1 on the northwest side of F-Area. It receives nonprocess discharges and stormwater runoff from the northeast portion of F-Area. Upper Three Runs-F3 is an environmental surveillance monitoring site located in SPD Area 2 on the northwest side of F-Area. It receives stormwater runoff from the vicinity of the Naval Fuels Facility. The F-05 site is an environmental surveillance location located on the northeast side of F-Area and is located in SPD Area X. It receives nonprocess water and stormwater runoff from the northeast portion of F-Area. Additional information about the SRS liquid effluent and liquid surveillance programs appears in the WSRC Environmental Monitoring Program document.

The sediment surveillance program consists of sites located in and around SRS at which the deposition of waterborne activity is measured. Changes in program requirements have resulted in both the addition and the elimination of certain monitoring sites. No sediment monitoring stations have been located in or near the SPD project area. Additionally, no sediment monitoring stations are located near areas where tributaries associated with the SPD project discharge into Upper Three Runs.

3.3.2 Analytical Results

Analytical results from the liquid effluent and surveillance monitoring programs from 1965 through 1999 were examined. As with the numbers and locations of monitoring sites, changing program requirements and laboratory analytical capabilities have resulted in analytical protocols that vary from year to year. Most process-related activity released from F-Area was discharged to seepage basins. Specific monitoring results are not presented, but are summarized in table 5. These results show that the majority of activity released to streams was H-3. Based on source term, environmental behavior, and exposure potential, key radionuclides are Sr-89,90, Cs-137, U-234,

U-235, U-238, Pu-238, and Pu-239; where available, gross alpha and gross beta results are useful in providing general trending information.

4. NONRADIOLOGICAL (CHEMICAL) MONITORING

Information about releases of nonradiological material (chemicals) from F-Area is less detailed than it is about releases of radiological contaminants. Releases of chemicals from site facilities were examined during the first two phases of the SRS dose reconstruction project authorized by DOE and completed by the Centers for Disease Control in 1998. Although actual amounts released were not estimated, chemicals of specific concern which may result in offsite impacts were identified.

Chemicals released via the air pathway that were examined included ammonia, ammonia nitrate, benzene, chlorinated solvents, chromium, coal and coal ash, gasoline and other fuel oils, hydrazine mononitrate, hydrogen sulfide, lead, manganese compounds, mercury, nickel, nitric acid, oxides of nitrogen, sulfur dioxide, and uranium. Chemicals released via the liquid pathway that were considered included arsenic, cadmium, chromium, coal and coal ash, gasoline, hydrogen sulfide, lead, manganese, mercury, nickel, nitrates, uranium, and zinc. From these analyses, the following chemicals were identified as those released in quantities large that could have posed an adverse health effects: ammonia, nitrate, cadmium, chromium, hydrazine, mercury, manganese, nitric acid, and oxides of nitrogen.

SRS airborne releases are regulated to ensure compliance with the Clean Air Act, while the site's liquid releases are regulated to ensure compliance with the Clean Water Act as implemented by the National Pollutant Discharge Elimination System (NPDES). As indicated in tables 3 and 7, three active NPDES outfalls are located in the SPD project area. The constituents monitored at these outfalls are identified in table 7. From this, it may be assumed that F-Area processes have some potential to release and/or impact these constituents.

5. GROUNDWATER MONITORING

Because of SRS operations, considerable groundwater contamination exists in the vicinity of separation and waste management areas. Sources of this contamination include buried material in E-Area and in seepage basins. Areas of concern in terms of the SPD project consist of the old F-Area seepage basin (located in SPD Area 1) and contamination originating from E-Area (which impacts SPD Areas 4 and 5). Figure 6 shows the extent of contaminated groundwater plumes, as indicated by tritium. As figure 6 shows, the most significant plume relating to the SPD project originates from the northwest portion of E-Area and has moved in a northwest direction towards Upper Three Runs. This plume impacts SPD Areas 4 and 5.

Figure 6 shows the extent of the tritium-contaminated groundwater plumes, but E-Area releases a variety of other contaminants as well. The extent of groundwater contamination by other materials depends on their mobility; tritium is the most mobile. The only other contaminant showing a significant plume impacting the SPD project area is volatile organic compounds (VOC), although the plume is much smaller. However, other contaminants may be present.

There are 76 wells in the SPD project area, of which 37 are active (table 4). Figure 3 shows the water contours and the locations of monitoring wells. Analytical results are from these wells are not included in this report, but they have been tabulated and are available electronically. In addition to tritium and VOCs, a number of other contaminants are found in one or more wells at concentrations above their respective limits as established by the U.S. Environmental Protection Agency in the Safe Drinking Water Act's primary drinking water standards.

6. OTHER CONSIDERATIONS

Other environmental issues—such as unusual events/releases and ecological studies—were considered as part of this historical data summary. The major source of this information was personal conversations with individuals from a number of research, regulatory, and operational organizations.

A number of unusual operating events at F-Area have resulted in the unanticipated release of radioactive and/or nonradioactive material to the environment. Generally, the material was released to seepage basins (in the case of liquid releases) or was confined to the ground within F-Area (in the case of atmospheric releases). All known releases that may have impacted the environment have been categorized as known waste units or ECODs. No site evaluation units or documented events have resulted in contamination within the SPD project area (Gracy, 2000).

The SPD project area contains a diverse ecosystem, well suited to environmental and ecological research. However, neither SRTC nor the Savannah River Ecology Laboratory have indicated that active research is ongoing in the project area (Friday, 2000; Gladden, 2000; Hinton, 2000).

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TABLE 1
SPD Project Potential Construction Sites

Location	Area (acres)	Area (m^2)
X	25.36	1.026e+5
1	25.09	1.015e+5
2	24.81	1.004e+5
2A	8.04	3.254e+4
3	25.09	1.015e+5
4	45.85	1.855e+5
5	25.09	1.015e+5
5A	17.50	7.085e+4

Table 2
Waste Units and ECODs within the SPD Project Area

Waste Unit ID	Waste Unit Name	Index Number	SPD Construction Area
474-3	General Area, Other: Process and Sewer Lines as Abandoned, NBN	474	1
105	Old F-Area Seepage Basin, 904-49G	105	1
523-1	ECODS F-1 (Southeast of F-Ash Basin, 276-0F)	523	4
523-2	ECODS F-1 (Southeast of F-Ash Basin, 276-0F)	523	4
523-4	ECODS F-1 (Southeast of F-Ash Basin, 276-0F)	523	4
523-5	ECODS F-1 (Southeast of F-Ash Basin, 276-0F)	523	4
276	F-Area Ash Basin, 288-0F	276	4 , 5
16-2	Mixed Waste Management Facility (including the RCRA Regulated Portions of LLRWF 643-7E), 643-28E	16	5
2	F-Area Acid Caustic Basin, 904-47G	2	5A
284	F-Area Acid/Caustic Basin (Groundwater)	284	5A
277	F-Area Ash Basin, 288-1F	277	5A
71	F-Area Coal Pile Runoff Basin, 289-F	71	5A

TABLE 3
Monitoring Locations within the SPD Project Area

Sampling Point Name	Monitoring Program	Status	SPD Construction Area
F-02	NPDES	Active	1
Upper Three Runs-2	RAD Liquid Effluent	Active	1
F-03	NPDES	Active	2
F-Area North	RAD Soil Surveillance	Inactive	2
Upper Three Runs-F3	RAD Liquid Surveillance	Active	2
F-007	NPDES	Inactive	4
F-Area East	RAD Soil Surveillance	Inactive	5
OBG-2	RAD Vegetation Surveillance	Inactive	5
F-05	NPDES	Active	X
F-05	RAD ALARA	Active	X

Table 4
Monitoring Wells within the SPD Project Area

Well Name	Type	Date Installed	Date Abandoned	Catalog ID	SPD Construction Area
FNB 1	Mw	8/9/83		FNB1	1
FNB 1A	Mw	11/17/93		FNB1A	1
ZW 20				ZW20	2
BG 93	Ab,Mw	10/12/81	1/22/97	BG93	3
DRB 1WW	Sp	2/1/61		DRB1WW	3
F 51	Ab	5/18/67	1978	F51	3
HMD 2D	Mw	2/1/91		HMD2D	3
BG 122	Ab,Mw		1/21/97	BG122	4
BG 125	Ab,Mw		1/23/97	BG125	4
BG 38	Ab,Mw	5/24/76	4/25/88	BG38	4
BG 39	Ab,Mw	5/25/76	4/22/88	BG39	4
BG 91	Ab,Mw	10/6/81	1/21/97	BG91	4
BG 92	Ab,Mw	10/8/81	1/22/97	BG92	4
BGO 11D	Ab,Mw	8/24/87	11/1/95	BGO11D	4
BGO 11DR	Mw	9/7/95		BGO11DR	4
BGO 12A	Ab,Mw	10/2/87	11/1/95	BGO12A	4
BGO 12AR	Ab,Mw	2/21/91	1/26/96	BGO12AR	4
BGO 12AX	Mw	10/3/95		BGO12AX	4
BGO 12C	Ab,Mw	10/1/87	2/25/92	BGO12C	4
BGO 12CR	Ab,Mw	3/18/91	1/26/96	BGO12CR	4
BGO 12CX	Mw	9/29/95		BGO12CX	4
BGO 12D	Ab,Mw	9/29/87	11/1/95	BGO12D	4
BGO 12DR	Mw	9/12/95		BGO12DR	4
BGO 43A	Mw	4/26/91		BGO43A	4
BGO 43AA	Mw	4/1/91		BGO43AA	4
BGO 43CR	Mw	6/6/91		BGO43CR	4
BGO 43D	Mw	4/29/91		BGO43D	4
F 43	Ab	2/13/67	1978	F43	4
F 55		9/19/67		F55	4
F 56		10/25/67		F56	4
F 57A	Ab	10/30/67	1978	F57A	4
F 57B	Ab	11/8/67	1978	F57B	4
F 57C	Ab	11/8/67	1978	F57C	4
F 58	Ab	11/16/67	1978	F58	4
F 59		12/4/67		F59	4
ZW 4	Ab,Mw	9/7/51	1/27/97	ZW4	4
BG 40	Ab,Mw	5/26/76	4/21/88	BG40	5
BGO 13D	Mw	10/12/87		BGO13D	5
BGO 13DR	Mw	2/27/91		BGO13DR	5
FAC 6P	Pz	2/3/92		FAC6P	5
FAC 7	Ab,Mw	9/15/88	4/4/96	FAC7	5
FAC 8	Ab,Mw	9/9/88	4/4/96	FAC8	5
FAC 9C	Mw	6/21/94		FAC9C	5

Table 4 (continued)
Monitoring Wells within the SPD Project Area

Well Name	Type	Date Installed	Date Abandoned	Catalog ID	SPD Construction Area
MZ 6	Ab		1/27/97	MZ6	5
BG 13		6/1/61		BG13	5A
BG 14		5/26/61		BG14	5A
FAB 1	Mw	5/13/94		FAB1	5A
FAB 2	Mw	5/9/94		FAB2	5A
FAB 3	Mw	5/12/94		FAB3	5A
FAB 4	Mw	5/10/94		FAB4	5A
FAC 1P	Ab,Pz	1/28/92	4/11/96	FAC1P	5A
FAC 2	Ab,Mw	8/24/83	3/10/89	FAC2	5A
FAC 3	Ab,Mw	8/26/83	4/4/96	FAC3	5A
FAC 3P	Ab,Pz	1/21/92	4/4/96	FAC3P	5A
FAC 4P	Ab,Pz	1/21/92	4/4/96	FAC4P	5A
FAC 5	Ab,Mw	9/2/88	4/4/96	FAC5	5A
FAC 6	Ab,Mw	9/15/88	4/4/96	FAC6	5A
FAC 10C	Mw	6/21/94		FAC10C	5A
FAC 11C	Ab,Mw	6/24/94	4/4/96	FAC11C	5A
FAC 12C	Ab,Mw	6/24/94	4/4/96	FAC12C	5A
FCB 1	Ab,Mw	10/16/81	7/13/88	FCB1	5A
FCB 7	Mw	7/7/88		FCB7	5A
FAC 2P	Ab,Pz	1/28/92	4/3/96	FAC2P	X
FAC 4	Ab,Mw	7/20/84	4/3/96	FAC4	X
FC 2A		4/1/77		FC2A	X
FC 2B		4/7/77		FC2B	X
FC 2C		4/14/77		FC2C	X
FC 2D		4/18/77		FC2D	X
FC 2E		4/21/77		FC2E	X
FC 2F		4/22/77		FC2F	X
P 28A	Mw	9/27/86		P28A	X
P 28TA	Mw	7/8/86		P28TA	X
P 28TB	Mw	10/2/86		P28TB	X
P 28TC	Mw	10/7/86		P28TC	X
P 28TD	Mw	10/9/86		P28TD	X
P 28TE	Mw	10/14/86		P28TE	X

Mw: monitoring well
Ab: abandoned
Pz: piezometer
Sp: special

Table 5
Inventory of Radionuclides Released from F-Area

Radionuclide	Liquid Release (Ci)[1]	Airborne Release (Ci)[1]
Am-241	1.85e-5	4.68e-3
C-14		6.48e+2
Cm-244	7.28e-6	5.35e-3
Co-60		1.91e-2
Cs-134		8.56e-4
Cs-137	1.00e+0	5.97e-1
Eu-154		5.21e-7
H-3	7.50e+2	See note[2]
I-129		1.92e-2[3]
Pm-147	6.13e-2	
Pu-238	3.80e-5	1.46e-2
Pu-239	9.28e-4	2.44e+0
Ru-103,106		3.85e+1
Ru-106		3.29e+1
Sb-125		2.93e-3
Sr-89,90	3.69e-2	6.76e-1
Sr-90	2.95e-1	
U (nat)	5.95e-5	5.80e-1
U-234	2.13e-4	4.02e-4
U-235	1.65e-5	2.07e-3
U-238	4.17e-4	2.03e-3
Unidentified Alpha[4]	2.90e-1	7.41e-2
Unidentified Beta[5]	1.63e+1	1.53e+1

Notes
[1]Blanks indicate either no quantifiable activity or monitoring for the radionuclide is not conducted.
[2]Airborne releases of tritium from F-Area and H-Area are combined
[3]Releases from F-Area and H-Area combined until 1991.
[4]Assumed to be Pu-239
[5]Assumed to be Sr-89,90

Table 6
1973 F-Area Special Soil Survey
Results in pCi/g

Location	Cs-137	Sr-90	Pu-238	Pu-239
1	3.90E-01	3.20E-01	4.66E-02	3.70E-02
2	3.70E-01	4.58E-01	1.00E-03	3.13E-02
9	5.00E-01	2.88E-01	3.00E-03	3.39E-02
10	5.00E-01	4.80E-02	9.72E-02	3.75E-02
11	3.10E-01	1.18E-01	6.80E-03	1.15E-01
12	3.80E-01	3.08E-01	7.20E-03	1.64E-01
13	4.00E-01	5.70E-02	4.00E-03	5.32E-02
14	2.50E-01	1.62E-01	2.80E-03	1.40E-02
15	5.50E-01	3.88E-01	not detected	9.36E-02
16	3.20E-01	1.40E-01	4.80E-03	2.89E-02

Table 7
Current NPDES Monitoring Requirements

Outfall	Measurement and Monitoring Parameters
F-02	Flow Total suspended solids Temperature pH
F-03	Flow Total suspended solids Temperature pH Lead
F-05	Flow Total suspended solids Temperature pH Oil and grease

Figure 1
SPD Project Areas with Topography (20’ Contours)

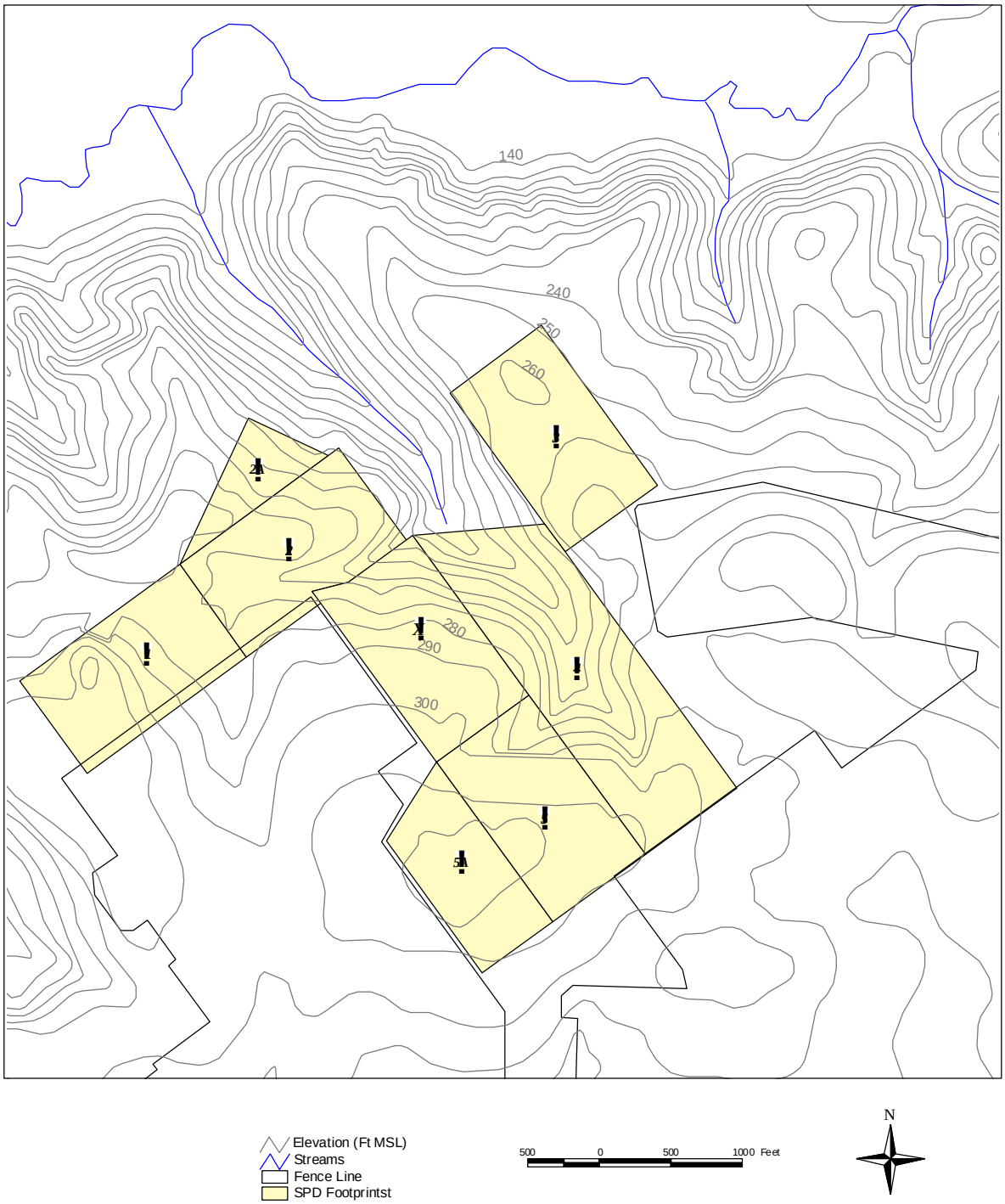


Figure 2
Identified Waste Units and ECODs

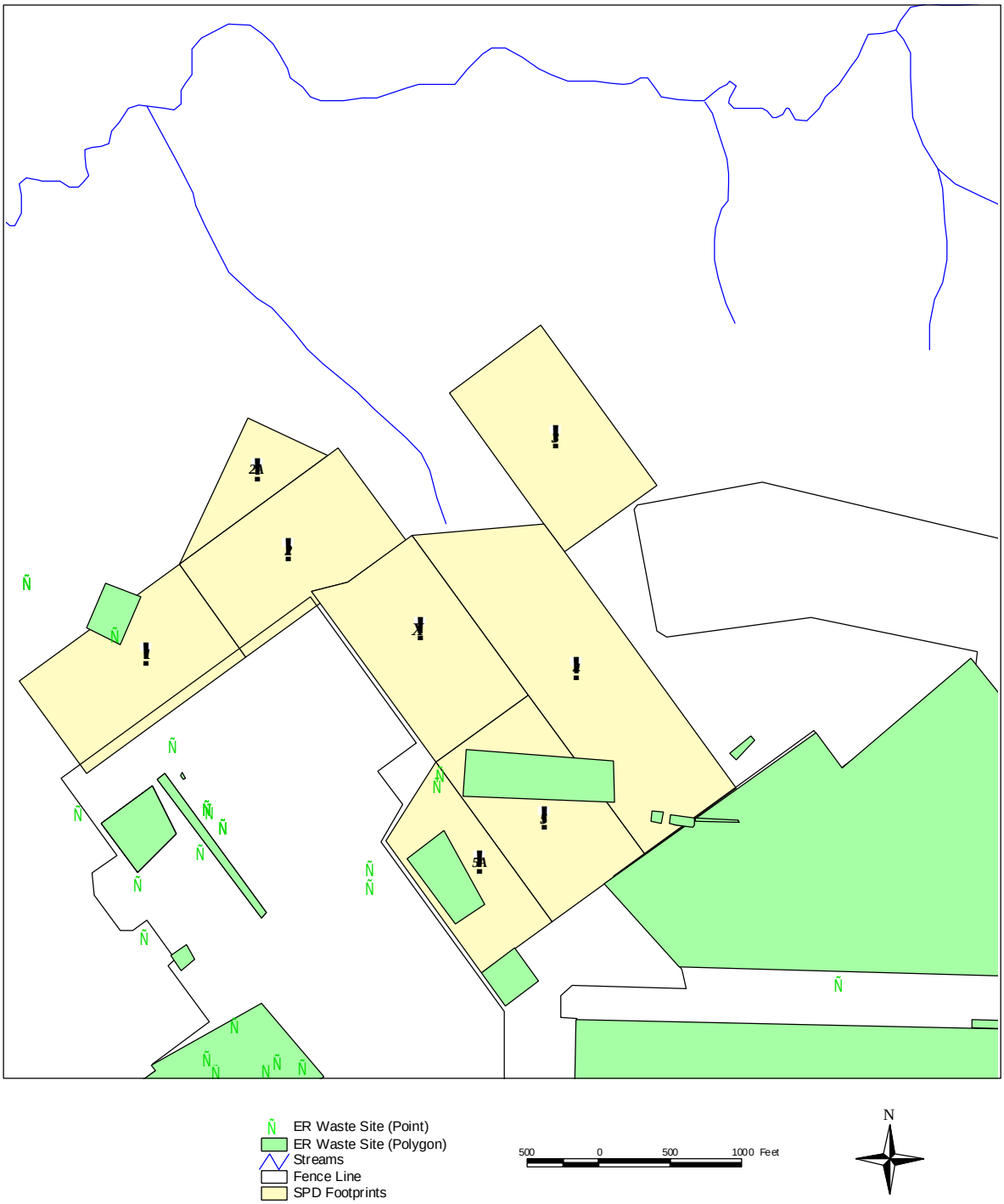


Figure 3
Water Table Elevation and Well Locations

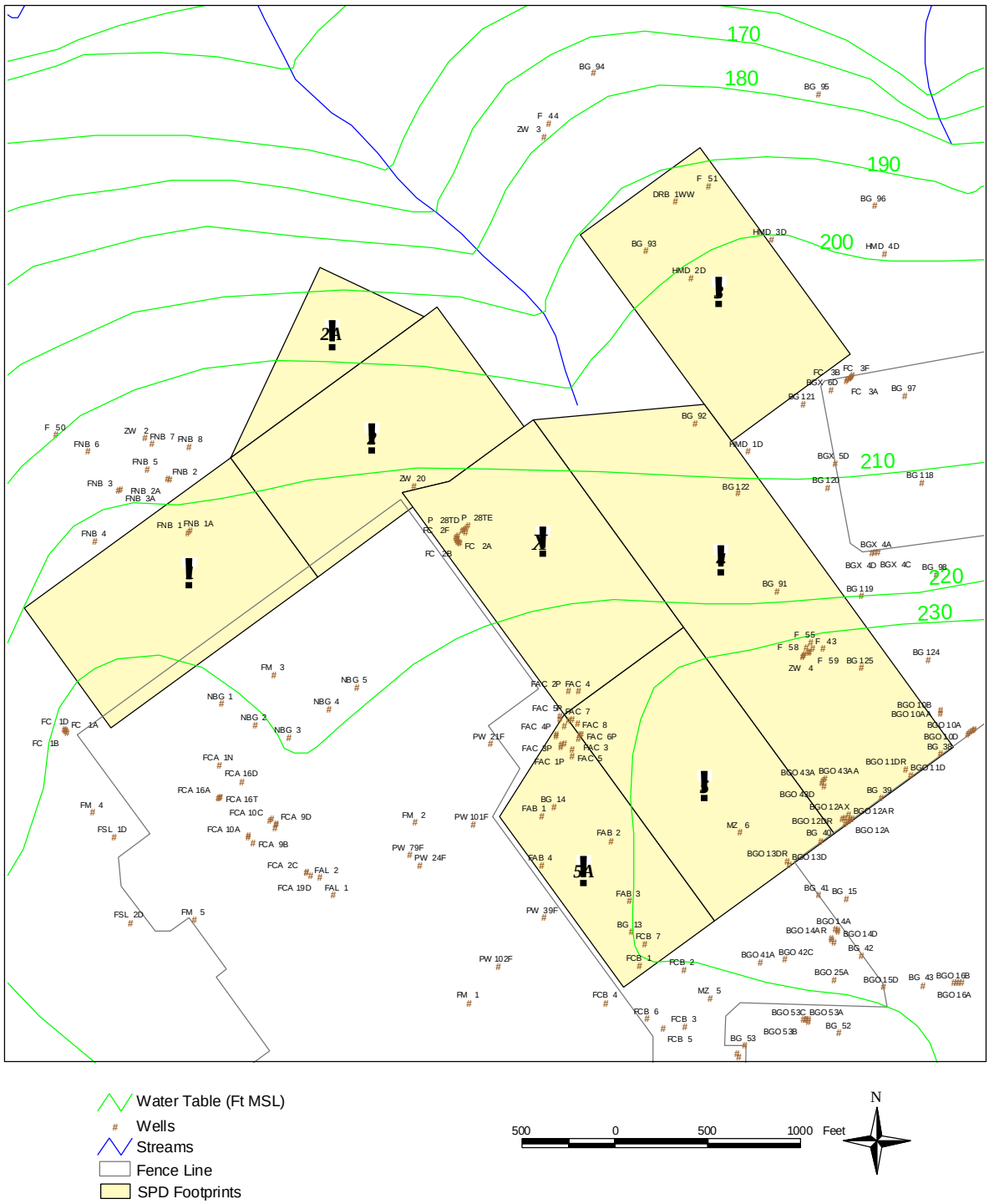


Figure 4
Routine EMS Monitoring Locations

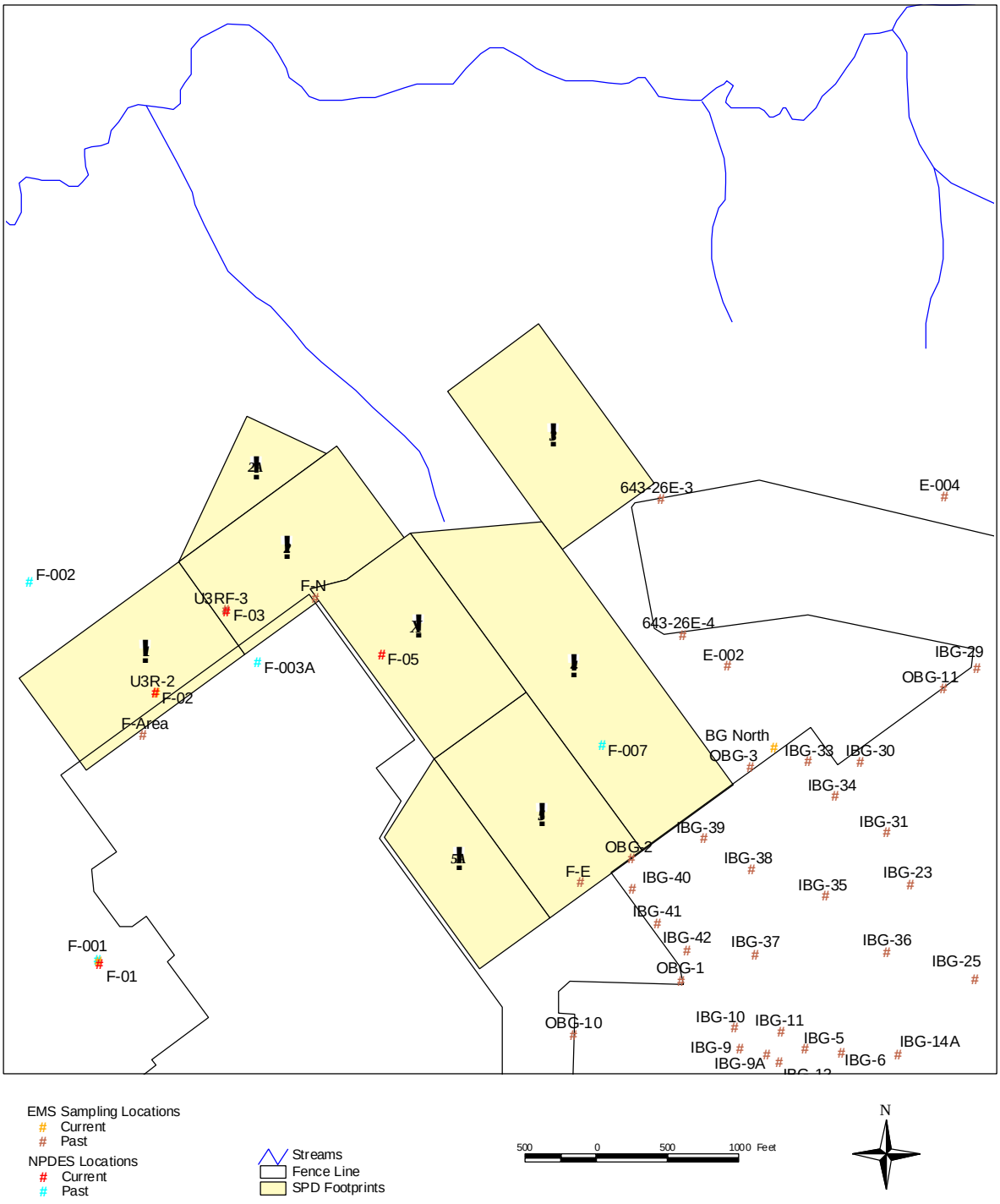


Figure 5
Groundwater Tritium Plumes

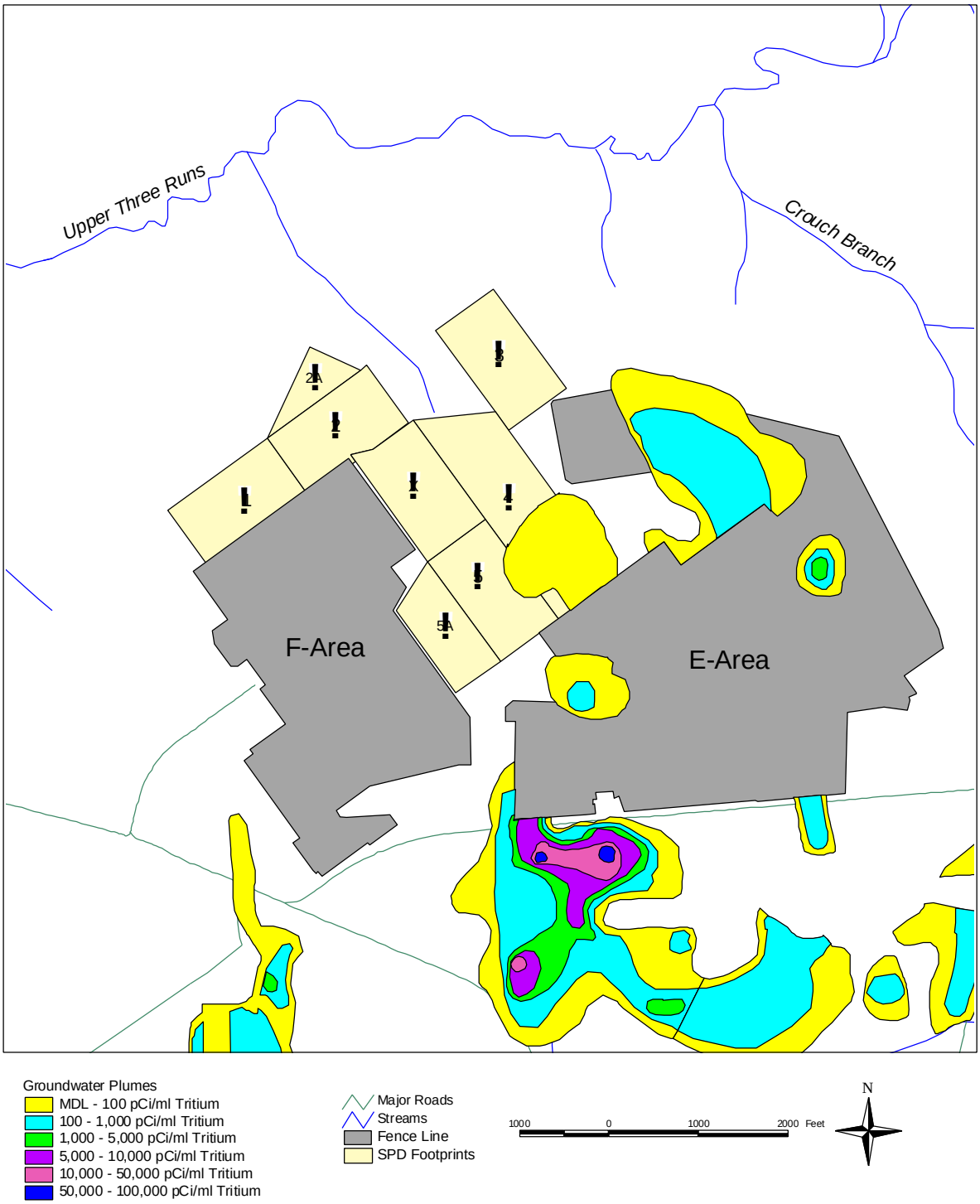


Figure 6
Comparison of Airborne Gross Alpha Concentrations at All Locations

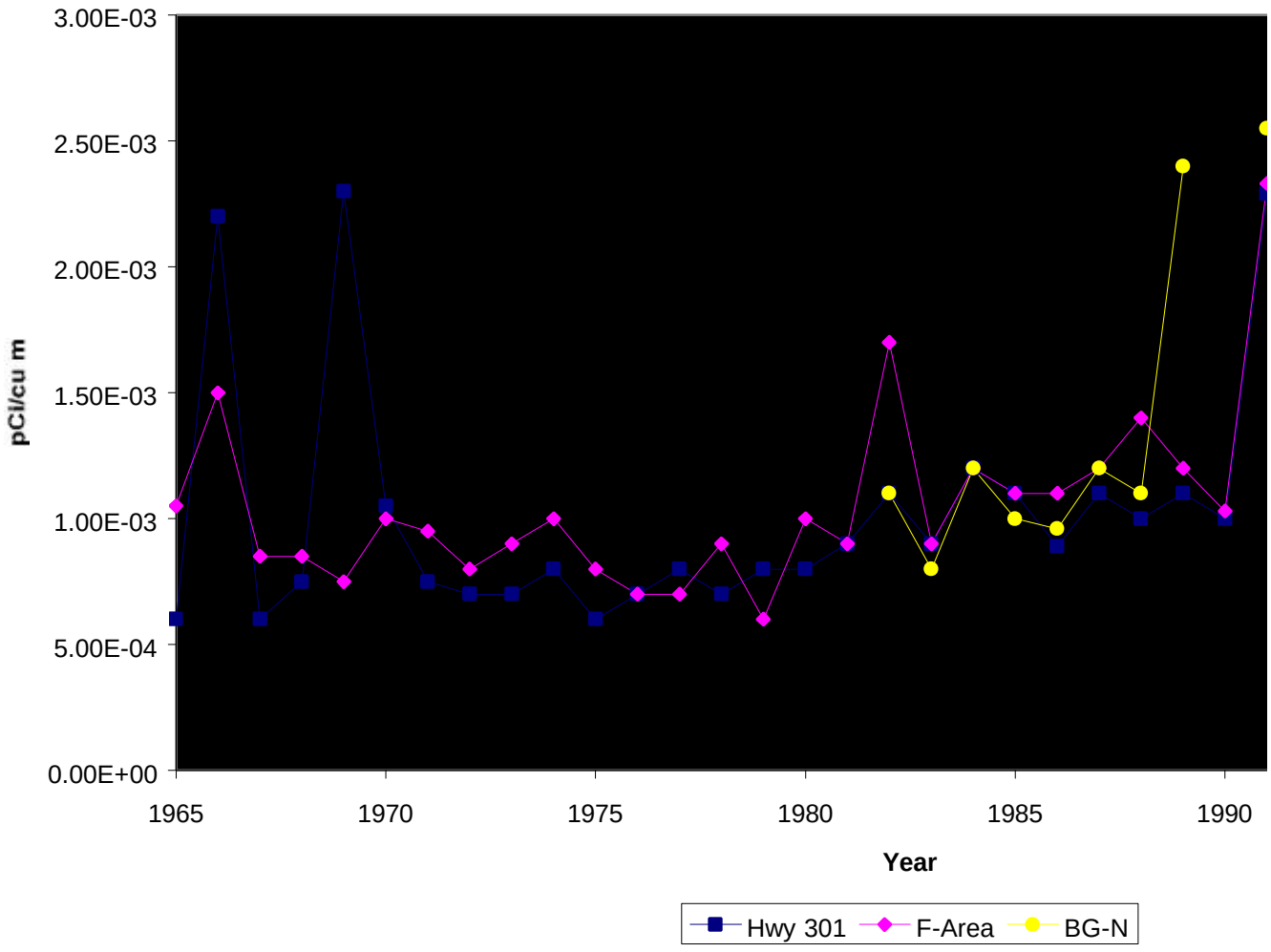


Figure 7
Comparison of Airborne Gross Beta Concentrations at All Locations

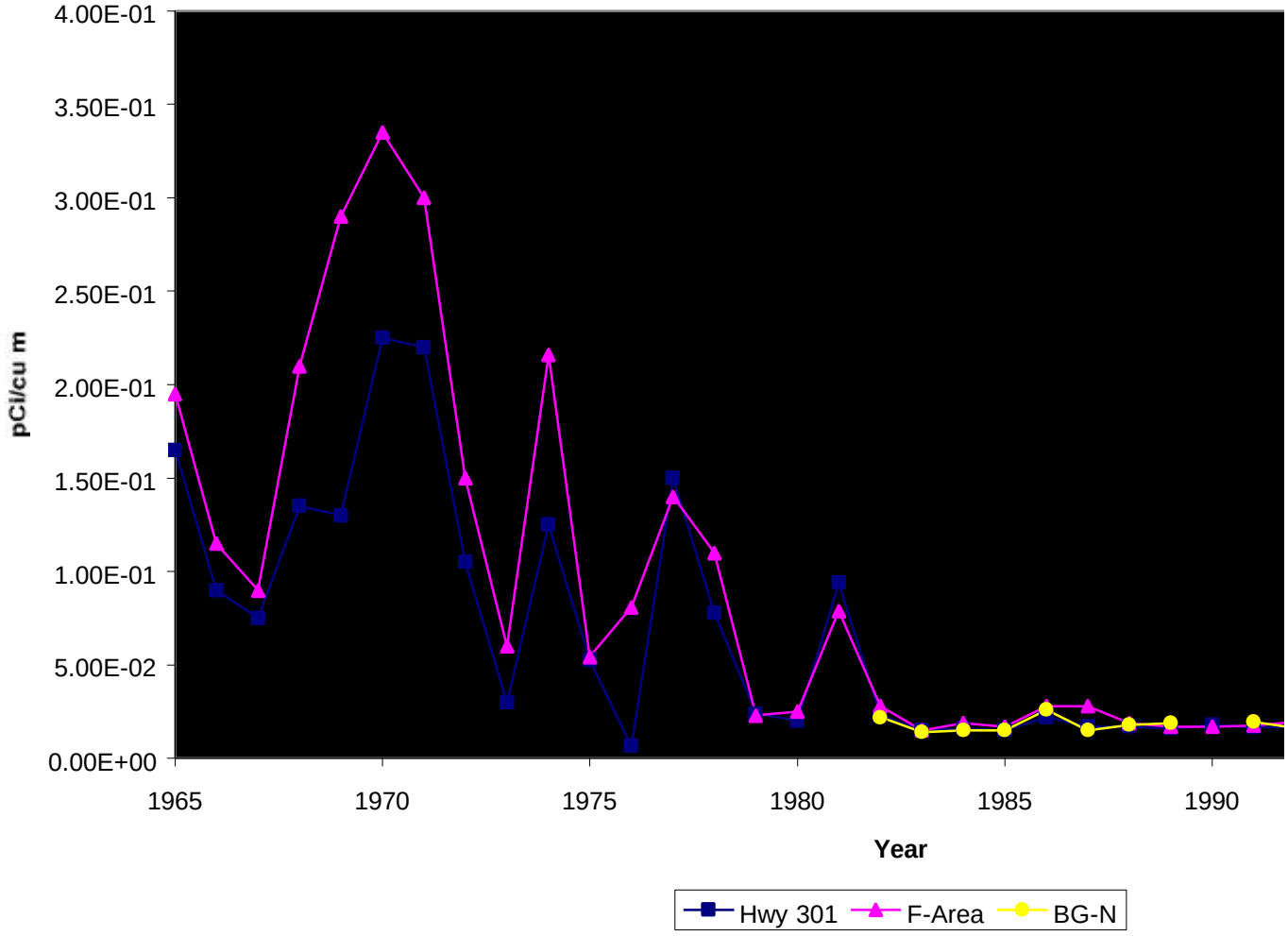


Figure 8
Comparison of Tritium-in-Air Concentrations at All Locations

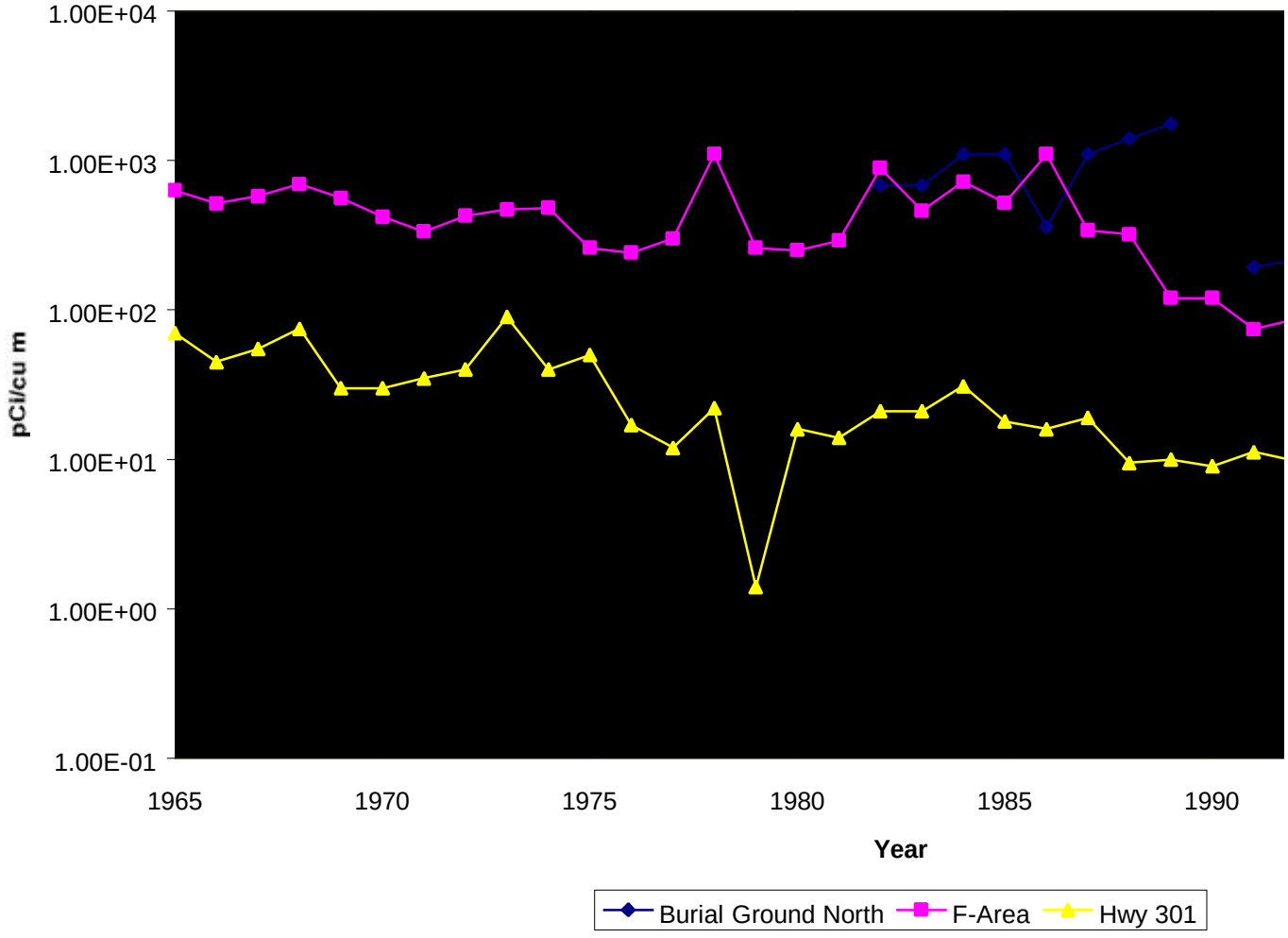


Figure 9
Gross Alpha and Gross Beta Concentrations at F-Area

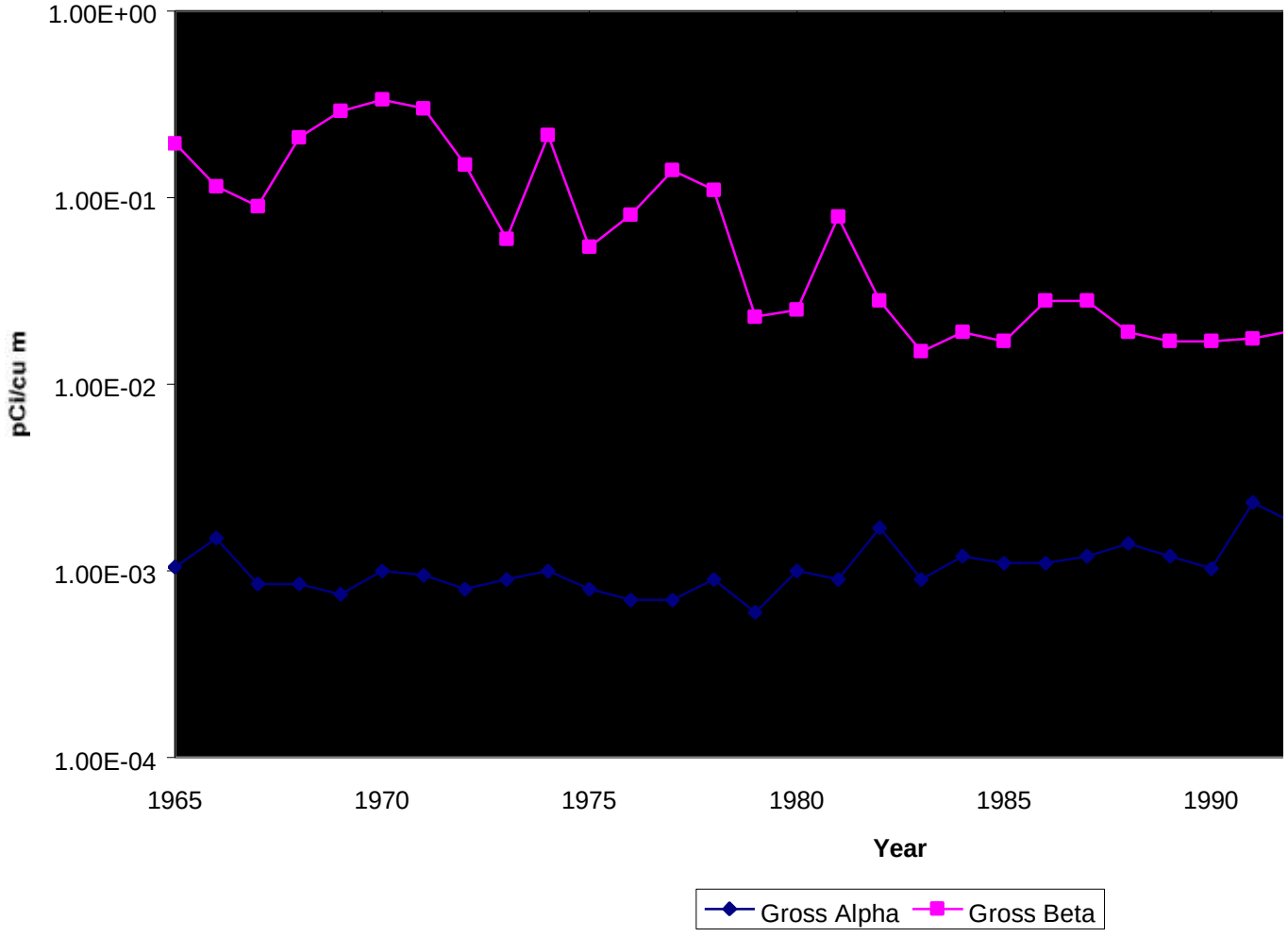


Figure 10
Gross Alpha and Gross Beta Concentrations
at Burial Ground North

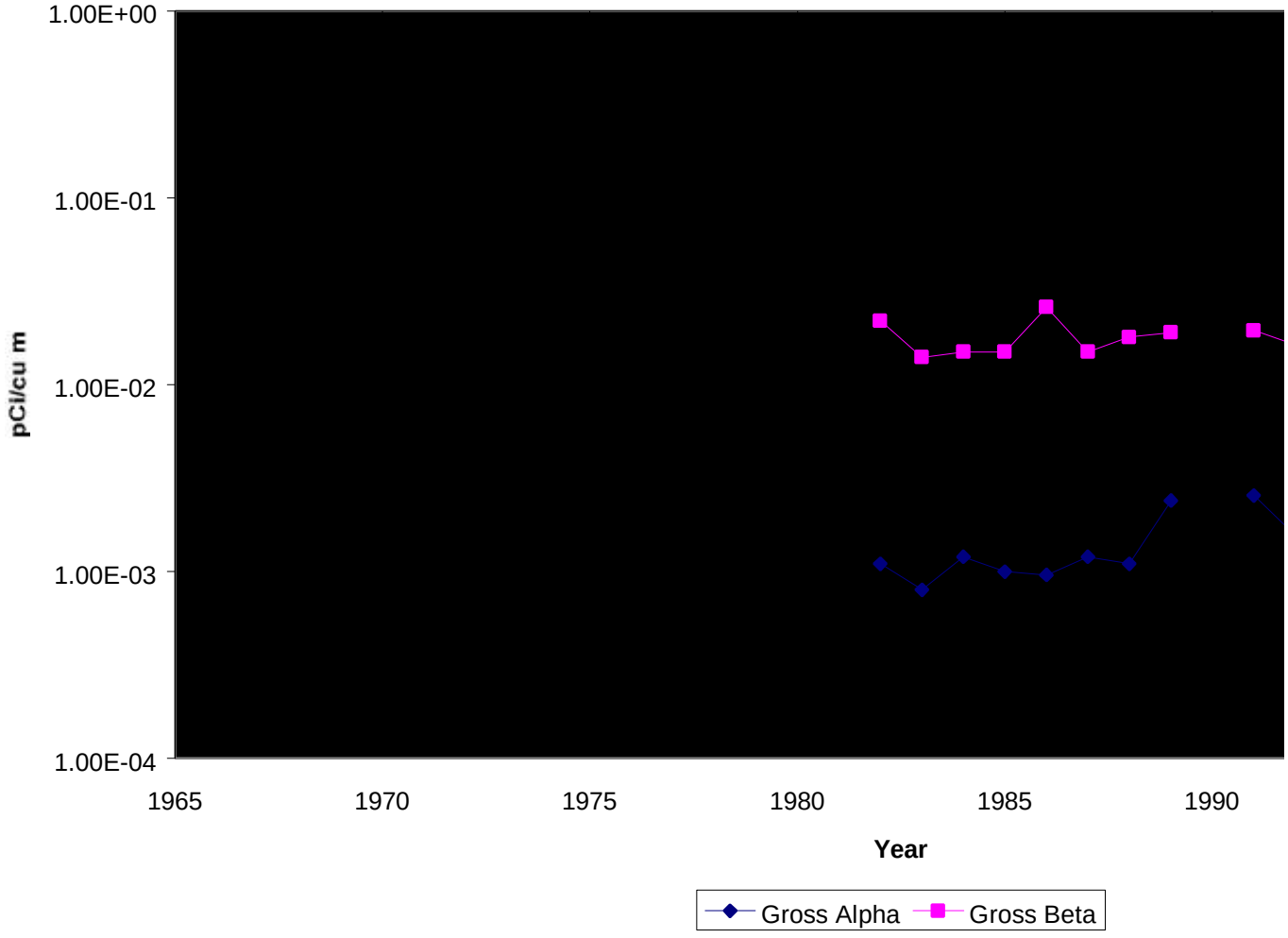


Figure 11
Gross Alpha and Gross Beta Concentrations
at U.S. Highway 301

Figure 12
F-Area Filter Paper Co-60 (Weekly Sample)

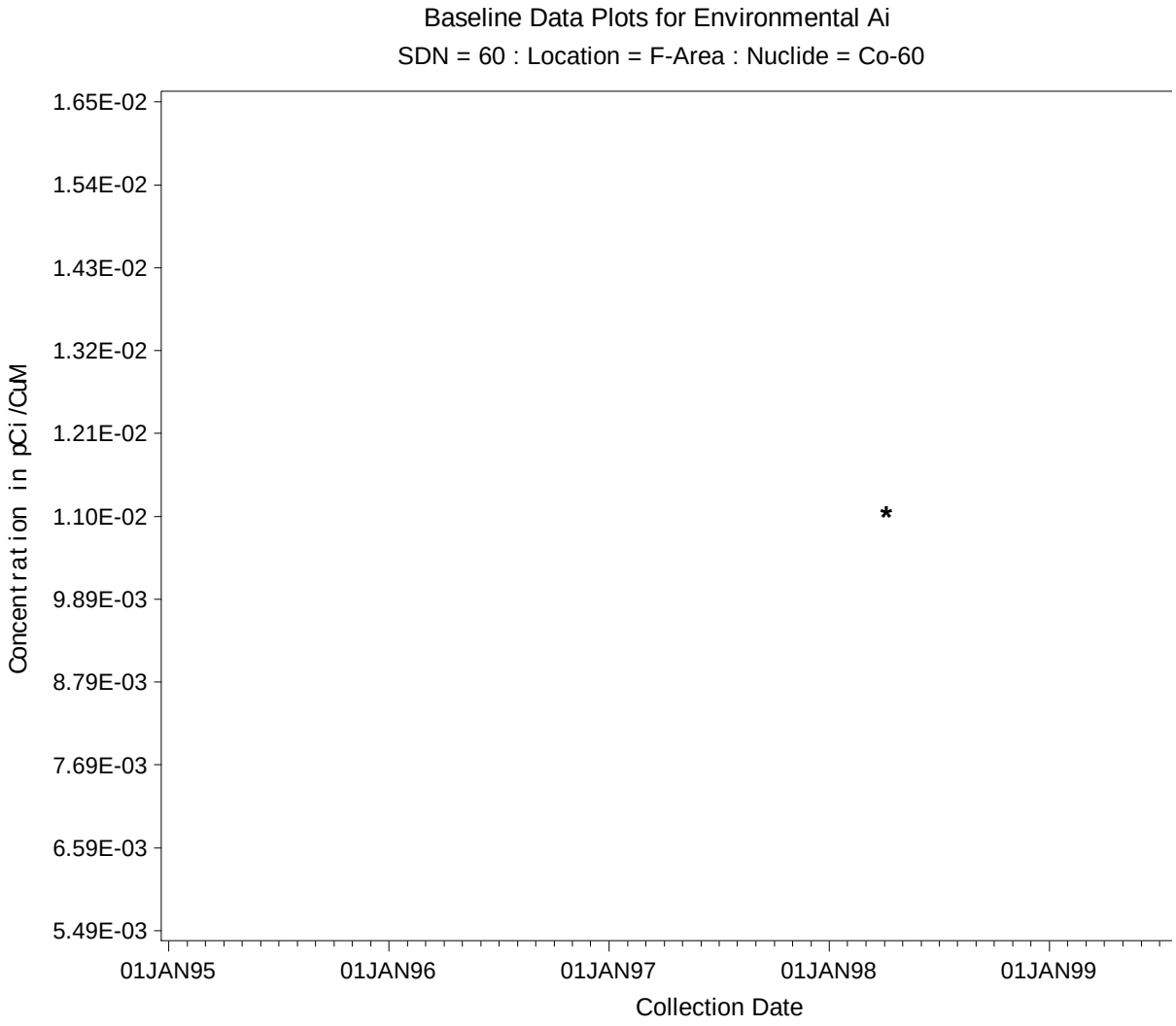


Figure 13
F-Area Filter Paper Cs-137 (Weekly Sample)

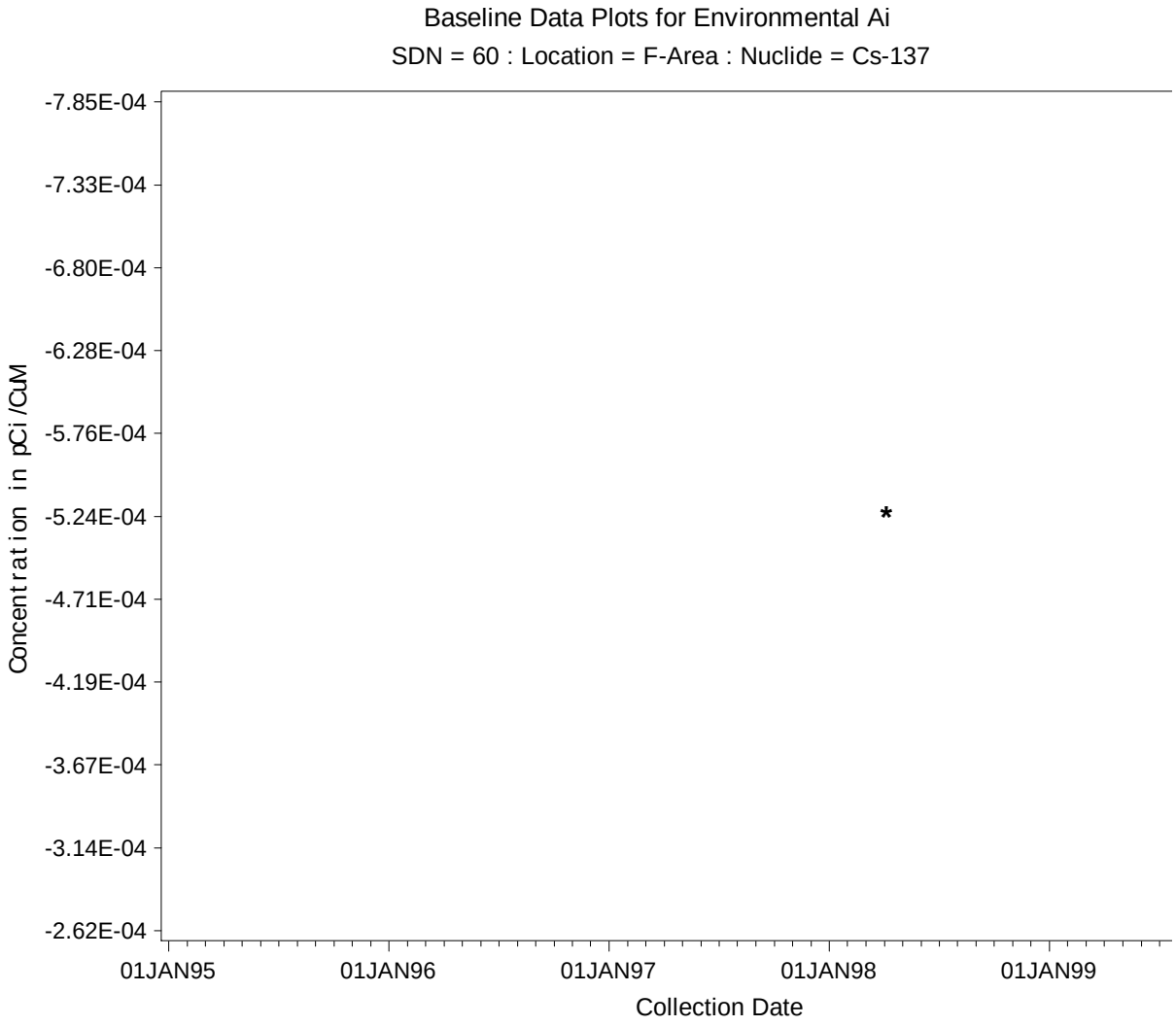


Figure 14
F-Area Filter Paper Gross Beta (Weekly Sample)

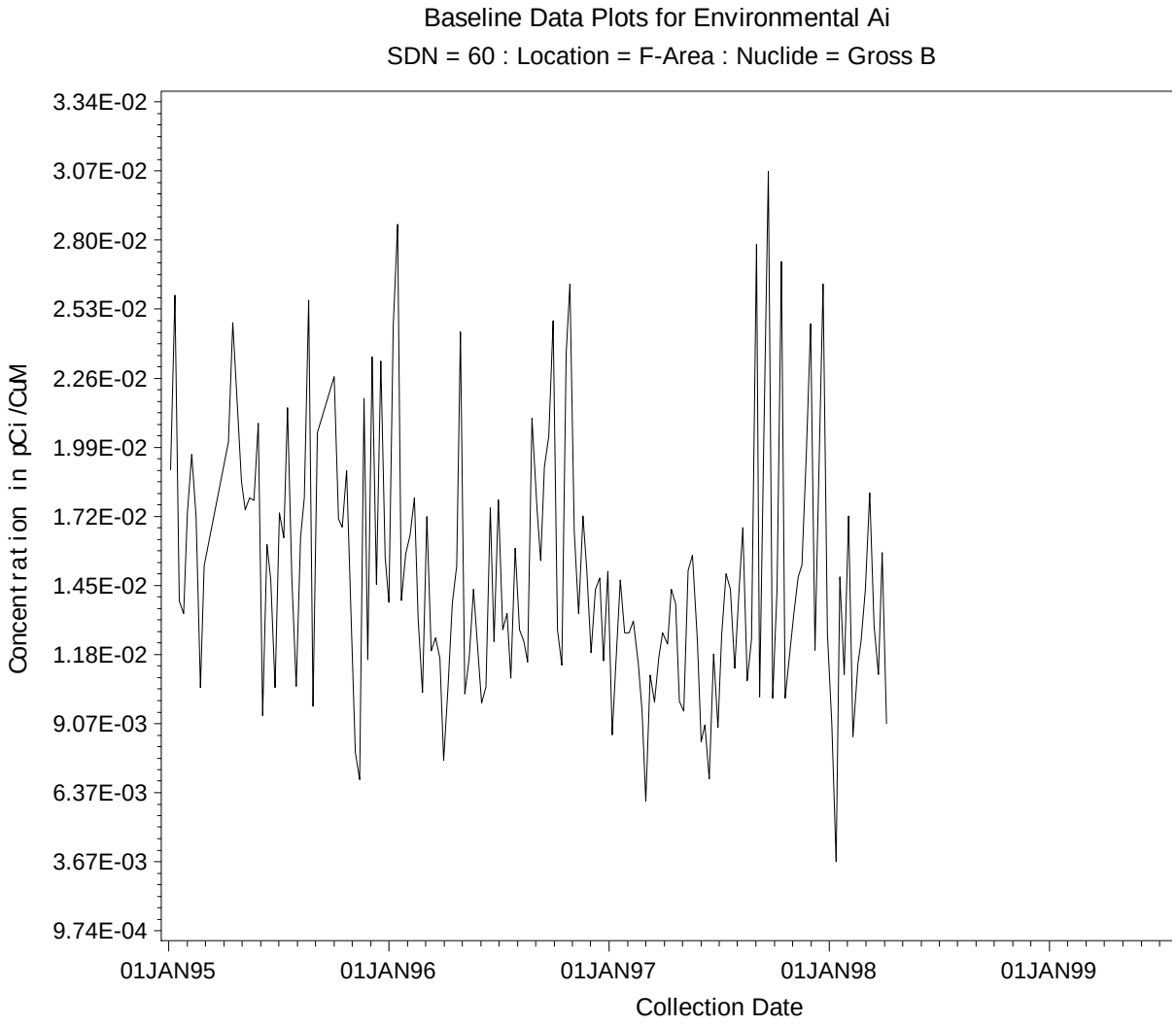


Figure 15
F-Area Filter Paper Gross Alpha (Weekly Sample)

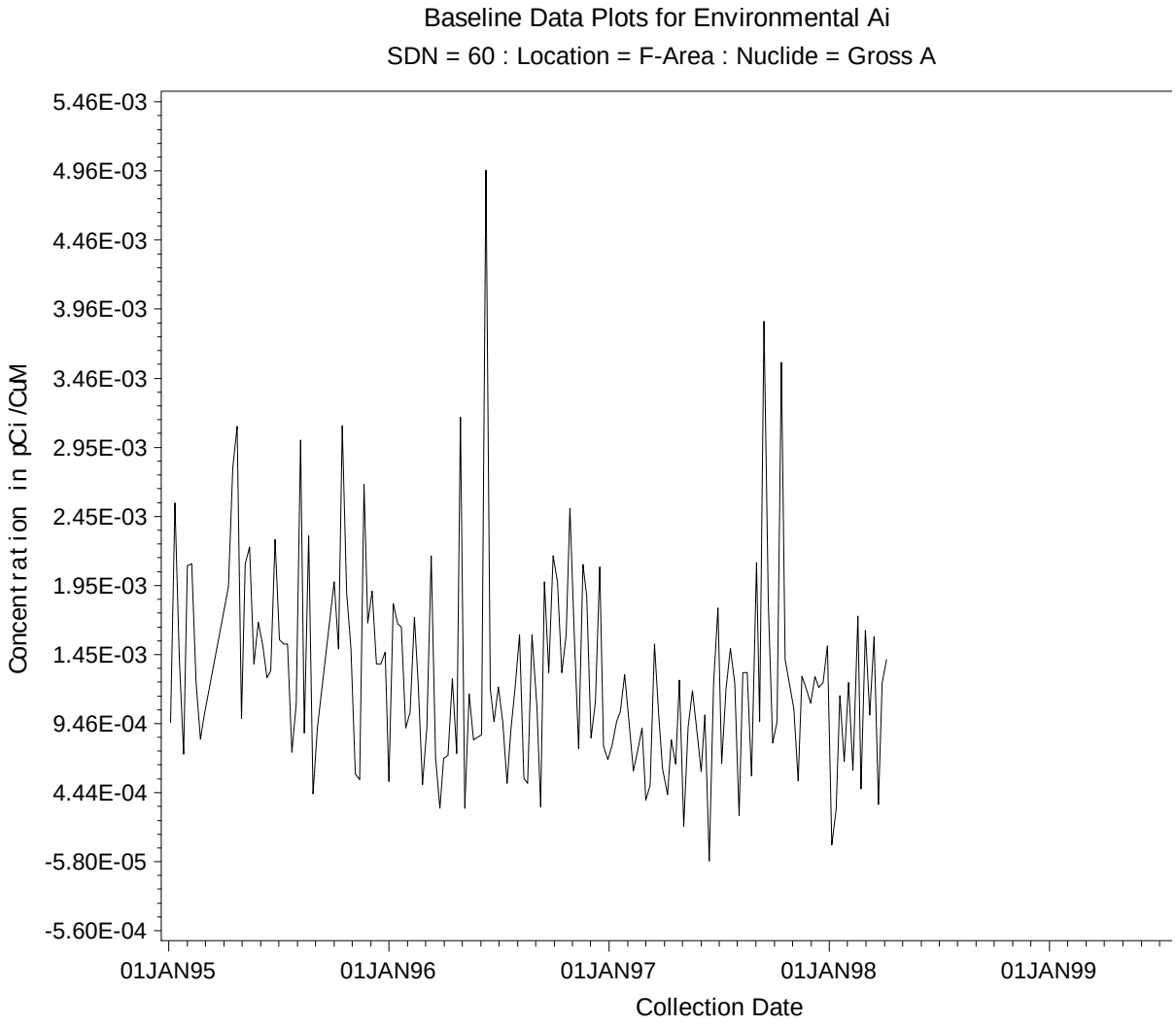


Figure 16
F-Area Filter Paper Co-60 (Monthly Composite)

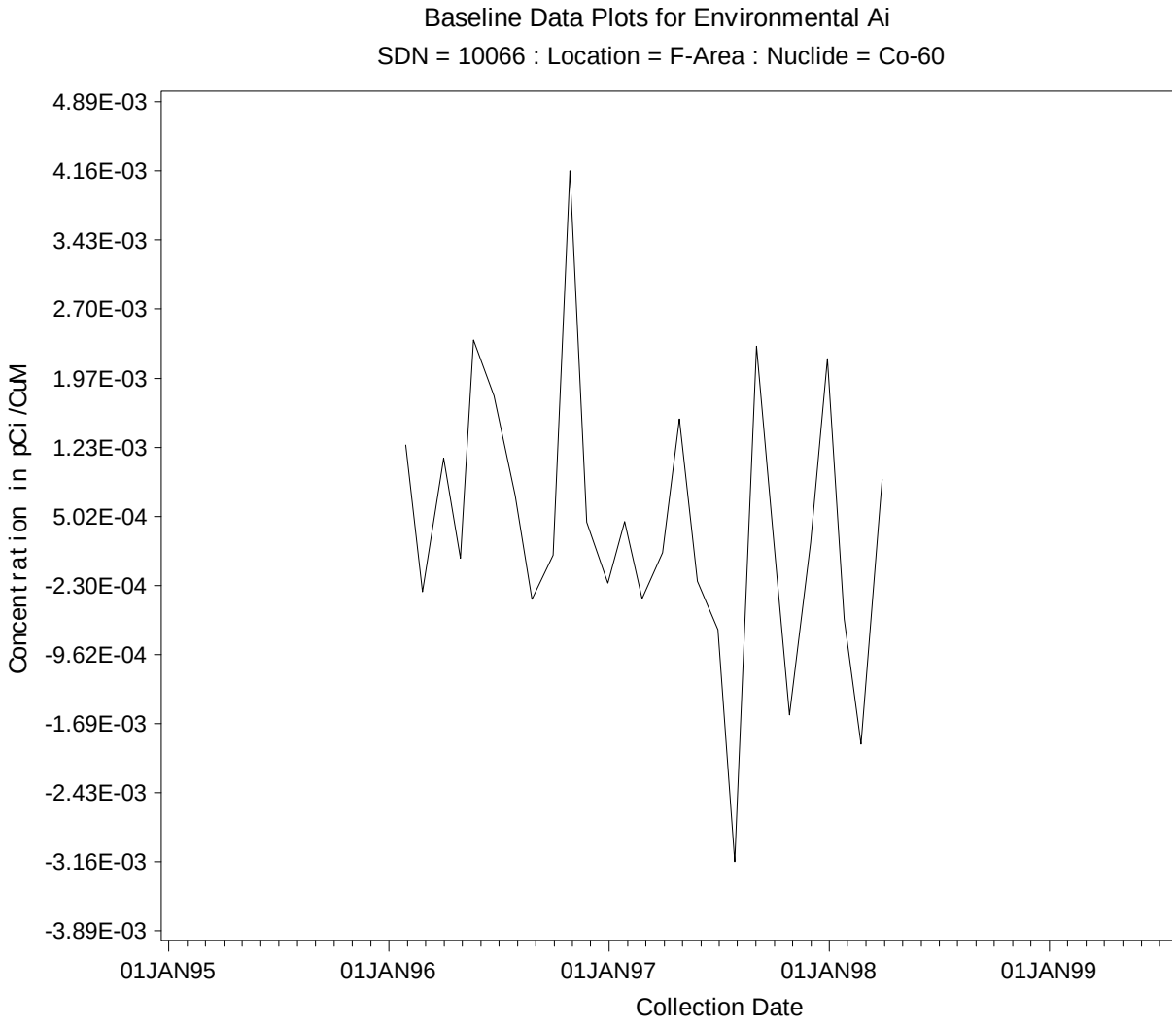


Figure 17
F-Area Filter Paper Cs-137 (Monthly Composite)

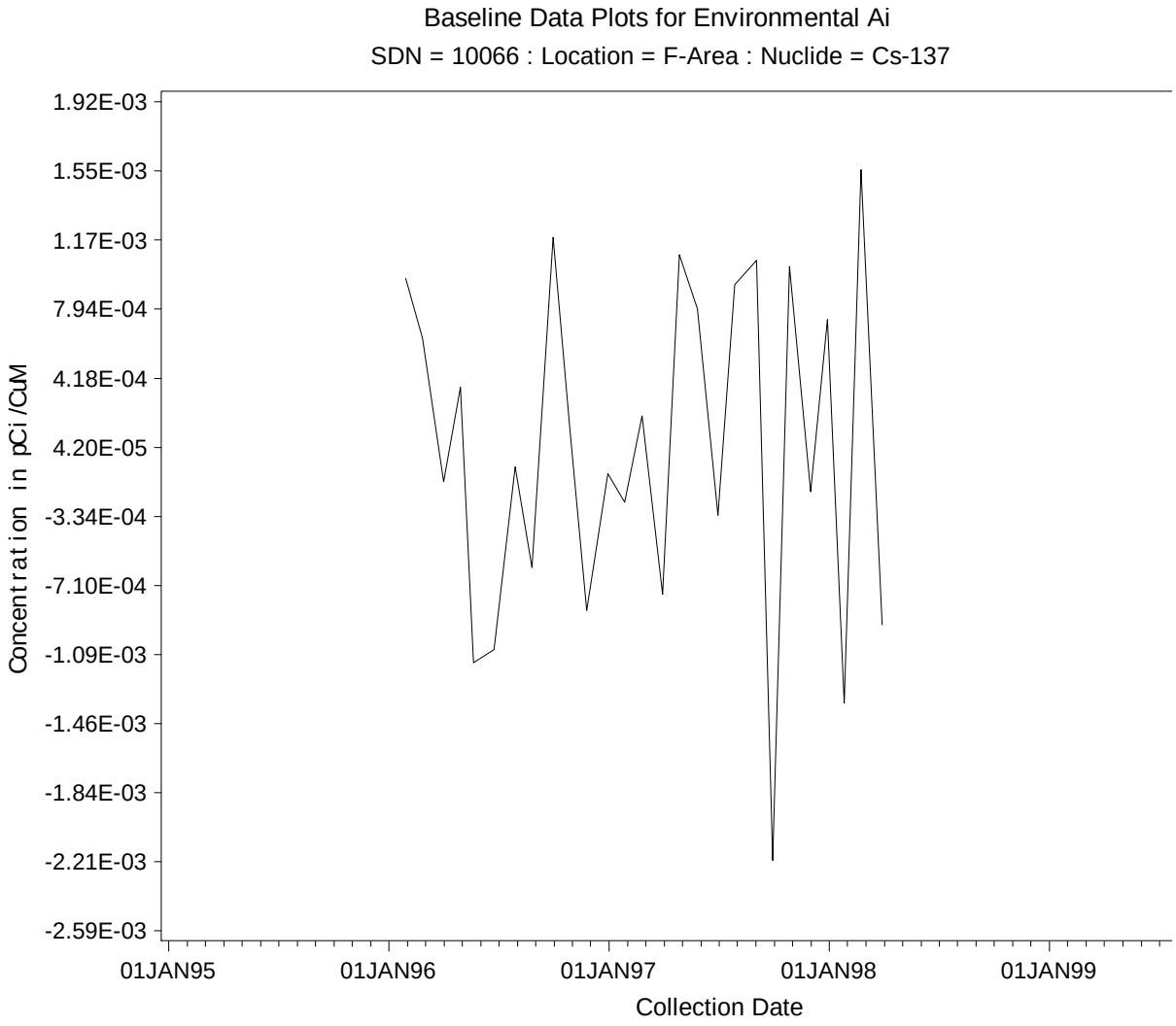


Figure 18
F-Area Filter Paper Pu-238 (Monthly Composite)

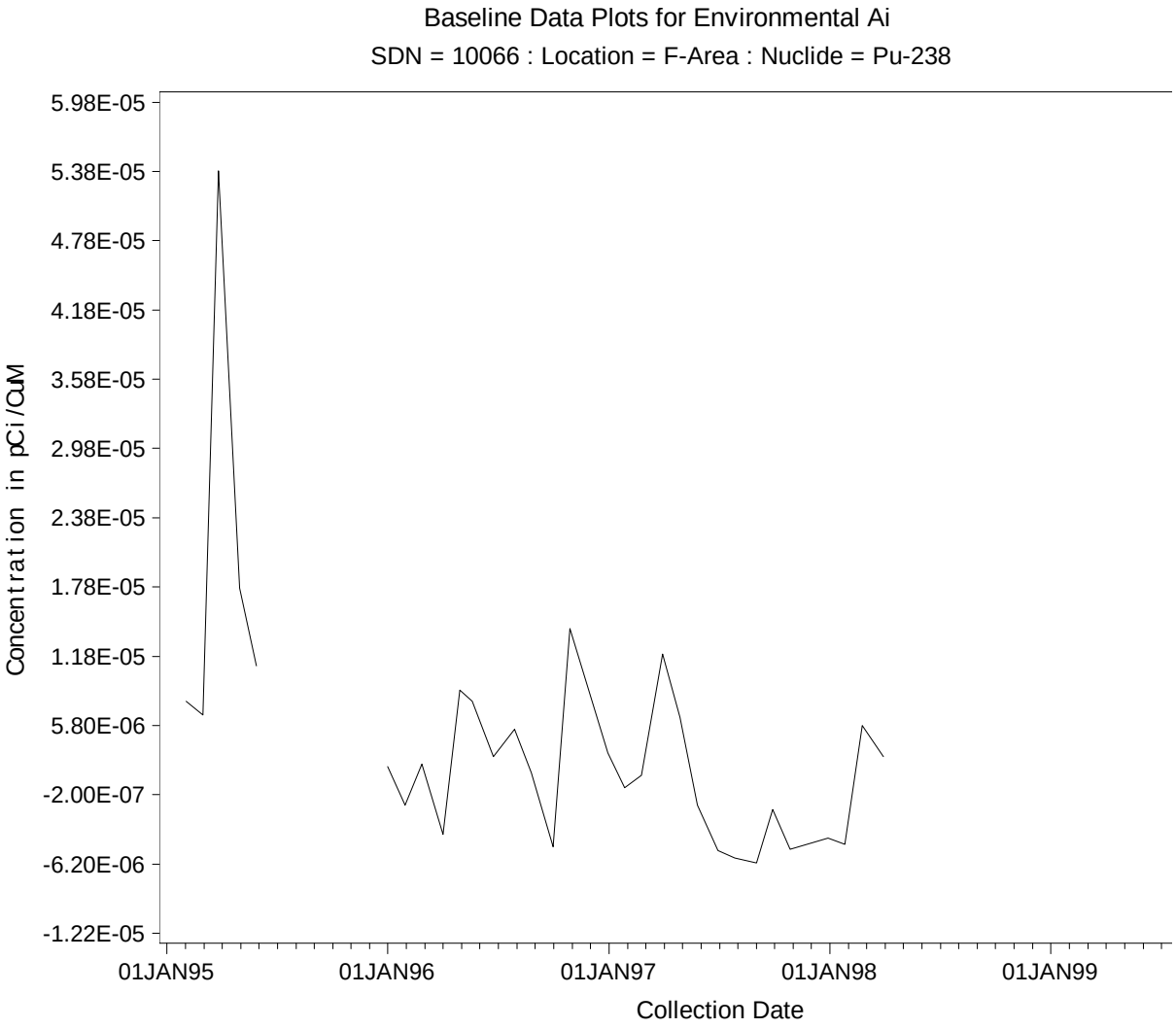


Figure 19
F-Area Filter Paper Pu-239 (Monthly Composite)

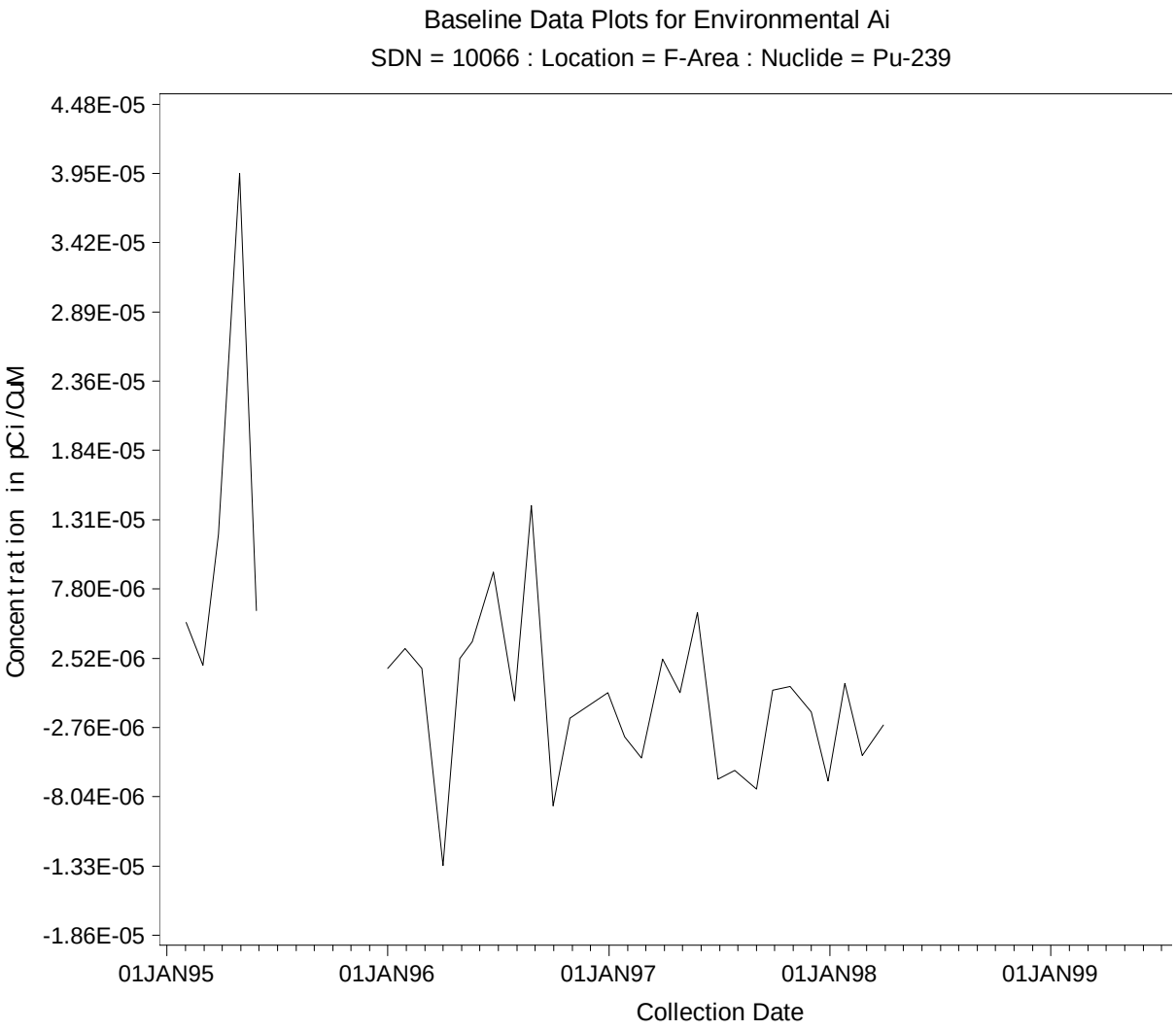


Figure 20
F-Area Filter Paper Sr-89,90 (Monthly Composite)

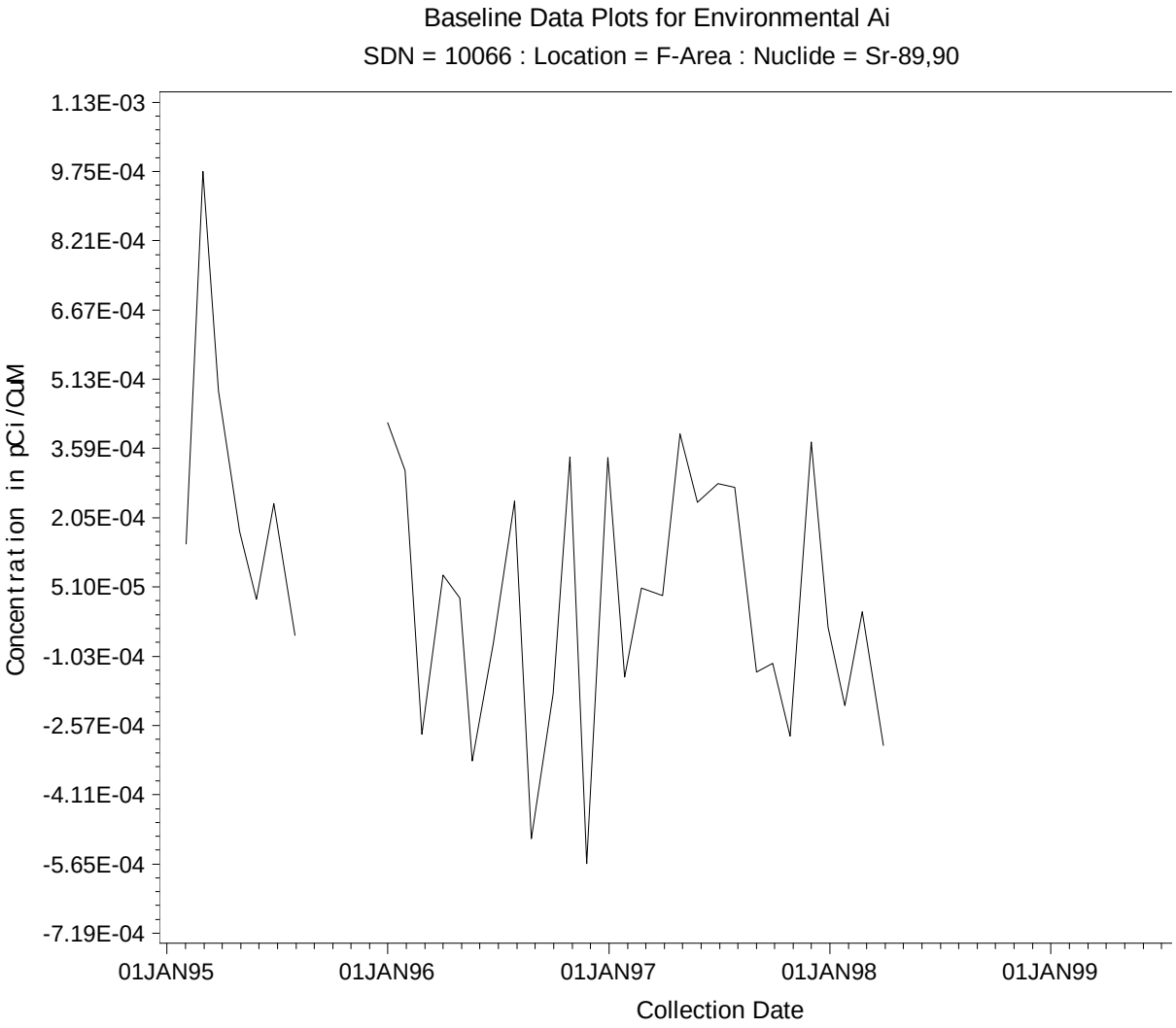


Figure 21
F-Area Charcoal Canister Co-60 (Weekly Sample)

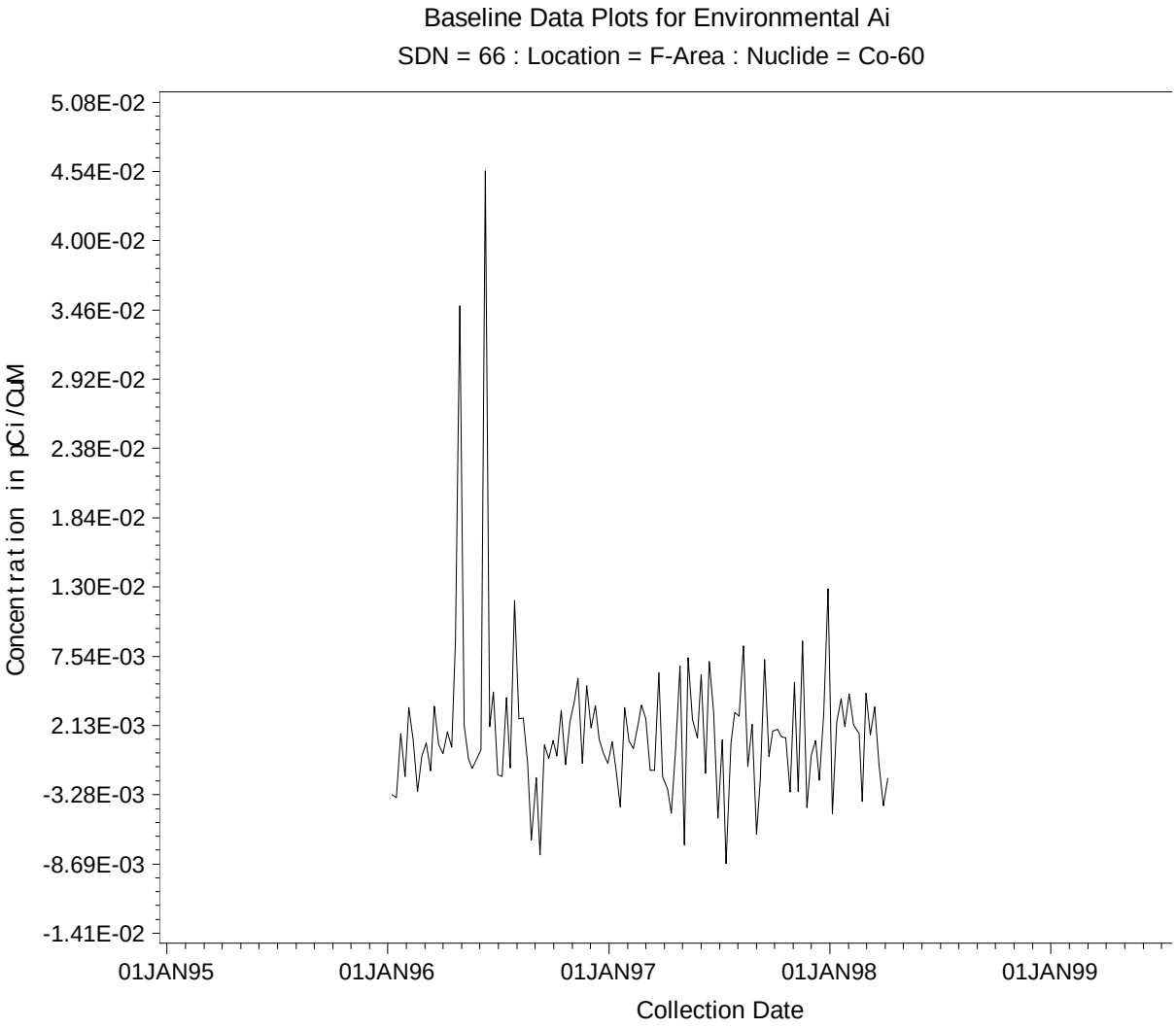


Figure 22
F-Area Charcoal Canister Cs-137 (Weekly Sample)

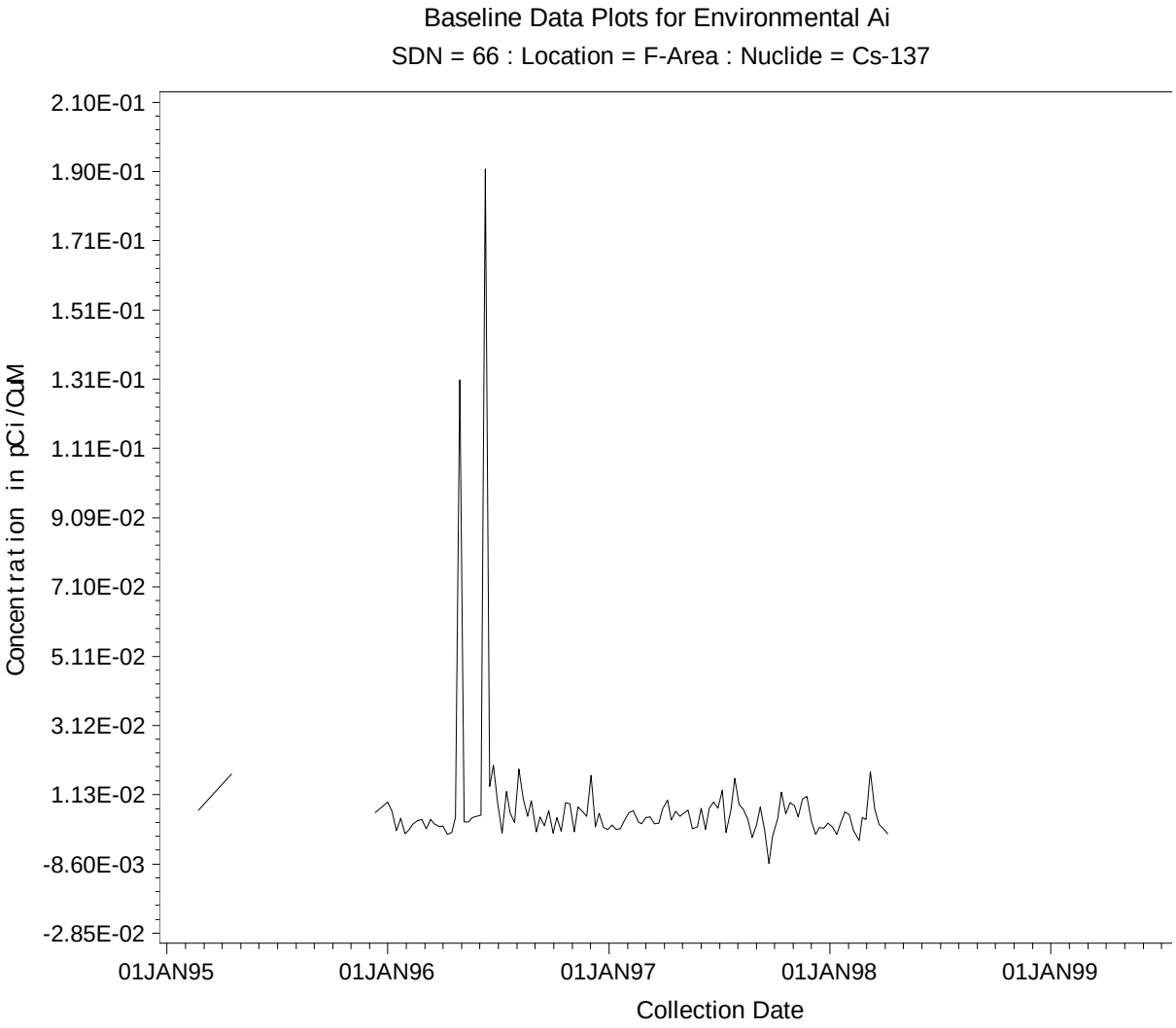


Figure 23
F-Area Silica Gel H-3 (Biweekly Sample)

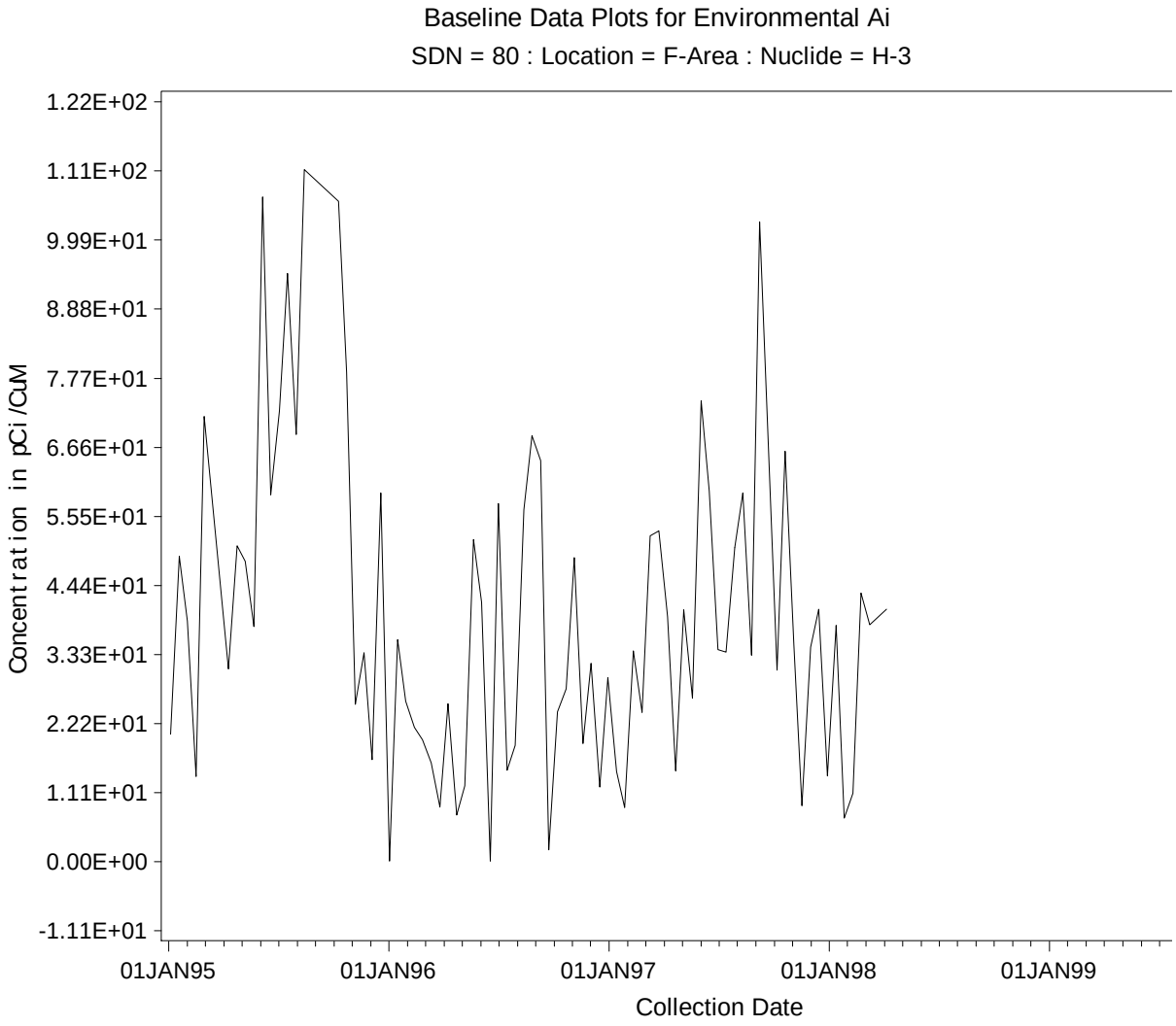


Figure 24
F-Area Rainwater H-3 (Biweekly Sample)

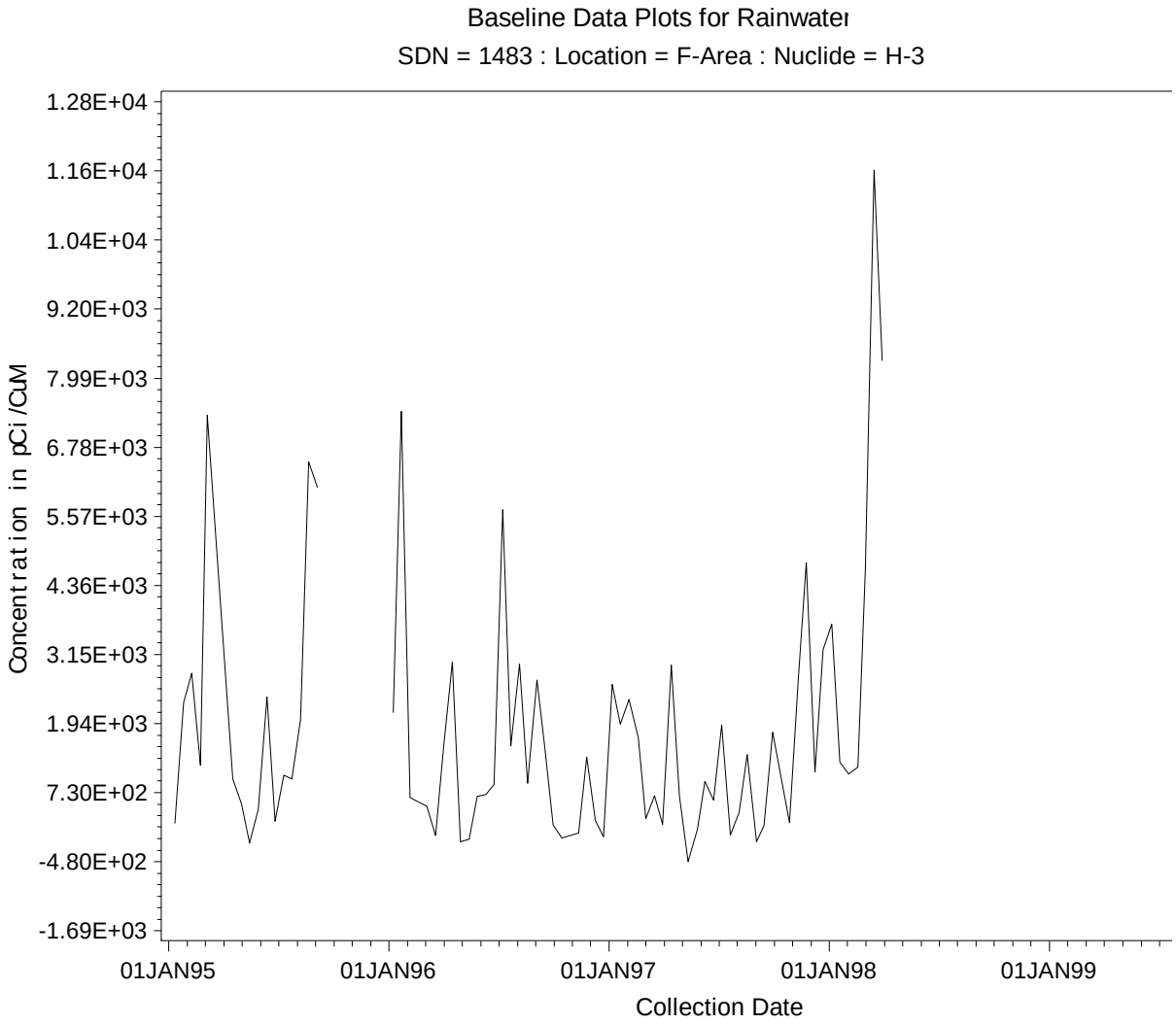


Figure 25
Burial Ground North Filter Paper Co-60 (Weekly Sample)

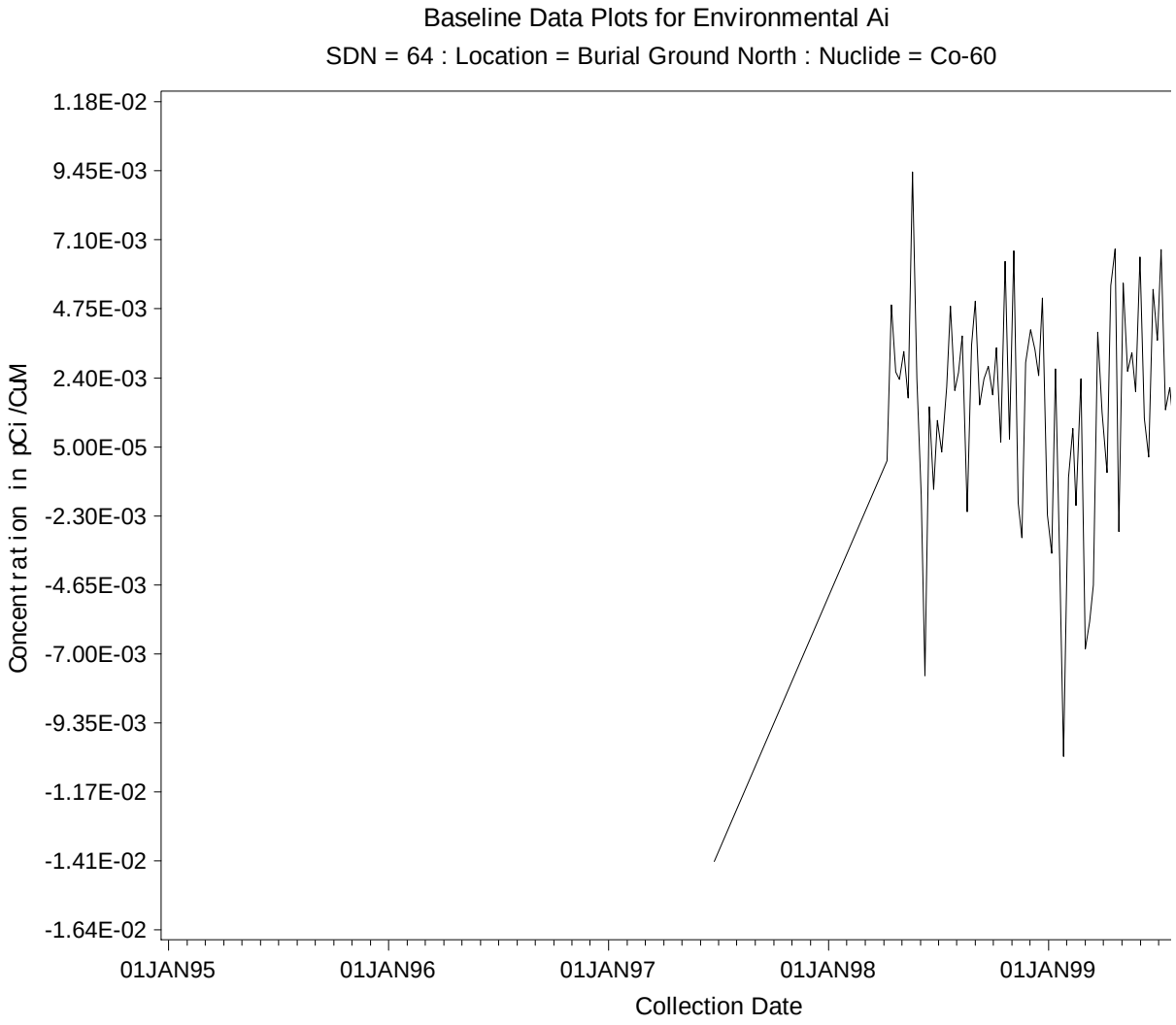


Figure 26
Burial Ground North Filter Paper Cs-137 (Weekly Sample)

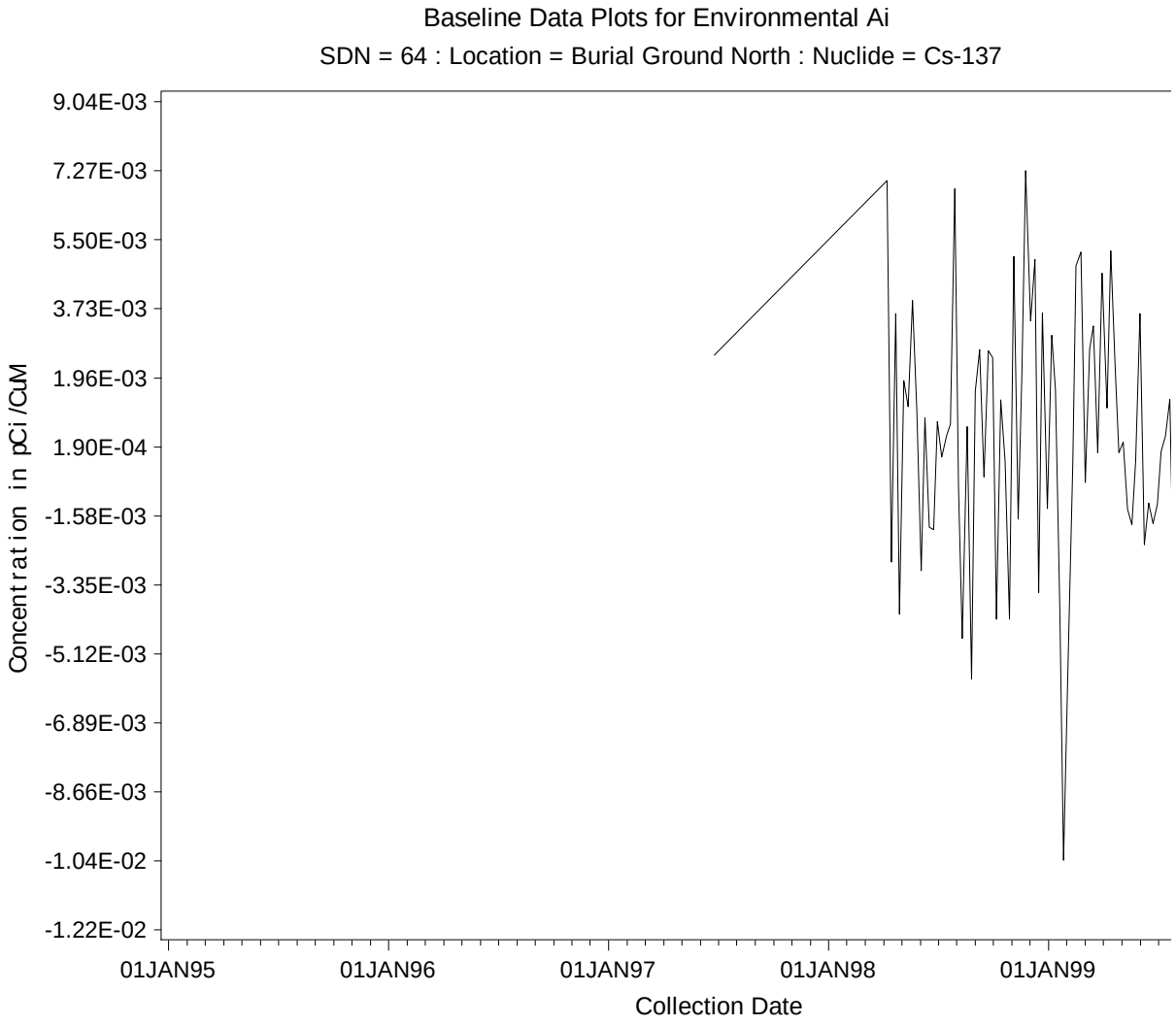


Figure 27
Burial Ground North Filter Paper U-234 (Annual Sample)

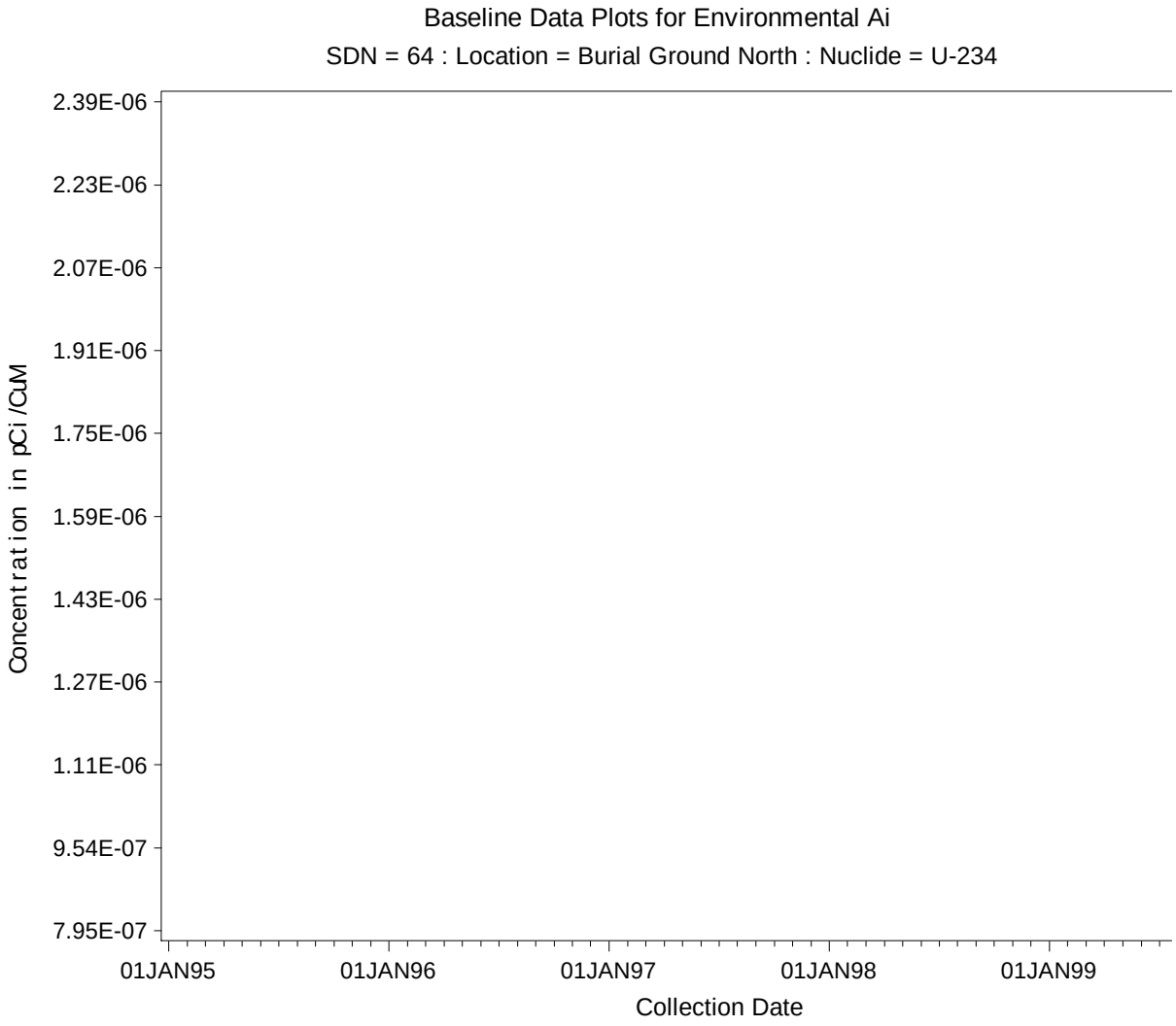


Figure 28
Burial Ground North Filter Paper U-235 (Annual Sample)

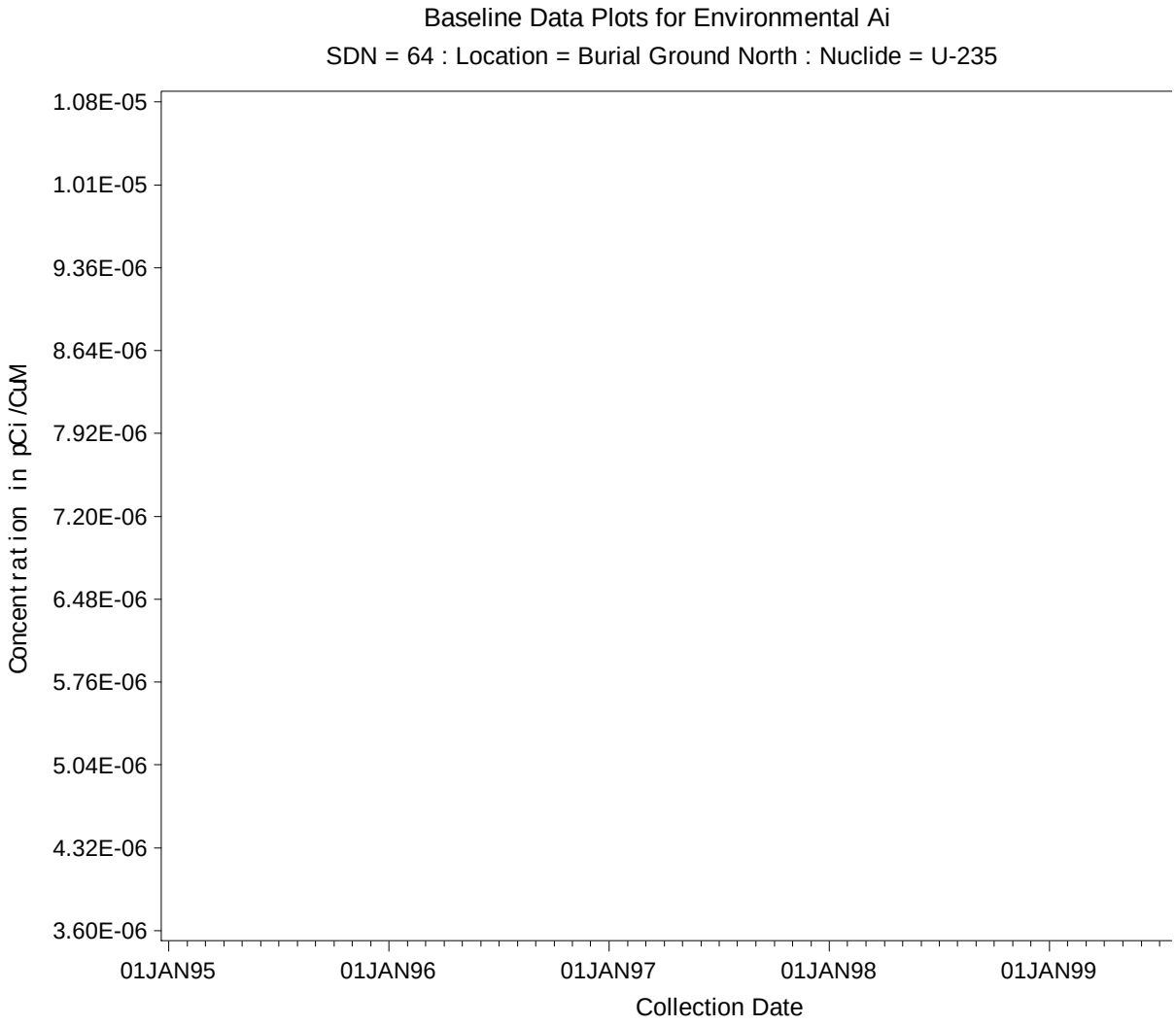


Figure 29
Burial Ground North Filter Paper U-238 (Annual Sample)

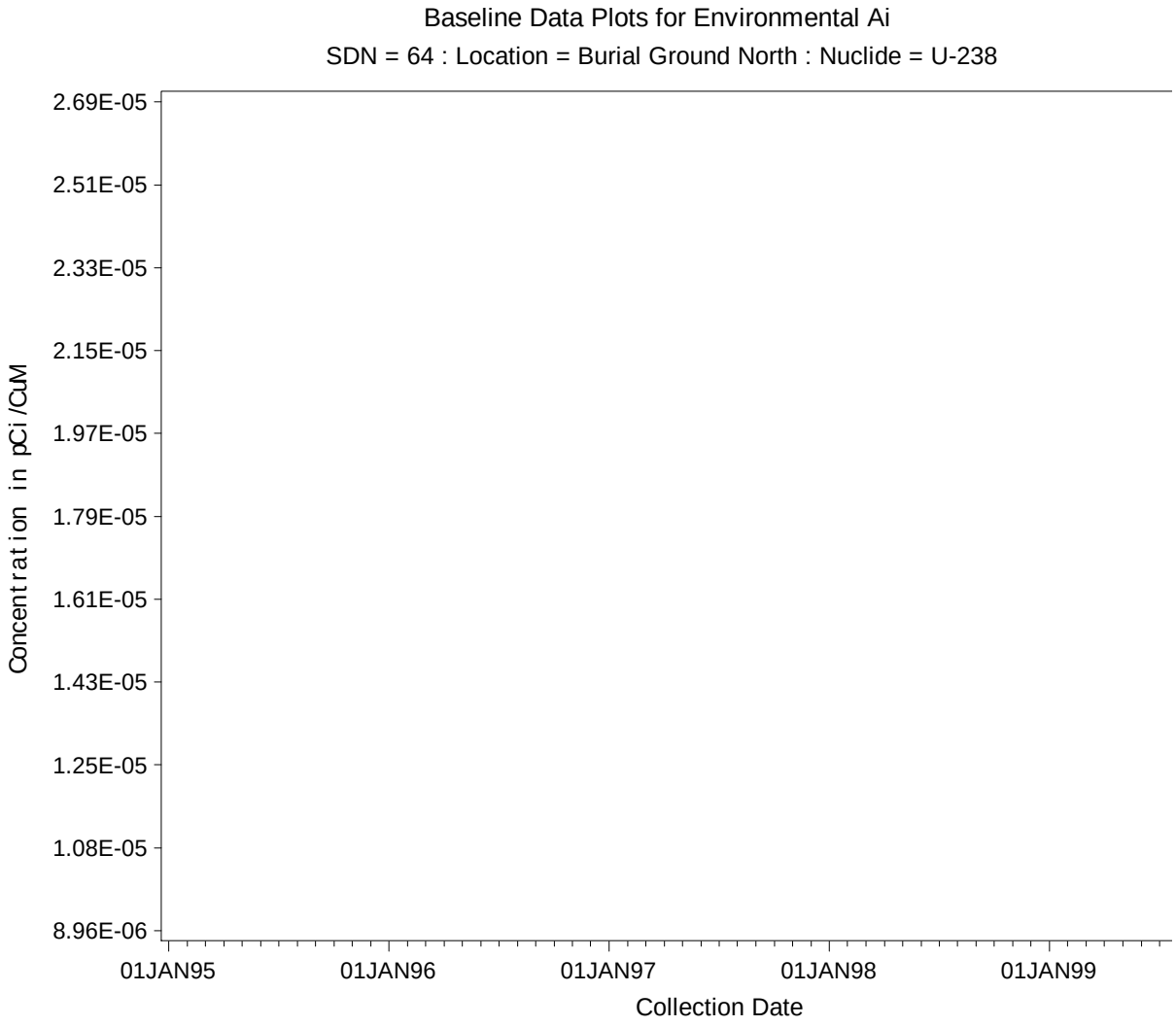


Figure 30
Burial Ground North Filter Paper Pu-238 (Annual Sample)

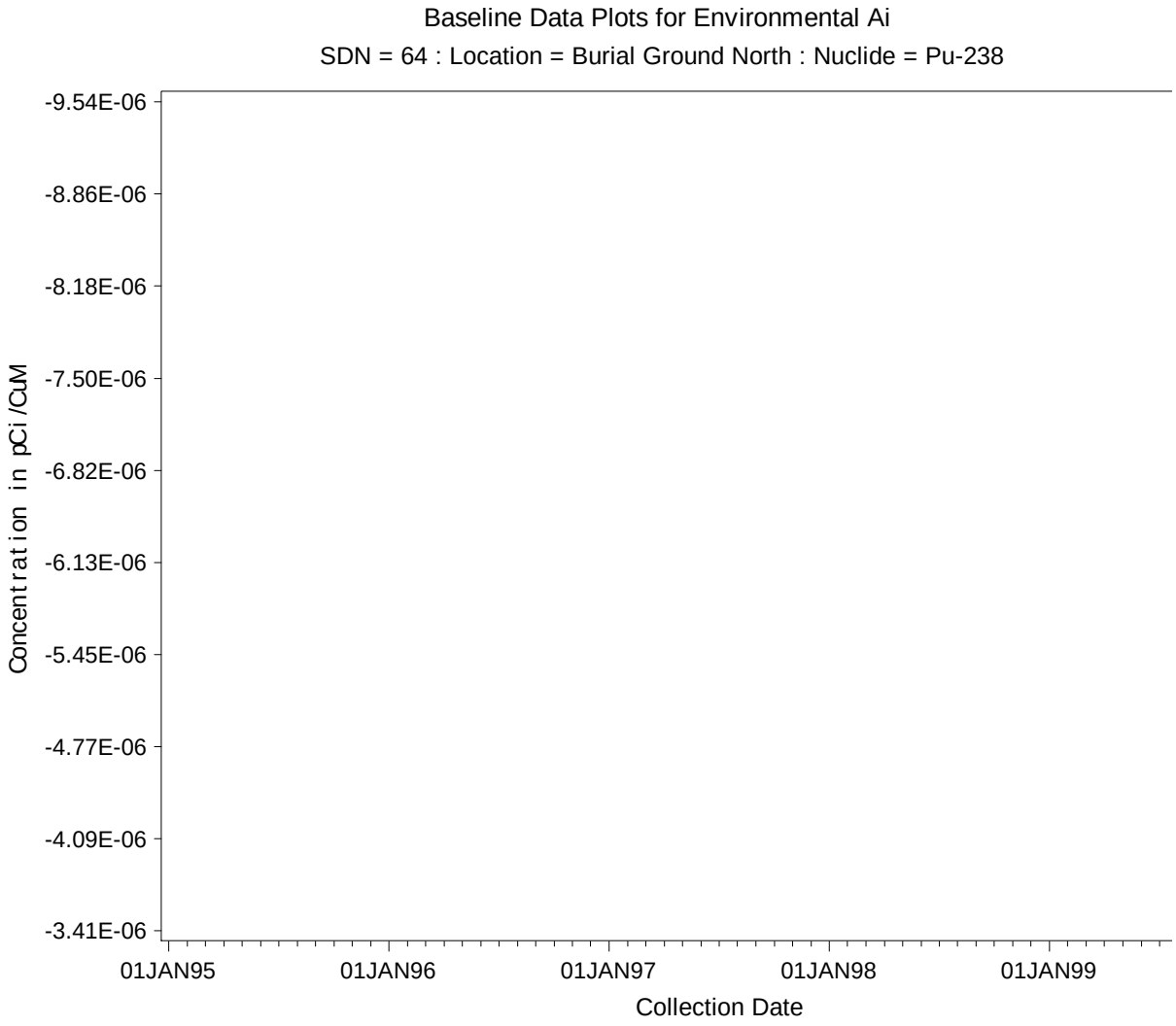


Figure 31
Burial Ground North Filter Paper Pu-239 (Annual Sample)

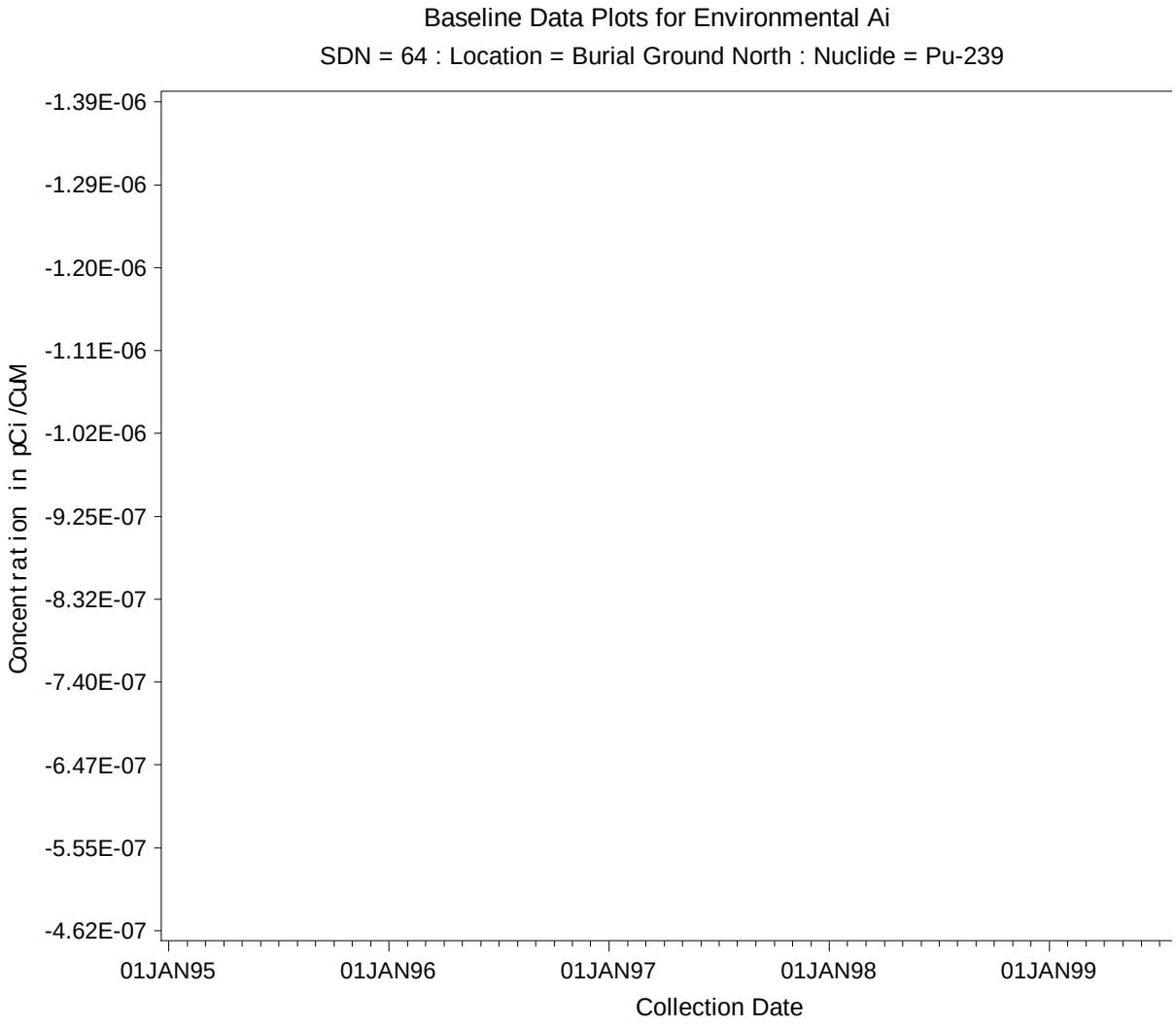


Figure 32
Burial Ground North Filter Paper Am-241 (Annual Sample)

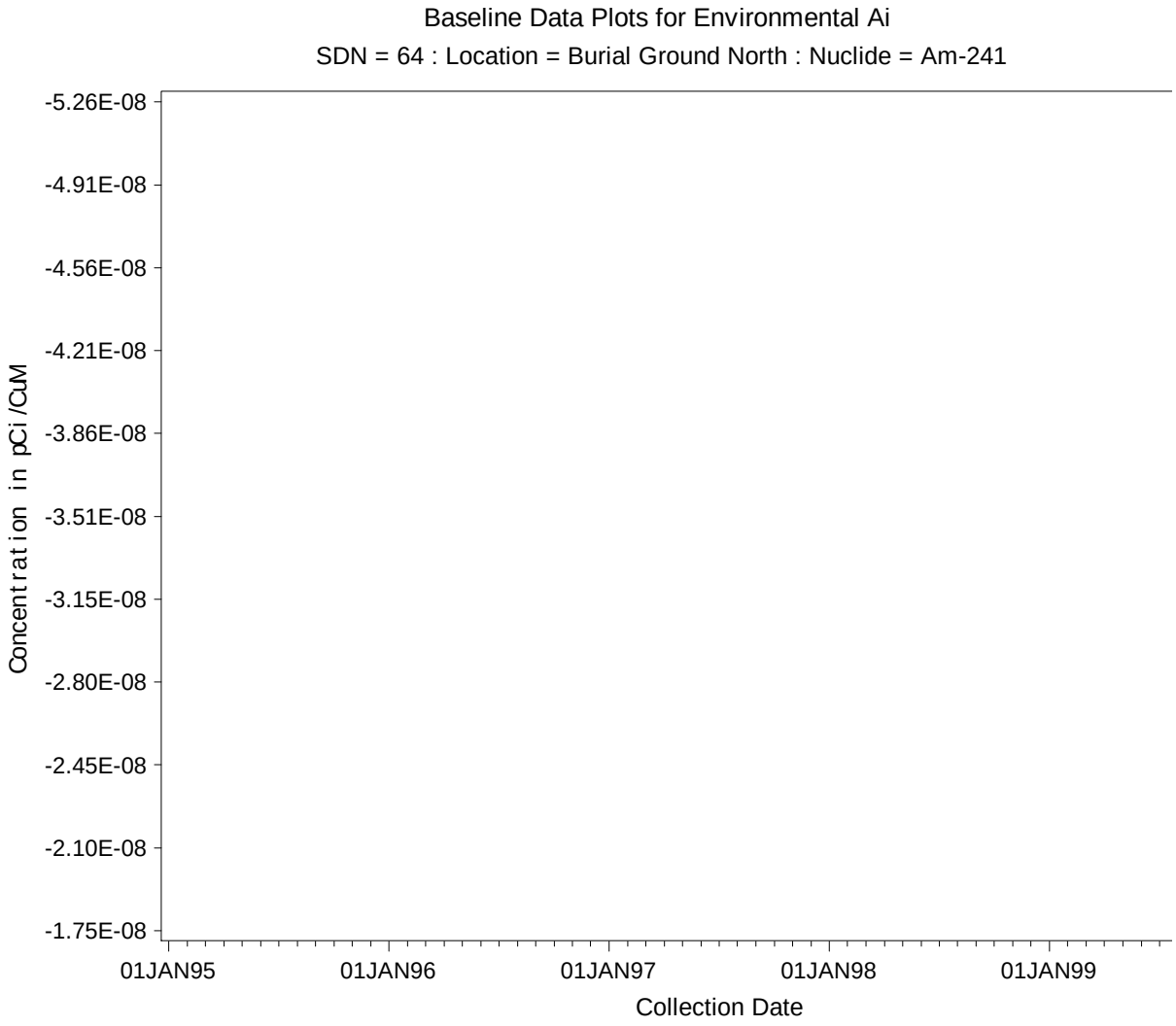


Figure 33
Burial Ground North Filter Paper Cm-244 (Annual Sample)

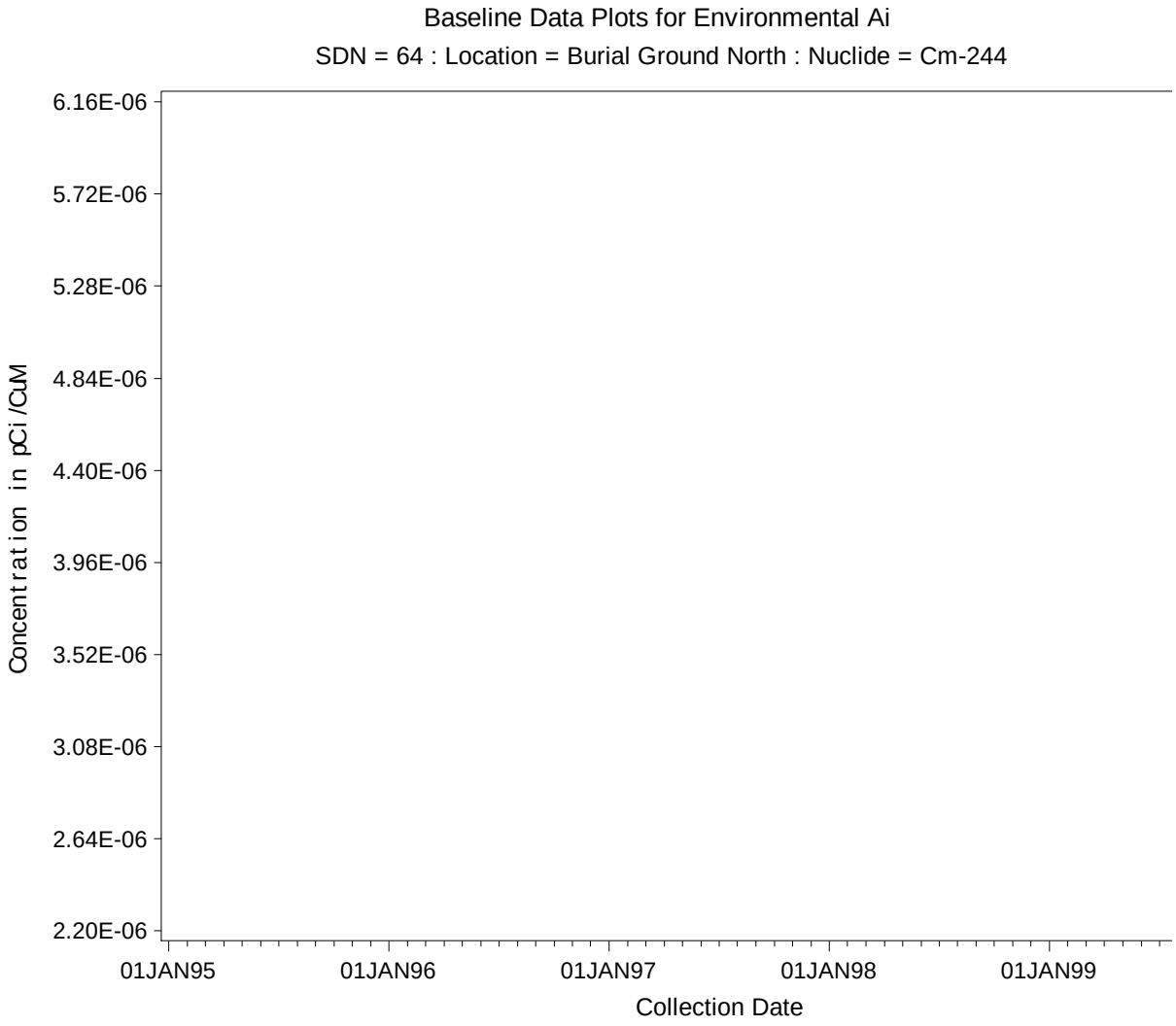


Figure 34
Burial Ground North Filter Paper Sr-89,90 (Annual Sample)

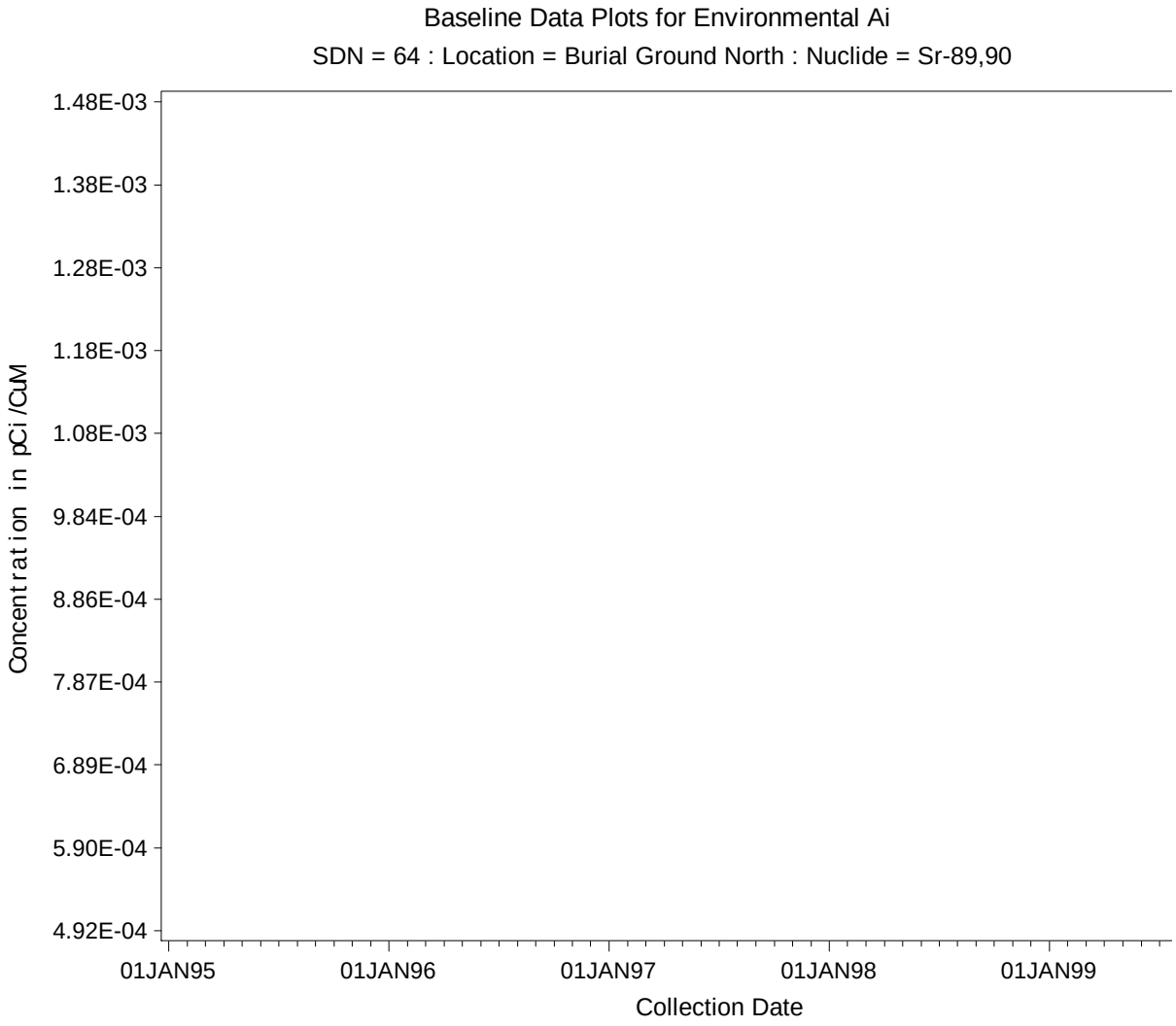


Figure 35
Burial Ground North Filter Paper Gross Beta (Weekly Sample)

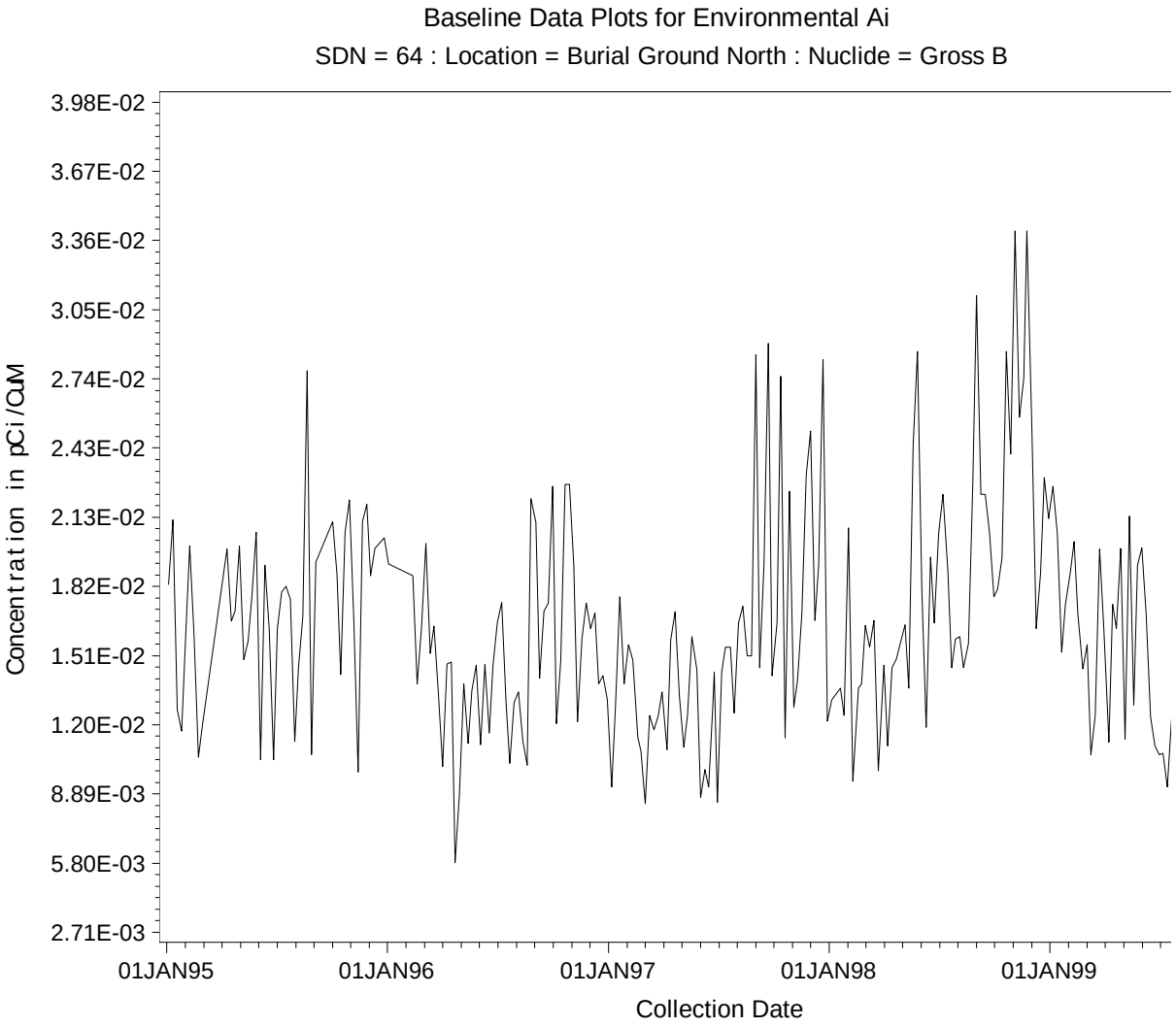


Figure 36
Burial Ground North Filter Paper Gross Alpha (Weekly Sample)

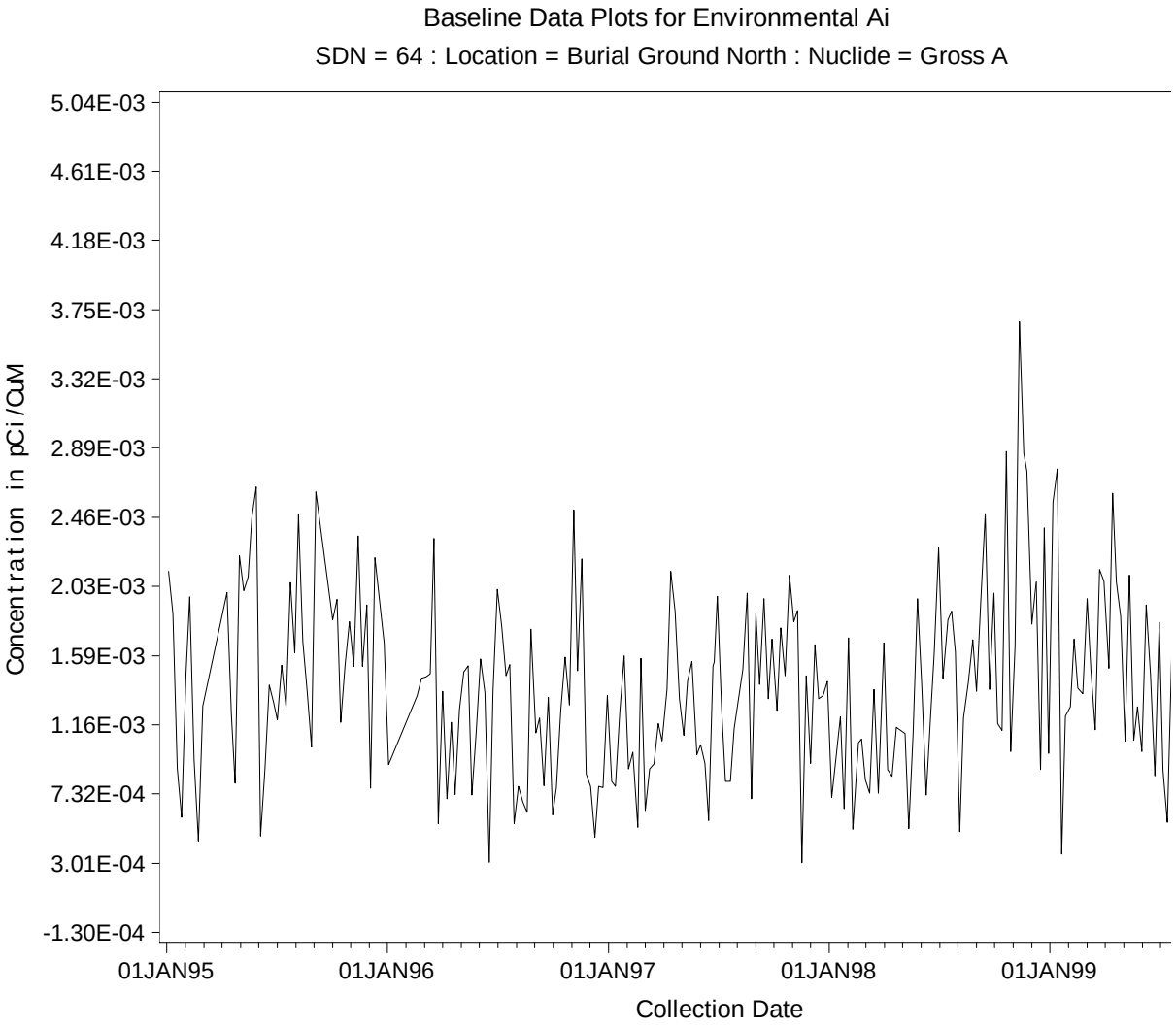


Figure 37
Burial Ground North Filter Paper Co-60 (Monthly Composite)

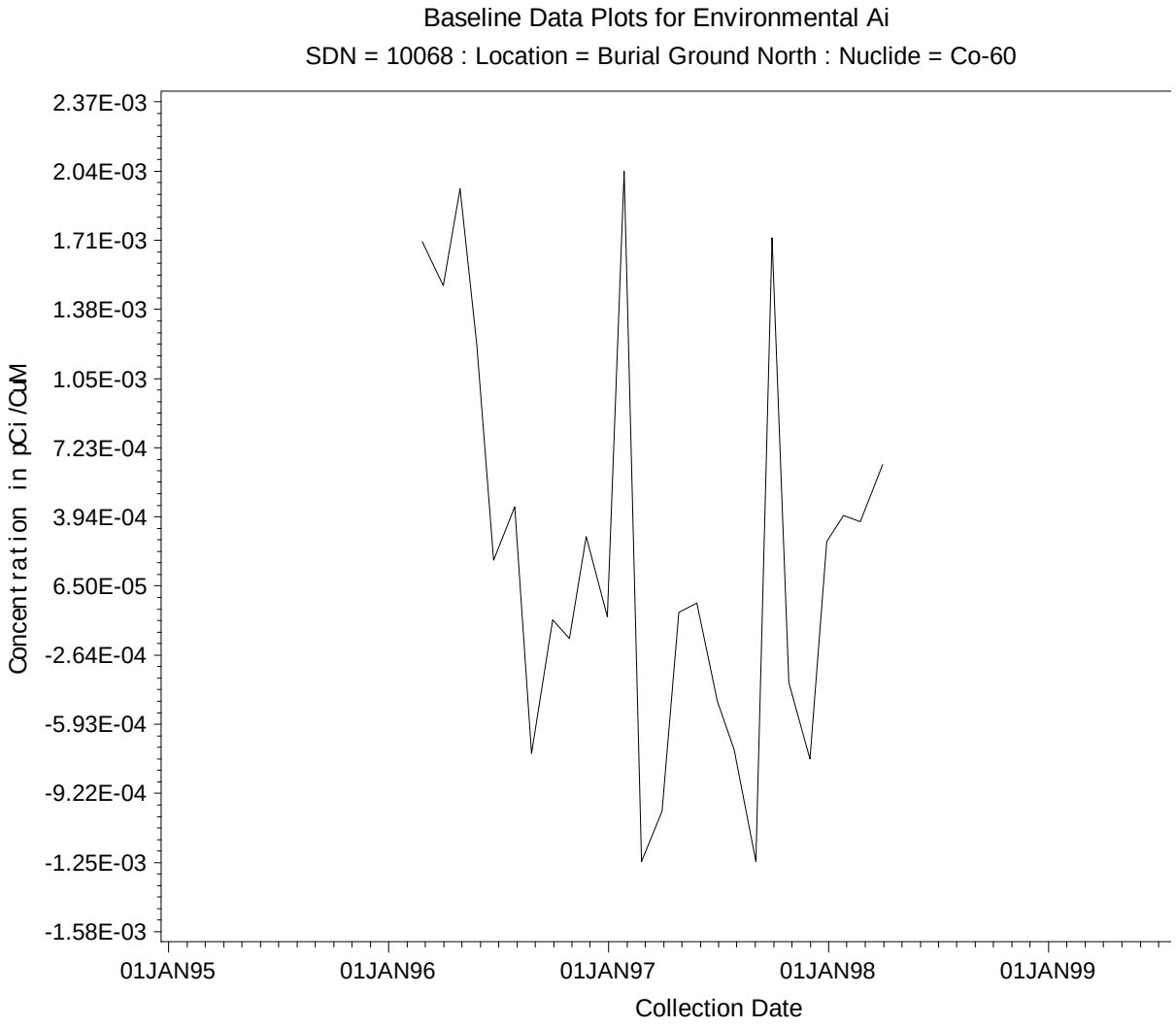


Figure 38
Burial Ground North Filter Paper Cs-137 (Monthly Composite)

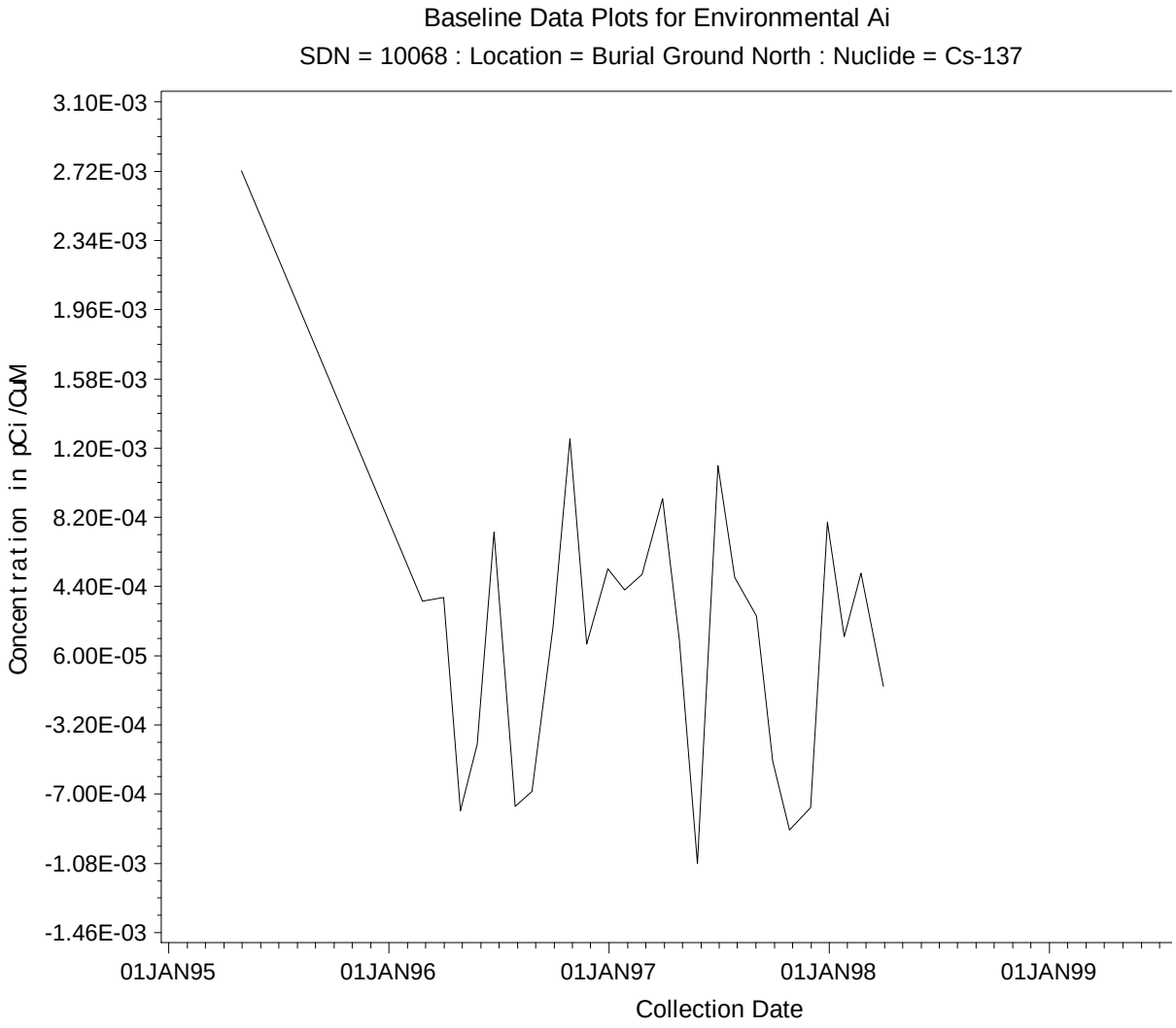


Figure 39
Burial Ground North Filter Paper Pu-238 (Monthly Composite)

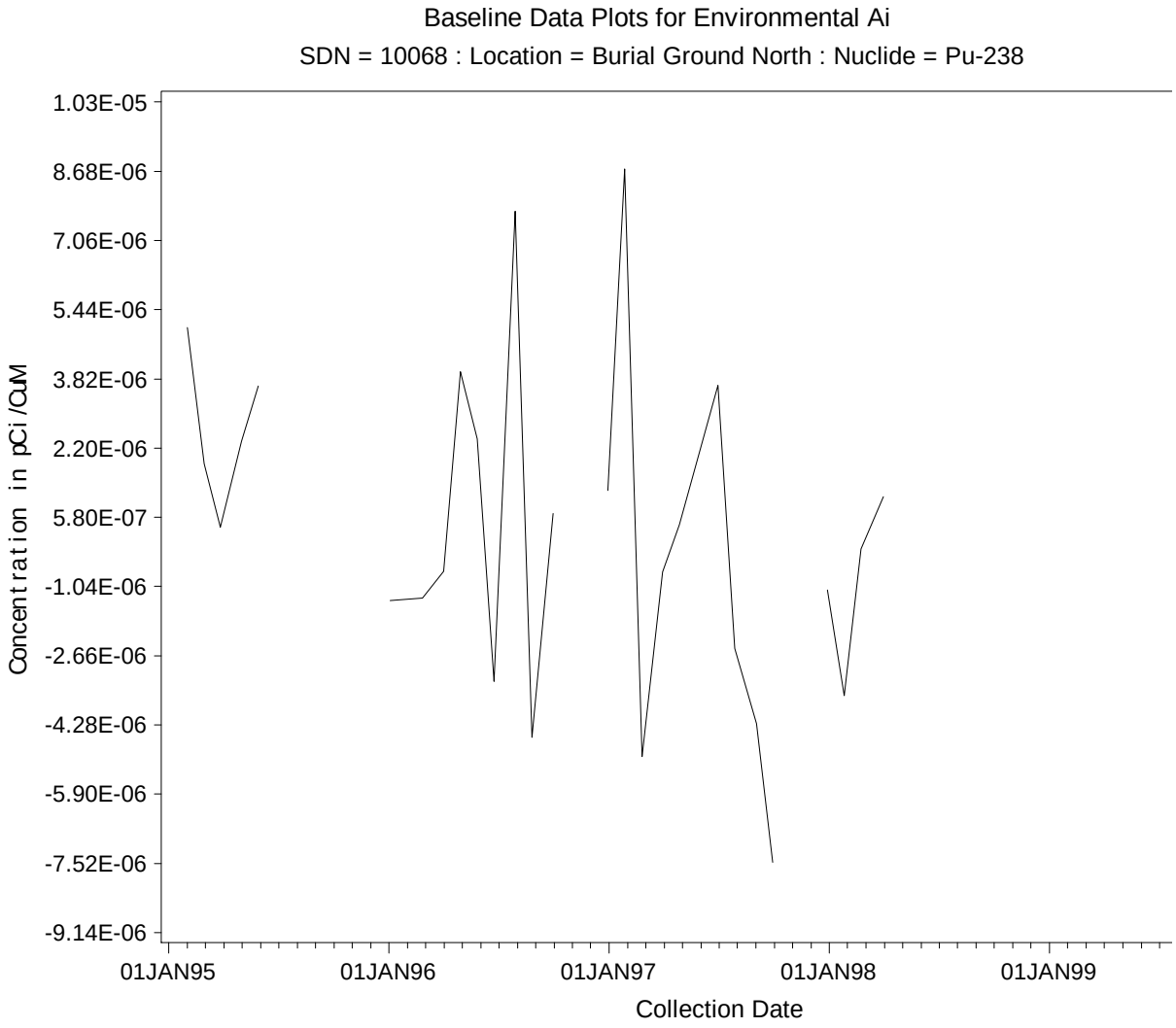


Figure 40
Burial Ground North Filter Paper Pu-239 (Monthly Composite)

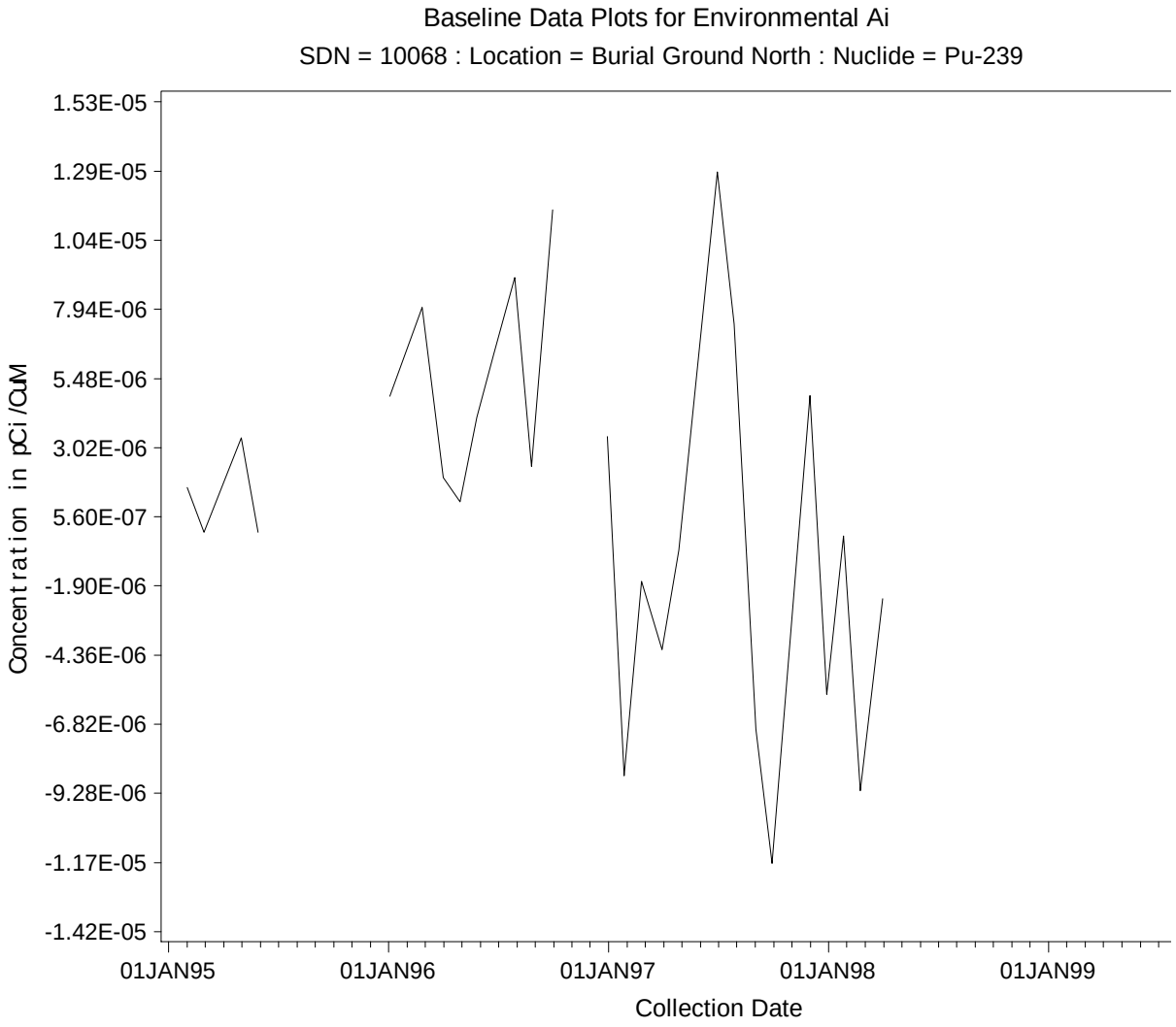


Figure 41
Burial Ground North Filter Paper Sr-89,90 (Monthly Composite)

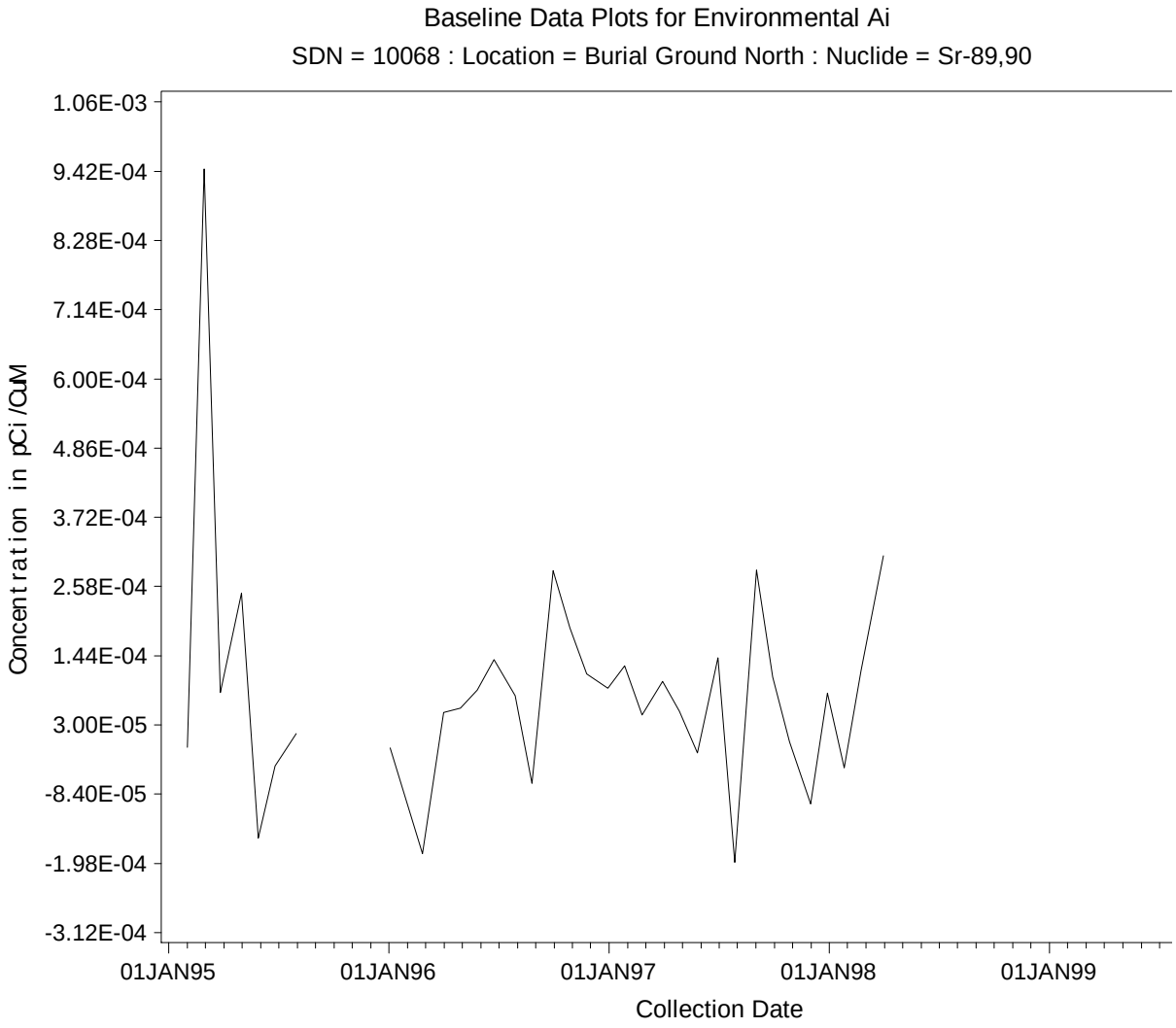


Figure 42
Burial Ground North Charcoal Canister Co-60 (Weekly Sample)

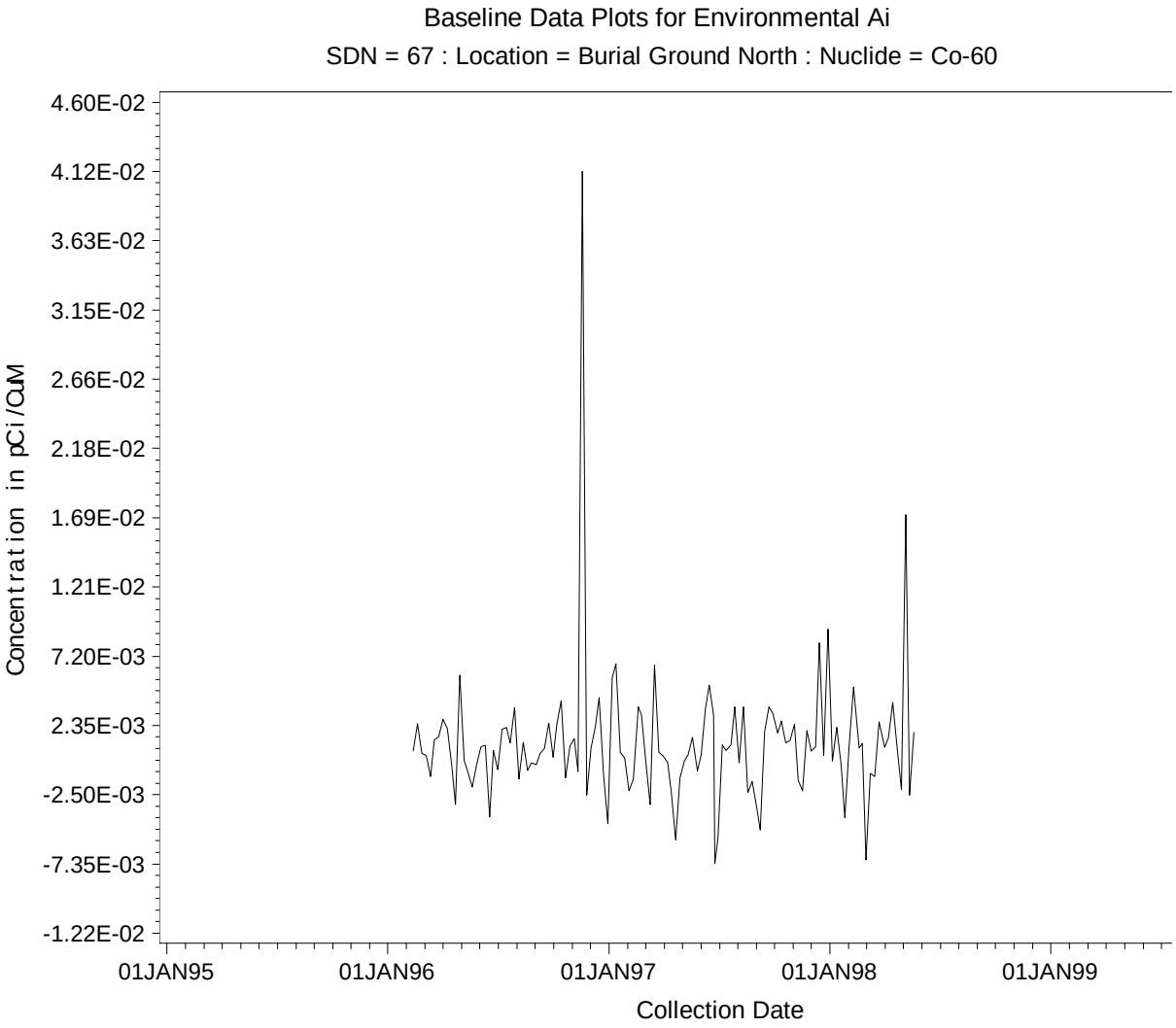


Figure 43
Burial Ground North Charcoal Canister Co-137 (Weekly Sample)

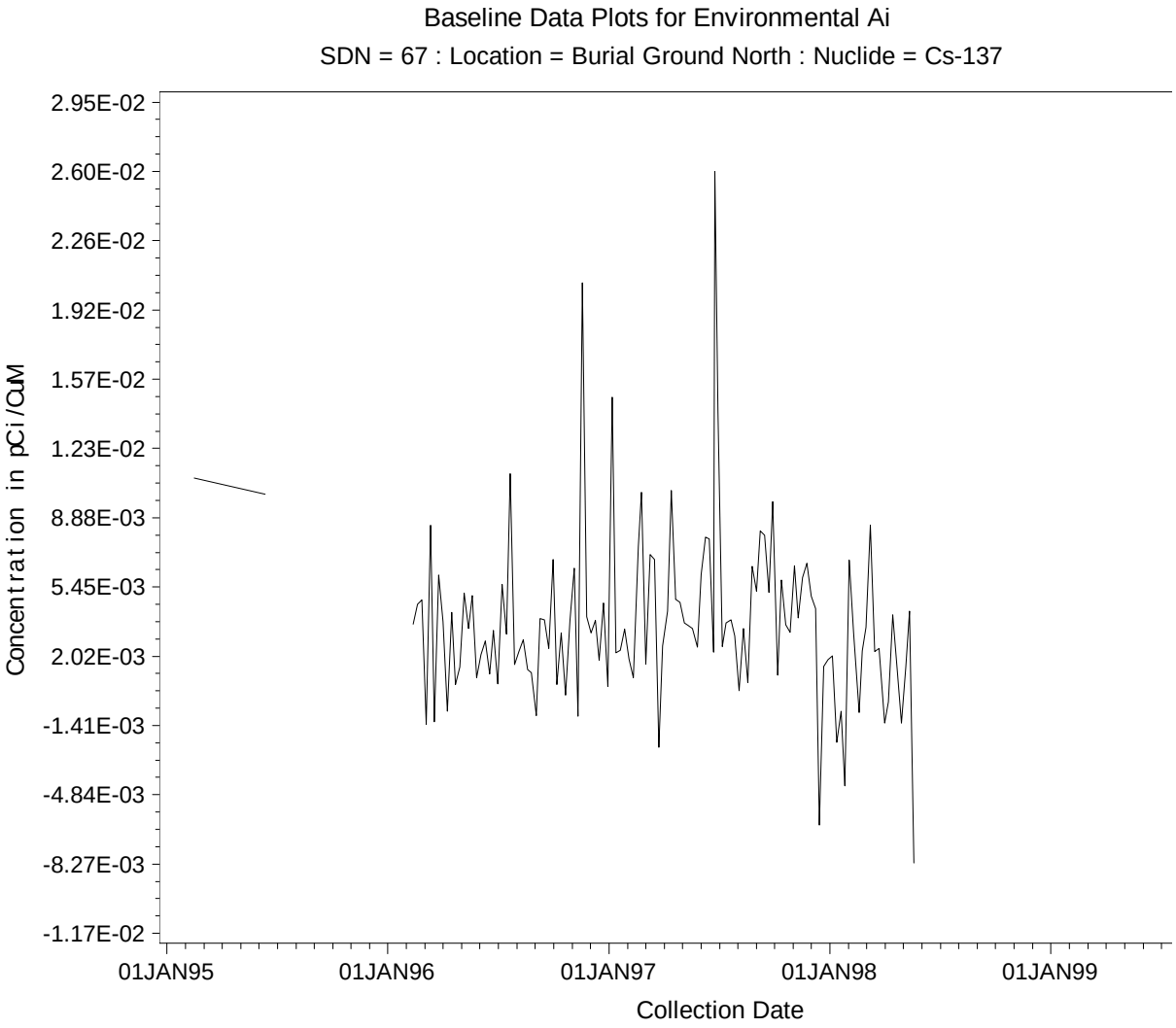


Figure 44
Burial Ground North Silica Gel H-3 (Biweekly Sample)

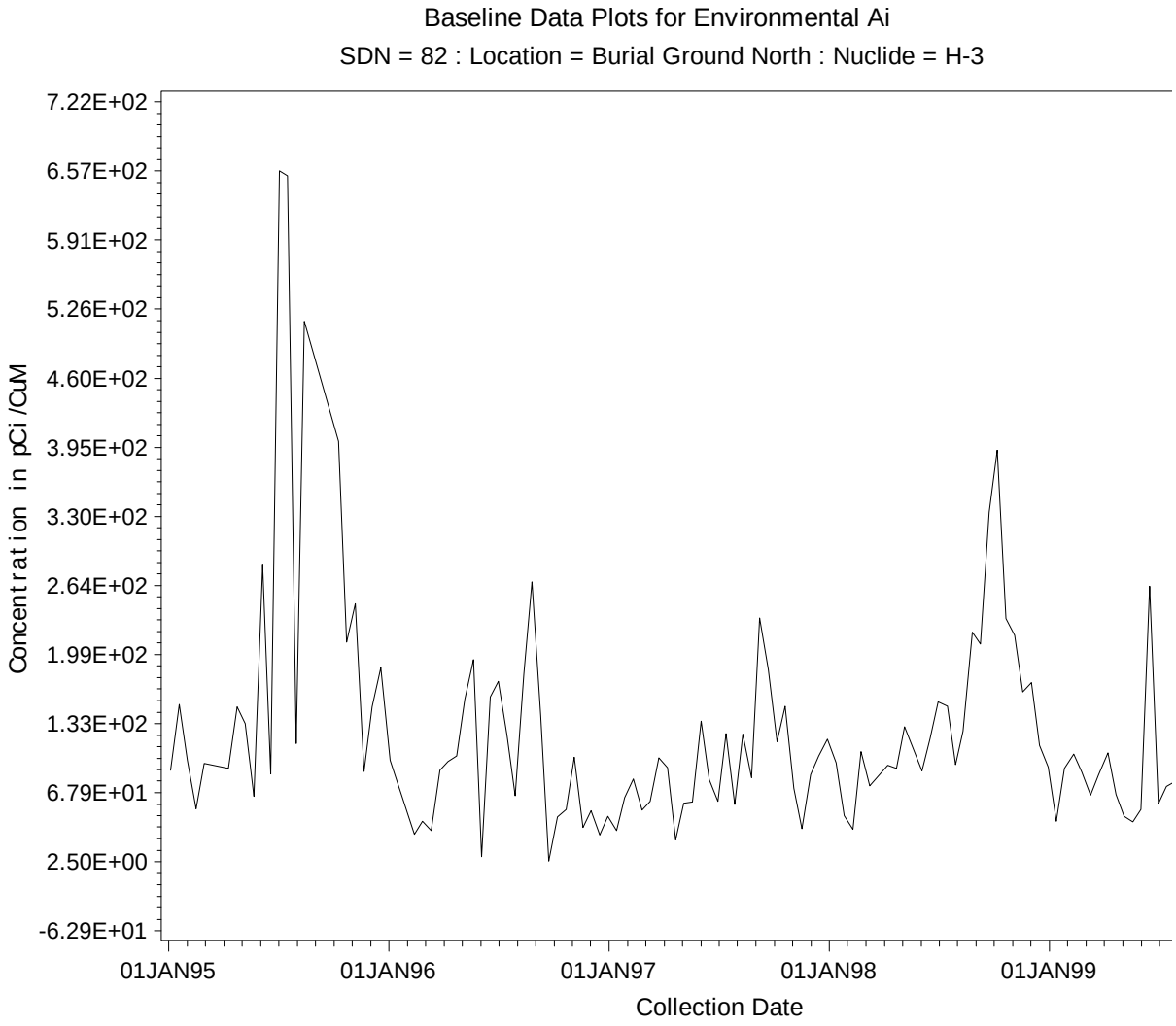


Figure 45
Burial Ground North Rain Water H-3 (Biweekly Sample)

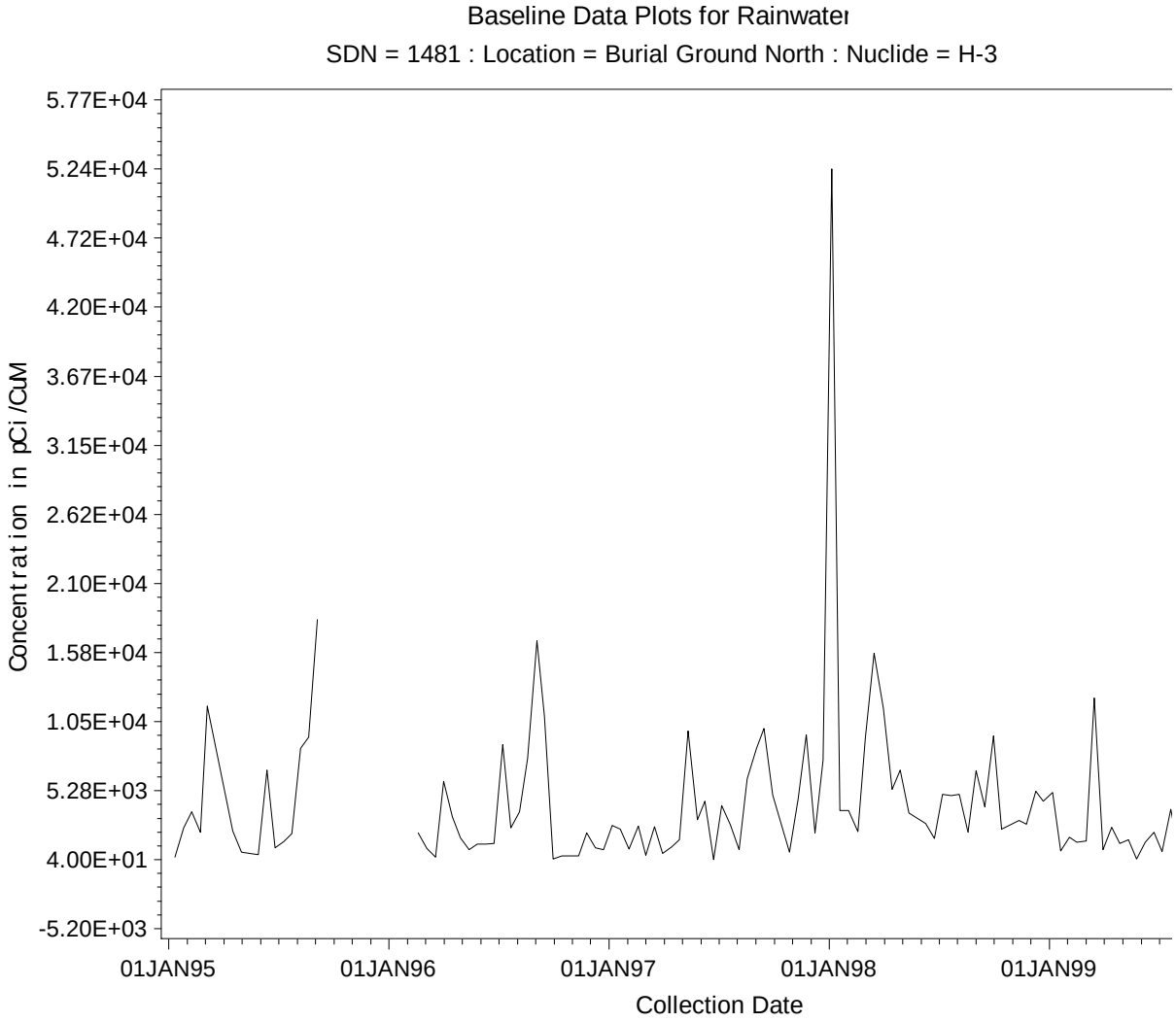


Figure 46
U.S. Highway 301 Filter Paper Co-60 (Weekly Sample)

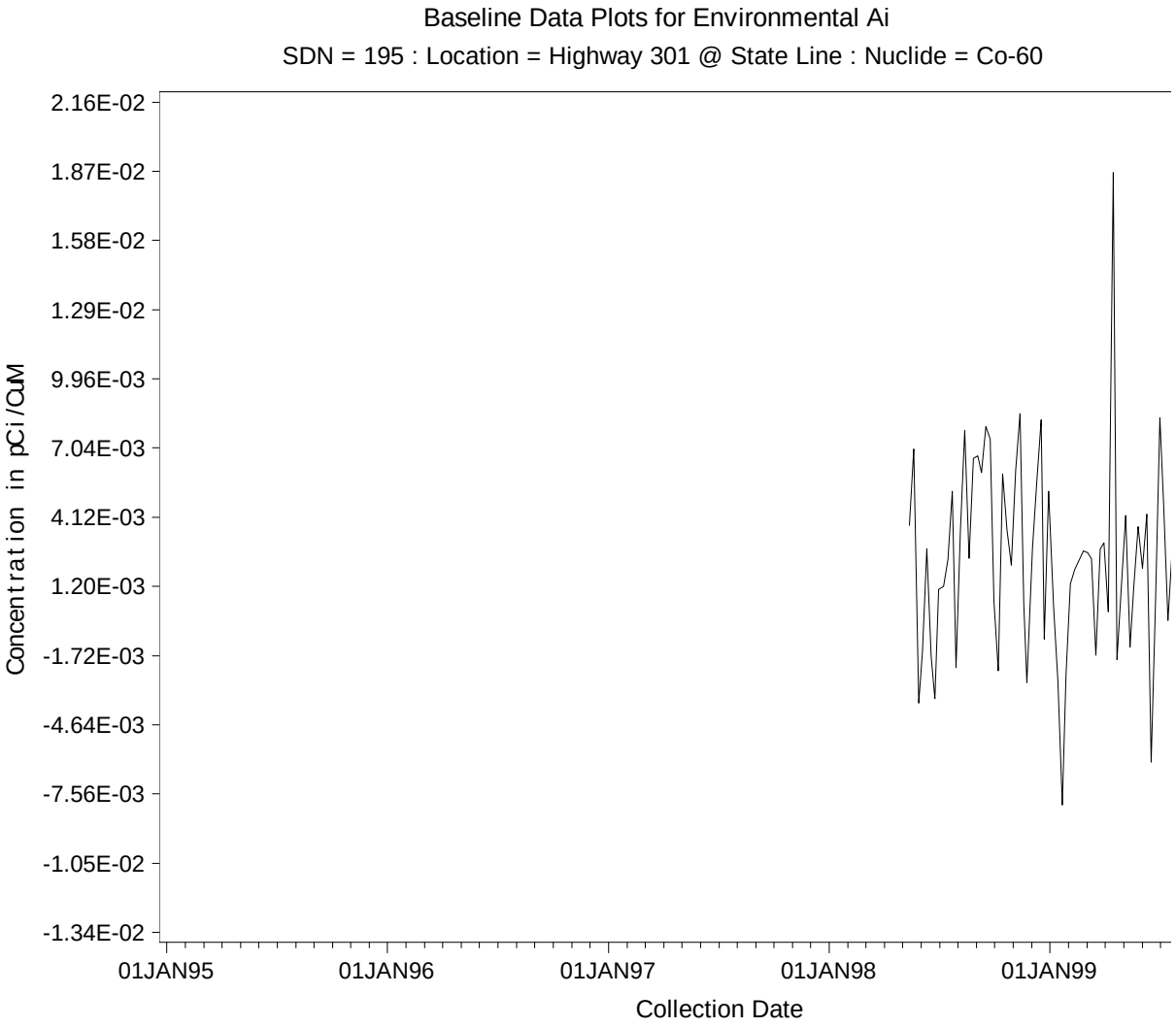


Figure 47
U.S. Highway 301 Filter Paper Co-137 (Weekly Sample)

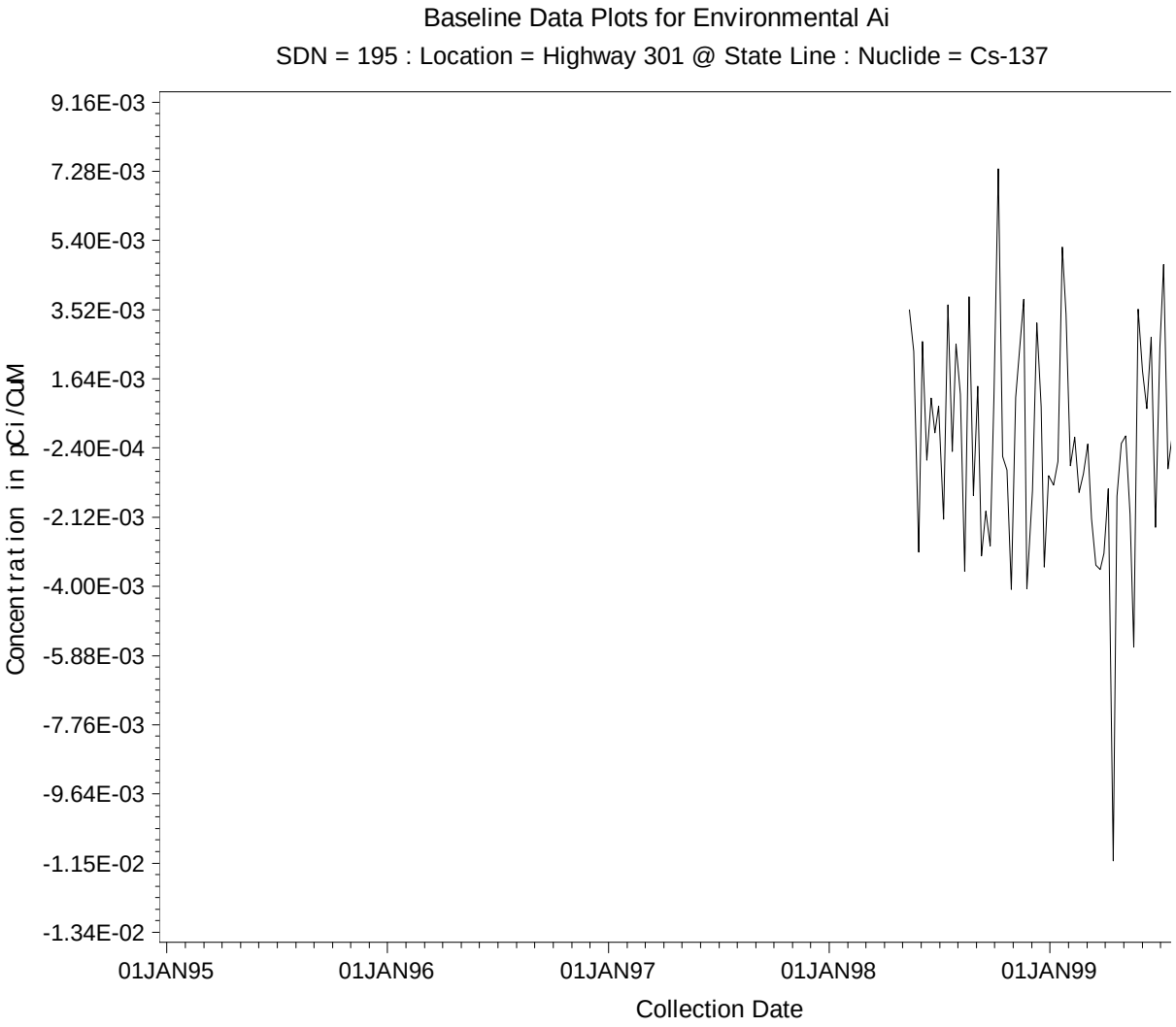


Figure 48
U.S. Highway 301 Filter Paper U-234 (Annual Sample)

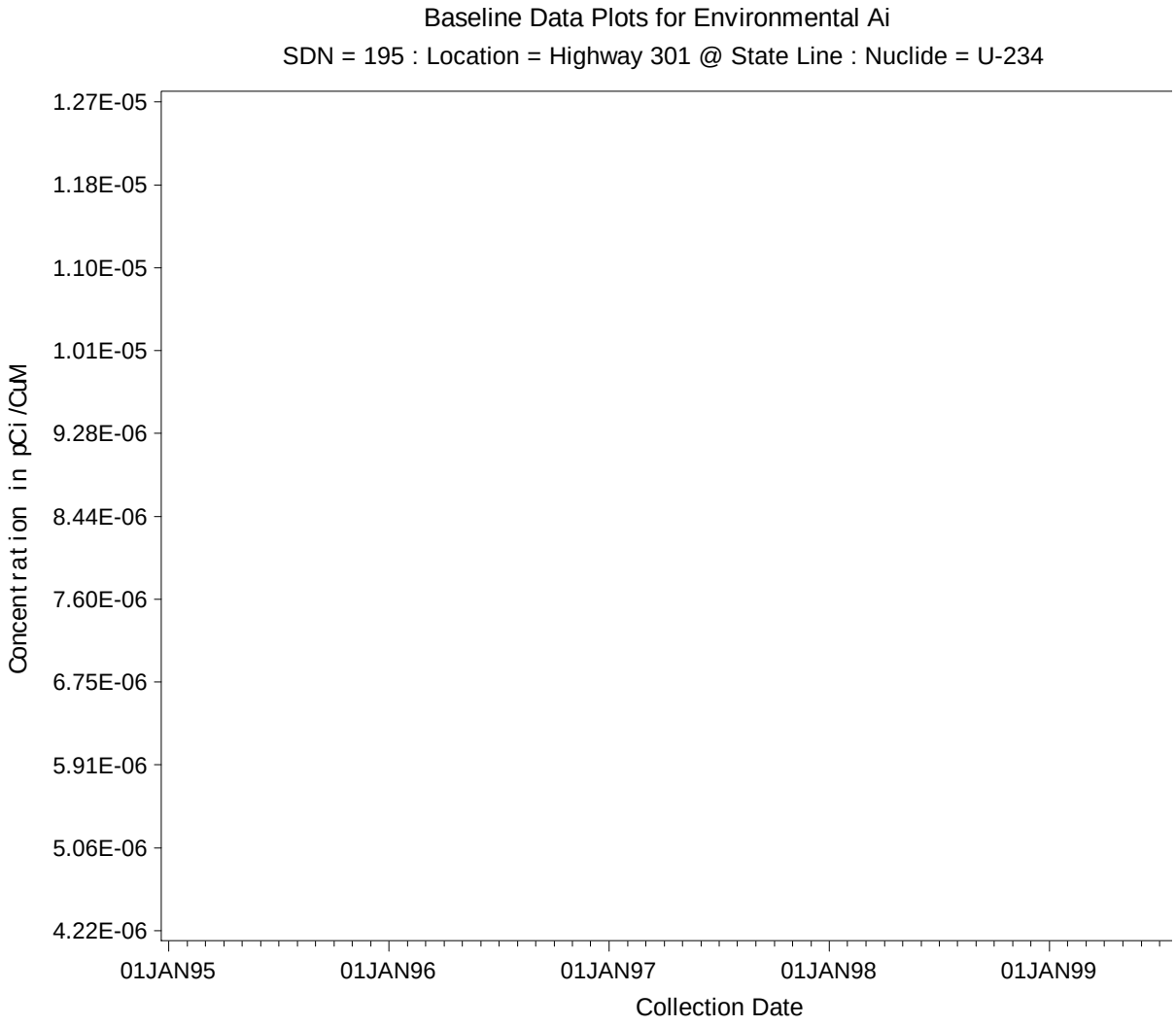


Figure 49
U.S. Highway 301 Filter Paper U-235 (Annual Sample)

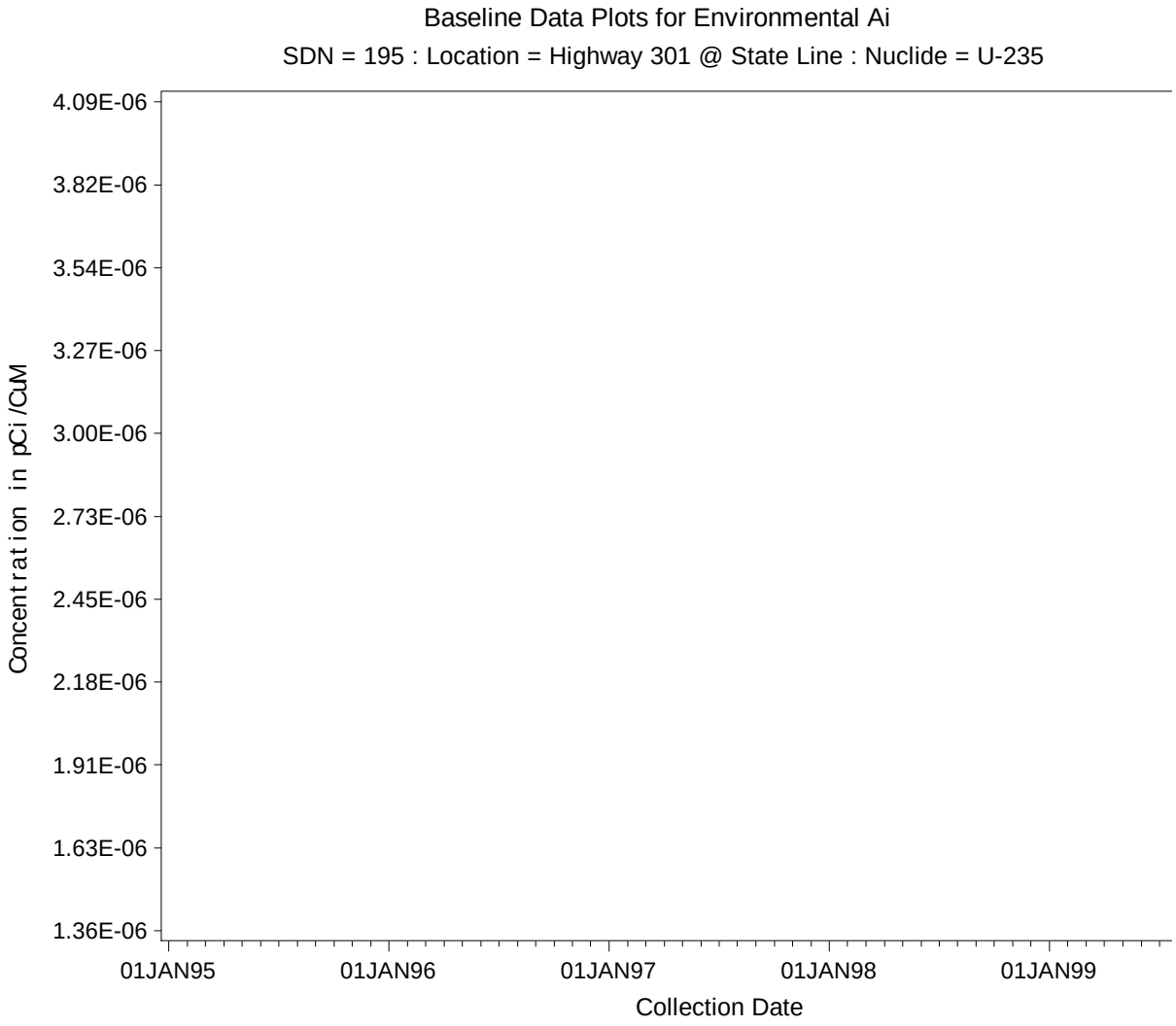


Figure 50
U.S. Highway 301 Filter Paper U-238 (Annual Sample)

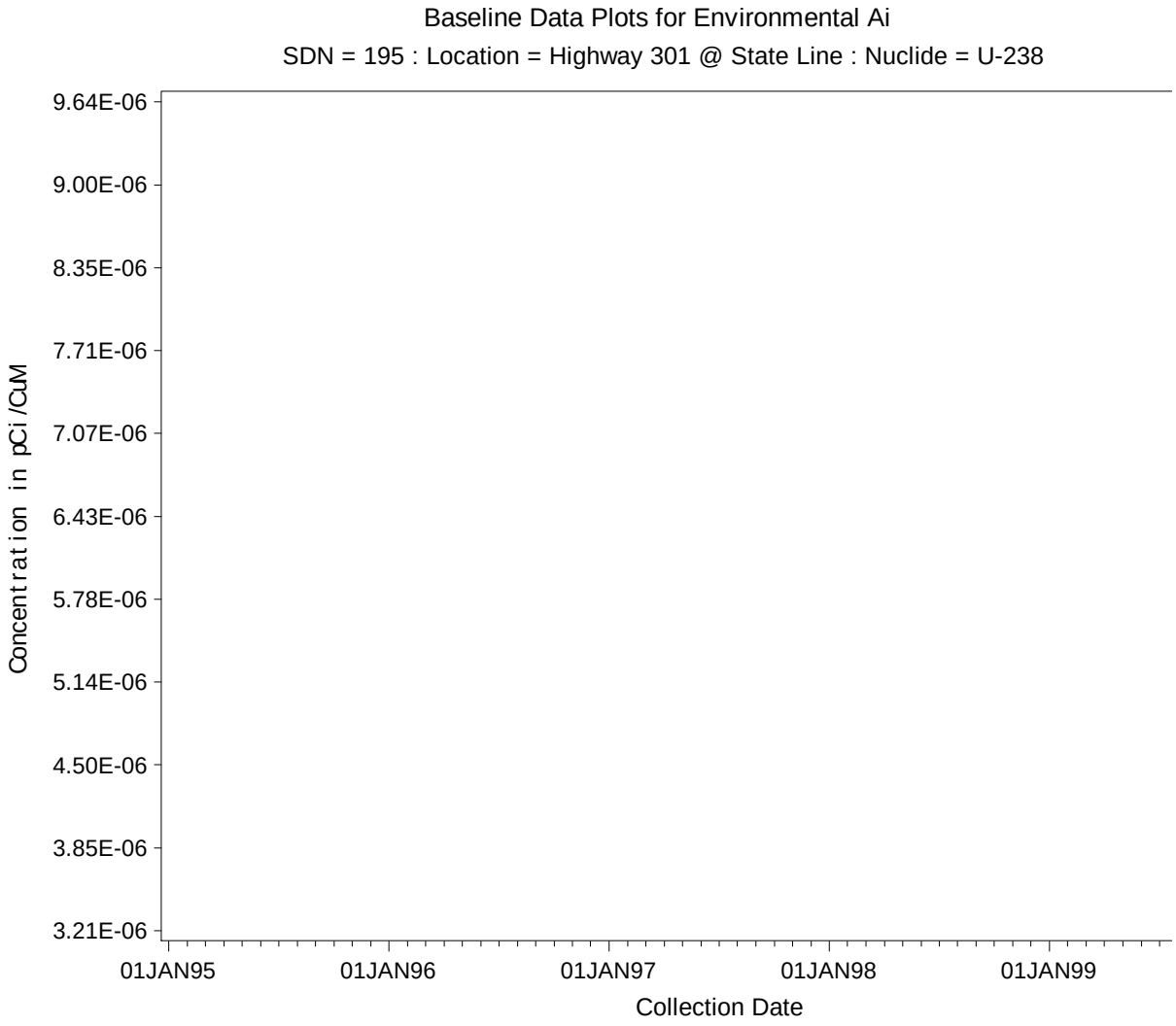


Figure 51
U.S. Highway 301 Filter Paper Pu-238 (Annual Sample)

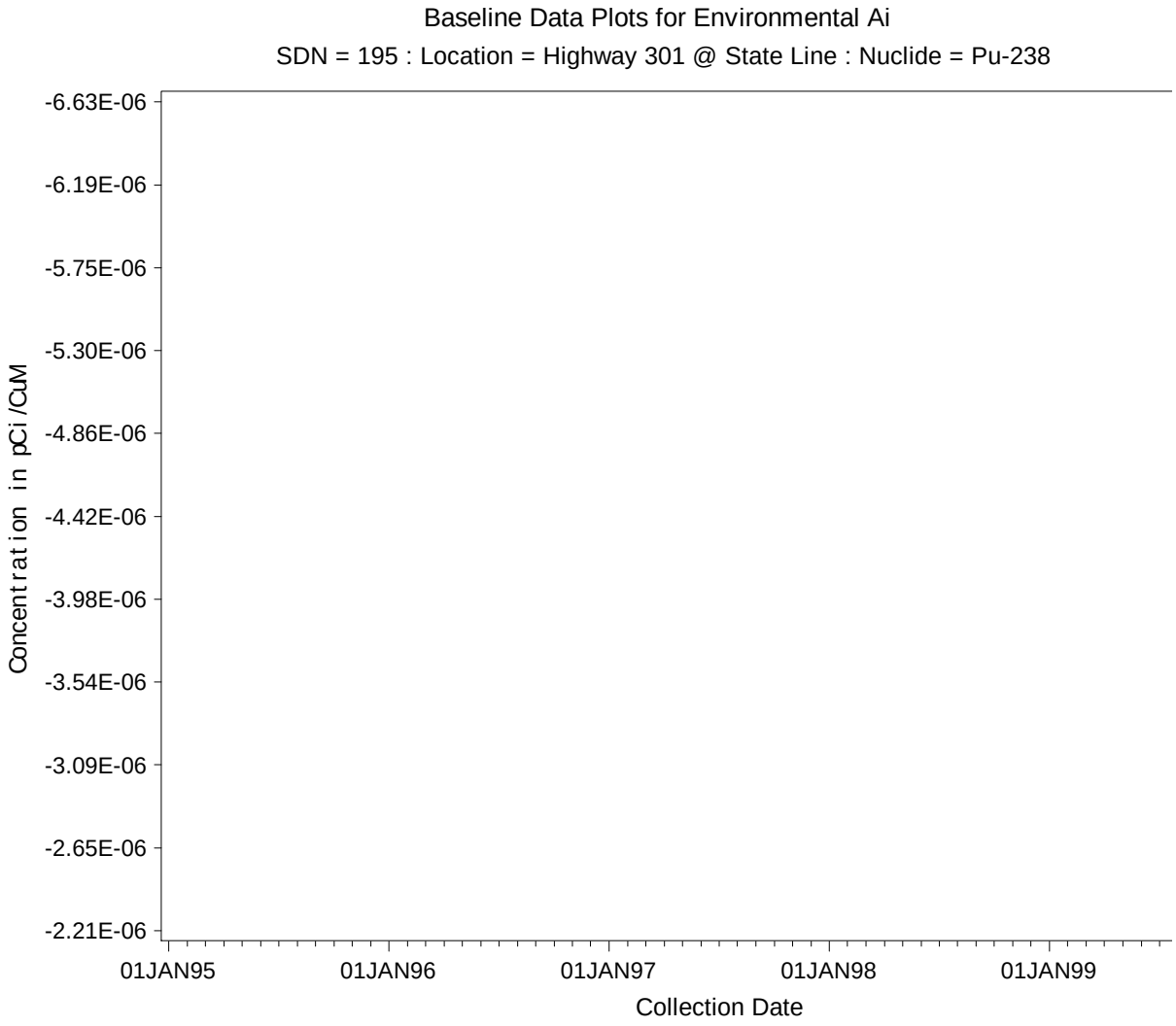


Figure 52
U.S. Highway 301 Filter Paper Pu-239 (Annual Sample)

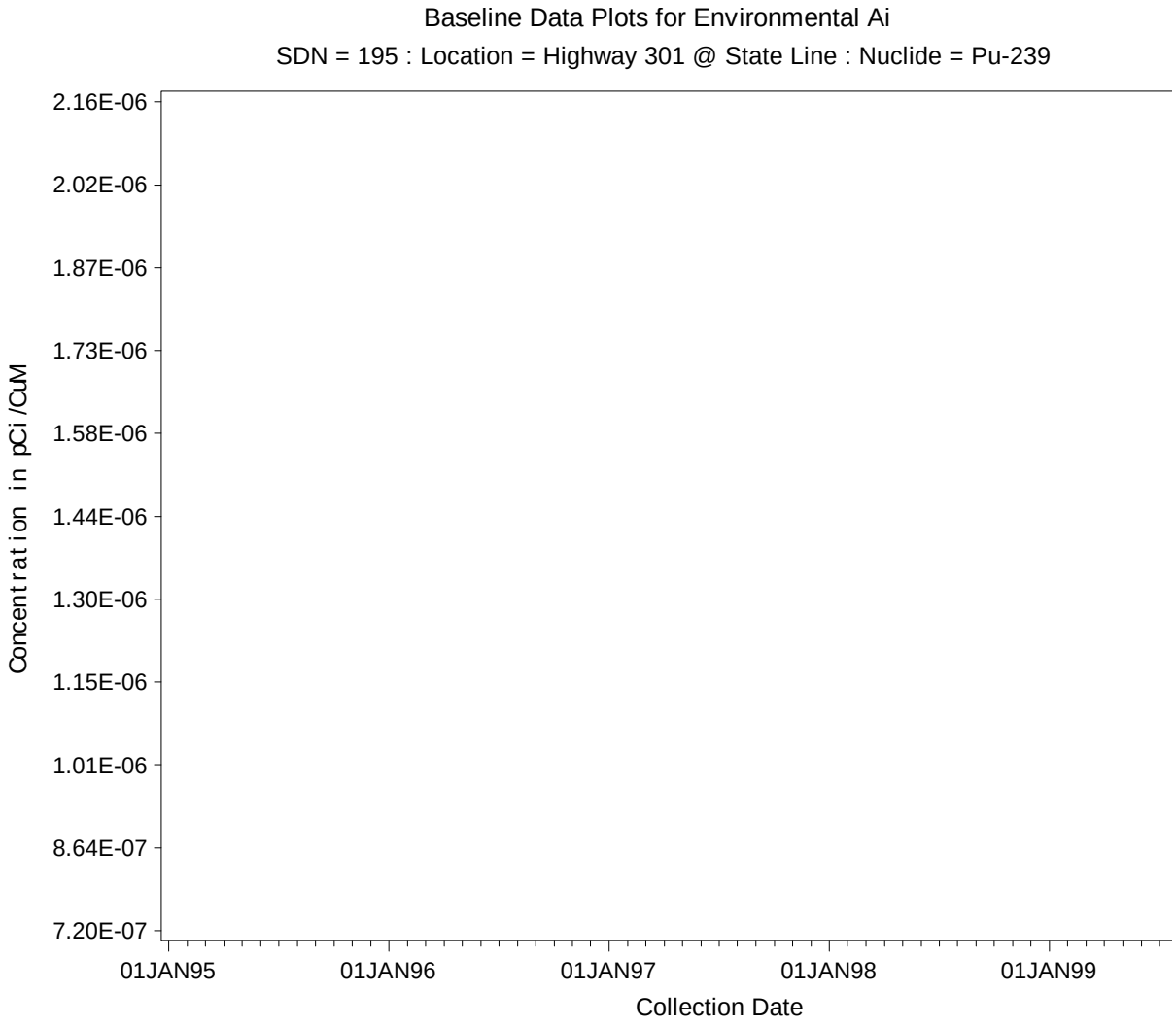


Figure 53
U.S. Highway 301 Filter Paper Am-241 (Annual Sample)

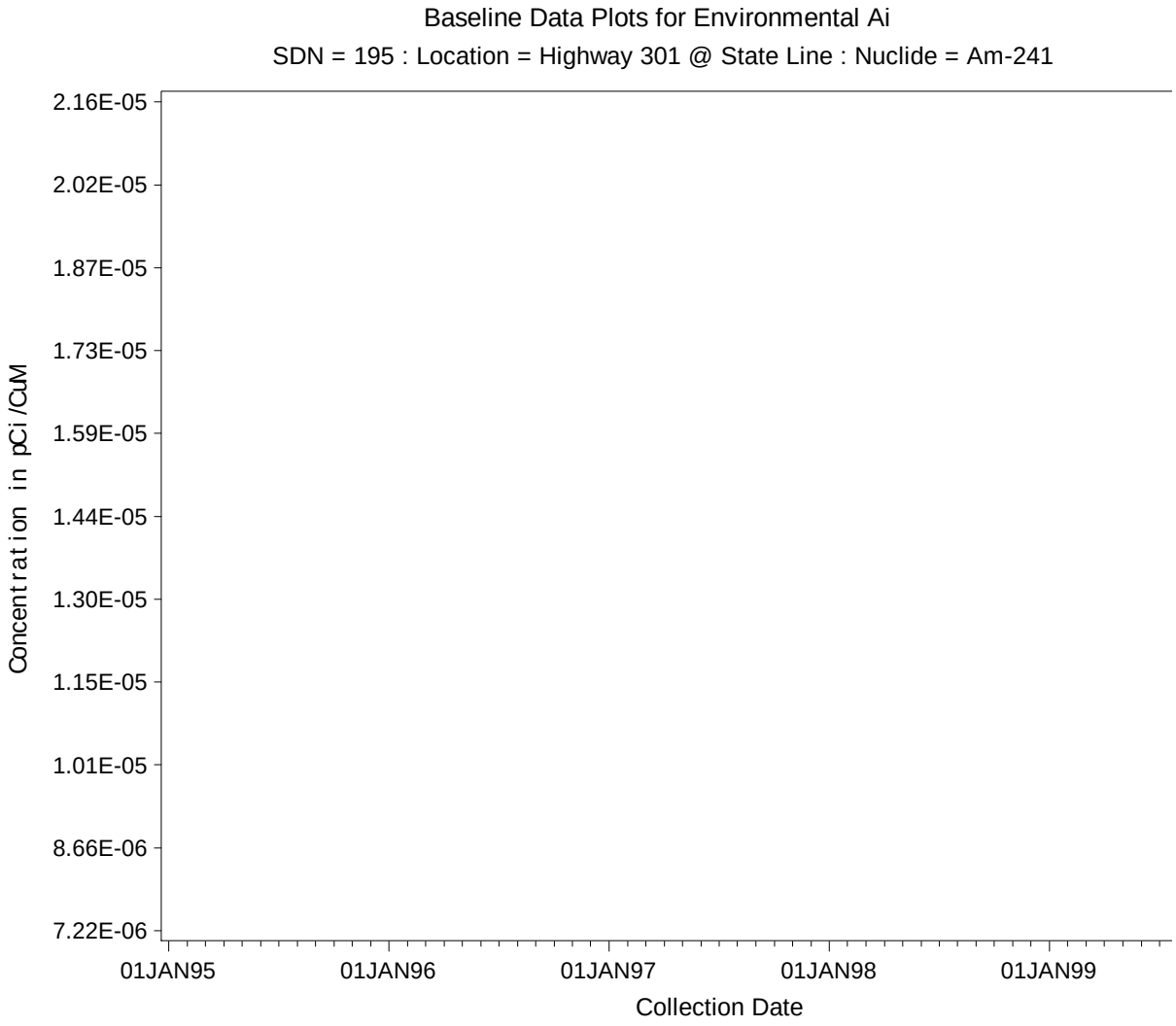


Figure 54
U.S. Highway 301 Filter Paper Cm-244 (Annual Sample)

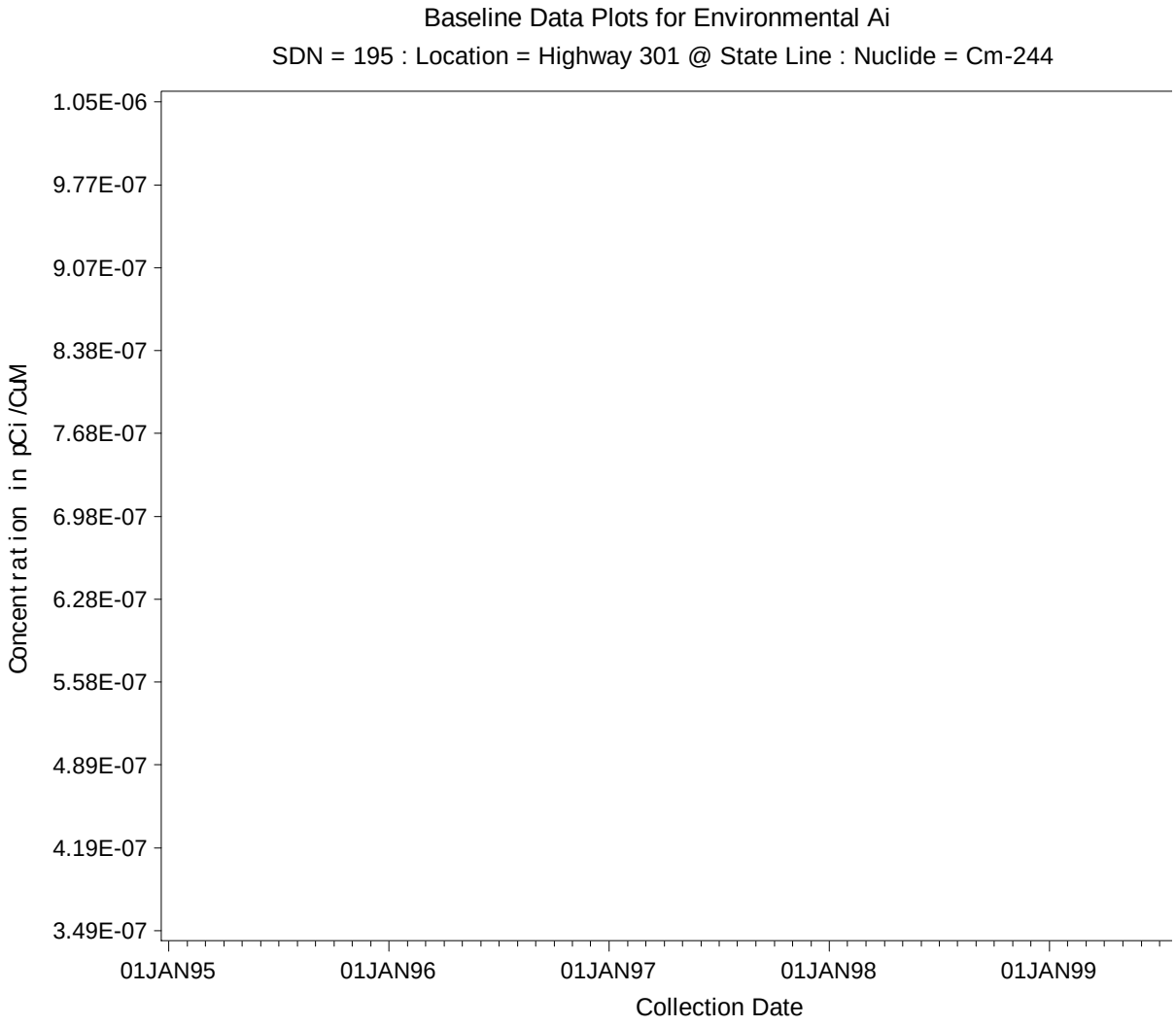


Figure 55
U.S. Highway 301 Filter Paper Sr-89,90 (Annual Sample)

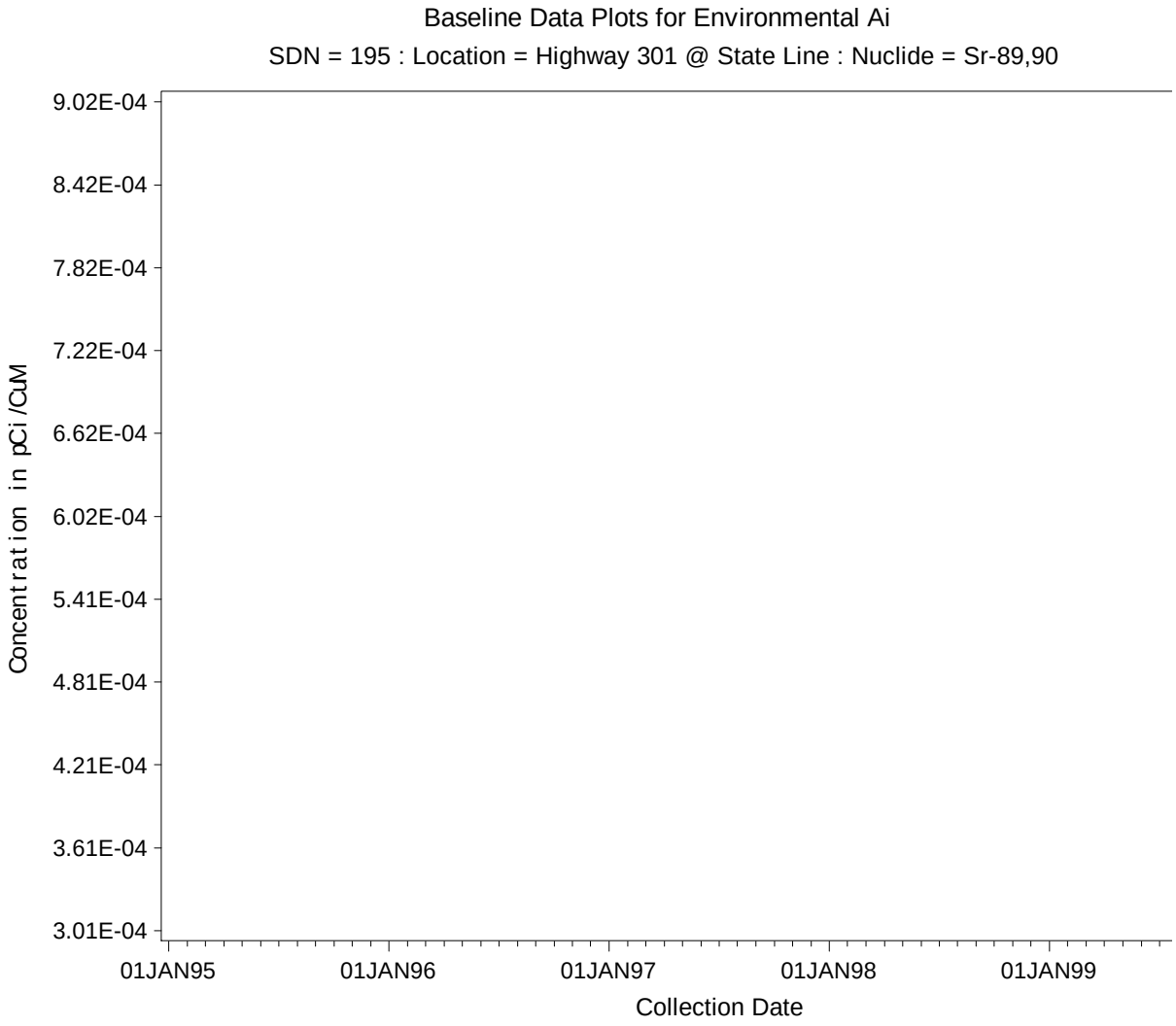


Figure 56
U.S. Highway 301 Filter Paper Gross Beta (Weekly Sample)

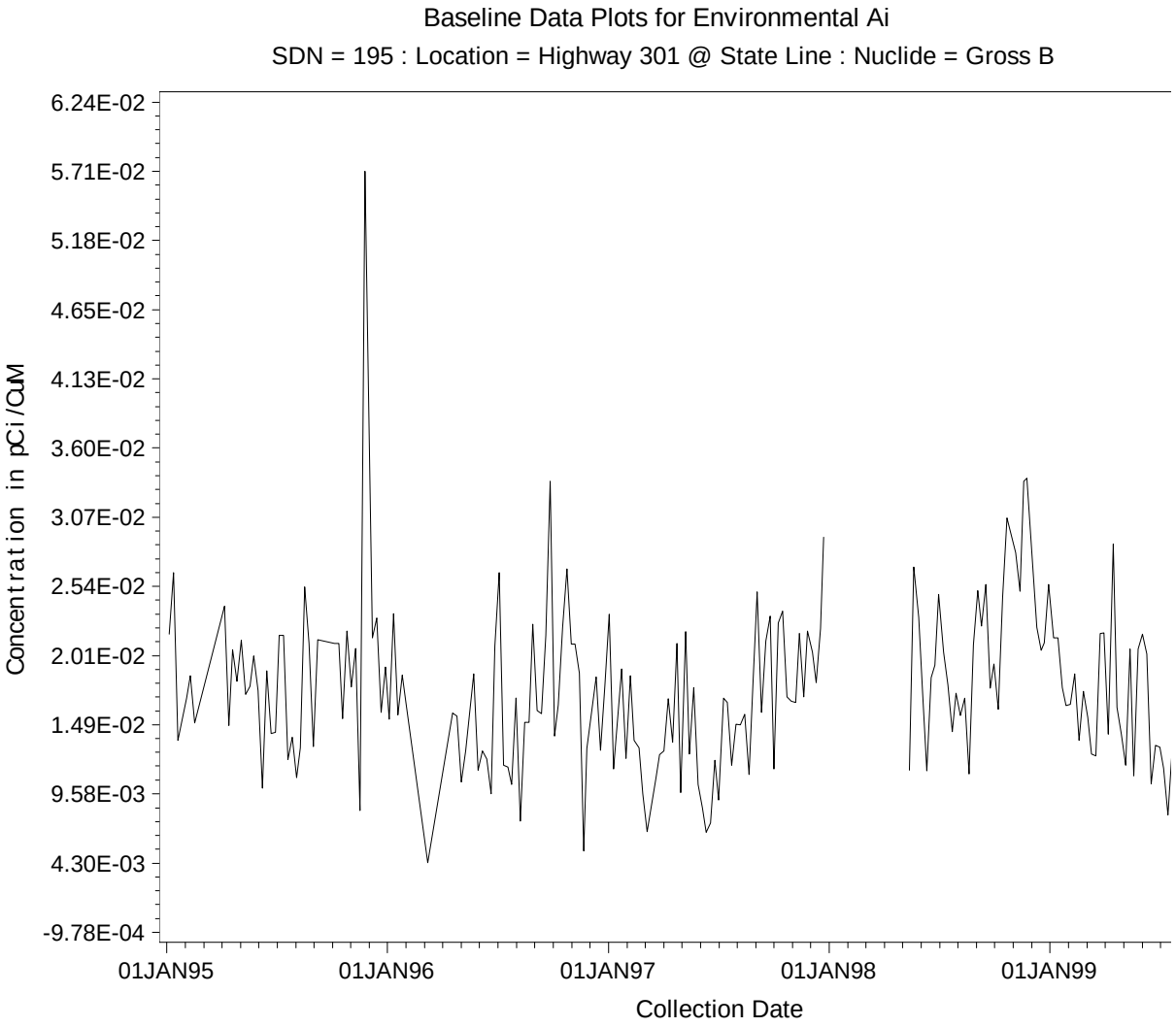


Figure 57
U.S. Highway 301 Filter Paper Gross Alpha (Weekly Sample)

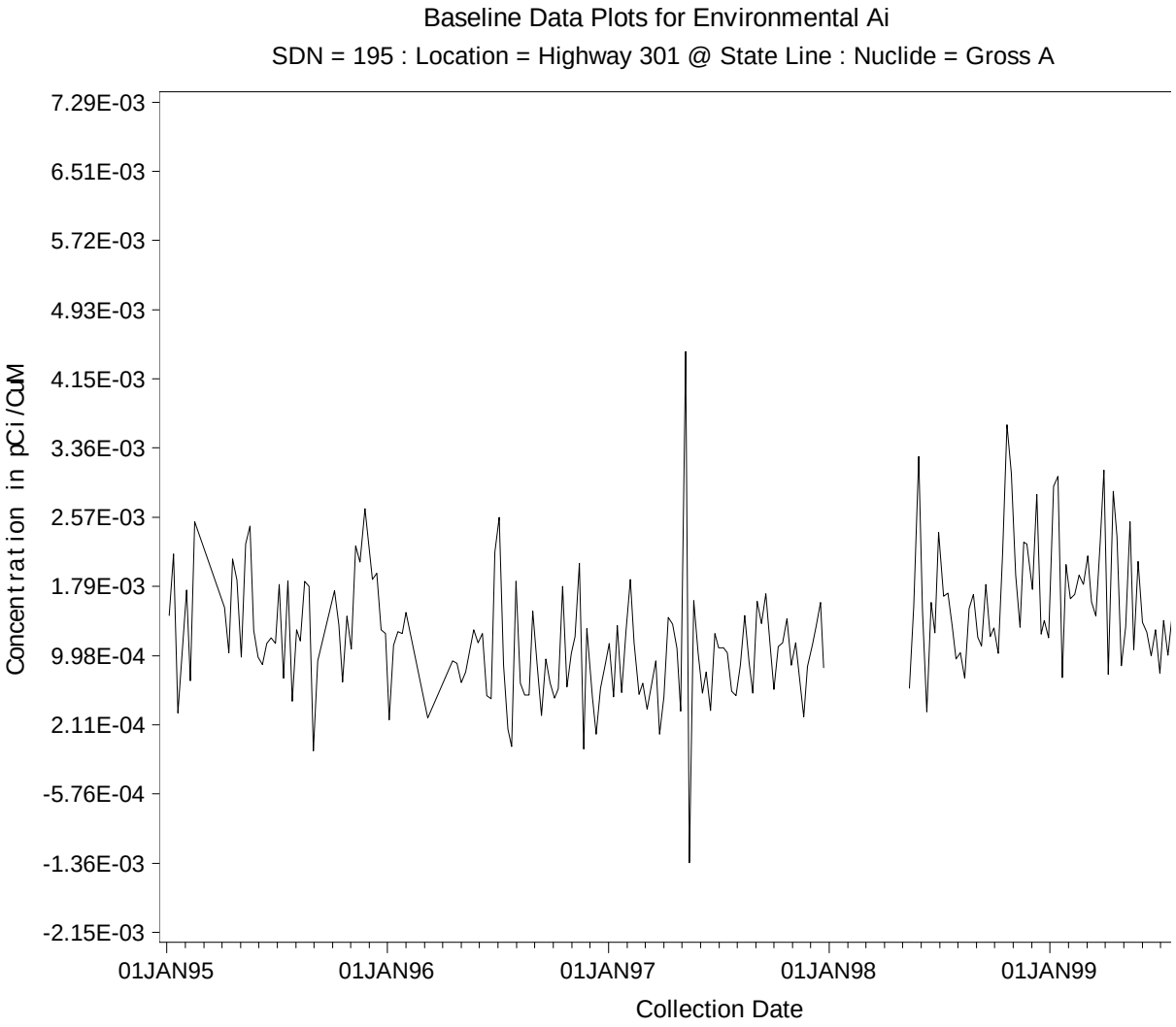


Figure 58
U.S. Highway 301 Charcoal Canister Co-60 (Weekly Sample)

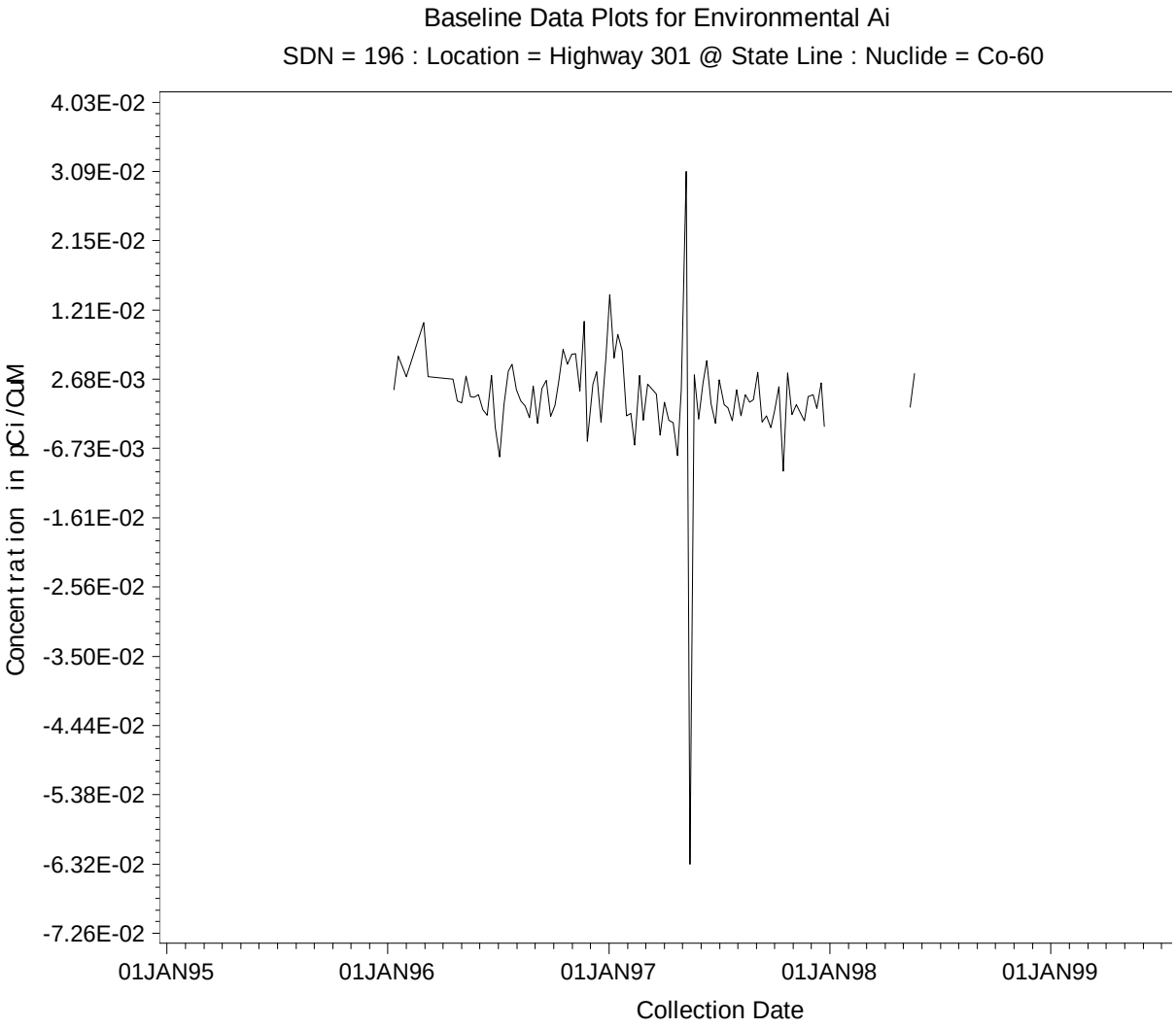


Figure 59
U.S. Highway 301 Charcoal Canister Cs-137 (Weekly Sample)

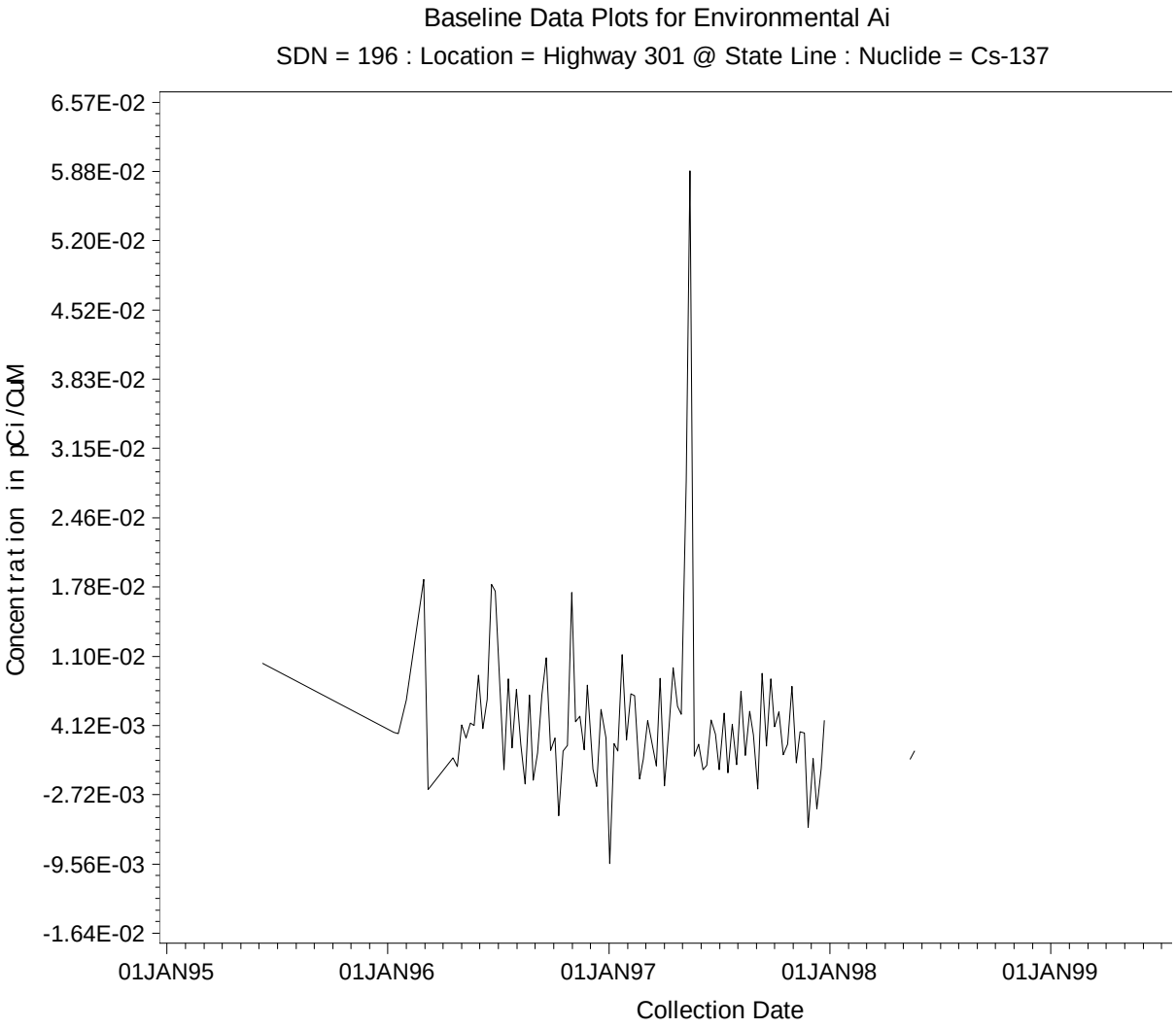


Figure 60
U.S. Highway 301 Silica Gel H-3 (Biweekly Sample)

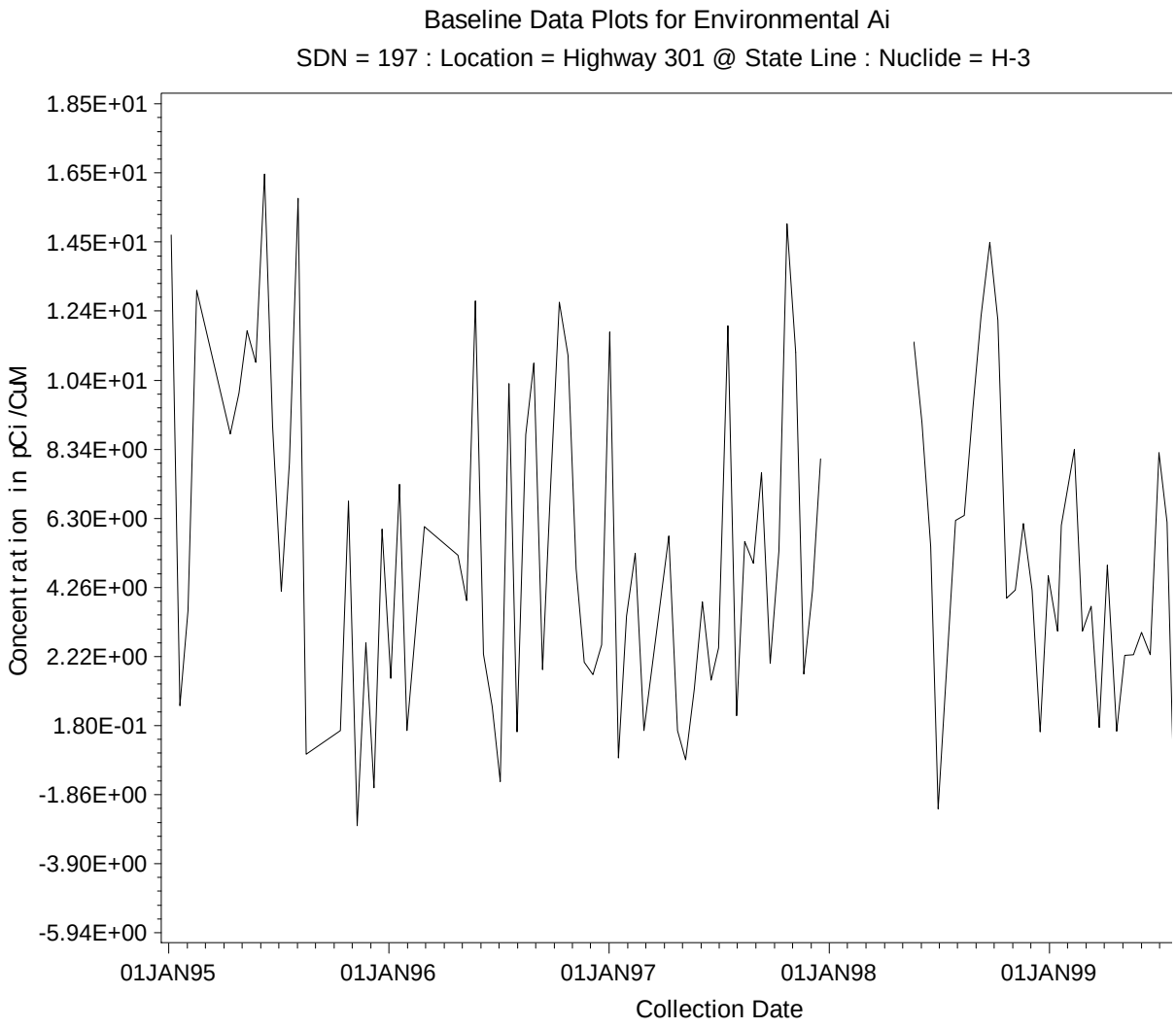


Figure 61
U.S. Highway 301 Rain Water H-3 (Biweekly Sample)

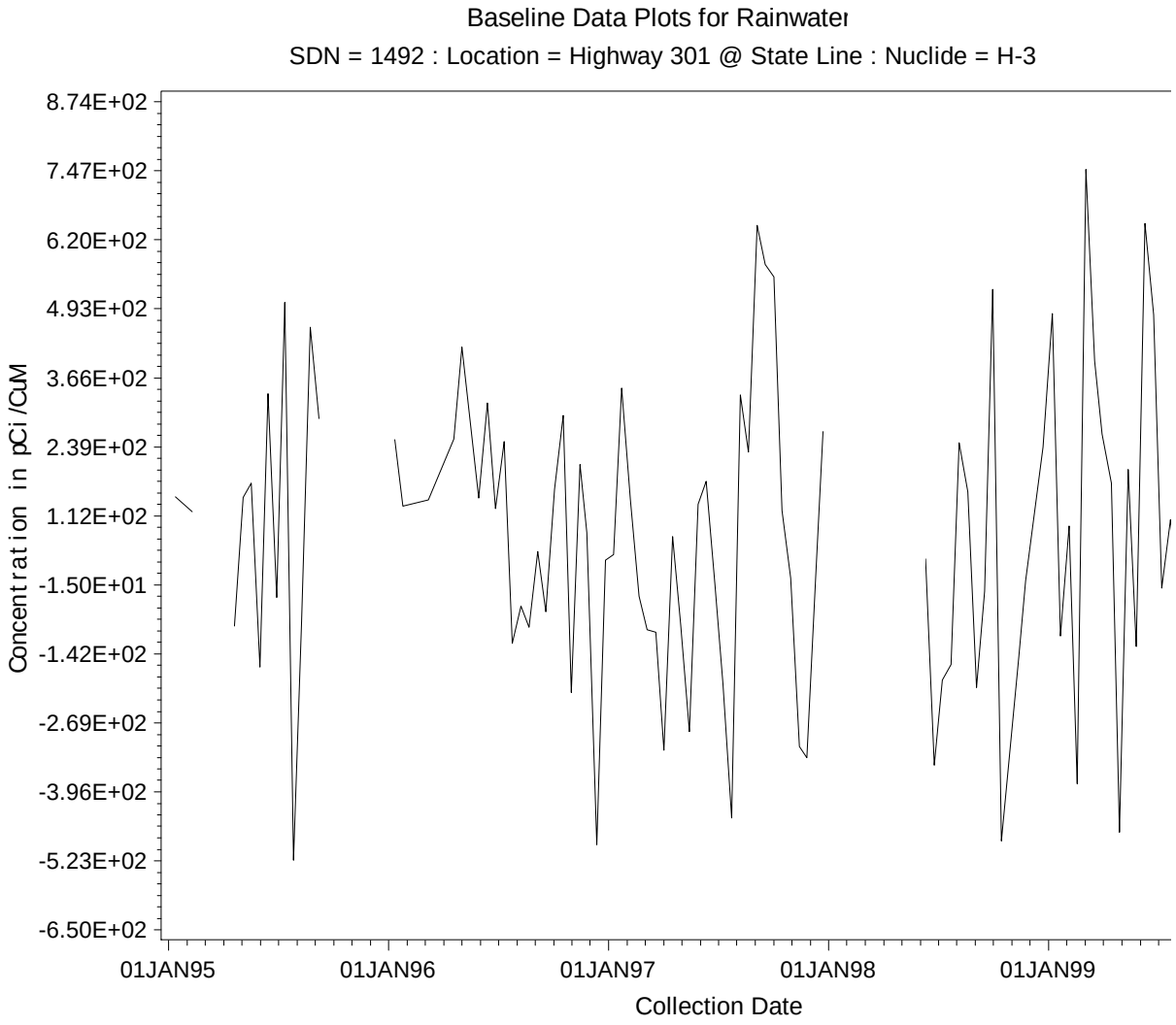


Figure 62
Cs-137 Concentration in Soil
Near F-Area

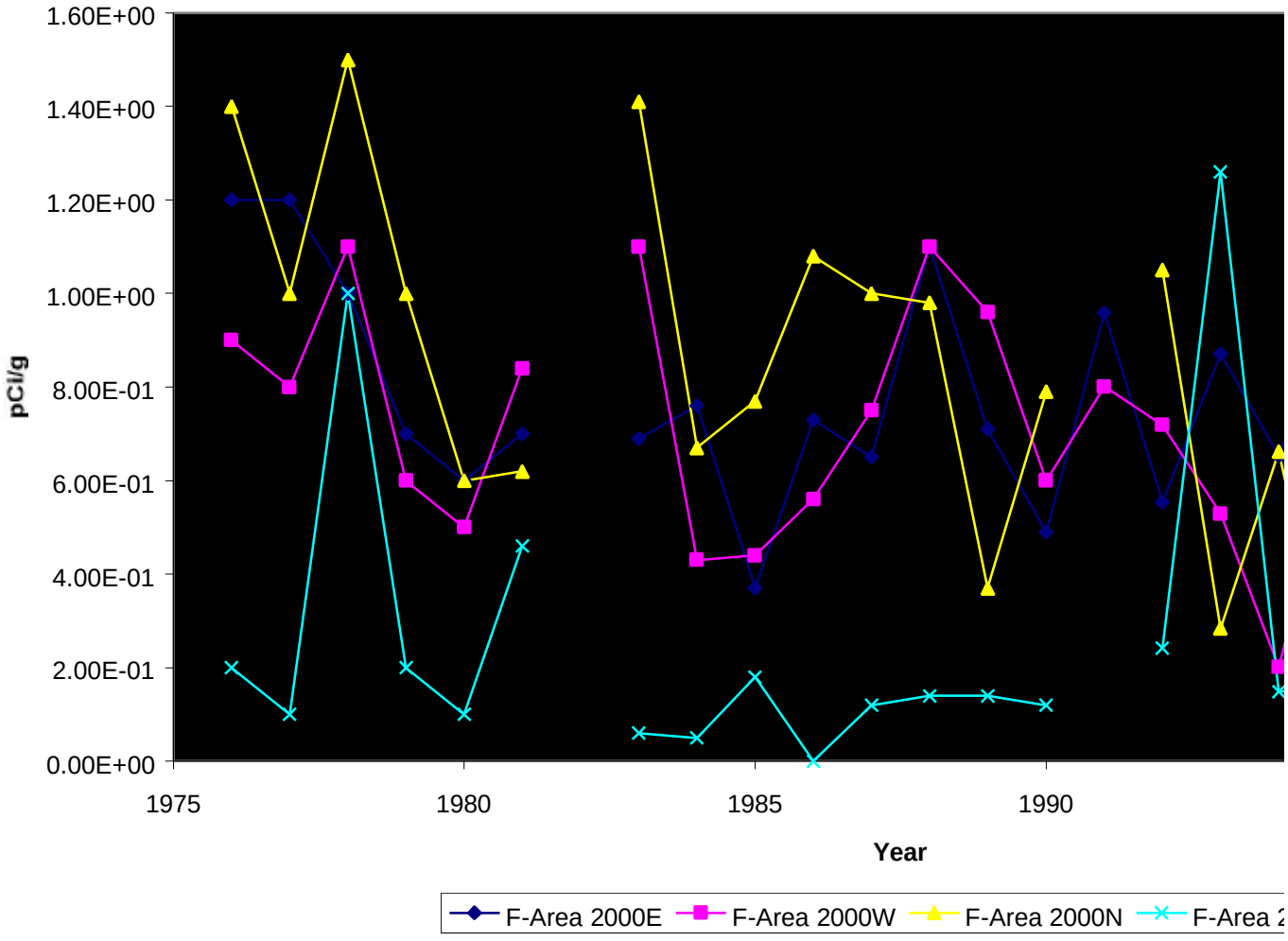


Figure 63
Sr-89,90 Concentration in Soil
Near F-Area

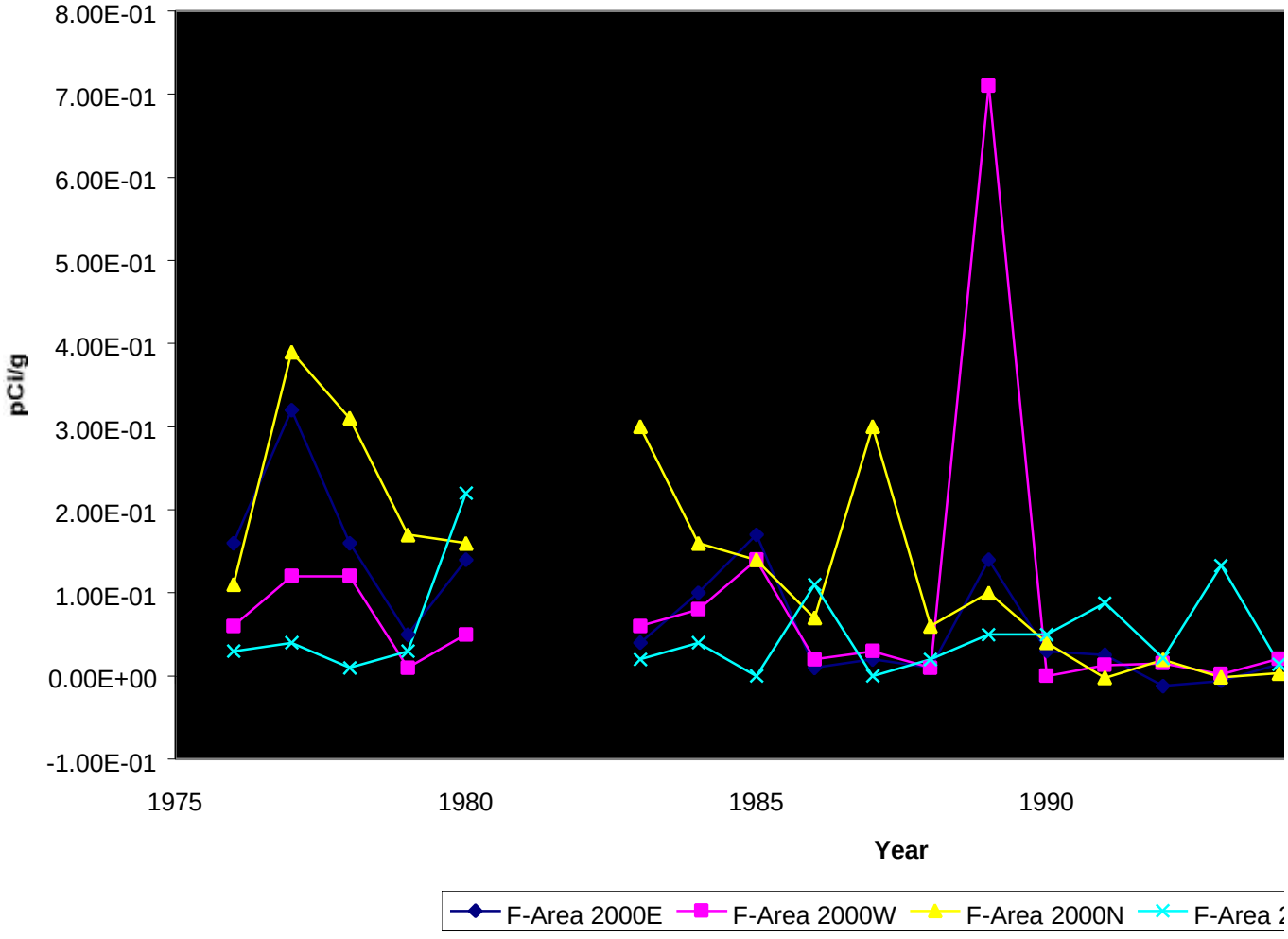


Figure 64
Pu-238 Concentration in Soil
Near F-Area

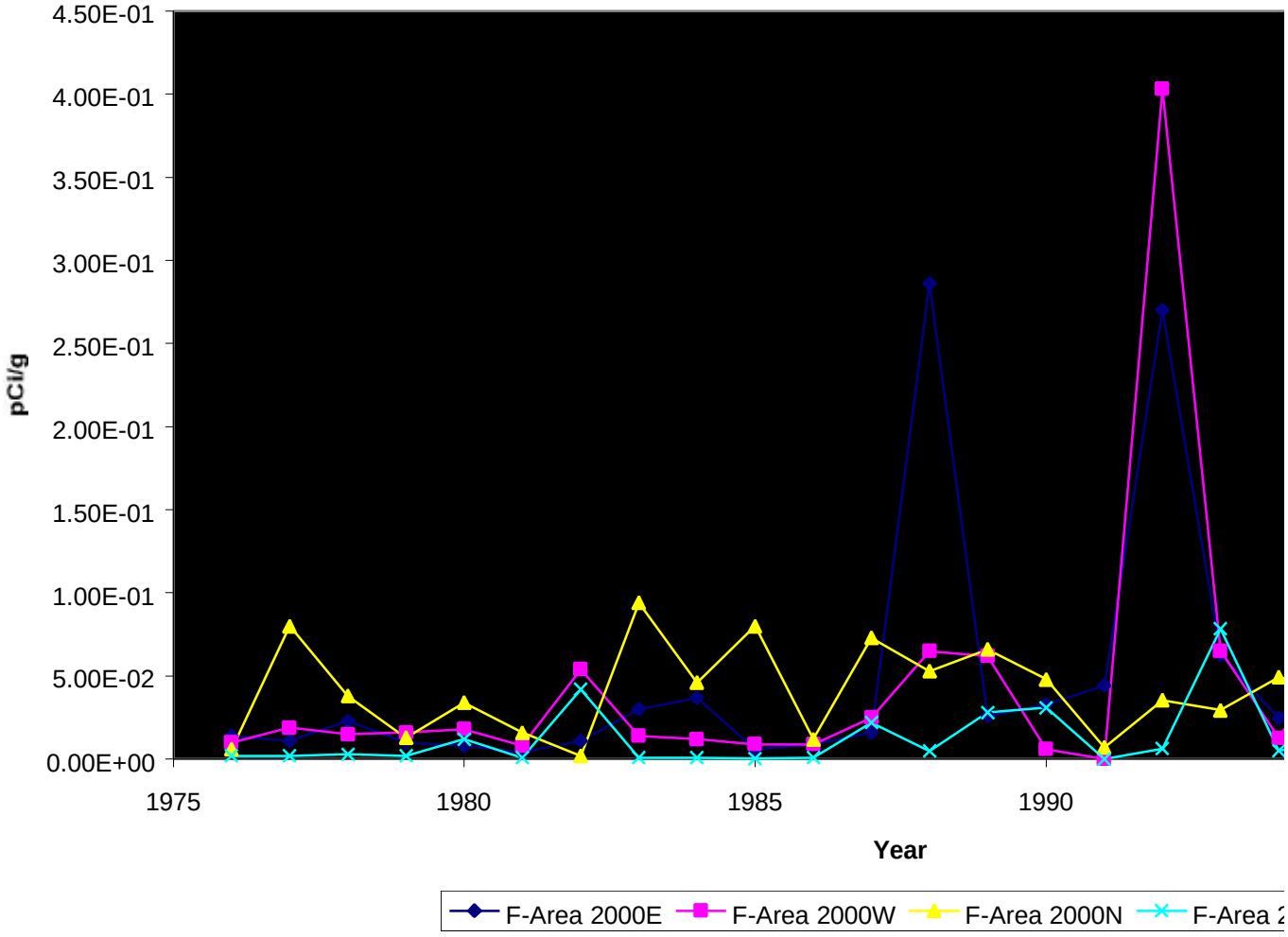
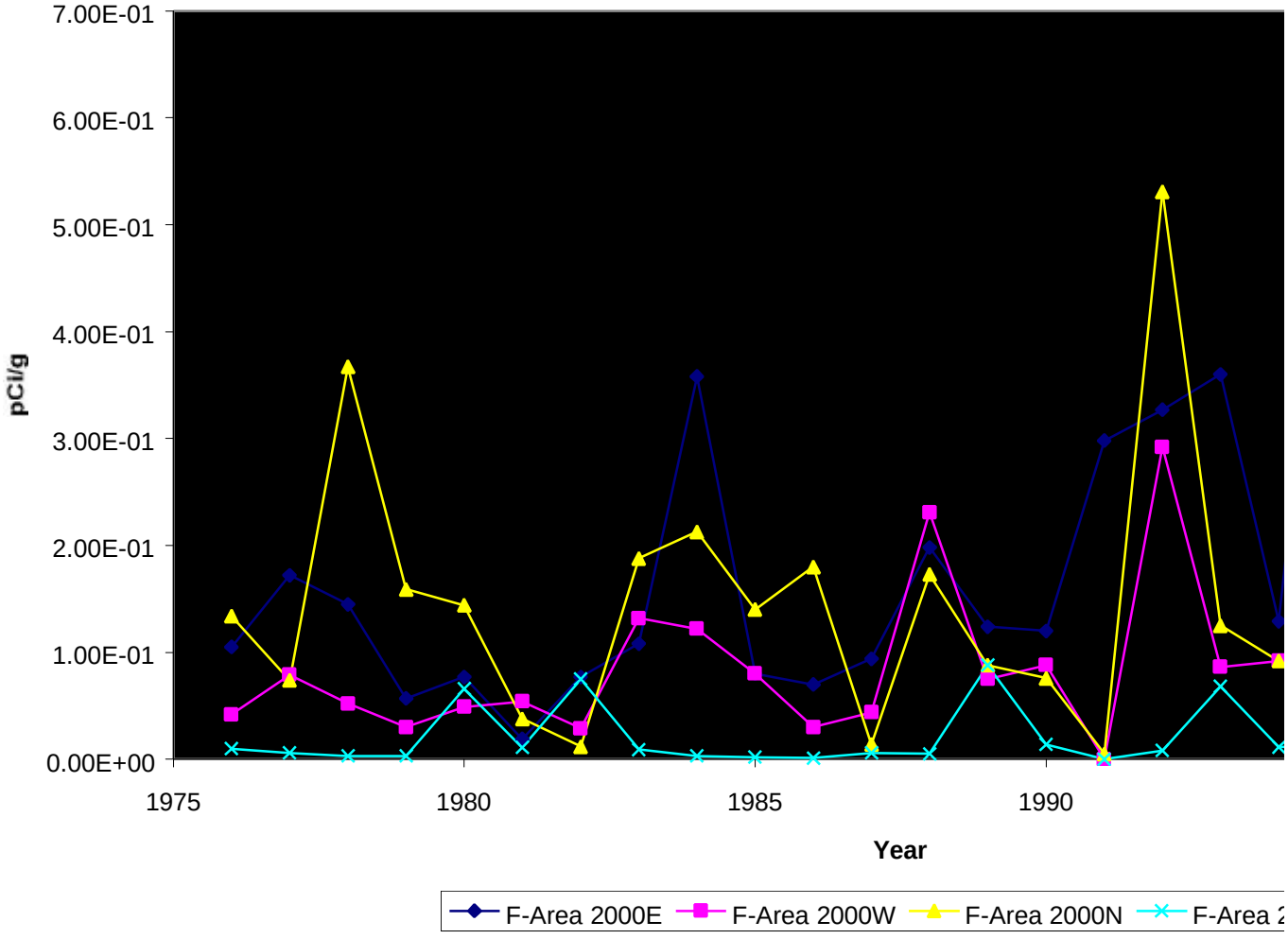


Figure 65
Pu-239 Concentration in Soil
Near F-Area



Westinghouse
Savannah River Company
Aiken, SC 29808

January 24, 2001

ESH-CGP-2001-00014

Ms. Susan B. Alder
Bureau of Drinking Water Protection
Water Use Program
South Carolina Department of Health and
Environmental Control
2600 Bull Street
Columbia, S. C. 29201

Dear Ms. Alder:

2000 WATER USE REPORT: SAVANNAH RIVER SITE

Please find attached the Water Use Report for 2000. This form is provided in accordance with state regulatory requirements specified under the Water Use Reporting and Coordination Act (282 of 1982), Section 49-4-50, as revised.

Also, per our 1/23/01 phone conversation, information on water use at the TNX-Area Air Stripper was not included in reports for 1996 through 1999. A monthly breakdown for that period is attached for your use.

Please contact Lori Coward at (803) 725-9592 should you have any questions.

Yours very truly,

M. B. Hughes, Manager
CERCLA, Geological, and Permitting Section
Environmental Protection Department
Westinghouse Savannah River Company/LLC

lsc/aeo
Att.*
c: D. F. Holroyd, EPA-Region IV*
SRS Administrative Record File (E. R. Palmer, 730-2B)*

bc: C. V. Anderson, 703-A
C. L. Bergren, 730-2B
D. T. Bignell, 742-A
J. E. Bolen, 703-A*
S. M. Butts, 210-S*
L. S. Coward, 742-A*
A. B. Gould, Jr., 703-A
G. S. Hoover, 703-A*
R. F. Keenan, 724-A
B. E. Kuglar, 740-5A*
C. M. Lybrand, 704-22G*
B. Mohip, 679-T*
J. C. Turknett, 730-2B
R. D. Turner, 777-20A*
EPD Fileroom, 742-A*
Records Processing, 773-52A*

File info:
SCDHEC, Water Use Report
10046
DOE 1-8.f
Permanent

DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
PERMIT AND DATA ADMINISTRATION SECTION
2600 BULL STREET
COLUMBIA, SC 29201

WATER USE REPORT

Section I. Water User Identification

Owner Westinghouse Savannah River Company **Phone** 725-9592

Address Building 742-A

City Aiken **State** SC **Zip Code** 29802

Section II. Monthly Useage

Owner's ID	Source ID	Calc. Method	Jan 00	Feb 00	Mar 00
H-Area	02IN07G03	2	31.200	28.200	31.20
N-Area (Central Shops)	02IN07G04	0	0.000	0.000	0.00
L-Area	02IN07G05	2	4.910	4.750	4.59
K-Area	02IN07G06	2	6.250	6.480	6.04
A-Area (300/700)	02IN07G07	1, 2	87.322	85.042	89.52
F-Area	02IN07G08	2	26.800	24.100	26.80
B-Area	02IN07G09	1	3.334	6.988	1.97
C-Area	02IN07G10	0	0.000	0.000	0.00
TNX-Area	02IN07G11	1, 2	2.704	2.666	2.57
S-Area	02IN07G12	1	0.915	1.001	1.20
Bldg. 483-7D	02IN07G13	1	0.457	0.359	2.16
Bldg. 681-3G	02IN07S03	2	223.200	208.800	208.80
		TOTAL	387.092	368.386	374.88

Section III. The above is true and correct to the best of my knowledge.

Savannah River Site
Water User Name

Authorized Representative

1/24/2001
Date

USERID: 02IN07

8

DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
PERMIT AND DATA ADMINISTRATION SECTION
2600 BULL STREET
COLUMBIA, SC 29201

WATER USE REPORT

Section I. Water User Identification

Owner Westinghouse Savannah River Company **Phone** 725-9592

Address Building 742-A

City Aiken **State** SC **Zip Code** 29802

Section II. Monthly Useage

Owner's ID	Source ID	Calc. Method	Apr 00	May 00	Jun 00
H-Area	02IN07G03	2	30.200	31.200	30.2
N-Area (Central Shops)	02IN07G04	0	0.000	0.000	0.0
L-Area	02IN07G05	2	4.910	4.752	4.9
K-Area	02IN07G06	2	6.696	6.480	6.6
A/M Area (300/700)	02IN07G07	1, 2	89.098	93.961	97.8
F-Area	02IN07G08	2	25.900	26.800	25.9
B-Area	02IN07G09	1	1.676	1.350	2.4
C-Area	02IN07G10	0	0.000	0.000	0.0
TNX-Area	02IN07G11	1, 2	2.498	2.656	2.4
S-Area	02IN07G12	1	1.205	2.087	2.1
Bldg. 483-7D (D-Area)	02IN07G13	1	2.173	0.992	1.6
Bldg. 681-3G	02IN07S03	2	223.200	216.000	223.2
		TOTAL	387.556	386.278	397.5

Section III. The above is true and correct to the best of my knowledge.

Savannah River Site
Water User Name

Keri L Conard
Authorized Representative

1/24/2001
Date

USERID: 02IN07 88