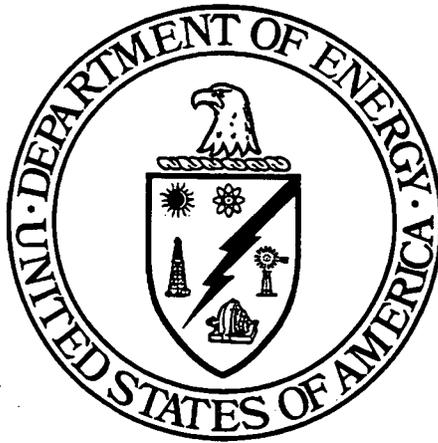


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# SECOND IEMP DATA QUARTERLY SUMMARY FOR 2001

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT  
FERNALD, OHIO



JULY 2001

U.S. DEPARTMENT OF ENERGY

51350-RP-0016

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FINAL

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## LIST OF ACRONYMS

AMS	air monitoring station
BTV	benchmark toxicity value
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
EPLTS	Enhanced Permanent Leachate Transmission System
ESD	Explanation of Significant Differences
FFCA	Federal Facilities Compliance Agreement
FRL	final remediation level
gpad	gallons per acre per day
gpm	gallons per minute
IEMP	Integrated Environmental Monitoring Plan
LCS	leachate collection system
LDS	leak detection system
M gal	million gallons
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NPDES	National Pollutant Discharge Elimination System
OEPA	Ohio Environmental Protection Agency
OSDF	on-site disposal facility
pCi/L	picoCuries per liter
pCi/m <sup>3</sup>	picoCuries per cubic meter
PSP	Project-Specific Plan
SWRB	Storm Water Retention Basin
TLD	thermoluminescent dosimeter
WPRAP	Waste Pits Remedial Action Project
µg/L	micrograms per liter
µg/m <sup>3</sup>	micrograms per cubic meter

## 1.0 INTRODUCTION

This Second Integrated Environmental Monitoring Plan (IEMP) Data Quarterly Summary for 2001 has been prepared in a manner consistent with Revision 2 of the IEMP (DOE 2001c), and incorporates subsequent input from the U.S. Environmental Protection Agency (EPA) and the Ohio Environmental Protection Agency (OEPA). All IEMP data are now being provided to the EPA and OEPA on an ongoing basis throughout the quarter via the IEMP Data Information Site (i.e., the "Extranet Site"), at <http://iempdata.fernald.gov>. This document covers all data that were made available on the IEMP Data Information Site from April 1 through June 30 (the second quarter) of 2001. Table 1-1 identifies, on a general level, the data covered under this quarterly summary. Note that the 2000 IEMP data added to the IEMP data information site during this time period were already covered in the 2000 Integrated Site Environmental Report (DOE 2001a), therefore, this information is not repeated in this document.

The goal of the IEMP quarterly summaries is to minimize textual discussion by focusing on notable events and results related to the data covered, while summarizing data in the form of graphical and tabular presentations. Comprehensive reporting, including all tables and graphs, will still be provided through IEMP annual integrated site environmental reports.

TABLE 1-1

SCHEDULE FOR IEMP DATA INFORMATION SITE AVAILABILITY AND REPORTING

IEMP PROGRAM <sup>b</sup>	TIME PERIOD <sup>a</sup>											
	Third Quarter/2000			Fourth Quarter/2000			First Quarter/2001			Second Quarter/2001		
	J U L	A U G	S E P	O C T	N O V	D E C	J A N	F E B	M A R	A P R	M A Y	J U N
<u>GROUNDWATER SAMPLING ACTIVITIES</u>												
Extraction/Re-injection Operational Data				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	◆	◆	◆	
South Plume Aquifer Conditions	----- <input checked="" type="checkbox"/> -----			Covered in ISER <sup>b</sup>			-----◆-----					
South Field Extraction Aquifer Conditions	----- <input checked="" type="checkbox"/> -----			Covered in ISER <sup>b</sup>			-----◆-----					
Waste Storage Area Aquifer Conditions				Covered in ISER <sup>b</sup>			-----◆-----					
Plant 6 Area Aquifer Conditions				----- <input checked="" type="checkbox"/> -----			Not Applicable <sup>c</sup>					
Groundwater Elevations				----- <input checked="" type="checkbox"/> -----			----- <input checked="" type="checkbox"/> -----			◆-----		
Property Boundary Monitoring	----- <input checked="" type="checkbox"/> -----			----- <input checked="" type="checkbox"/> -----			◆-----					
Private Well Monitoring	----- <input checked="" type="checkbox"/> -----			----- <input checked="" type="checkbox"/> -----			◆-----					
<u>OSDF SAMPLING ACTIVITIES</u>												
LCS and LDS Volumes				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	◆	◆	◆	
Analytical	----- <input checked="" type="checkbox"/> -----			Covered in ISER <sup>b</sup>			-----◆-----					
<u>SURFACE WATER SAMPLING ACTIVITIES</u>												
NPDES				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	◆	◆	◆	
FFCA				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	◆	◆	◆	
IEMP Characterization	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	◆	◆	◆			
Turbidity Monitoring (for Sloan's Crayfish)				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	◆	◆	◆
<u>AIR SAMPLING ACTIVITIES</u>												
Radiological Particulate				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	◆	◆	◆	◆ <sup>d</sup>
NESHAP Composite				----- <input checked="" type="checkbox"/> -----			-----◆-----					
NESHAP Stack				----- <input checked="" type="checkbox"/> -----			-----◆-----					
Radon (Environmental and Silos Headspace)				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	◆	◆	◆	<sup>c</sup>
Direct Radiation (TLD)				----- <input checked="" type="checkbox"/> -----			-----◆-----					

◆ Data available on the IEMP Data Information Site on June 30, 2001, and summarized in this quarterly summary. Subsequent data were not yet made available on the IEMP Data Information Site by June 30, 2001; and therefore, will be summarized in future quarterly summaries.  
 Data summarized/evaluated in the previous IEMP data quarterly summary (April 2001).

<sup>a</sup>IEMP sampling that takes place during one scheduled event per quarter is identified with a marker (e.g., |-----◆-----|) in the month the samples were collected.

<sup>b</sup>Data were already covered in the 2000 Integrated Site Environmental Report (ISER), and therefore, are not included with this quarterly summary.

<sup>c</sup>Plant 6 area aquifer conditions sampling is conducted semi-annually.

<sup>d</sup>Radiological Particulate data from June are available for the first biweekly sampling event (June 4<sup>th</sup>) only.

<sup>e</sup>June monthly average radon concentrations are included in Figure 5-10 to support findings discussed in the text. These data will be available on the IEMP Data Information Site at the time this quarterly summary is submitted, and summarized in the next quarterly summary.

## 2.0 GROUNDWATER MONITORING DATA

### 2.1 DATA COVERED

This IEMP data quarterly summary covers all IEMP groundwater monitoring data added to the IEMP Data Information Site from April 1 through June 30, 2001, as discussed in Section 1.0. Specifically, this includes:

- Operational data from March 2001 through May 2001
- All analytical data from first quarter 2001. This includes the South Field, South Plume, Property Boundary, Private Well, and the Waste Storage Area Monitoring Programs
- Groundwater (Great Miami Aquifer) elevations for the second quarter of 2001.

All of the data sets for the aforementioned programs are complete in accordance with sampling requirements identified in the IEMP Revision 2 (DOE 2001c) for the time periods identified.

### 2.2 NOTABLE RESULTS AND EVENTS

Notable results and events are those that impact, or could potentially impact, the scope of IEMP monitoring or remediation operations at the Fernald site. Notable results and events associated with IEMP groundwater monitoring data for the time period covered by this quarterly summary include:

- On April 20, 2001 the U.S. Department of Energy (DOE) submitted the design for remediation of the Great Miami Aquifer in the waste storage and Plant 6 areas, including drawings and specifications (reference DOE letter # DOE-0528-01). Also included in this package was information concerning the installation of an additional groundwater recovery well in the South Field. The design for the waste storage area calls for a two-phased approach with the three Phase I wells being installed this year and the two Phase II wells being installed after the remediation of the waste pits is complete. The design package does not call for extraction wells in the Plant 6 area since groundwater total uranium concentrations in that area are now below the final remediation level (FRL). However, the package does recommend continued monitoring in the Plant 6 area.
- On May 15, 2001 DOE submitted a Project-Specific Plan (PSP) outlining the installation protocol for the groundwater recovery wells specified in the April 20 design submittal as noted above (reference DOE letter # DOE-0575-01). Collection of lithologic cores at each of the groundwater recovery well locations began in mid May 2001 in support of well screen design. The installation details for the monitoring well installed in the South Plume to replace Monitoring Wells 2551 and 3551 were also included in the PSP. The replacement well (23064) was installed in late May 2001.

- As described in the First IEMP Data Quarterly Summary for 2001 (DOE 2001b), DOE is working with the EPA and OEPA to modify the groundwater FRL for total uranium from 20 micrograms per liter ( $\mu\text{g/L}$ ) to 30  $\mu\text{g/L}$ . The modification to the Operable Unit 5 Record of Decision is based on EPA's finalization of the drinking water standard for total uranium of 30  $\mu\text{g/L}$  last December. A Draft Explanation of Significant Differences (ESD) document explaining the modification was submitted to the EPA and OEPA on May 4, 2001 (reference DOE letter # DOE-0555-01). OEPA and EPA have subsequently submitted comments on the draft ESD. Those comments were addressed, and a revised ESD document was submitted as draft final. The "draft final" version of the ESD document was public noticed in July per 40 CFR 300.435 (c)(2)(1), thus initiating the public comment period.
- On June 13, 2001 DOE submitted a letter formally requesting a reduction in the number of monitoring wells scheduled to be sampled for dioxins this year (reference DOE letter # DOE-0642-01).
- South Field Extraction Well 31565 was shut down on May 22, 2001, so that additional soil remediation could be completed in the vicinity. The decision to re-start Extraction Well 31565 after the soil remediation is complete will be made as part of the South Field Phase II design.
- Re-Injection Well 22109 was shutdown on June 5, 2001, after reaching the high-level shutdown point due to residual plugging. With the shutdown of this well, only one of the re-injection wells (22240) remains operable. An industry expert in the field of injection well treatment for plugging has been consulted. Water samples from two of the plugged wells were collected in May and a revised treatment to alleviate the plugging in the wells was being developed as of the close of the reporting period. It is anticipated that the revised treatment process will be implemented later this summer after the necessary approvals have been obtained.
- Changes have been made to the first quarter 2001 total uranium plume based on the following:
  - Geoprobe™ sampling continued in the South Field area in support of the South Field Phase II Extraction System Design. Results of this investigation to-date indicate that the total uranium plume in this area of the site has lower total uranium concentrations than anticipated and is smaller than anticipated both in size and in depth below the water table. Figure 2-1 reflects the revised interpretation of the total uranium plume in this area based on the Geoprobe™ and well sampling data through the first quarter of 2001.
  - Ongoing Geoprobe™ sampling also revealed a total uranium concentration of 67  $\mu\text{g/L}$  just east of the western chamber of the Storm Water Retention Basin (SWRB) (refer to Figure 2-1). Detailed analysis of the total uranium plume data for the South Field area, including the vicinity of the SWRB, will be provided in the design documentation for the South Field Phase II Module. This documentation is tentatively scheduled for submittal to the EPA and OEPA for review later this year.
  - The total uranium concentration in samples from South Field Monitoring Well 62433 continued to increase, with the first quarter 2001 result of 845  $\mu\text{g/L}$  (refer to Figure 2-1) compared to 571  $\mu\text{g/L}$  in the fourth quarter of 2000. This well monitors an area that has been highlighted in previous IEMP reports; and as indicated in those reports, pumping and/or system design changes will need to be considered in order to ensure that the area is being adequately flushed. On April 19, 2001, the pumping rate for Extraction Well 32447 was increased from 200 gallons per minute (gpm) to 300 gpm in an effort to increase the flushing of this area. Extraction Well 32447 is located just west of Monitoring Well 62433.

A thorough review of the groundwater monitoring data covered by this quarterly summary was conducted to identify the notable results. Supplementary tables and figures are also provided here in support of the findings listed above. Tables 2-1 through 2-4 provide an operational summary of the groundwater extraction well performance for March through May 2001. All data covered by this quarterly summary are available on the IEMP Data Information Site. Maps showing the locations of IEMP groundwater monitoring wells are also provided on the IEMP Data Information Site.

**TABLE 2-1**  
**AQUIFER RESTORATION SYSTEM OPERATIONAL SUMMARY SHEET**

	Reporting Period					
	March 2001 through May 2001			August 1993 through May 2001		
	Gallons Pumped/Re-Injected (M gal)	Total Uranium Removed/Re-Injected (lbs)	Uranium Removal Index (lbs/M gal)	Gallons Pumped/Re-injected (M gal)	Total Uranium Removed/Re-Injected (lbs)	Uranium Removal Index (lbs/M gal)
South Field (Phase I) Extraction Module	283.44	162.34	0.57	2,532.374	1,599.96	0.63
South Plume Module	215.645	70.3	0.33	5,820.695	1,173.67	0.20
Re-Injection Module	47.223	1.99	NA <sup>a</sup>	927.376	38.48	NA <sup>a</sup>
<b>Aquifer Restoration Systems Totals</b>						
(Extraction Wells)	499.085	232.64	0.47	8,353.069	2,773.63	0.33
(Re-Injection Wells)	<u>47.223</u>	<u>1.99</u>	NA <sup>a</sup>	<u>927.376</u>	<u>38.48</u>	NA <sup>a</sup>
(net)	451.862	230.65	NA <sup>a</sup>	7,425.693	2,735.15	NA <sup>a</sup>

<sup>a</sup>NA = not applicable

TABLE 2-2

SOUTH FIELD (PHASE I) EXTRACTION MODULE  
OPERATIONAL SUMMARY SHEET  
(MARCH 2001 THROUGH MAY 2001)

Extraction Well	31565 <sup>a</sup>	31564	31566 <sup>b</sup>	31563	31567 <sup>c</sup>	31550	31560	31561	31562 <sup>d</sup>	32276	32447 <sup>e</sup>	32446
Baseline Remedial Strategy Report Target Pumping Rates (gpm)												
	200	200	200	200	100	100	100	100	100	200	NA	NA
Average Pumping Rates (gpm)												
March	222	203	NA	216	222	110	110	109	266	321	199	199
April	222	221	NA	220	278	98	98	93	246	114	231	201
May	<u>152</u>	<u>224</u>	<u>NA</u>	<u>224</u>	<u>283</u>	<u>112</u>	<u>112</u>	<u>94</u>	<u>260</u>	<u>316</u>	<u>302</u>	<u>190</u>
Average	199	216	NA	220	261	107	107	99	257	250	244	197
Average Total Uranium Concentrations (µg/L)												
March	9.5	13.6	8.7	22.9	27.9	40.7	67.2	54.3	104.6	129.1	179.1	80.0
April	9.9	13.0	8.7	22.6	27.9	43.3	67.6	52.2	99.3	128.9	174.0	80.0
May	<u>10.4</u>	<u>12.4</u>	<u>7.9</u>	<u>21.4</u>	<u>24.6</u>	<u>42.0</u>	<u>61.1</u>	<u>52.8</u>	<u>91.8</u>	<u>123.7</u>	<u>164.8</u>	<u>76.8</u>
Average	9.9	13.0	8.4	22.3	26.8	42.0	65.3	53.1	98.6	127.2	172.6	78.9
Uranium Removal Index (Pounds of Total Uranium Removed/Million Gallons Pumped)												
March	0.08	0.11	NA	0.19	0.23	0.34	0.56	0.45	0.87	1.08	1.49	0.67
April	0.08	0.11	NA	0.19	0.23	0.36	0.56	0.44	0.83	1.08	1.45	0.67
May	<u>0.09</u>	<u>0.10</u>	<u>NA</u>	<u>0.18</u>	<u>0.21</u>	<u>0.35</u>	<u>0.51</u>	<u>0.44</u>	<u>0.77</u>	<u>1.03</u>	<u>1.37</u>	<u>0.64</u>
Average	0.08	0.11	NA	0.19	0.22	0.35	0.54	0.44	0.82	1.06	1.44	0.66
	Average Module Pumping Rate (gpm)						Water Pumped by Module (M gal)			Total Uranium Concentration from Module <sup>f</sup> (µg/L)		
March	2,177						97,283			71.0		
April	2,022						87,186			63.8		
May	<u>2,269</u>						<u>98,971</u>			<u>70.4</u>		
Average	2,156						Total	283.44		Average	68.4	

<sup>a</sup>The well was removed from service on May 22, 2001.

<sup>b</sup>NA = not applicable

<sup>c</sup>Target pumping rate was increased from 100 gpm to 250 gpm on August 8, 2000.

<sup>d</sup>Target pumping rate was increased from 200 gpm to 290 gpm on September 14, 2000.

<sup>e</sup>Target pumping rate was increased from 200 gpm to 300 gpm on April 19, 2001.

<sup>f</sup>Average is calculated from individual well total uranium concentrations and flow rates.

**TABLE 2-3**  
**SOUTH PLUME MODULE**  
**OPERATIONAL SUMMARY SHEET**  
**(MARCH 2001 THROUGH MAY 2001)**

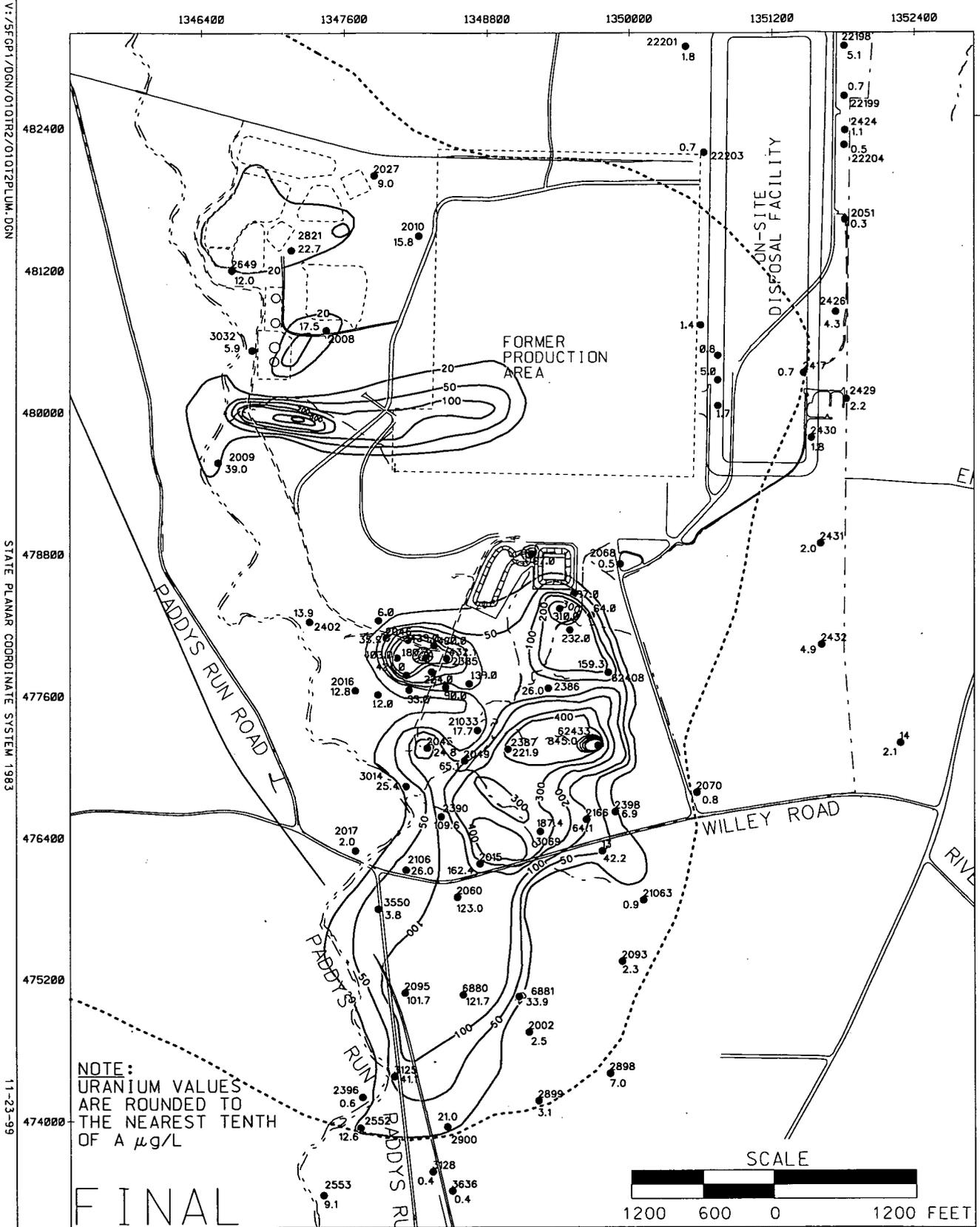
Extraction Well	3924	3925 <sup>a</sup>	3926	3927 <sup>a</sup>	32308	32309
Baseline Remedial Strategy Report Target Pumping Rates (gpm)						
	300	300	400	400	250	250
Average Pumping Rates (gpm)						
March	287	54	367	485	292	291
April	302	306	370	33	301	300
May	<u>254</u>	<u>308</u>	<u>344</u>	<u>15</u>	<u>296</u>	<u>294</u>
Average	281	223	360	178	296	295
Average Total Uranium Concentrations (µg/L)						
March	35.4	NA	30.0	2.8	67.0	57.9
April	35.5	31.0	29.4	2.7	65.7	60.6
May	<u>34.2</u>	<u>27.6</u>	<u>27.4</u>	<u>NA</u>	<u>62.7</u>	<u>57.0</u>
Average	35.0	29.3	28.9	2.8	65.1	58.5
Uranium Removal Index (Pounds of Total Uranium Removed/Million Gallons Pumped)						
March	0.30	NA	0.25	0.02	0.56	0.48
April	0.30	0.26	0.25	0.02	0.55	0.51
May	<u>0.29</u>	<u>0.23</u>	<u>0.23</u>	<u>NA</u>	<u>0.52</u>	<u>0.48</u>
Average	0.30	0.25	0.24	0.02	0.54	0.49
	Average Module Pumping Rate (gpm)		Water Pumped by Module (M gal)		Total Uranium Concentration From Module <sup>b</sup> (µg/L)	
March	1,785		79.316		34.1	
April	1,611		69.462		42.8	
May	<u>1,511</u>		<u>66.867</u>		<u>40.9</u>	
Average	1,636		Total 215.645		Average	39.3

<sup>a</sup>NA = not applicable

<sup>b</sup>Average is calculated from individual well total uranium concentrations and flow rates.

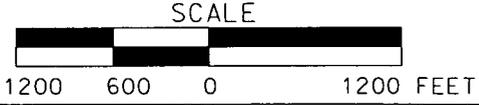
TABLE 2-4  
RE-INJECTION MODULE  
OPERATIONAL SUMMARY SHEET  
(MARCH 2001 THROUGH MAY 2001)

Re-Injection Well	22107	22108	22109	22240	22111
Baseline Remedial Strategy Report Target Re-Injection Rates (gpm)					
	200	200	200	200	200
Average Re-Injection Rates (gpm)					
March	0	2	175	174	0
April	0	0	181	178	0
May	0	0	179	180	0
Average	0	1	178	177	0
	Average Module Re-Injection Rate (gpm)		Water Re-Injected By Module (M gal)		Total Uranium Concentration from Module (µg/L)
March	351		15.693		4.9
April	359		15.495		5.9
May	359		16.035		4.3
Average	356		Total 47.223		Average 5.0



NOTE:  
URANIUM VALUES  
ARE ROUNDED TO  
THE NEAREST TENTH  
OF A  $\mu\text{g/L}$

FINAL



- LEGEND:
- 2553 MONITORING WELL OR GEOPROBE LOCATION
  - 5.1 TOTAL URANIUM CONCENTRATION MEASURED IN FIRST QUARTER 2001
  - CONTOUR CHANGES BASED ON NEW MAXIMUM FIRST QUARTER 2001 DATA
  - FEMP BOUNDARY
  - ↗ MAX TOTAL URANIUM CONTOUR IN  $\mu\text{g/L}$  FROM BASELINE MODIFIED QUARTERLY
  - ..... 10-YEAR, URANIUM-BASED RESTORATION FOOTPRINT (BRSR 1997)

FIGURE 2-1. TOTAL URANIUM PLUME MAP, FIRST QUARTER 2001

### 3.0 ON-SITE DISPOSAL FACILITY MONITORING DATA

#### 3.1 DATA COVERED

This IEMP data quarterly summary covers all on-site disposal facility monitoring data collected under the IEMP program that were added to the IEMP Data Information Site from April 1 through June 30, 2001, as discussed in Section 1.0. Specifically, this includes:

- Leachate collection system (LCS) volumes, leak detection system (LDS) volumes, and accumulation rates from March through May 2001
- Analytical data from the first quarter of 2001.

These data sets are complete for these time periods, in accordance with sampling requirements identified in the On-Site Disposal Facility Groundwater/Leak Detection and Leachate Monitoring Plan (DOE 1997) and subsequent agreements with the EPA and OEPA.

#### 3.2 NOTABLE RESULTS AND EVENTS

Notable results and events are those that impact, or could potentially impact, the scope of IEMP monitoring or remediation operations at the Fernald site. Notable results and events associated with on-site disposal facility monitoring data covered by this quarterly summary include the following:

- As of the end of May 2001, LCS and LDS flow measurements for Cells 1 and 2 were once again available due to completion of the tie-ins to the new Enhanced Permanent Leachate Transmission System (EPLTS). Cell 3 LCS/LDS flow measurements via the new system will be available starting in June 2001. Figures 3-1 through 3-2 show the "old" LDS accumulation rates (i.e., those collected prior to the shut down of the old system), the number of weeks where rate readings were not available and the "new" accumulation rates (i.e., those collected after the startup of the new EPLTS system). Note that the old and new readings for Cell 1 are relatively consistent; while the new (May 24, 2001 through May 30, 2001) Cell 2 reading is considerably higher than the old readings obtained just prior to shut down of the old system. The new reading for Cell 2 is about 8 percent of the initial response leakage rate of 20 gallons per acre per day.
- The first quarter 2001 data indicated new maximum total uranium concentrations in the Cell 1 LCS (12338C) and the Cell 3 LCS (12340C).
- Data evaluation in support of the Technical Memorandum for Cells 1, 2, and 3 Baseline Groundwater Conditions began in June 2001.

A thorough review of the on-site disposal facility monitoring data covered by this quarterly summary was conducted to identify the notable results. Supplementary tables and figures are also provided here in support of the findings listed above. Tables 3-1 through 3-3 provide analytical results from the first quarter of 2001 for Cells 1 through 3, respectively, along with a summary of previous data for those constituents. Previously, only detected constituents were shown in these tables. However, in the current tables, all constituents in the on-site disposal facility monitoring program are being shown to highlight the number of constituents that have not been detected. Based on the large number of non-detects, revisions to the on-site disposal facility monitoring program constituent list may be pursued later this year with the closure and capping of Cell 1. Figures 3-1 and 3-2 show accumulation rates plotted against weekly precipitation for Cells 1 and 2, respectively. All data covered by this quarterly summary are available on the IEMP Data Information Site. A map of the on-site disposal facility sample locations is also provided on the IEMP Data Information Site.

TABLE 3-1

ON-SITE DISPOSAL FACILITY CELL 1 DATA SUMMARY FOR FIRST QUARTER 2001

Note: Non-italicized pertains to total number of samples (including first quarter samples); *Italicized* pertains to first quarter samples only. Shading indicates at least one detection for that constituent at that location.

Constituent (FRL) <sup>a</sup>	LCS <sup>b,c,d,e</sup> (12338C)		LDS <sup>b,c,d,e</sup> (12338D)		HTW <sup>b,c,d,e</sup> (12338)		Great Miami Aquifer			
	No. of Samples with Detections	Range	No. of Samples with Detections	Range	No. of Samples with Detections	Range	Upgradient <sup>b,c,d</sup> (22201)		Downgradient <sup>b,c,d</sup> (22198)	
	No. of Samples		No. of Samples		No. of Samples		No. of Samples	Range	No. of Samples	Range
Total Organic Carbon (NA <sup>f</sup> mg/L)	11/13 <i>1/1</i>	ND to 123 <i>14.3</i>	10/12 <i>1/1</i>	ND to 80.9 <i>7.81</i>	30/33 <i>1/1</i>	ND to 12.2 <i>1.99</i>	25/28 <i>1/1</i>	ND to 59.7 <i>3.01</i>	23/28 <i>1/1</i>	ND to 52.5 <i>1.58</i>
Total Organic Halogens (NA <sup>f</sup> mg/L)	11/13 <i>1/1</i>	ND to 0.352 <i>0.101</i>	9/12 <i>1/1</i>	ND to 0.361 <i>0.0618</i>	19/32 <i>1/1</i>	ND to 0.077 <i>0.00354</i>	14/28 <i>0/1</i>	ND to 0.308 <i>ND</i>	8/28 <i>0/1</i>	ND to 0.184 <i>ND</i>
Boron (0.33 mg/L)	14/14 <i>1/1</i>	0.0642 to 2.8 <i>0.971</i>	11/12 <i>1/1</i>	ND to 0.321 <i>0.233</i>	26/33 <i>1/1</i>	ND to 0.685 <i>0.0869</i>	23/28 <i>1/1</i>	ND to 0.142 <i>0.0815</i>	31/42 <i>1/2</i>	ND to 0.116 <i>ND to 0.0417</i>
Mercury (0.0020 mg/L)	2/13 <i>0/1</i>	ND to 0.00047 <i>ND</i>	0/12 <i>0/1</i>	ND to ND <i>ND</i>	0/33 <i>0/1</i>	ND to ND <i>ND</i>	0/28 <i>0/1</i>	ND to ND <i>ND</i>	0/41 <i>0/2</i>	ND to ND <i>ND to ND</i>
Technetium-99 (94 pCi/L)	4/13 <i>0/1</i>	ND to 18.28 <i>ND</i>	1/12 <i>0/1</i>	ND to 8.92 <i>ND</i>	7/33 <i>0/1</i>	ND to 28.77 <i>ND</i>	1/28 <i>0/1</i>	ND to 13.41 <i>ND</i>	2/42 <i>0/1</i>	ND to 14.8 <i>ND</i>
Total Uranium (20 µg/L)	12/13 <i>1/1</i>	ND to 142.186 <i>142.186</i>	12/12 <i>1/1</i>	1.5 to 20.17 <i>9.696</i>	32/33 <i>1/1</i>	ND to 19 <i>1.5</i>	24/28 <i>1/1</i>	ND to 6.384 <i>1.837</i>	43/43 <i>3/3</i>	0.557 to 8.365 <i>4.24 to 5.145</i>
Alpha-chlordane (2.0 µg/L)	0/13 <i>0/1</i>	ND to ND <i>ND</i>	0/12 <i>0/1</i>	ND to ND <i>ND</i>	0/33 <i>0/1</i>	ND to ND <i>ND</i>	0/28 <i>0/1</i>	ND to ND <i>ND</i>	0/28 <i>0/1</i>	ND to ND <i>ND</i>
Bis(2-chloroisopropyl)ether (5.0 µg/L)	0/13 <i>0/1</i>	ND to ND <i>ND</i>	0/12 <i>0/1</i>	ND to ND <i>ND</i>	0/33 <i>0/1</i>	ND to ND <i>ND</i>	0/28 <i>0/1</i>	ND to ND <i>ND</i>	0/28 <i>0/1</i>	ND to ND <i>ND</i>
Bromodichloromethane (100 µg/L)	0/14 <i>0/1</i>	ND to ND <i>ND</i>	1/12 <i>0/1</i>	ND to 10 <i>ND</i>	5/33 <i>0/1</i>	ND to 10 <i>ND</i>	0/28 <i>0/1</i>	ND to ND <i>ND</i>	0/28 <i>0/1</i>	ND to ND <i>ND</i>
Carbazole (11 µg/L)	0/13 <i>0/1</i>	ND to ND <i>ND</i>	0/12 <i>0/1</i>	ND to ND <i>ND</i>	0/33 <i>0/1</i>	ND to ND <i>ND</i>	0/28 <i>0/1</i>	ND to ND <i>ND</i>	0/28 <i>0/1</i>	ND to ND <i>ND</i>
1,1-Dichloroethene (7.0 µg/L)	0/14 <i>0/1</i>	ND to ND <i>ND</i>	0/12 <i>0/1</i>	ND to ND <i>ND</i>	0/33 <i>0/1</i>	ND to ND <i>ND</i>	0/28 <i>0/1</i>	ND to ND <i>ND</i>	0/28 <i>0/1</i>	ND to ND <i>ND</i>
1,2-Dichloroethene (total) (NA <sup>f</sup> µg/L)	0/12 <i>0/1</i>	ND to ND <i>ND</i>	0/12 <i>0/1</i>	ND to ND <i>ND</i>	0/33 <i>0/1</i>	ND to ND <i>ND</i>	0/28 <i>0/1</i>	ND to ND <i>ND</i>	0/28 <i>0/1</i>	ND to ND <i>ND</i>
4-Nitroaniline (NA <sup>f</sup> µg/L)	0/13 <i>0/1</i>	ND to ND <i>ND</i>	0/12 <i>0/1</i>	ND to ND <i>ND</i>	0/33 <i>0/1</i>	ND to ND <i>ND</i>	0/28 <i>0/1</i>	ND to ND <i>ND</i>	0/28 <i>0/1</i>	ND to ND <i>ND</i>
Tetrachloroethene (NA <sup>f</sup> µg/L)	0/14 <i>0/1</i>	ND to ND <i>ND</i>	0/12 <i>0/1</i>	ND to ND <i>ND</i>	0/33 <i>0/1</i>	ND to ND <i>ND</i>	1/28 <i>0/1</i>	ND to 10 <i>ND</i>	0/28 <i>0/1</i>	ND to ND <i>ND</i>
Trichloroethene (5.0 µg/L)	0/14 <i>0/1</i>	ND to ND <i>ND</i>	0/12 <i>0/1</i>	ND to ND <i>ND</i>	0/33 <i>0/1</i>	ND to ND <i>ND</i>	0/28 <i>0/1</i>	ND to ND <i>ND</i>	0/42 <i>0/2</i>	ND to ND <i>ND to ND</i>
Vinyl Chloride (2.0 µg/L)	0/14 <i>0/1</i>	ND to ND <i>ND</i>	0/12 <i>0/1</i>	ND to ND <i>ND</i>	0/33 <i>0/1</i>	ND to ND <i>ND</i>	0/28 <i>0/1</i>	ND to ND <i>ND</i>	0/28 <i>0/1</i>	ND to ND <i>ND</i>

<sup>a</sup>From Operable Unit 5 Record of Decision, Table 9-4

<sup>b</sup>If there was more than one sample result per day (e.g., a duplicate sample), then only the maximum sample concentration was counted and compared to the FRL.

<sup>c</sup>Rejected data qualified with either a R or Z were not used in this comparison.

<sup>d</sup>ND = not detected

<sup>e</sup>LCS = leachate collection system; LDS = leak detection system; HTW = horizontal till well

<sup>f</sup>NA = not applicable

TABLE 3-2

ON-SITE DISPOSAL FACILITY CELL 2 DATA SUMMARY FOR FIRST QUARTER 2001

Note: Non-italicized pertains to total number of samples (including first quarter samples); *Italicized* pertains to first quarter samples only. Shading indicates at least one detection for that constituent at that location.

Constituent (FRL) <sup>a</sup>	LCS <sup>b,c,d,e</sup> (12339C)		LDS <sup>b,c,d,f</sup> (12339D)		HTW <sup>b,c,d,e</sup> (12339)		Great Miami Aquifer			
	No. of Samples with Detections	Range	No. of Samples with Detections	Range	No. of Samples with Detections	Range	Upgradient <sup>b,c,d</sup> (22200)		Downgradient <sup>b,c,d</sup> (22199)	
	No. of Samples		No. of Samples		No. of Samples		No. of Samples with Detections	Range	No. of Samples with Detections	Range
Total Organic Carbon (NA <sup>g</sup> mg/L)	7/10 <i>1/1</i>	ND to 6.25 <i>2.86</i>	10/11 <i>2/2</i>	ND to 26.1 <i>3.26 to 3.44</i>	26/31 <i>1/1</i>	ND to 11.1 <i>2.33</i>	21/23 <i>1/1</i>	ND to 47.6 <i>1.96</i>	18/23 <i>1/1</i>	ND to 51.8 <i>1.54</i>
Total Organic Halogens (NA <sup>g</sup> mg/L)	4/10 <i>0/1</i>	ND to 0.0576 <i>ND</i>	4/11 <i>0/2</i>	ND to 0.138 <i>ND to ND</i>	20/31 <i>0/1</i>	ND to 0.101 <i>ND</i>	11/23 <i>1/1</i>	ND to 0.177 <i>0.00578</i>	10/23 <i>1/1</i>	ND to 0.0386 <i>0.00476</i>
Boron (0.33 mg/L)	10/11 <i>1/1</i>	ND to 0.915 <i>0.389</i>	11/11 <i>2/2</i>	0.289 to 2.22 <i>0.421 to 0.424</i>	19/31 <i>1/1</i>	ND to 0.0829 <i>0.055</i>	15/23 <i>1/1</i>	ND to 0.158 <i>0.0431</i>	16/23 <i>1/1</i>	ND to 0.0569 <i>0.0343</i>
Mercury (0.0020 mg/L)	0/10 <i>0/1</i>	ND to ND <i>ND</i>	0/11 <i>0/2</i>	ND to ND <i>ND to ND</i>	2/30 <i>0/1</i>	ND to 0.00037 <i>ND</i>	0/22 <i>0/1</i>	ND to ND <i>ND</i>	0/22 <i>0/1</i>	ND to ND <i>ND</i>
Technetium-99 (94 pCi/L)	1/10 <i>0/1</i>	ND to 21.25 <i>ND</i>	1/10 <i>0/2</i>	ND to 15.99 <i>ND to ND</i>	5/32 <i>0/1</i>	ND to 12 <i>ND</i>	0/23 <i>0/1</i>	ND to ND <i>ND</i>	0/23 <i>0/1</i>	ND to ND <i>ND</i>
Total Uranium (20 µg/L)	10/10 <i>1/1</i>	4.51 to 39.299 <i>27.514</i>	10/10 <i>1/1</i>	9.334 to 71 <i>10.588</i>	31/32 <i>1/1</i>	ND to 3.607 <i>2.938</i>	15/23 <i>0/1</i>	ND to 1.11 <i>ND</i>	23/23 <i>1/1</i>	0.259 to 12.1 <i>0.737</i>
Alpha-chlordane (2.0 µg/L)	0/10 <i>0/1</i>	ND to ND <i>ND</i>	0/11 <i>0/2</i>	ND to ND <i>ND to ND</i>	0/31 <i>0/1</i>	ND to ND <i>ND</i>	0/23 <i>0/1</i>	ND to ND <i>ND</i>	0/23 <i>0/1</i>	ND to ND <i>ND</i>
Bis(2-chloroisopropyl)ether (5.0 µg/L)	0/10 <i>0/1</i>	ND to ND <i>ND</i>	0/11 <i>0/2</i>	ND to ND <i>ND to ND</i>	0/31 <i>0/1</i>	ND to ND <i>ND</i>	0/23 <i>0/1</i>	ND to ND <i>ND</i>	0/23 <i>0/1</i>	ND to ND <i>ND</i>
Bromodichloromethane (100 µg/L)	0/11 <i>0/1</i>	ND to ND <i>ND</i>	0/11 <i>0/2</i>	ND to ND <i>ND to ND</i>	1/31 <i>0/1</i>	ND to 10 <i>ND</i>	0/23 <i>0/1</i>	ND to ND <i>ND</i>	0/23 <i>0/1</i>	ND to ND <i>ND</i>
Carbazole (11 µg/L)	0/11 <i>0/1</i>	ND to ND <i>ND</i>	0/11 <i>0/2</i>	ND to ND <i>ND to ND</i>	0/31 <i>0/1</i>	ND to ND <i>ND</i>	0/23 <i>0/1</i>	ND to ND <i>ND</i>	0/23 <i>0/1</i>	ND to ND <i>ND</i>
1,1-Dichloroethene (7.0 µg/L)	0/11 <i>0/1</i>	ND to ND <i>ND</i>	0/11 <i>0/2</i>	ND to ND <i>ND to ND</i>	0/31 <i>0/1</i>	ND to ND <i>ND</i>	0/23 <i>0/1</i>	ND to ND <i>ND</i>	0/23 <i>0/1</i>	ND to ND <i>ND</i>
1,2-Dichloroethene (total) (NA <sup>g</sup> µg/L)	0/9 <i>0/1</i>	ND to ND <i>ND</i>	0/11 <i>0/2</i>	ND to ND <i>ND to ND</i>	0/31 <i>0/1</i>	ND to ND <i>ND</i>	0/23 <i>0/1</i>	ND to ND <i>ND</i>	0/23 <i>0/1</i>	ND to ND <i>ND</i>
4-Nitroaniline (NA <sup>g</sup> µg/L)	0/10 <i>0/1</i>	ND to ND <i>ND</i>	0/11 <i>0/2</i>	ND to ND <i>ND to ND</i>	0/31 <i>0/1</i>	ND to ND <i>ND</i>	0/23 <i>0/1</i>	ND to ND <i>ND</i>	0/23 <i>0/1</i>	ND to ND <i>ND</i>
Tetrachloroethene (NA <sup>g</sup> µg/L)	0/11 <i>0/1</i>	ND to ND <i>ND</i>	0/11 <i>0/2</i>	ND to ND <i>ND to ND</i>	0/31 <i>0/1</i>	ND to ND <i>ND</i>	0/23 <i>0/1</i>	ND to ND <i>ND</i>	0/23 <i>0/1</i>	ND to ND <i>ND</i>
Trichloroethene (5.0 µg/L)	0/11 <i>0/1</i>	ND to ND <i>ND</i>	0/11 <i>0/2</i>	ND to ND <i>ND to ND</i>	0/31 <i>0/1</i>	ND to ND <i>ND</i>	0/23 <i>0/1</i>	ND to ND <i>ND</i>	0/23 <i>0/1</i>	ND to ND <i>ND</i>
Vinyl Chloride (2.0 µg/L)	0/11 <i>0/1</i>	ND to ND <i>ND</i>	0/11 <i>0/2</i>	ND to ND <i>ND to ND</i>	0/31 <i>0/1</i>	ND to ND <i>ND</i>	0/23 <i>0/1</i>	ND to ND <i>ND</i>	0/23 <i>0/1</i>	ND to ND <i>ND</i>

<sup>a</sup>From Operable Unit 5 Record of Decision, Table 9-4

<sup>b</sup>If there was more than one sample result per day (e.g., a duplicate sample), then only the maximum sample concentration was counted and compared to the FRL.

<sup>c</sup>Rejected data qualified with either a R or Z were not used in this comparison.

<sup>d</sup>ND = not detected

<sup>e</sup>LCS = leachate collection system; LDS = leak detection system; HTW = horizontal till well

<sup>f</sup>Cell 2 LDS data from December 1998 to present are suspect due to a December 1998/January 1999 back-up of leachate from the leachate transmission system line into the Cell 2 LDS layer and the resultant residual contamination of the LDS layer from the back-up.

<sup>g</sup>NA = not applicable

TABLE 3-3

## ON-SITE DISPOSAL FACILITY CELL 3 DATA SUMMARY FOR FIRST QUARTER 2001

Note: Non-italicized pertains to total number of samples (including first quarter samples); *Italicized* pertains to first quarter samples only. Shading indicates at least one detection for that constituent at that location.

Constituent (FRL) <sup>a</sup>	LCS <sup>b,c,d,e</sup> (12340C)		HTW <sup>b,c,d,e</sup> (12340)		Great Miami Aquifer			
	No. of Samples with Detections	Range	No. of Samples with Detections	Range	Upgradient <sup>b,c,d</sup> (22203)		Downgradient <sup>b,c,d</sup> (22204)	
	No. of Samples		No. of Samples		No. of Samples with Detections	Range	No. of Samples with Detections	Range
Total Organic Carbon (NA <sup>f</sup> mg/L)	5/7 1/1	ND to 34.2 1.75	17/26 1/1	ND to 9.81 2.31	10/21 1/1	ND to 14.1 1.5	10/21 1/1	ND to 8.83 1.59
Total Organic Halogens (NA <sup>f</sup> mg/L)	3/7 0/1	ND to 0.178 ND	20/26 1/1	ND to 0.158 0.00818	10/21 1/1	ND to 0.213 0.00304	8/22 0/1	ND to 0.165 ND
Boron (0.33 mg/L)	7/7 1/1	0.202 to 1.51 1.4	21/25 1/1	ND to 0.24 0.172	13/21 1/1	ND to 0.0776 0.0347	14/21 1/1	ND to 0.179 0.0311
Mercury (0.0020 mg/L)	0/7 0/1	ND to ND ND	1/25 0/1	ND to 0.00026 ND	0/20 0/1	ND to ND ND	2/20 0/1	ND to 0.00028 ND
Technetium-99 (94 pCi/L)	0/7 0/1	ND to ND ND	2/25 0/1	ND to 38.35 ND	1/21 0/1	ND to 22.92 ND	0/21 0/1	ND to ND ND
Total Uranium (20 µg/L)	7/7 1/1	9.27 to 50.671 50.671	23/25 1/1	ND to 9.14 8.044	16/21 1/1	ND to 2.522 0.744	20/21 1/1	ND to 5.924 0.455
Alpha-chlordane (2.0 µg/L)	0/7 0/1	ND to ND ND	0/26 0/1	ND to ND ND	0/21 0/1	ND to ND ND	0/21 0/1	ND to ND ND
Bis(2-chloroisopropyl)ether (5.0 µg/L)	0/7 0/1	ND to ND ND	0/26 0/1	ND to ND ND	0/21 0/1	ND to ND ND	0/21 0/1	ND to ND ND
Bromodichloromethane (100 µg/L)	0/7 0/1	ND to ND ND	0/25 0/1	ND to ND ND	0/21 0/1	ND to ND ND	0/21 0/1	ND to ND ND
Carbazole (11 µg/L)	0/7 0/1	ND to ND ND	0/26 0/1	ND to ND ND	0/21 0/1	ND to ND ND	0/21 0/1	ND to ND ND
1,1-Dichloroethene (7.0 µg/L)	0/7 0/1	ND to ND ND	0/25 0/1	ND to ND ND	0/21 0/1	ND to ND ND	0/21 0/1	ND to ND ND
1,2-Dichloroethene (total) (NA <sup>f</sup> µg/L)	0/6 0/1	ND to ND ND	0/25 0/1	ND to ND ND	0/21 0/1	ND to ND ND	0/21 0/1	ND to ND ND
4-Nitroaniline (NA <sup>f</sup> µg/L)	0/7 0/1	ND to ND ND	0/26 0/1	ND to ND ND	0/21 0/1	ND to ND ND	0/21 0/1	ND to ND ND
Tetrachloroethene (NA <sup>f</sup> µg/L)	0/7 0/1	ND to ND ND	0/25 0/1	ND to ND ND	0/21 0/1	ND to ND ND	0/21 0/1	ND to ND ND
Trichloroethene (5.0 µg/L)	0/7 0/1	ND to ND ND	0/25 0/1	ND to ND ND	0/21 0/1	ND to ND ND	0/21 0/1	ND to ND ND
Vinyl Chloride (2.0 µg/L)	0/7 0/1	ND to ND ND	0/25 0/1	ND to ND ND	0/21 0/1	ND to ND ND	0/21 0/1	ND to ND ND

<sup>a</sup>From Operable Unit 5 Record of Decision, Table 9-4

<sup>b</sup>If there was more than one sample result per day (e.g., a duplicate sample), then only the maximum sample concentration was counted and compared to the FRL.

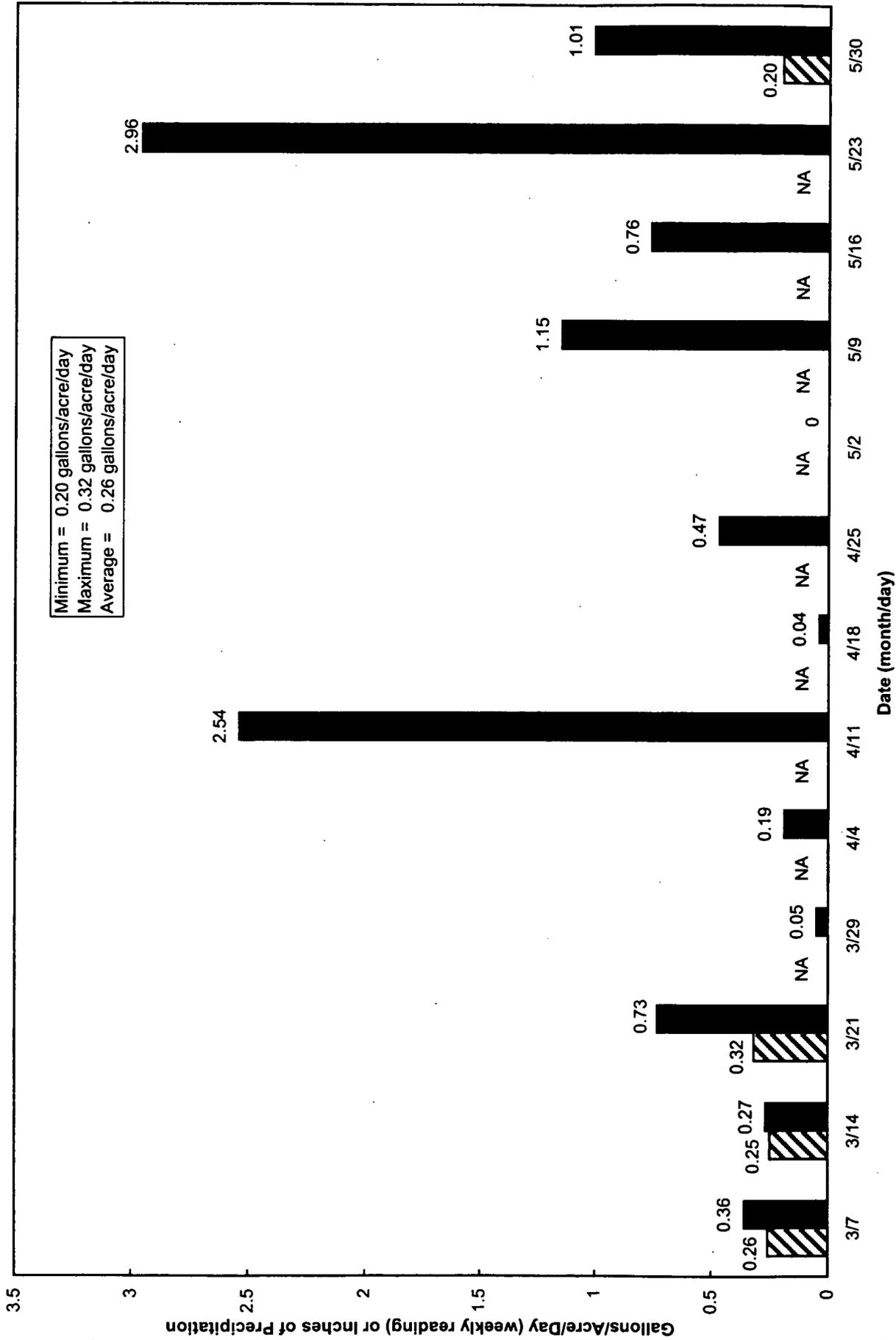
<sup>c</sup>Rejected data qualified with either a R or Z were not used in this comparison.

<sup>d</sup>ND = not detected

<sup>e</sup>HTW = horizontal till well; LCS = leachate collection system;

<sup>f</sup>NA = not applicable

020000

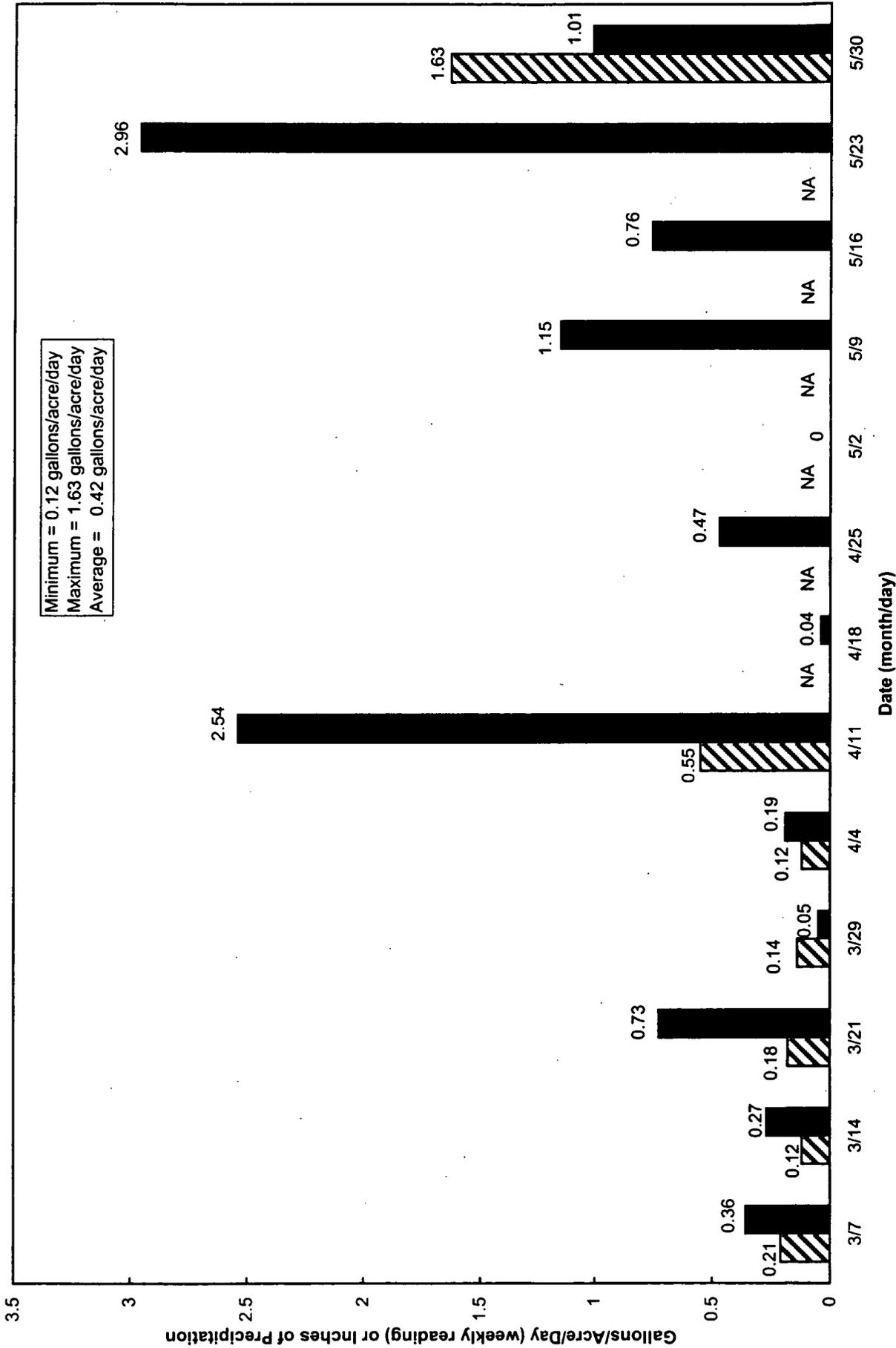


Minimum = 0.20 gallons/acre/day  
 Maximum = 0.32 gallons/acre/day  
 Average = 0.26 gallons/acre/day

Note: NA = accumulation rate not available due to tie in to the new EPLTS.

■ Accumulation Rate ■ FEMP Precipitation

FIGURE 3-1. 2001 ON-SITE DISPOSAL FACILITY LDS ACCUMULATION RATES FOR CELL 1



Minimum = 0.12 gallons/acre/day  
 Maximum = 1.63 gallons/acre/day  
 Average = 0.42 gallons/acre/day

Note: NA = accumulation rate not available due to tie in to the new EPLTS.

■ Accumulation Rate ■ FEMP Precipitation

FIGURE 3-2. 2001 ON-SITE DISPOSAL FACILITY LDS ACCUMULATION RATES FOR CELL 2

FINAL

## 4.0 SURFACE WATER MONITORING DATA

### 4.1 DATA COVERED

This IEMP data quarterly summary covers all surface water monitoring data collected under the IEMP program that were added to the IEMP Data Information Site from April 1 through June 30, 2001, as discussed in Section 1.0. Specifically, this includes:

- National Pollutant Discharge Elimination System (NPDES) data from March through May 2001
- Federal Facilities Compliance Agreement (FFCA) data from March through May 2001
- IEMP characterization monitoring data from the first quarter of 2001
- Turbidity monitoring in Paddys Run from April through June 2001.

All of these data sets are complete in accordance with sampling requirements identified in the IEMP, Revision 2, for the time periods identified.

### 4.2 NOTABLE RESULTS AND EVENTS

Notable results and events are those that impact, or could potentially impact, the scope of IEMP monitoring or remediation operations at the Fernald site. Notable results and events associated with the surface water monitoring program data identified above are as follows:

- NPDES Permit noncompliances: The following table lists the NPDES noncompliances that occurred and were reported to OEPA, as required, during the period under evaluation. The total suspended solids noncompliances at the Parshall Flume (PF 4001) resulted from the advanced wastewater treatment facility Phase 2 clarifier upset as described below.

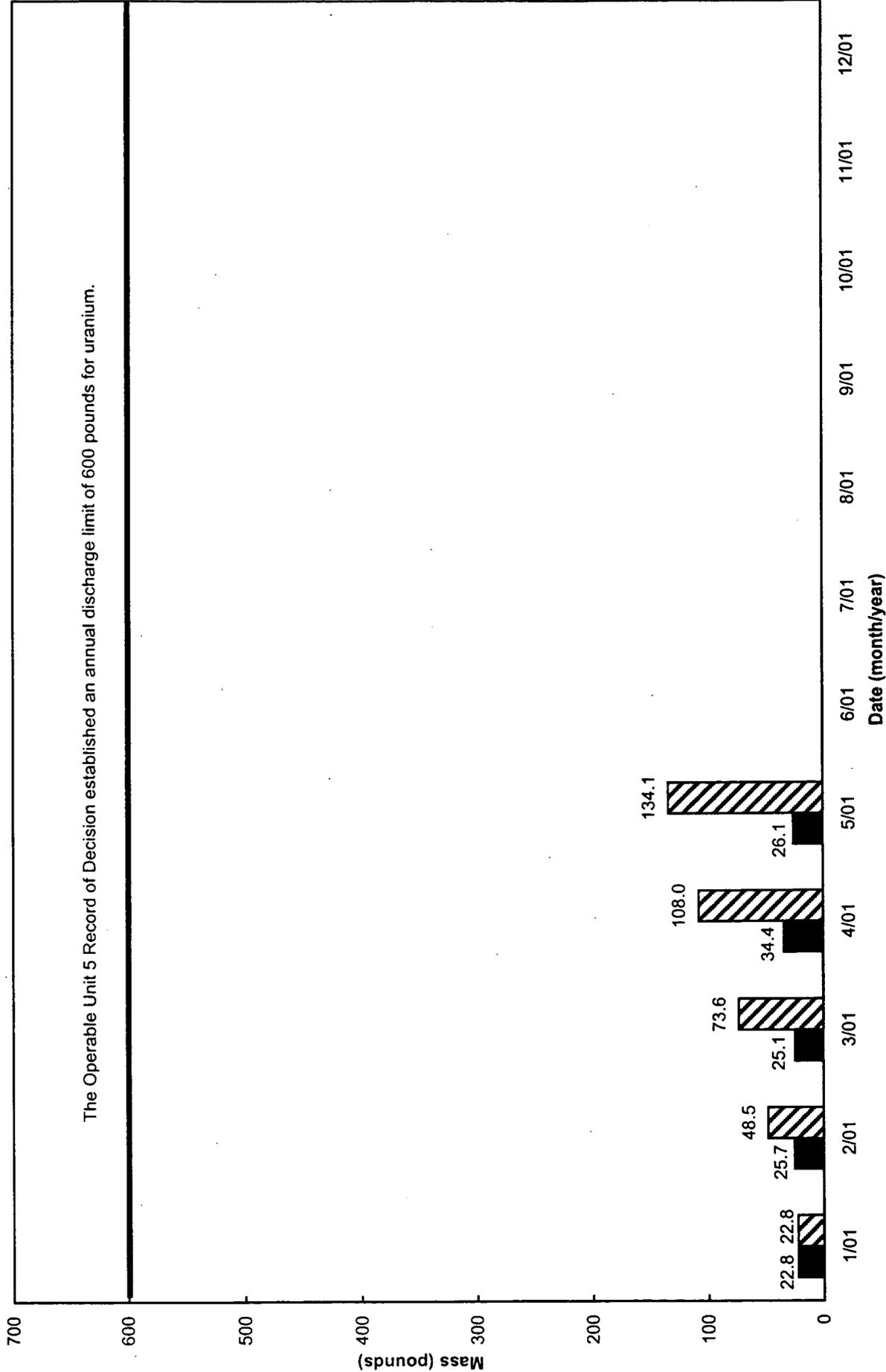
Date	Location	Parameter	Limit	Result
April 25, 2001	PF 4001	Total Suspended Solids	20 mg/L	40.8 mg/L
April 25, 2001	PF 4001	Total Suspended Solids	473 kg/d	828.4 kg/d
May 21, 2001	STP 4601	Total Suspended Solids	40 mg/L	77.0 mg/L
May 21, 2001	STP 4601	Total Suspended Solids	24.2 kg/d	25.36 kg/d
May 28, 2001	STP 4601	Total Suspended Solids	40 mg/L	60.0 mg/L
May 2001	STP 4601	Total Suspended Solids (avg.)	20 mg/L	29.11 mg/L

- FFCA/Record of Decision compliance: The Operable Unit 5 Record of Decision limit of 20 µg/L at the Parshall Flume (PF 4001) was not met in April 2001. An upset in the advanced wastewater treatment facility Phase 2 clarifier on April 25, 2001, caused the total uranium concentration at the Parshall Flume to be 297 µg/L, resulting in a monthly average concentration of 24.3 µg/L. The 20 µg/L total uranium limit was met in March and May 2001.

- IEMP FRL/benchmark toxicity value (BTV) exceedances: There were no surface water FRL or BTV exceedances during the evaluation period. This review is based on all IEMP characterization monitoring data available from January 1, 2001 through March 31, 2001 and NPDES/FFCA Record of Decision data from March 1, 2001 through May 31, 2001.
- OEPA representatives conducted the annual NPDES compliance inspection on June 13, 2001. Based on the exit interview, no deficiencies were noted in the NPDES Permit program.
- Elevated total uranium concentrations have been experienced at locations SWD-03 and STRM 4005. These elevated concentrations have been discussed with OEPA and EPA. The bio-surge lagoon line leak (repaired on February 2, 2001) may have contributed to these elevated total uranium concentrations, and this possibility will be evaluated as additional routine sampling events occur.
- Eight observations were made for turbidity impacts from the northern drainage ditch on Paddys Run during the second quarter of 2001. During an observation on June 21, 2001, a visibly turbid plume from the northern drainage ditch was found to be affecting the turbidity conditions in Paddys Run. As discussed in previous IEMP reports, the source of this plume is believed to be the railyard sedimentation basin, and several corrective measures have been implemented.
- The investigation of elevated total uranium concentrations (discovered in March 2000) in the northern drainage ditch area was completed in December of 2000. Subsequent sampling revealed elevated total uranium concentrations in drainage from the solid waste landfill. No specific actions are being proposed at this time, although the possibility of accelerating the excavation of the solid waste landfill is being evaluated.
- As discussed in Section 2.0, DOE has prepared and submitted an ESD to the Operable Unit 5 Record of Decision to support revising the groundwater FRL for total uranium to reflect the finalized EPA drinking water standard for total uranium of 30 µg/L. The surface water uranium discharge limit to the Great Miami River established in the Operable Unit 5 Record of Decision is also being revised to reflect the 30 µg/L standard.

A thorough review of the surface water monitoring data covered in this quarterly summary was conducted to identify the notable results. Supplementary figures are also provided here in support of the findings listed above. Figure 4-1 shows pounds of uranium discharged to the Great Miami River from the Parshall Flume to-date in 2001. Figure 4-2 shows the 2001 monthly average total uranium concentrations in water discharged from the Parshall Flume. All data covered by this quarterly summary are available on the IEMP Data Information Site. Maps of NPDES and surface water sample locations are also provided on the IEMP Data Information Site.

The Operable Unit 5 Record of Decision established an annual discharge limit of 600 pounds for uranium.



Note: Sum of monthly discharges may not always agree with cumulative total due to rounding differences.

■ Monthly ▨ Cumulative

FIGURE 4-1. POUNDS OF URANIUM DISCHARGED TO THE GREAT MIAMI RIVER FROM THE PARSHALL FLUME (PF 4001) IN 2001

FINAL

The Operable Unit 5 Record of Decision established a monthly discharge limit of 20 µg/L for total uranium.

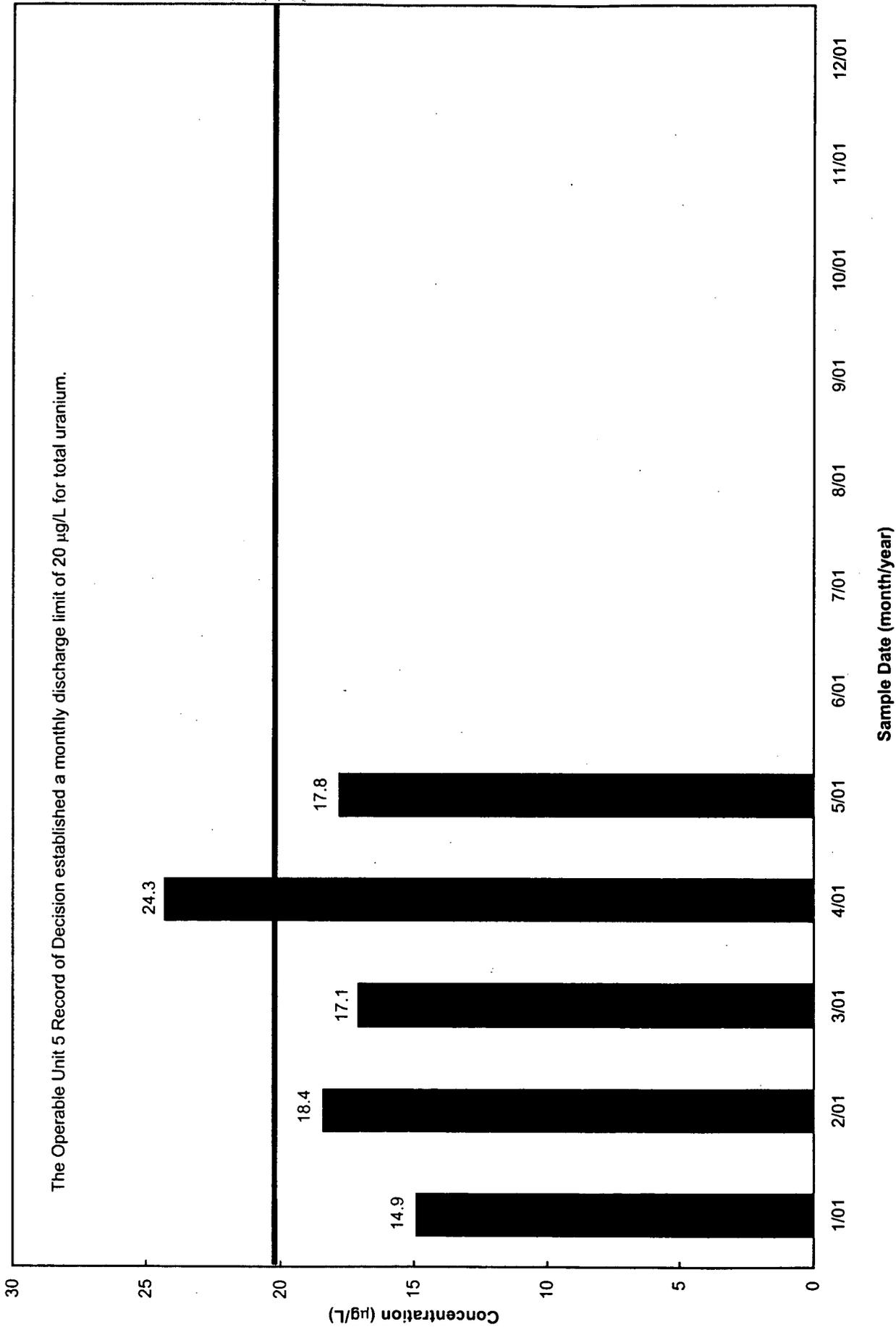


FIGURE 4-2. 2001 MONTHLY AVERAGE TOTAL URANIUM CONCENTRATION IN WATER DISCHARGED FROM THE PARSHALL FLUME (PF 4001) TO THE GREAT MIAMI RIVER

FINAL

## 5.0 AIR MONITORING DATA

### 5.1 DATA COVERED

This IEMP data quarterly summary covers all air monitoring data collected under the IEMP program that were added to the IEMP Data Information Site from April 1 through June 30, 2001, as discussed in Section 1.0. Specifically, this includes:

- Radiological air particulate monitoring results from biweekly and quarterly composite samples from March through June 4, 2001
- National Emissions Standards for Hazardous Air Pollutants stack emissions monitoring from the first quarter of 2001
- Radon monitoring, including environmental radon and silos headspace radon, from March through May 2001. Note that June 2001 monthly average radon concentrations are included in Figure 5-10 to support findings discussed in the text. These data will be available on the Extranet at the time this summary is submitted, and summarized in the next quarterly summary.
- Direct radiation (thermoluminescent dosimeter [TLD]) monitoring from the first quarter of 2001.

All of the data sets for the aforementioned programs are complete in accordance with sampling requirements identified in the IEMP, Revision 2 for the time periods identified.

### 5.2 NOTABLE RESULTS AND EVENTS

Notable results and events are those that impact, or could potentially impact, the scope of IEMP monitoring or remediation operations at the Fernald site. Notable results and events associated with IEMP air monitoring data for the time period covered by this quarterly summary include the following:

- There was a general increase in uranium and thorium-230 concentrations at the site fenceline, particularly in the northeast quadrant of the site during the first quarter of 2001. The increases reflect the sequential operations phase testing of the Waste Pits Remedial Action Project (WPRAP) that was conducted through March 2, 2001. Following the completion of the testing at WPRAP, practices to control fugitive emissions and a limit on the thorium-230 concentration of waste material fed into the dryers were implemented. These practices, in combination with changes in the properties of waste processed at WPRAP, led to a general decrease in uranium and thorium concentrations at the fenceline. Figures 5-1 through 5-6 demonstrate these findings.
- The maximum first quarter 2001 annual dose at the site fenceline air monitoring stations was 0.27 millirem (mrem). The maximum dose occurred at AMS-3. On average, thorium isotopes contributed approximately 59 percent of the quarterly dose measured at all air monitors. In particular, thorium-230 contributed 51 percent of the dose, while uranium and radium-226 contributed an average of approximately 29 percent and 12 percent, respectively.

- As noted in previous IEMP quarterly status reports, direct radiation (TLD) measurements have shown a positive upward trend in the immediate area of the K-65 Silos (locations 22 through 26 [refer to Figure 5-7]) and, to a lesser extent, at the site fenceline nearest the K-65 Silos (location 6 [refer to Figure 5-8]). During the first quarter of 2001, decreases in the silo headspace concentration of radon lead to a slight decrease in the direct radiation measurements in the vicinity of the K-65 Silos and at location 6 at the property boundary.
- During the first and second quarters of 2001, there was a significant decrease in the silo headspace radon concentrations (refer to Figure 5-9). The lower headspace concentrations have been confirmed through periodic headspace grab samples. Periodic decreases in silo headspace concentrations have occurred in the past and are apparently related to seasonal weather patterns. However, the decreases during the first half of 2001 are generally larger than what has been previously observed. The decreasing headspace concentrations do not appear to be related to an increase in the silo leakage rate since the average radon levels at the exclusion fence monitors (KNE, KSE, etc.) have been generally stable since the fourth quarter of 2000 (refer to Figure 5-10). A possible cause for the larger decrease in measured silo headspace radon concentrations would be variations in response to the different headspace monitoring instruments which are routinely exchanged for calibration or instrument failure.
- During the period of March through May 2001, there were three exceedances of the DOE Order 5400.5 100 picoCuries per liter (pCi/L) radon limit. For comparison, there were five exceedances of the 100 pCi/L radon limit during that same time period in 2000.

A thorough review of the air monitoring data covered by this quarterly summary was conducted to identify the notable results. Supplementary tables and figures are also provided here in support of the findings listed above. Table 5-1 contains the first quarter doses for each air monitoring station and the fractional contribution of each radionuclide to the total dose. Tables 5-2 through 5-6 summarize the total uranium, total particulate and isotopic thorium concentrations at the fenceline during the first quarter of 2001. Table 5-7 summarizes the current (March through May 2001) and 2001 year-to-date environmental radon data from continuous monitors. All data covered by this quarterly summary are available on the IEMP Data Information Site, as well as maps showing the locations of air monitoring stations.

TABLE 5-1  
FIRST QUARTER 2001 NESHAP COMPLIANCE TRACKING

40 CFR 61 (NESHAP) Subpart H Appendix E, Table 2; Net Ratios <sup>a</sup>														
Location	Ac-228 <sup>b</sup>	Ra-224 <sup>b</sup>	Ra-226	Ra-228 <sup>b</sup>	Th-228	Th-230	Th-231 <sup>b</sup>	Th-232	Th-234 <sup>b</sup>	U-234	U-235/ U-236	U-238	Ratio Totals	Dose <sup>c</sup> (mrem)
<b>Fenceline</b>														
AMS-2	1.0E-07	2.5E-06	2.3E-03	6.4E-05	1.8E-04	2.9E-03	3.4E-09	6.1E-04	7.1E-06	1.8E-03	1.3E-04	1.9E-03	0.0098	0.098
AMS-3	3.6E-07	8.8E-06	6.4E-03	2.2E-04	3.6E-04	9.0E-03	9.0E-09	2.1E-03	1.8E-05	4.1E-03	3.5E-04	4.6E-03	0.027	0.273
AMS-4	--	--	--	--	--	5.6E-03	8.6E-10	--	1.4E-06	3.2E-04	3.4E-05	3.6E-04	0.0013	0.013
AMS-5	--	--	3.0E-03	--	--	1.8E-03	--	--	1.5E-06	2.7E-04	--	4.0E-04	0.0054	0.054
AMS-6	1.2E-07	3.0E-06	1.6E-04	7.7E-05	1.1E-04	8.2E-03	--	7.3E-04	3.7E-06	9.0E-04	--	9.8E-04	0.011	0.112
AMS-7	--	--	--	--	--	2.0E-03	7.9E-10	--	1.0E-06	2.0E-04	3.1E-06	2.7E-04	0.0025	0.025
AMS-8A	3.8E-07	9.4E-06	2.9E-03	2.4E-04	3.5E-04	6.1E-03	6.9E-09	2.3E-03	1.6E-05	3.7E-03	2.7E-04	4.2E-03	0.020	0.201
AMS-9C	3.0E-07	7.3E-06	--	1.9E-04	1.8E-04	7.5E-03	9.2E-09	1.8E-03	1.9E-05	4.7E-03	3.6E-04	5.0E-03	0.020	0.197
AMS-22	3.7E-07	9.0E-06	4.3E-04	2.3E-04	1.1E-04	6.6E-03	4.5E-09	2.2E-03	7.4E-06	1.8E-04	1.7E-05	2.0E-03	0.013	0.135
AMS-23	4.5E-07	1.1E-06	1.5E-03	2.8E-05	1.9E-05	3.3E-03	2.3E-09	2.7E-04	4.4E-06	1.0E-04	8.9E-05	1.2E-03	0.0074	0.074
AMS-24	--	--	--	--	1.5E-05	1.7E-03	6.3E-10	--	7.7E-07	2.0E-04	2.5E-05	2.1E-04	0.0022	0.022
AMS-25	8.1E-08	2.0E-06	--	5.1E-05	--	3.2E-03	1.6E-09	4.8E-04	7.5E-07	2.5E-04	6.4E-05	2.0E-04	0.0043	0.043
AMS-26	3.0E-08	7.4E-06	1.7E-03	1.9E-05	--	3.7E-03	1.8E-09	1.8E-04	4.5E-06	1.1E-03	7.2E-05	1.2E-03	0.0079	0.079
AMS-27	1.0E-07	2.5E-06	9.5E-04	6.3E-05	--	1.1E-03	1.2E-09	6.0E-04	9.0E-07	8.6E-05	4.7E-05	2.4E-04	0.0031	0.031
AMS-28	7.2E-09	1.8E-06	--	4.5E-05	--	4.0E-03	1.7E-09	4.3E-04	3.1E-06	6.8E-04	6.7E-05	8.2E-04	0.006	0.060
AMS-29	1.2E-07	3.0E-06	--	7.6E-05	--	6.5E-03	3.4E-09	7.2E-04	6.1E-06	1.4E-04	1.3E-04	1.6E-03	0.011	0.0106
<b>Background</b>														
AMS-12	1.3E-07	3.1E-06	1.2E-02	7.9E-05	--	4.9E-04	--	7.5E-04	7.6E-07	1.9E-04	--	2.0E-04	NA <sup>d</sup>	
AMS-16	3.5E-07	8.6E-05	1.6E-02	2.2E-04	5.2E-04	4.6E-04	--	2.1E-03	1.1E-06	3.4E-04	--	2.8E-04	NA <sup>d</sup>	
<b>QA/QC</b>														
Column Check <sup>e</sup>	0.000	0.001	0.193	0.013	0.013	0.683	0.000	0.124	0.001	0.225	0.019	0.252	NA <sup>d</sup>	1.52

Maximum Quarterly Ratio: 0.0273  
Maximum Quarterly Dose (mrem): 0.273

<sup>a</sup>A "--" indicates the filter results were less than or equal to the blank results, and/or the indicator concentrations were less than or equal to the average net background concentrations.

<sup>b</sup>Isotopes assumed to be in equilibrium with their parents.

<sup>c</sup>Dose conversions are based on the NESHAP standard of 10 mrem per year.

<sup>d</sup>NA = not applicable

<sup>e</sup>Column check is the sum of doses from each radionuclide, followed by the sum of doses (1.52) at all fenceline monitors.

00000

TABLE 5-2  
TOTAL URANIUM PARTICULATE CONCENTRATIONS IN AIR

	First Quarter 2001 Results <sup>a</sup> (pCi/m <sup>3</sup> x 1E-6)			2000 Summary Results <sup>a</sup> (pCi/m <sup>3</sup> x 1E-6)			1990 through 2000 Summary Results <sup>a</sup> (pCi/m <sup>3</sup> x 1E-6)			
	No. of Samples	Min.	Max.	Avg.	No. of Samples	Min.	Max.	Avg.	Min.	Max.
<b>Fenceline</b>										
AMS-2	7	19	235	124	26	18	264	89	0	3500
AMS-3	7	108	908	339	26	34	988	223	0	17000
AMS-4	7	16	105	53	26	10	185	45	0	2300
AMS-5	7	13	139	63	26	0	203	41	0	4400
AMS-6	7	13	257	99	26	0	259	87	0	3200
AMS-7	7	0.0	98	53	26	2.7	101	35	0	7800
AMS-8A	7	76	928	360	26	25	841	191	0	1135
AMS-9C <sup>b</sup>	7	105	989	359	26	26	545	187	0	784
AMS-22	7	28	743	159	26	0.52	238	73	0	238
AMS-23	7	35	191	104	26	10	191	68	0	202
AMS-24	7	7.6	87	41	26	0	207	43	0	207
AMS-25	7	4.9	72	34	26	0	215	35	0	402
AMS-26	7	20	340	99	26	9.4	267	50	0	267
AMS-27	7	2.7	117	42	26	0	170	54	0	170
AMS-28	7	23	126	77	26	2.2	153	63	0	445
AMS-29	7	7.6	314	114	26	10	326	76	0	326
<b>Background</b>										
AMS-12	7	0.0	53	15	26	0	43	13	0	480
AMS-16	7	4.9	56	20	26	2.6	143	19	0	350

<sup>a</sup>For blank corrected concentrations less than or equal to 0.0 pCi/m<sup>3</sup>, the concentration is set as 0.0 pCi/m<sup>3</sup>.

<sup>b</sup>Summary results for 1990 through 2000 include AMS-9B/C data.

TABLE 5-3  
TOTAL PARTICULATE CONCENTRATIONS IN AIR

	First Quarter 2001 Results ( $\mu\text{g}/\text{m}^3$ )			2000 Summary Results ( $\mu\text{g}/\text{m}^3$ )			1990 through 2000 Summary Results ( $\mu\text{g}/\text{m}^3$ )			
	No. of Samples	Min.	Max.	Avg.	No. of Samples	Min.	Max.	Avg.	Min.	Max.
<b>Fenceline</b>										
AMS-2	7	24	35	28	26	17	39	29	7.0	77
AMS-3	7	21	29	25	26	17	44	30	8.0	159
AMS-4	7	24	36	29	26	19	55	31	13	79
AMS-5	7	21	31	24	26	20	44	28	9.6	62
AMS-6	7	23	33	29	26	20	45	30	8.0	69
AMS-7	7	3.0	33	26	26	20	52	32	6.8	84
AMS-8A	7	23	35	27	26	20	67	33	13	89
AMS-9C <sup>a</sup>	7	24	35	28	26	19	46	31	7.1	136
AMS-22	7	19	34	29	26	21	45	31	13	57
AMS-23	7	22	34	26	26	11	45	27	11	57
AMS-24	7	15	41	27	26	5	54	32	5.4	79
AMS-25	7	26	48	31	26	23	47	32	17	69
AMS-26	7	21	34	26	26	20	40	28	15	52
AMS-27	7	27	53	41	26	30	72	47	16	92
AMS-28	7	5.8	32	22	26	16	68	27	12	68
AMS-29	7	22	39	29	26	18	45	30	11	62
<b>Background</b>										
AMS-12 <sup>b</sup>	7	20	30	24	26	17	39	26	6.0	416
AMS-16 <sup>b</sup>	7	29	46	36	26	27	52	39	18	84
<b>Project-Specific</b>										
WPTH-2	7	28	41	33	26	25	46	33	25	46

<sup>a</sup>Summary results for 1990 through 2000 include AMS-9B/C data.

<sup>b</sup>Total particulate analysis was discontinued during 1994 and was reinstated for AMS-12 and AMS-16 in 1997.

**TABLE 5-4**  
**THORIUM-228 PARTICULATE CONCENTRATIONS IN AIR**

	First Quarter 2001 Results <sup>a</sup> (pCi/m <sup>3</sup> x 1E-6)			2000 Summary Results <sup>a</sup> (pCi/m <sup>3</sup> x 1E-6)			1990 through 2000 Summary Results <sup>a</sup> (pCi/m <sup>3</sup> x 1E-6)			
	No. of Samples	Min.	Max.	Avg.	No. of Samples	Min.	Max.	Avg.	Min.	Max.
<b>Fenceline</b>										
AMS-2	7	0.0	8.1	3.7	6	0.8	10	5.0	0.8	10
AMS-3	7	2.2	21	7.9	6	1.1	10	4.5	1.1	10
AMS-4	7	0.0	7.5	3.2	6	0.0	8.6	4.2	0.0	8.6
AMS-5	7	0.0	14	3.5	6	0.0	6.1	3.6	0.0	6.1
AMS-6	7	0.0	12	3.3	6	0.0	8.1	5.5	0.0	8.1
AMS-7	7	0.0	3.4	2.0	6	4.4	11	7.1	4.4	11
AMS-8A	7	0.0	29	6.9	6	1.2	13	5.6	1.2	13
AMS-9C <sup>b</sup>	7	4.2	28	9.7	6	3.0	13	6.1	3.0	13
AMS-22	7	0.0	27	5.4	6	1.4	8.6	5.7	1.4	8.6
AMS-23	7	0.0	6.9	3.7	6	0.0	7.6	3.0	0.0	7.6
AMS-24	7	0.0	7.7	2.1	6	0.38	7.5	5.2	0.38	7.5
AMS-25	7	0.0	8.8	3.6	6	0.0	6.7	3.2	0.0	6.7
AMS-26	7	0.0	11	3.8	6	2.6	14	6.0	2.6	14
AMS-27	7	0.0	21	4.5	6	0.37	7.4	3.4	0.37	7.4
AMS-28	7	0.0	10	4.0	26	1.1	14	5.7	0.0	14
AMS-29	7	0.0	20	5.2	6	0.0	7.1	3.2	0.0	7.1
<b>Background</b>										
AMS-12	7	0.0	5.6	2.3	6	0.0	6.7	1.9	0.0	6.7
AMS-16	7	0.0	14	5.4	6	0.0	17	7.1	0.0	17
<b>Background</b>										
WPTH-2	7	0.0	8.9	3.4	26	0.0	13	6.5	0.0	17

<sup>a</sup>For blank corrected concentrations less than or equal to 0.0 pCi/m<sup>3</sup>, the concentration is set as 0.0 pCi/m<sup>3</sup>.

<sup>b</sup>Summary results for 1990 through 2000 include AMS-9B/C data.

TABLE 5-5  
THORIUM-230 PARTICULATE CONCENTRATIONS IN AIR

	First Quarter 2001 Results <sup>a</sup> (pCi/m <sup>3</sup> x 1E-6)			2000 Summary Results <sup>a</sup> (pCi/m <sup>3</sup> x 1E-6)			1990 through 2000 Summary Results <sup>a</sup> (pCi/m <sup>3</sup> x 1E-6)			
	No. of Samples	Min.	Max.	Avg.	No. of Samples	Min.	Max.	Avg.	Min.	Max.
<b>Fenceline</b>										
AMS-2	7	7.0	104	40	6	3.1	27	13	3.1	27
AMS-3	7	7.9	391	139	6	3.4	63	28	3.4	63
AMS-4	7	1.0	81	21	6	0.0	23	11	0.0	23
AMS-5	7	0.0	620	105	6	0.0	43	14	0.0	43
AMS-6	7	6.3	226	53	6	0.0	74	36	0.0	74
AMS-7	7	0.0	34	9.0	6	0.0	44	21	0.0	44
AMS-8A	7	5.1	461	123	6	6.3	71	29	6.3	71
AMS-9C <sup>b</sup>	7	4.8	407	122	6	12	78	38	12	78
AMS-22	7	15	493	99	6	12	46	24	12	46
AMS-23	7	7.8	153	47	6	1.5	19	9.5	1.5	19
AMS-24	7	0.0	125	24	6	3.4	24	12	3.4	24
AMS-25	7	0.0	223	40	6	0.37	23	11	0.37	23
AMS-26	7	0.0	233	49	6	2.6	37	15	2.6	37
AMS-27	7	0.0	68	25	6	0.0	99	27	0.0	99
AMS-28	7	10	123	48	26	7	357	94	0.0	357
AMS-29	7	13	537	99	6	6.1	45	18	6.1	45
<b>Background</b>										
AMS-12	7	0.0	12	3.9	6	0.0	9.3	3.3	0.0	9.3
AMS-16	7	0.0	18	7.3	6	0.0	18	9.2	0.0	18
<b>Background</b>										
WPTH-2	7	25	82	54	26	0.73	557	96	0.73	557

<sup>a</sup>For blank corrected concentrations less than or equal to 0.0 pCi/m<sup>3</sup>, the concentration is set as 0.0 pCi/m<sup>3</sup>.

<sup>b</sup>Summary results for 1990 through 2000 include AMS-9B/C data.

**TABLE 5-6**  
**THORIUM-232 PARTICULATE CONCENTRATIONS IN AIR**

	First Quarter 2001 Results <sup>a</sup> (pCi/m <sup>3</sup> x 1E-6)			2000 Summary Results <sup>a</sup> (pCi/m <sup>3</sup> x 1E-6)			1990 through 2000 Summary Results <sup>a</sup> (pCi/m <sup>3</sup> x 1E-6)			
	No. of Samples	Min.	Max.	Avg.	No. of Samples	Min.	Max.	Avg.	Min.	Max.
<b>Fenceline</b>										
AMS-2	7	0.0	13	6.3	6	0.0	8.6	3.7	0.0	8.6
AMS-3	7	0.0	20	7.3	6	0.0	9.8	5.3	0.0	9.8
AMS-4	7	0.0	11	2.8	6	0.0	9.3	3.9	0.0	9.3
AMS-5	7	0.0	15	5.3	6	0.0	9.1	3.3	0.0	9.1
AMS-6	7	0.0	7.7	2.3	6	0.0	8.1	3.9	0.0	8.1
AMS-7	7	0.0	8.1	3.0	6	0.38	12	5.0	0.38	12
AMS-8A	7	1.1	24	7.8	6	0.0	8.4	5.1	0.0	8.4
AMS-9C <sup>b</sup>	7	2.7	34	12	6	1.8	11	5.5	1.8	11
AMS-22	7	0.0	35	7.0	6	0.0	6.5	3.8	0.0	6.5
AMS-23	7	0.0	13	4.3	6	0.0	5.2	3.1	0.0	5.2
AMS-24	7	0.0	3.0	1.6	6	0.0	9.1	5.0	0.0	9.1
AMS-25	7	0.0	10	3.1	6	1.1	10	3.8	1.1	10
AMS-26	7	0.0	8.3	4.9	6	0.38	14	4.0	0.38	14
AMS-27	7	0.0	14	3.6	6	0.0	7.8	4.0	0.0	7.8
AMS-28	7	0.0	4.5	2.3	26	0.0	17	6.0	0.0	17
AMS-29	7	0.0	18	4.2	6	0.0	13	4.5	0.0	13
<b>Background</b>										
AMS-12	7	0.0	4.2	1.5	6	0.0	9.3	4.8	0.0	9.3
AMS-16	7	0.0	8.0	3.9	6	0.0	14	6.0	0.0	14
<b>Background</b>										
WPTH-2	7	2.2	7.7	4.8	26	0.0	13	6.4	0.0	17

<sup>a</sup>For blank corrected concentrations less than or equal to 0.0 pCi/m<sup>3</sup>, the concentration is set as 0.0 pCi/m<sup>3</sup>.

<sup>b</sup>Summary results for 1990 through 2000 include AMS-9B/C data.

TABLE 5-7

CONTINUOUS ENVIRONMENTAL RADON MONITORING  
AVERAGE CONCENTRATIONS<sup>a</sup>

Location	March 2001 through May 2001 Summary Results (Instrument Background Corrected) <sup>b</sup> (pCi/L)			2001 Year-to-Date Summary Results (Instrument Background Corrected) <sup>b</sup> (pCi/L)		
	Min.	Max.	Avg.	Min.	Max.	Avg.
<b>Fenceline</b>						
AMS-02	0.1	0.2	0.1	0.1	0.2	0.1
AMS-03	0.1	0.2	0.1	0.1	0.2	0.1
AMS-04	0.2	0.2	0.2	0.1	0.2	0.2
AMS-05	0.1	0.3	0.2	0.1	0.3	0.2
AMS-06	0.1	0.2	0.2	0.1	0.2	0.2
AMS-07	0.3	0.4	0.3	0.2	0.4	0.3
AMS-08A	0.1	0.3	0.2	0.1	0.3	0.2
AMS-09C	0.1	0.3	0.2	0.1	0.3	0.2
AMS-22	0.1	0.2	0.1	0.1	0.2	0.1
AMS-23	0.1	0.1	0.1	0.1	0.1	0.1
AMS-24	0.1	0.3	0.2	0.1	0.3	0.2
AMS-25	0.2	0.2	0.2	0.1	0.3	0.2
AMS-26	0.2	0.3	0.2	0.2	0.4	0.3
AMS-27	0.2	0.3	0.3	0.1	0.3	0.2
AMS-28	0.1	0.2	0.1	0.1	0.2	0.1
AMS-29	0.1	0.2	0.1	0.1	0.2	0.1
<b>Background</b>						
AMS-12	0.2	0.3	0.2	0.2	0.4	0.3
AMS-16	0.1	0.1	0.1	0.1	0.2	0.1
<b>On Site</b>						
KNE	2.3	2.9	2.6	1.1	3.1	2.4
KNO <sup>c</sup>	1.9	2.3	2.2	0.3	2.6	1.3
KNW/KNW-A	0.4	0.8	0.6	0.4	1.3	0.8
KSE	1.7	2.6	2.1	0.9	2.6	1.9
KSO <sup>c</sup>	0.3	0.4	0.3	0.3	0.5	0.4
KSW/KSW-A	0.2	0.7	0.5	0.2	1.0	0.6
KTOP	3.5	4.0	3.8	3.5	6.1	4.5
LP2 <sup>d</sup>	0.3	0.3	0.3	0.3	0.5	0.4
Pilot Plant Warehouse	0.3	0.3	0.3	0.3	0.5	0.4
PR-1 <sup>e</sup>	0.5	0.7	0.6	0.4	0.7	0.6
Rally Point 4	0.2	0.6	0.4	0.2	0.6	0.4
Surge Lagoon	0.2	0.3	0.3	0.2	0.5	0.3
T117 <sup>d</sup>	0.2	0.2	0.2	0.2	0.3	0.2
T28/T28A	0.4	0.6	0.5	0.4	0.7	0.5
TS4	0.2	0.3	0.2	0.2	0.3	0.2
WP-17A	0.2	0.4	0.3	0.2	0.4	0.3

<sup>a</sup>Monthly average radon concentrations are calculated from daily average concentrations. Daily average concentrations are calculated by summing all hourly count data, treating the sum as a single daily measurement, and then converting the sum to a (daily average) concentration.

<sup>b</sup>Instrument background changes as monitors are replaced.

<sup>c</sup>Unit was placed in service in April 2000.

<sup>d</sup>Unit was placed in service in November 2000.

<sup>e</sup>Unit was placed in service in March 2000.

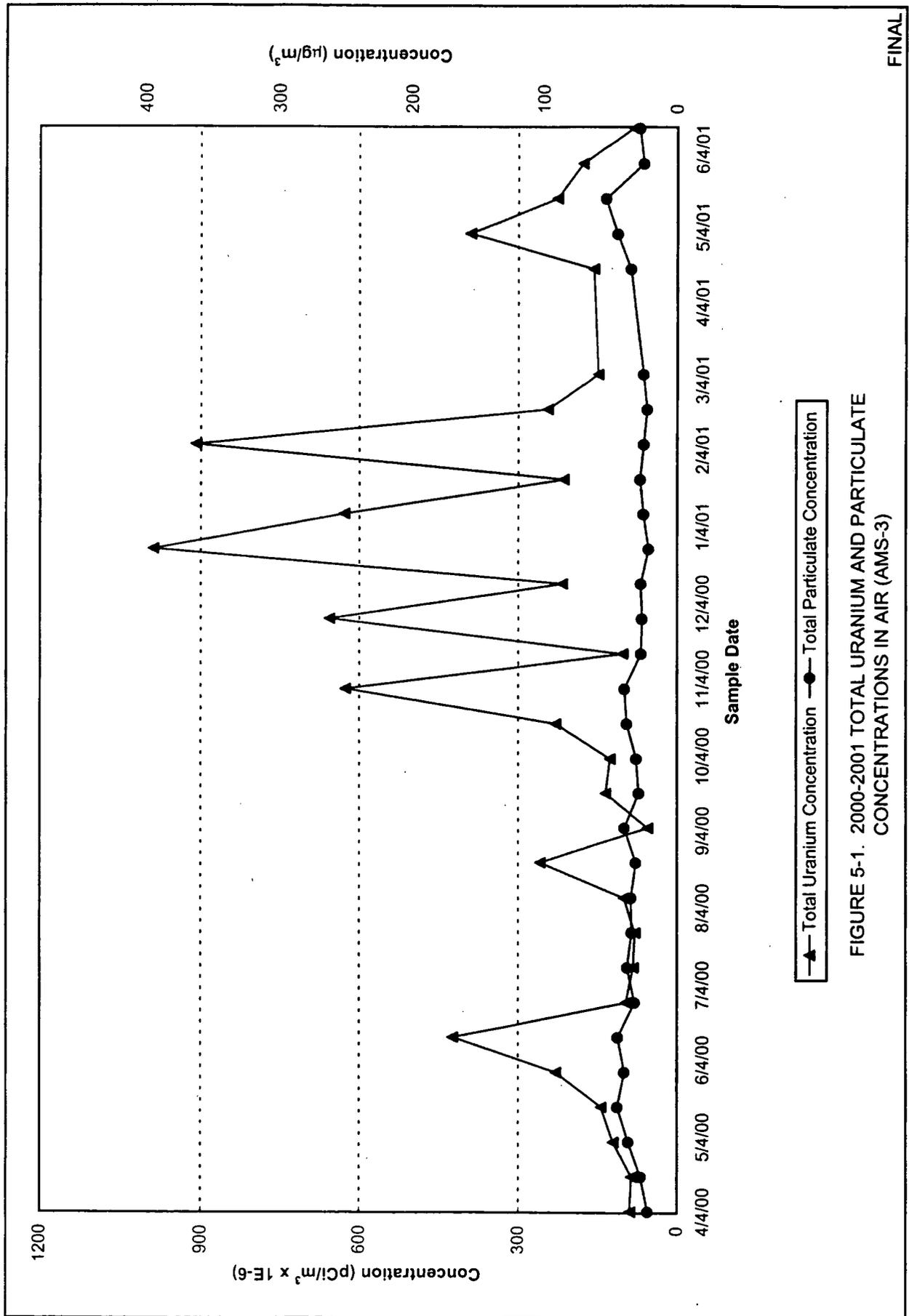


FIGURE 5-1. 2000-2001 TOTAL URANIUM AND PARTICULATE CONCENTRATIONS IN AIR (AMS-3)

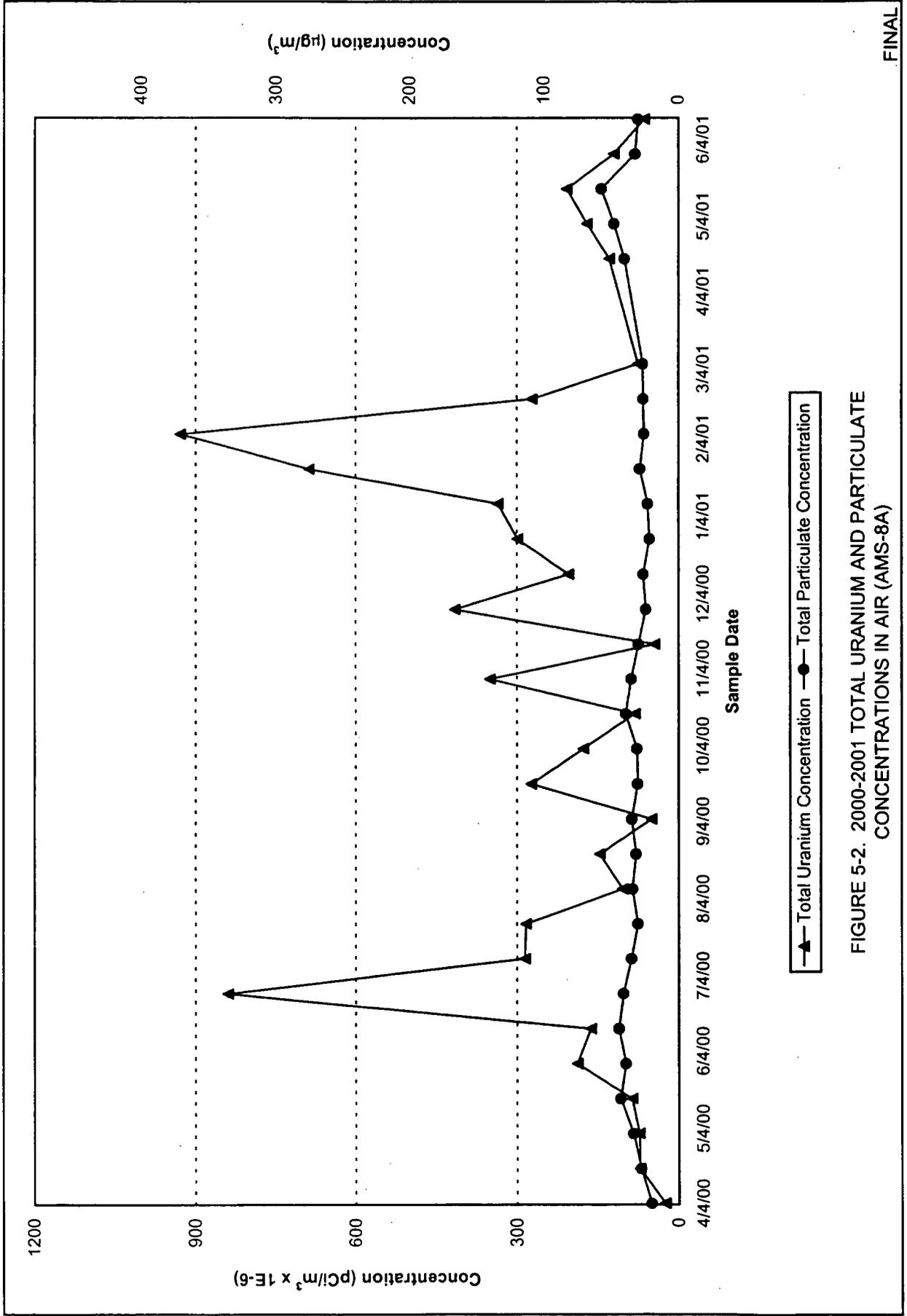


FIGURE 5-2. 2000-2001 TOTAL URANIUM AND PARTICULATE CONCENTRATIONS IN AIR (AMS-8A)

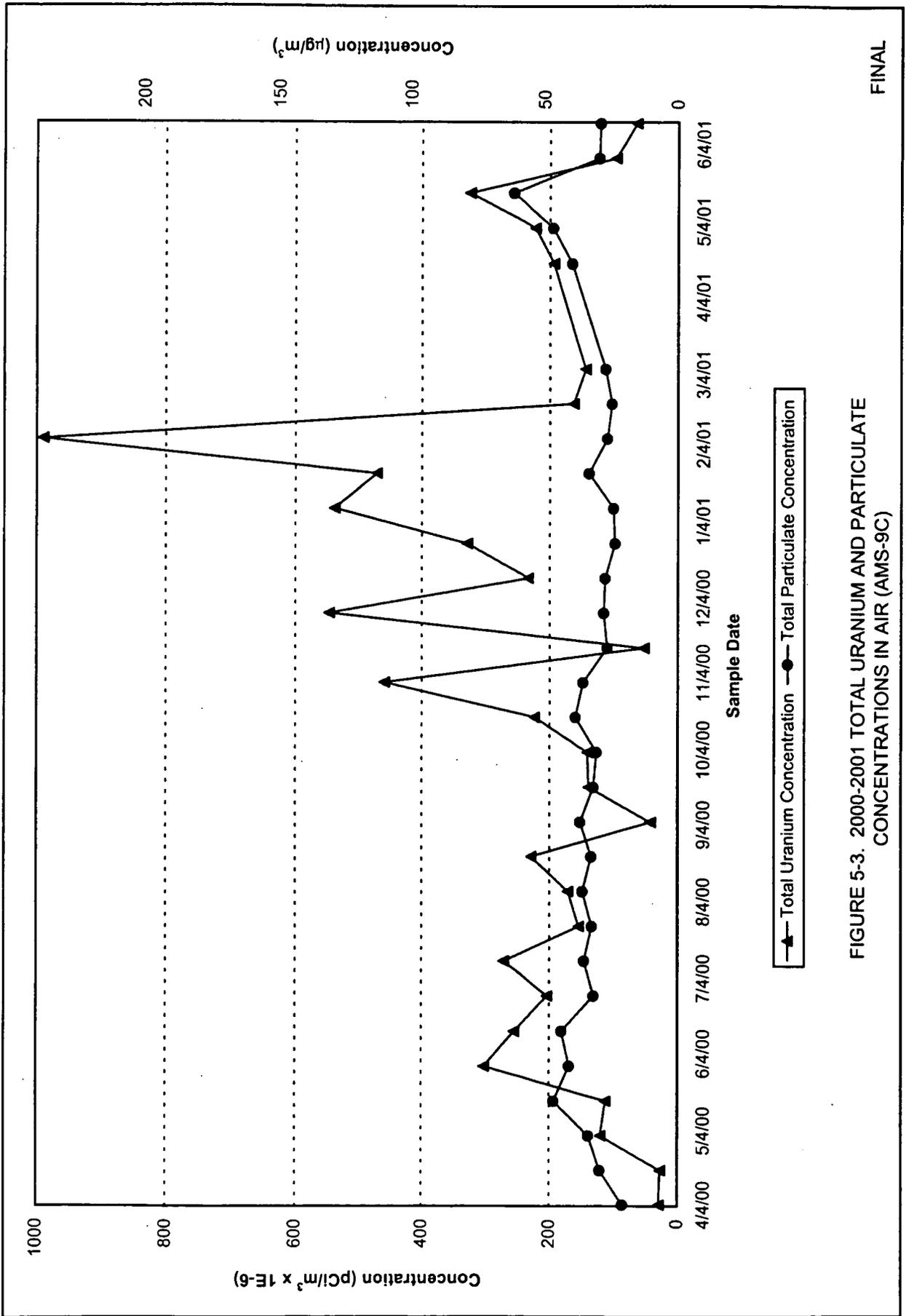


FIGURE 5-3. 2000-2001 TOTAL URANIUM AND PARTICULATE CONCENTRATIONS IN AIR (AMS-9C)

FINAL

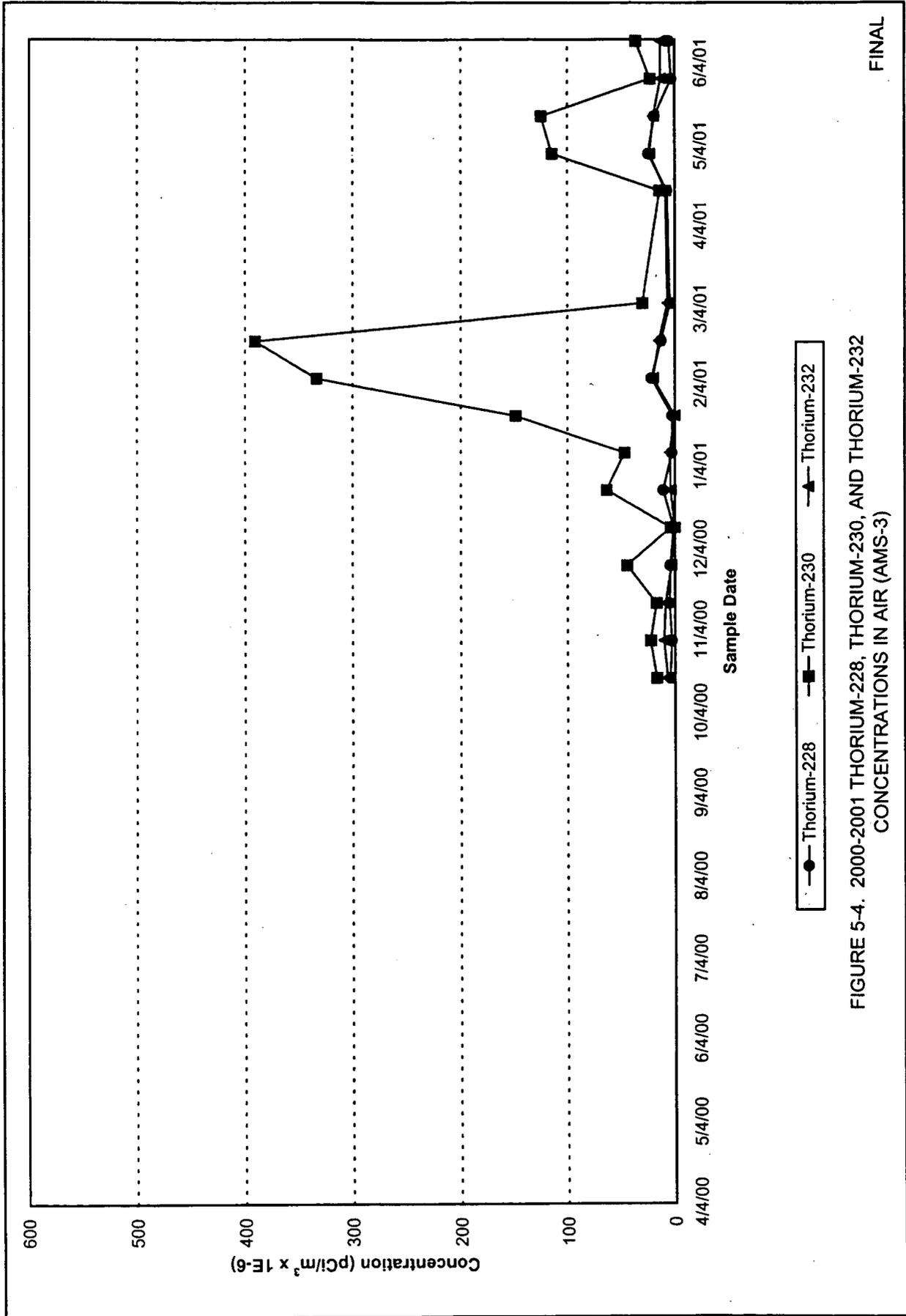


FIGURE 5-4. 2000-2001 THORIUM-228, THORIUM-230, AND THORIUM-232 CONCENTRATIONS IN AIR (AMS-3)

FINAL

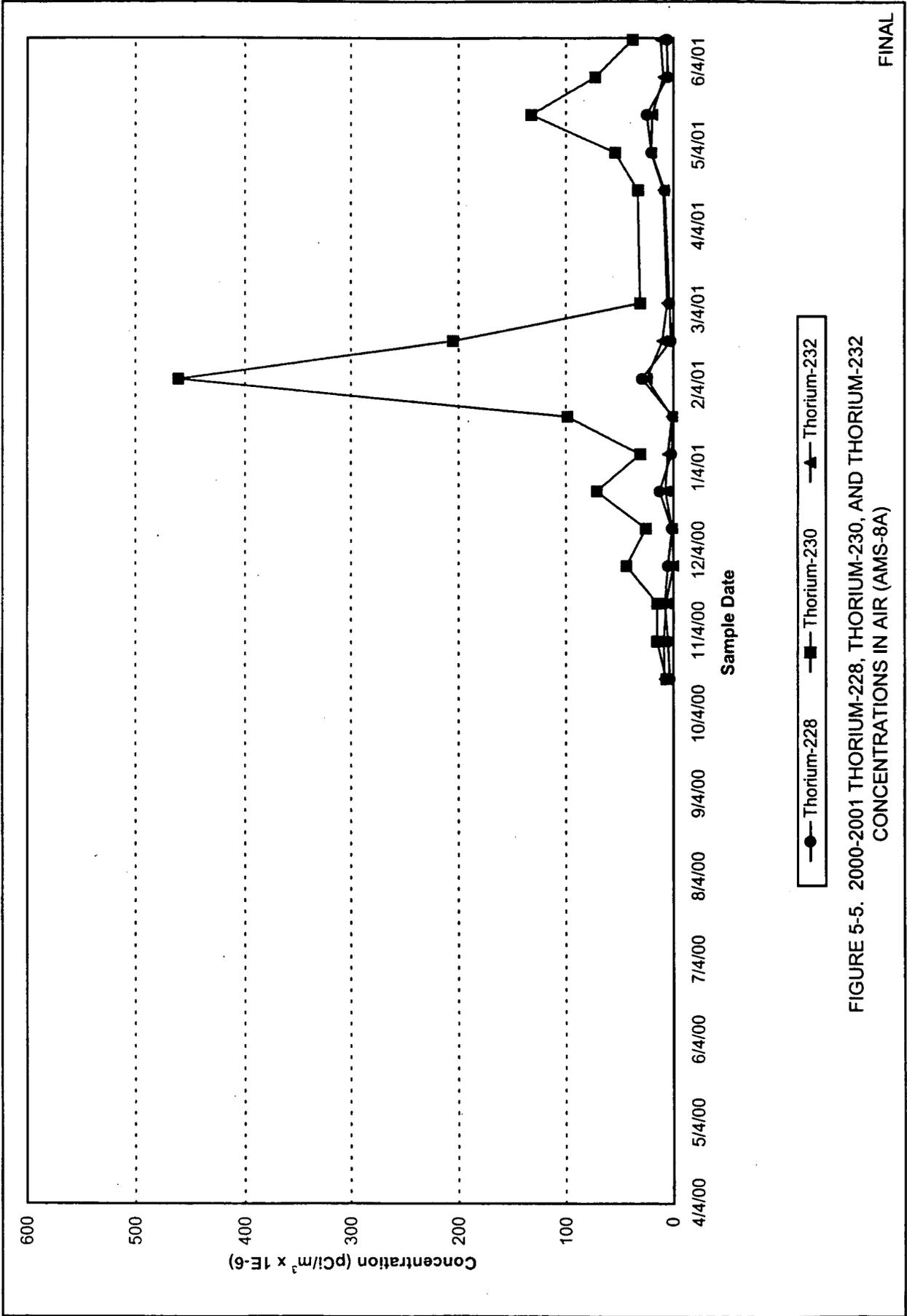


FIGURE 5-5. 2000-2001 THORIUM-228, THORIUM-230, AND THORIUM-232 CONCENTRATIONS IN AIR (AMS-8A)

FINAL

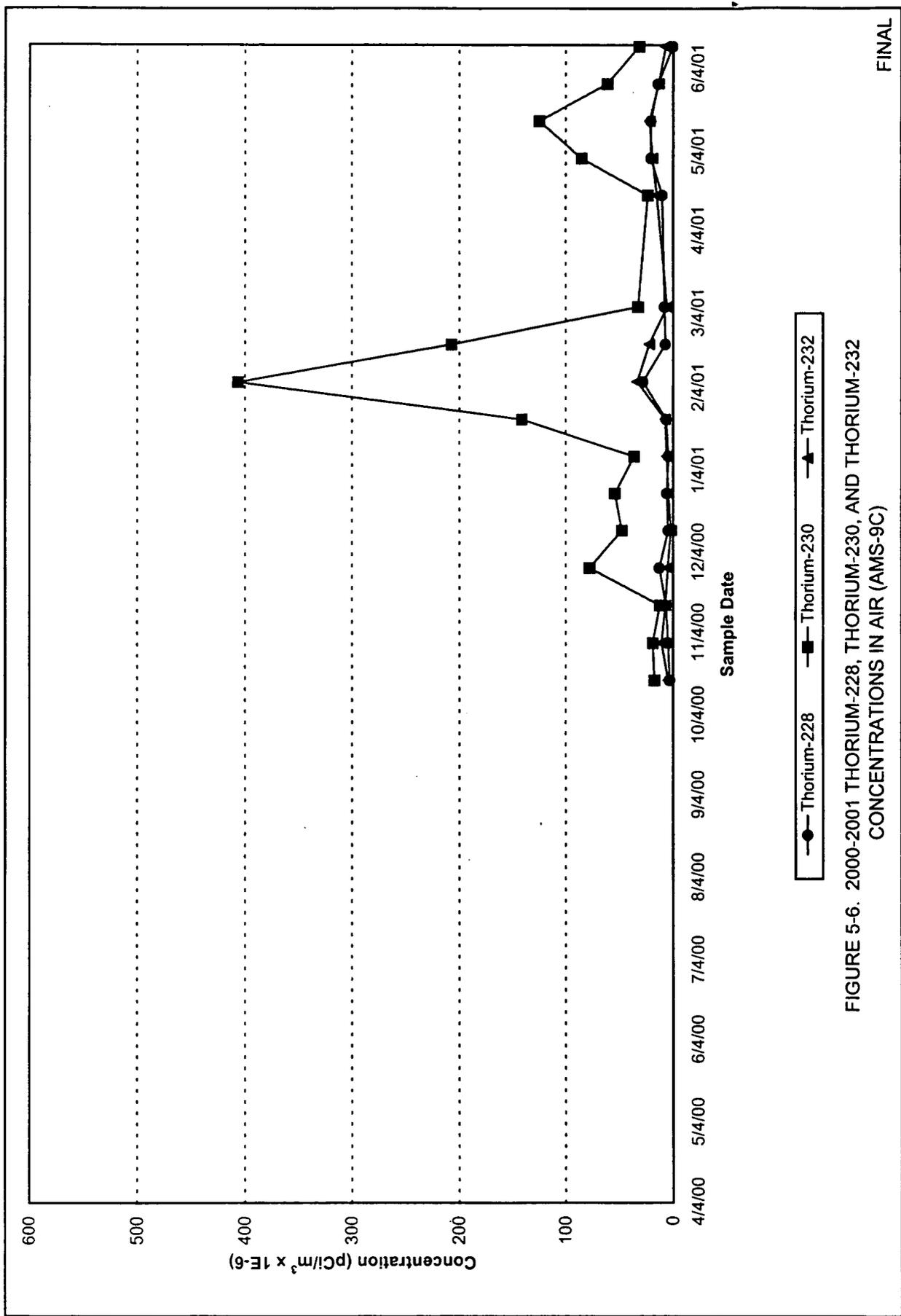
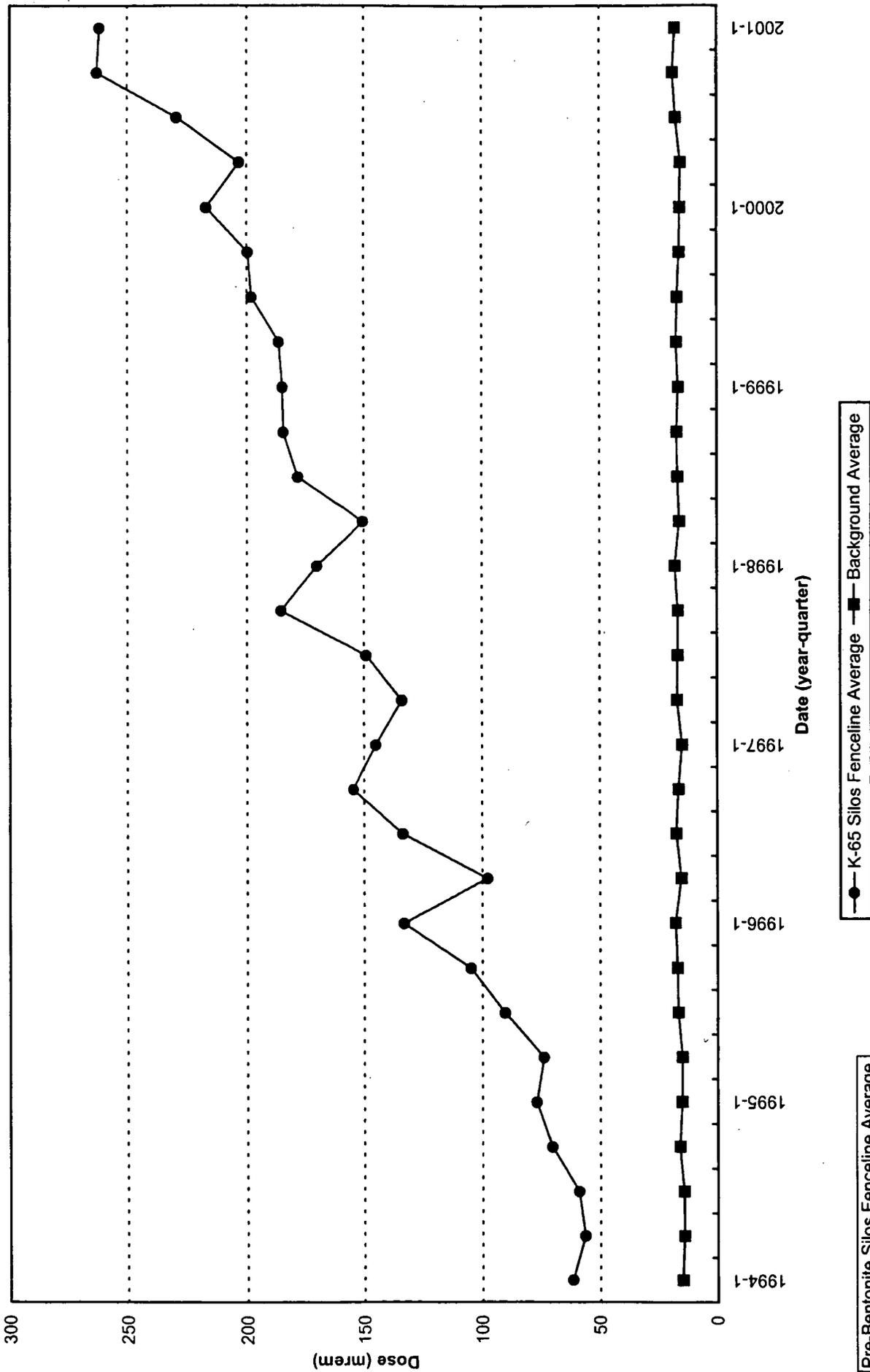


FIGURE 5-6. 2000-2001 THORIUM-228, THORIUM-230, AND THORIUM-232 CONCENTRATIONS IN AIR (AMS-9C)

FINAL



Pre-Bentonite Silos Fenceline Average  
1991: 484 mrem

FIGURE 5-7. QUARTERLY DIRECT RADIATION (TLD) MEASUREMENTS, 1994 - 2001  
(K-65 SILOS FENCELINE AVERAGE VERSUS BACKGROUND AVERAGE)

FINAL

140000

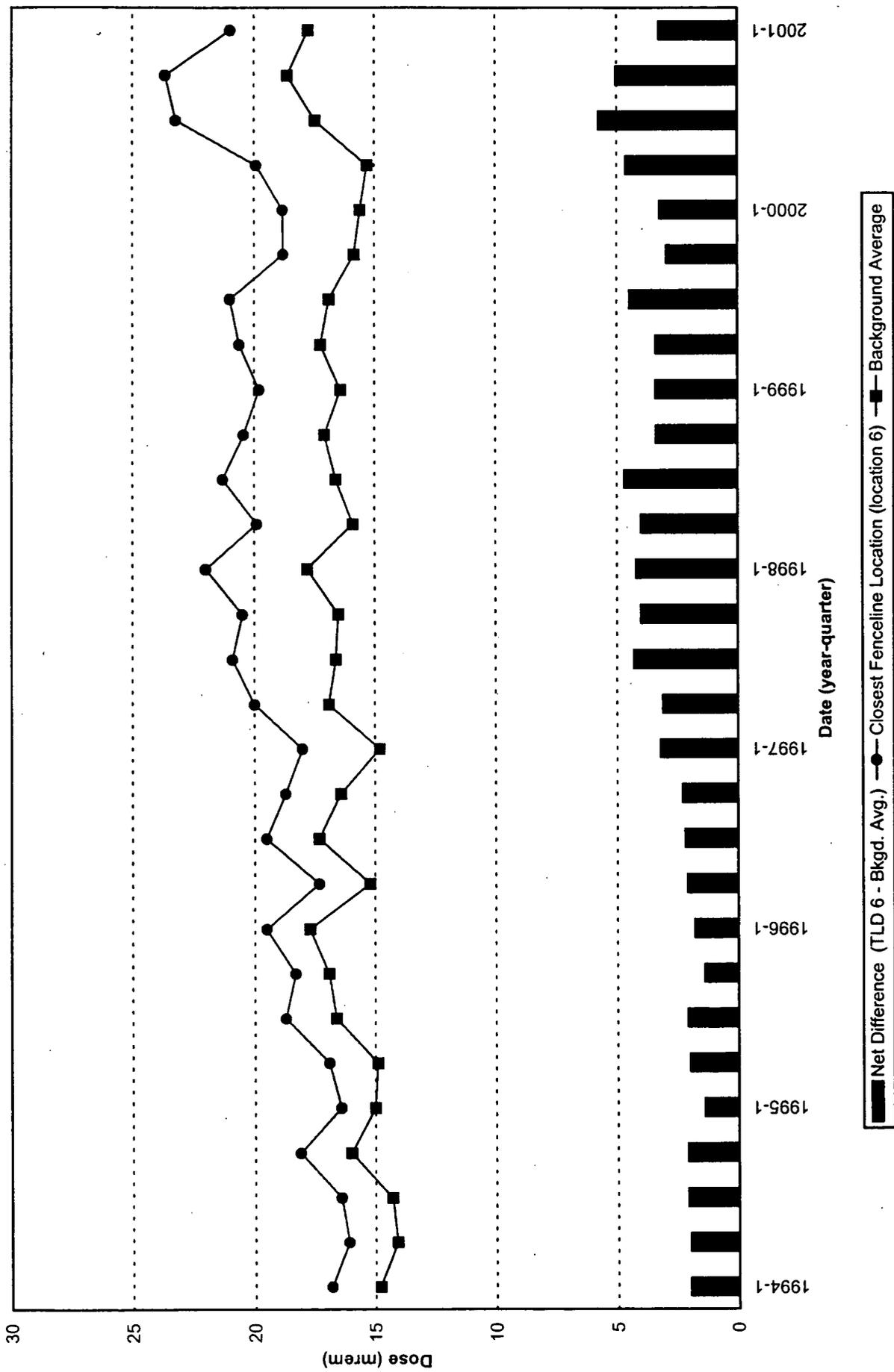


FIGURE 5-8. QUARTERLY DIRECT RADIATION (TLD) MEASUREMENTS, 1994 - 2001 (LOCATION 6 VERSUS BACKGROUND AVERAGE)

000043

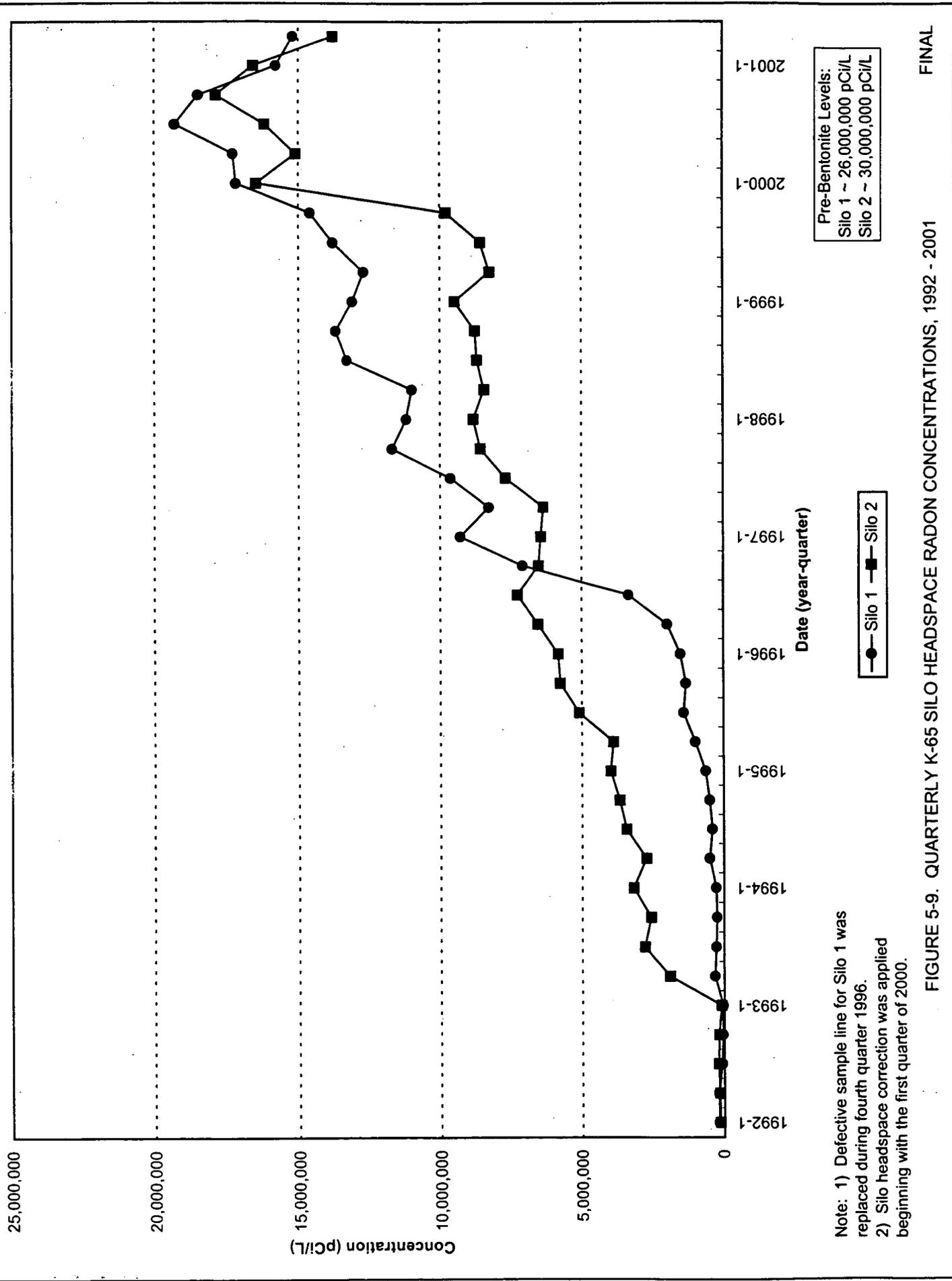


FIGURE 5-9. QUARTERLY K-65 SILO HEADSPACE RADON CONCENTRATIONS, 1992 - 2001

FINAL

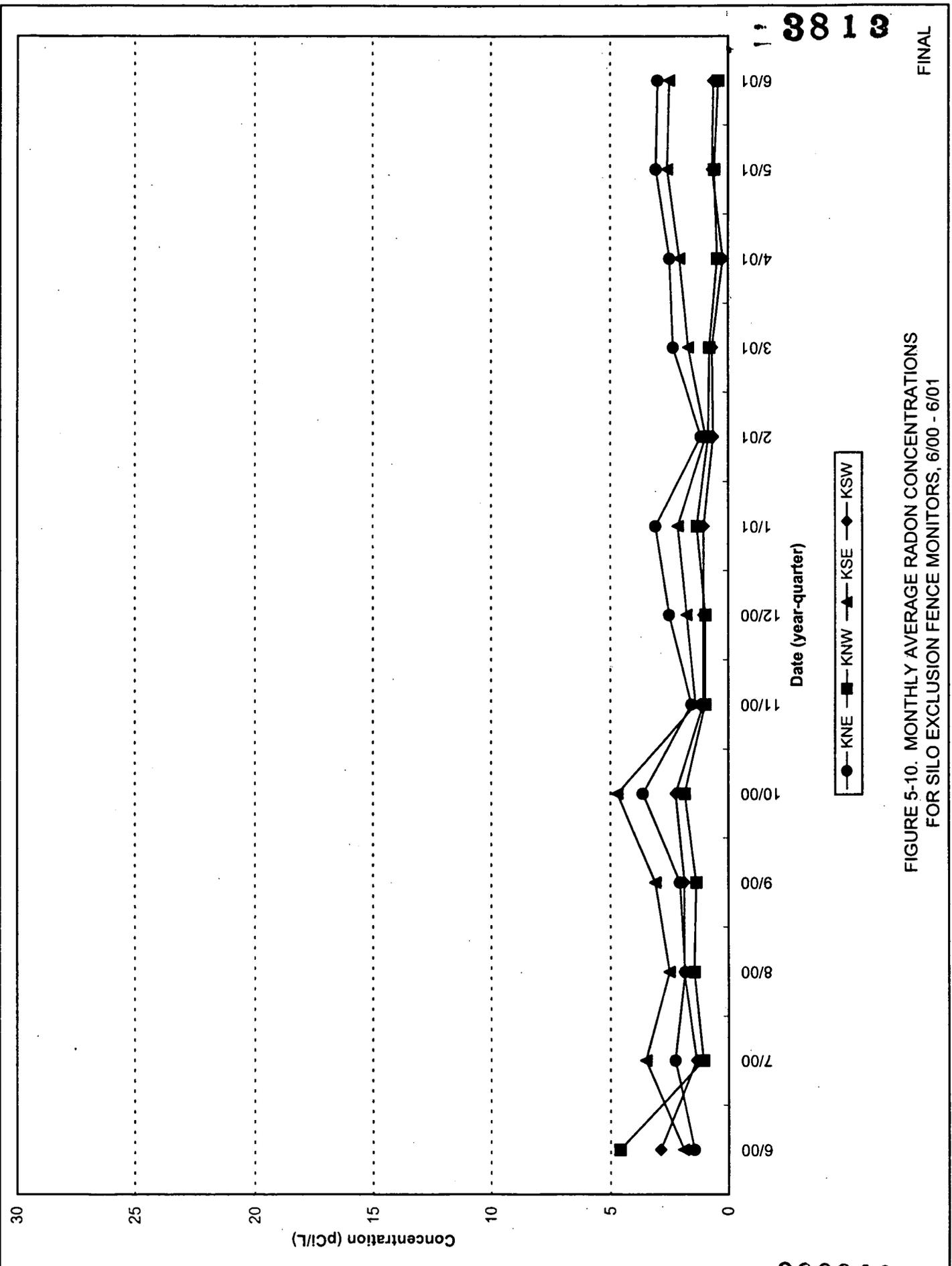


FIGURE 5-10. MONTHLY AVERAGE RADON CONCENTRATIONS FOR SILO EXCLUSION FENCE MONITORS, 6/00 - 6/01

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