



## Department of Energy

Portsmouth/Paducah Project Office  
1017 Majestic Drive, Suite 200  
Lexington, Kentucky 40513  
(859) 219-4000

March 31, 2025

Ms. Myrna Redfield, Program Manager  
Four Rivers Nuclear Partnership, LLC  
5511 Hobbs Road  
Kevil, Kentucky 42053

PPPO-02-10031934-25

Dear Ms. Redfield:

### **DE-EM0004895: APPROVAL OF DELIVERABLE NO. 37, 2024 ANNUAL EXTERNAL RADIATION MONITORING REPORT, FRNP-RPT-0374**

Reference: Letter from M. Redfield to J. Stokes, "Four Rivers Nuclear Partnership, LLC—Deliverable No. 37—2024 *Annual External Radiation Monitoring Report Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, FRNP-RPT-0374," (FRNP-25-9141), dated March 11, 2025

The U.S. Department of Energy reviewed and approves the Four Rivers Nuclear Partnership, LLC Deliverable No. 37, *2024 Annual External Radiation Monitoring Report Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, FRNP-RPT-0374, as submitted.

If you have any questions or require additional information, please contact Gil Whitehurst at (740) 897-2948.

Sincerely,

JOEL BRADBURNE Digitally signed by JOEL BRADBURNE  
Date: 2025.03.31 13:07:03 -0400'

Joel B. Bradburne  
Manager  
Portsmouth/Paducah Project Office

cc:

abigail.parish@pppo.gov, PPPO  
april.ladd@pppo.gov, PPPO  
bruce.ford@pad.pppo.gov, FRNP  
david.ruckstuhl@pad.pppo.gov, FRNP  
frnpcorrespondence@pad.pppo.gov  
gilbert.whitehurst@pppo.gov, PPPO  
jennifer.stokes@pppo.gov, PPPO  
joel.bradburne@pppo.gov, PPPO

kevin.funke@pad.pppo.gov, FRNP  
mona.dockery@pad.pppo.gov, FRNP  
myrna.redfield@pad.pppo.gov, FRNP  
pad.rmc@pad.pppo.gov  
reinhard.knerr@pppo.gov, PPPO  
tammy.stapleton@pad.pppo.gov, FRNP  
william.wessel@pppo.gov, PPPO

I am not authorized to negotiate, or make any agreements or commitments, which involve a change in the scope, price, period of performance, terms, or conditions of the contract. If you believe that a change has been directed as a result of this correspondence, then in accordance with contract clause DEAR 952.242-70 "Technical Direction," you are directed to contact the Contracting Officer, in writing, within five (5) working days after receipt of this letter (or email) and prior to taking any action as a result of this letter.

FRNP-RPT-0374

**2024 Annual External Radiation  
Monitoring Report  
Paducah Gaseous Diffusion Plant,  
Paducah, Kentucky**



**CLEARED FOR PUBLIC RELEASE**



**2024 Annual External Radiation  
Monitoring Report  
Paducah Gaseous Diffusion Plant,  
Paducah, Kentucky**

Date Issued—March 2025

U.S. DEPARTMENT OF ENERGY  
Office of Environmental Management

Prepared by  
FOUR RIVERS NUCLEAR PARTNERSHIP, LLC,  
managing the  
Deactivation and Remediation Project at the  
Paducah Gaseous Diffusion Plant  
under Contract DE-EM0004895

**CLEARED FOR PUBLIC RELEASE**

**THIS PAGE INTENTIONALLY LEFT BLANK**

# CONTENTS

EXECUTIVE SUMMARY .....	v
1. INTRODUCTION .....	1
2. BACKGROUND .....	1
3. MONITORING AND OBJECTIVES.....	1
4. METHODOLOGY .....	3
4.1 MEASUREMENT OF GAMMA RADIATION .....	3
4.2 MEASUREMENT OF NEUTRON RADIATION.....	3
4.3 ENVIRONMENTAL DOSIMETER SURVEILLANCE NETWORK .....	4
4.4 DATA COLLECTION .....	4
5. GROUP 1 .....	5
5.1 GROUP 1 QUARTERLY MEASURED FIELD DOSE .....	5
5.2 GROUP 1 NORMALIZED QUARTERLY FIELD DOSE.....	6
5.3 BASELINE QUARTERLY AND ANNUAL INFORMATION.....	6
5.3.1 Baseline Quarterly Information .....	7
5.3.2 Baseline Annual Information.....	8
5.3.3 Facility-related Dose.....	10
5.4 GROUP 1 FACILITY-RELATED DOSE .....	10
6. GROUP 2.....	11
6.1 GROUP 2 QUARTERLY MEASURED FIELD DOSE .....	11
6.2 GROUP 2 NORMALIZED QUARTERLY FIELD DOSE.....	11
6.3 GROUP 2 FACILITY-RELATED DOSE .....	12
7. GROUP 3.....	12
7.1 GROUP 3 QUARTERLY MEASURED FIELD DOSE .....	13
7.2 GROUP 3 NORMALIZED QUARTERLY FIELD DOSE.....	13
7.3 GROUP 3 FACILITY-RELATED DOSE.....	14
7.4 FOOD VENDOR ESTIMATED NORMALIZED DOSE.....	15
7.4.1 Equations Used to Determine Food Vendor Estimated Normalized Dose.....	15
7.4.2 Food Vendor 1 Estimated Normalized Dose .....	16
7.4.3 Food Vendor 2 Estimated Normalized Dose .....	16
7.4.4 Food Vendor 3 Estimated Normalized Dose .....	16
7.4.5 Food Vendor 4 Estimated Normalized Dose .....	17
7.4.6 Food Vendor 5 Estimated Normalized Dose .....	17
8. GROUP 4.....	18
8.1 GROUP 4 QUARTERLY MEASURED FIELD DOSE .....	18
8.2 GROUP 4 NORMALIZED QUARTERLY FIELD DOSE.....	18
8.3 GROUP 4 FACILITY-RELATED DOSE .....	19
9. GROUP 5.....	20
9.1 GROUP 5 QUARTERLY MEASURED FIELD DOSE .....	20
9.2 GROUP 5 NORMALIZED QUARTERLY FIELD DOSE.....	20

9.3	GROUP 5 FACILITY-RELATED DOSE.....	21
10.	NEUTRON MONITORING AND RESULTS.....	21
11.	ANALYSIS AND CONCLUSION .....	21
11.1	PUBLIC DOSE FROM DIRECT EXPOSURE TO DOE OPERATIONS .....	21
11.2	PUBLIC DOSE IN AREAS FREELY ACCESSIBLE.....	23
11.3	PUBLIC DOSE AT THE DOE BOUNDARY .....	23
11.4	MAXIMALLY EXPOSED INDIVIDUAL DOSE.....	23
11.5	CONCLUSION.....	24
12.	REFERENCES .....	24
APPENDIX:	DOSIMETER LOCATIONS AND COLLECTION DATES .....	A-1

## FIGURE

1.	Dosimeter Locations .....	2
----	---------------------------	---

## TABLES

1.	Group 1 Quarterly $M_F$ .....	5
2.	Group 1 $M_Q$ and $M_A$ .....	6
3.	Baseline $M_Q$ .....	7
4.	Baseline $B_Q$ , $S_Q$ , and $CV$ .....	7
5.	Baseline $M_A$ , $B_A$ , $S_A$ , and $CV$ .....	9
6.	Group 1 Facility-related Dose .....	10
7.	Group 2 Quarterly $M_F$ .....	11
8.	Group 2 $M_Q$ and $M_A$ .....	12
9.	Group 2 Facility-related Dose .....	12
10.	Group 3 Quarterly $M_F$ .....	13
11.	Group 3 $M_Q$ and $M_A$ .....	14
12.	Group 3 Facility-related Dose .....	14
13.	Food Vendor 1 Estimated $M_Q$ .....	16
14.	Food Vendor 2 Estimated $M_Q$ .....	16
15.	Food Vendor 3 Estimated $M_Q$ .....	17
16.	Food Vendor 4 Estimated $M_Q$ .....	17
17.	Food Vendor 5 Estimated $M_Q$ .....	18
18.	Group 4 Quarterly $M_F$ .....	18
19.	Group 4 $M_Q$ and $M_A$ .....	19
20.	Group 4 Facility-related Dose .....	19
21.	Group 5 Quarterly $M_F$ .....	20
22.	Group 5 $M_Q$ and $M_A$ .....	20
23.	Group 5 Facility-related Dose .....	21
24.	Calculated dose at locations along PPA boundary with a Facility-related Dose .....	22
25.	Comparison of MEI and Collective Population Potential E .....	24



**THIS PAGE INTENTIONALLY LEFT BLANK**

## ACRONYMS

ANSI	American National Standards Institute
D&R	deactivation and remediation
DOE	U.S. Department of Energy
E	effective dose
EDL	environmental dosimeter location
GPS	global positioning system
HPS	Health Physics Society
LA	Limited Area
MEI	maximally exposed individual
ND	not detected
O	Order
PPA	Property Protection Area
WKWMA	West Kentucky Wildlife Management Area

**THIS PAGE INTENTIONALLY LEFT BLANK**

## **EXECUTIVE SUMMARY**

The dose from the direct radiation pathway is evaluated by its contribution to the U.S. Department of Energy (DOE) total dose limit of 100 millirem (mrem) per year from all relevant pathways (i.e., air, surface water, sediment, direct radiation). In 2024, the estimated dose to the maximally exposed individual member of the public from the direct radiation pathway at the Paducah Site was 1.1E+00 mrem, which represents 1.1% of the DOE annual dose limit and 4.5% of the 25 mrem radioactive waste public dose constraint.

**THIS PAGE INTENTIONALLY LEFT BLANK**

# 1. INTRODUCTION

U.S. Department of Energy (DOE) Order (O) 458.1 Chg 4 (LtdChg), *Radiation Protection of the Public and the Environment*, has requirements in place to protect the public and environment from radiation exposure. Energy absorbed from radioactive materials outside the body is referred to as an external dose. At the Paducah Site, external doses come from direct ionizing radiation, which includes natural radioactivity from cosmic and terrestrial sources and man-made radioactive sources. This report summarizes the results of external gamma and neutron radiation monitoring conducted in 2024.

# 2. BACKGROUND

The external radiation monitoring program is designed to provide exposure data on direct radiation from DOE operations to members of the public. The Deactivation and Remediation (D&R) Contractor uses a surveillance network of environmental dosimeters to monitor this direct radiation. The surveillance network is divided into five groups, which are used to monitor locations inside the Limited Area (LA), locations outside the LA and inside the Property Protection Area (PPA), locations outside the PPA and inside the DOE boundary, locations outside the DOE boundary, and background locations. Figure 1 shows the LA boundary, PPA boundary, DOE boundary, and environmental dosimeter locations (EDLs).

The primary sources for radiation exposure to areas outside of the LA are the uranium hexafluoride (UF<sub>6</sub>) cylinder storage yards, which are also shown in Figure 1.

Historical monitoring for the past five years has shown that the background-corrected external gamma radiation effective dose (E) from routine DOE operations to the maximally exposed individual (MEI) has been 5 millirem (mrem) per year or less and the collective population E has been < 1 person-rem per year for the exposed population.

# 3. MONITORING AND OBJECTIVES

In 2024, the D&R Contractor conducted routine surveillance of external gamma and neutron radiation exposure to monitor any effects due to past releases of radionuclides and current operations involving radioactive sources (e.g., depleted UF<sub>6</sub> cylinder management). External gamma radiation monitoring provides data to model the direct radiation pathway from sources located on-site to members of the public, consistent with DOE O 458.1. Neutron radiation monitoring that is in place near cylinder yards is for information purposes only and not used in the direct radiation pathway calculations.

For 2024, the objectives for external exposure monitoring were the following.

- Establish the radiation dose potentially received by a member of the public from direct exposure to DOE operations.
- Calculate the E to a member of the public in areas freely accessible to members of the public.
- Calculate the E to a member of the public at the DOE boundary.
- Calculate the E to the MEI member of the public.

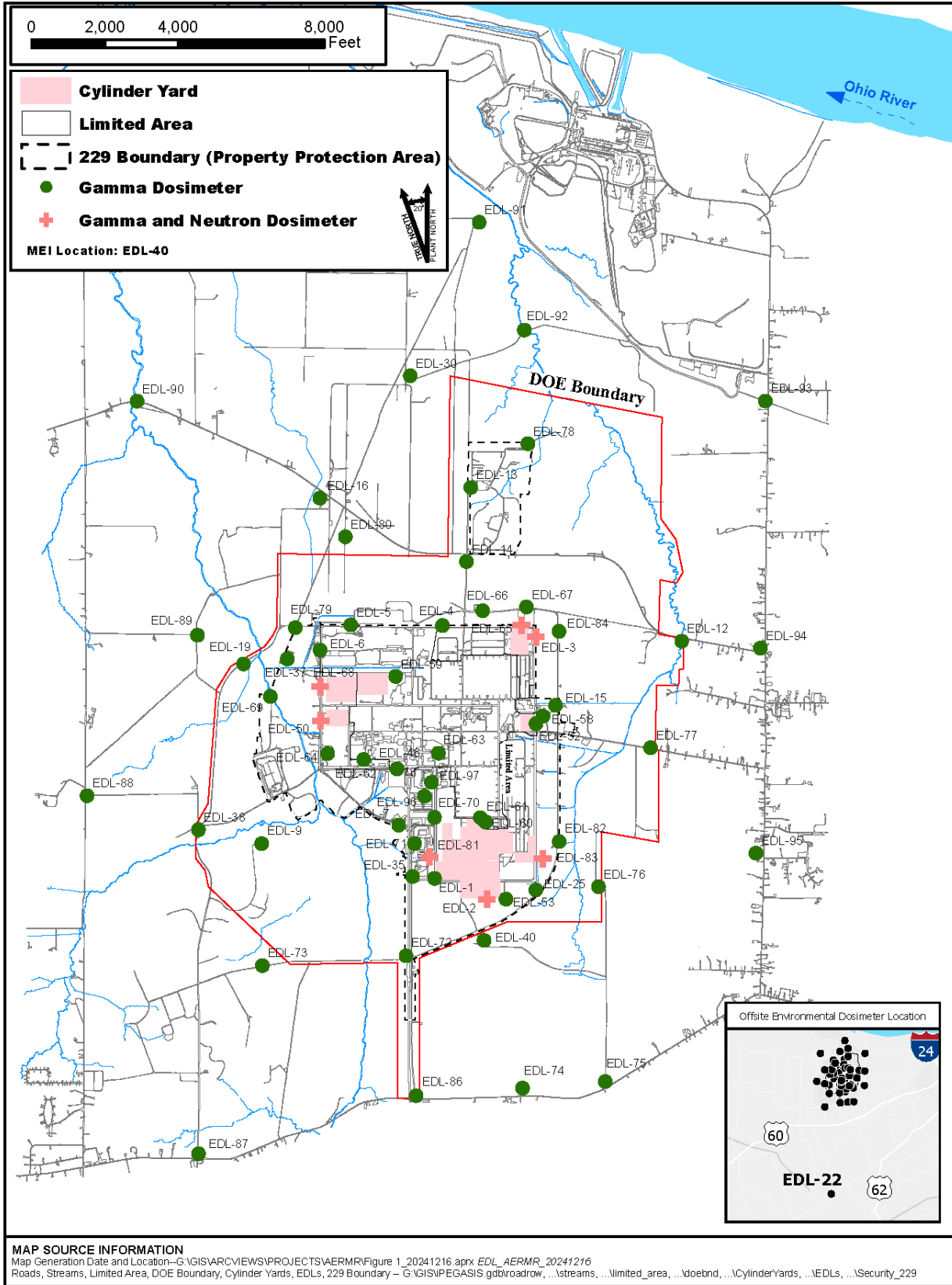


Figure 1. Dosimeter Locations

## 4. METHODOLOGY

### 4.1 MEASUREMENT OF GAMMA RADIATION

The D&R Contactor used the LANDAUER<sup>®</sup> InLight<sup>®</sup> EX Environmental dosimeter to measure external gamma radiation. Landauer, Inc. of Glenwood, Illinois, supplied this dosimeter. This environmental dosimeter meets American National Standards Institute (ANSI) N545-1975, *Performance, Testing, and Procedural Specifications for Thermoluminescence Dosimetry (Environmental Applications)* and ANSI/Health Physics Society (HPS) N13.37-2014, *Environmental Dosimetry—Criteria for System Design and Implementation*.

The dosimeter consists of a case that contains metal and plastic filters and a plastic slide that contains detector elements. The detector element is a layer of aluminum oxide (Al<sub>2</sub>O<sub>3</sub>) sandwiched between two layers of polyester for a total thickness of 0.3 mm. The method of analysis applied to the detector is optically stimulated luminescence.

The vendor literature supporting the use of this dosimeter indicates the following:

- Photons (X and gamma rays) with energies above 15 kiloelectron volt (keV) nominally: 0.1 mrem to 1,000 mrem; and
- Beta particles with energies approximately > 500 keV average energy: 20 mrem to 1,000 mrem.

Landauer, Inc. processed the dosimeters received from the D&R Contractor, following its internal processes, protocols, and quality control routines, and provided reports of the results to the D&R Contractor.

The D&R Contractor normalized the reported gamma radiation and compared it to a normalized baseline background to determine if the monitoring location had a facility-related dose. Sections 5 through 9 provide the results of this comparison.

### 4.2 MEASUREMENT OF NEUTRON RADIATION

The D&R Contactor used the LANDAUER<sup>®</sup> Neutrak<sup>®</sup> Type E dosimeter to measure external neutron radiation. Landauer, Inc. of Glenwood, Illinois, supplied this dosimeter. This environmental dosimeter is Department of Energy Laboratory Accreditation Program-accredited and used to collect external neutron radiation dose for information only.

The Neutrak<sup>®</sup> detector is a CR-39 (ally diglycol carbonate) based solid-state nuclear track detector that is not sensitive to x-ray, beta, or gamma radiation. The CR-39 is laser engraved for permanent identification and wrapped with a 2-D bar code to assure efficient chain-of-custody. The Neutrak<sup>®</sup> Type E detects fast, intermediate, and thermal neutrons.

The vendor literature supporting this dosimeter indicates the following:

- An energy range of 0.25 electron volt (eV) to 40 mega electron volt (MeV); and
- A dose measurement range of 10 mrem to 25 rem.



Landauer, Inc. processed the dosimeters received from the D&R Contractor, following its internal processes, protocols, and quality control routines, and provided reports of the results to the D&R Contractor. The neutron results are discussed in Section 10.

### **4.3 ENVIRONMENTAL DOSIMETER SURVEILLANCE NETWORK**

The D&R Contractor used 64 locations to measure external gamma radiation, seven locations to measure external neutron radiation for information only, and one control location.

Analysis of the data from this network of EDLs served to monitor changes in external radiation measures over time and any accidental releases of radioactive material related to D&R Contractor operational activities conducted for DOE.

The network of EDLs was divided into the following groups.

- Group 1 EDLs provided background analysis. Group 1 gamma results and data analysis are discussed in Section 5.
- Group 2 EDLs were located inside or on the perimeter of the LA. Group 2 gamma results and data analysis are discussed in Section 6, and neutron results are discussed in Section 10.
- Group 3 EDLs were located outside the LA and inside the PPA boundary. Group 3 gamma results and data analysis are discussed in Section 7, and neutron results are discussed in Section 10.
- Group 4 EDLs were located outside the PPA and inside the DOE boundary. Group 4 gamma results and data analysis are discussed in Section 8.
- Group 5 EDLs were located outside the DOE boundary. Group 5 gamma results and data analysis are discussed in Section 9.

The control location for the environmental dosimeters was the C-101 Cafeteria dosimetry office, which is located outside the LA boundary but inside the PPA boundary.

The coordinates for monitoring locations were determined using a differential global positioning system (GPS), and data were entered into the Paducah Site geographic information system. No dosimeters were placed in radiologically contaminated areas. The monitoring locations are shown in Figure 1 and location descriptions and coordinates are listed in the appendix.

### **4.4 DATA COLLECTION**

Environmental dosimeters were collected and analyzed quarterly. When the environmental dosimeters were collected, the following quarter's dosimeters were placed at the same locations when possible. The appendix lists the dosimeter collection dates.

One gamma dosimeter per quarterly sampling event was designated as a field blank and was carried to all monitoring locations during placement and collection of the environmental dosimeters. One control gamma dosimeter (i.e., trip blank) was retained in the C-101 dosimetry office and then used as a transit blank that accompanied the environmental dosimeters when they were shipped off-site for analysis. This control was not subtracted from the dosimeter results.

The gamma dosimeters were placed in a wide-mouth, plastic sample bottle when deployed to the monitoring location. A lid was screwed onto the bottle, and a nylon wire tie was wrapped around each bottle under the lid to secure it to a fence or other fixed structure, usually at a height of approximately 3–4 ft aboveground. The sample bottle provided a sturdy weather-resistant package that did not significantly attenuate gamma radiation (i.e., induce a negative bias on the measurement).

The neutron dosimeters were placed in a wide-mouth, plastic sample bottle when deployed to the monitoring location. A lid was screwed onto the bottle; a nylon wire tie was wrapped around each bottle under the lid to secure it to a Lucite block, which simulated the albedo effect; and the bottle was attached to a fence or other fixed structure, usually at a height of approximately 3–4 ft aboveground.

Based on process knowledge from historical surveys, the siting of dosimeters outside the bounds of radiological contamination areas, and the Class 3 radiological surveys performed by radiation protection to release the dosimeters prior to shipment to the vendor, the dosimeters were below the DOE release criteria and U.S. Department of Transportation level for regulated materials.

## 5. GROUP 1

Group 1 collected gamma background information from 11 locations that were unaffected by Paducah Site operations or other site-specific radiation sources.

### 5.1 GROUP 1 QUARTERLY MEASURED FIELD DOSE

The measured field dose ( $M_F$ ) was successfully obtained from the Group 1 locations for all four quarters, except for EDL-92, which was missing when the first quarter dosimeters were collected. Because EDL-92 was missing, the first quarter  $M_F$  was estimated using the following equation:

$$M_F = \text{Average } (M_F \text{ for second quarter} + M_F \text{ for third quarter} + M_F \text{ for fourth quarter})$$

Table 1 shows the Group 1 quarterly  $M_F$  and includes decimal places not shown when rounding.

**Table 1. Group 1 Quarterly  $M_F$**

<b>Quarter</b>	<b>1</b>		<b>2</b>		<b>3</b>		<b>4</b>	
<b>EDL Number</b>	<b>Days in Field</b>	<b><math>M_F</math> (mrem)</b>	<b>Days in Field</b>	<b><math>M_F</math> (mrem)</b>	<b>Days in Field</b>	<b><math>M_F</math> (mrem)</b>	<b>Days in Field</b>	<b><math>M_F</math> (mrem)</b>
22	91	23.1	92	23.4	84	21.9	96	23.3
86	91	22.5	92	21.5	84	22.5	96	24.2
87	90	22.0	92	20.2	89	20.0	91	20.5
88	90	23.3	92	23.0	84	22.9	96	22.4
89	90	24.2	92	20.7	84	23.0	96	21.1
90	90	21.1	92	21.9	84	21.5	96	22.9
91	90	22.3	92	18.7	84	18.5	96	21.2
92	90	20.9	92	20.9	84	21.0	96	20.9
93	91	25.1	92	20.7	84	21.8	96	24.6
94	91	24.4	92	22.6	84	23.2	96	24.4
95	91	26.1	92	21.6	84	22.0	96	23.2

## 5.2 GROUP 1 NORMALIZED QUARTERLY FIELD DOSE

The  $M_F$  in Table 1 was adjusted for a standardized 91-day period. This correction adjusts for the actual number of days of field deployment, which varied due to weather, holidays, and the fact that the number of days in a year is not exactly divisible by four. The normalized quarterly field dose ( $M_Q$ ) is determined by the following equation:

$$M_Q = M_F \times 91 \text{ days} \div \text{number of days in the field}$$

The corresponding normalized annual dose ( $M_A$ ), then, is the sum of the four normalized quarterly doses. Table 2 shows the Group 1  $M_Q$  and  $M_A$  and includes decimal places not shown when rounding.

**Table 2. Group 1  $M_Q$  and  $M_A$**

Quarter	1	2	3	4	
EDL Number	$M_Q$ (mrem)	$M_Q$ (mrem)	$M_Q$ (mrem)	$M_Q$ (mrem)	$M_A$ (mrem)
22	23.2	23.2	23.8	22.1	92.2
86	22.6	21.3	24.4	22.9	91.3
87	22.3	20.0	20.5	20.5	83.3
88	23.6	22.8	24.9	21.2	92.5
89	24.5	20.5	25.0	20.0	90.1
90	21.4	21.7	23.4	21.7	88.2
91	22.6	18.5	20.1	20.1	81.3
92	21.2	20.7	22.8	19.8	84.6
93	25.2	20.5	23.7	23.3	92.7
94	24.5	22.4	25.2	23.1	95.2
95	26.2	21.4	23.9	22.0	93.5

## 5.3 BASELINE QUARTERLY AND ANNUAL INFORMATION

The D&R Contractor changed to new types of environmental dosimeters at the beginning of 2024. In order to facilitate this change, a trial period was conducted during the second, third, and fourth quarters of 2023. ANSI/HPS N13.37-2014 recommends using five to 10 years of historical environmental radiation monitoring data for the baseline information. Because there are not five years of historical data, the baseline is based on available results.

Group 1 locations were unaffected by Paducah Site operations or other site-specific radiation sources, so a baseline background dose was established for each monitoring location using quarterly measurements. Each of the quarterly measurements were normalized to a standard 91-day quarter.

Table 3 shows the Group 1  $M_Q$  for each monitoring location and includes decimal places not shown when rounding.

**Table 3. Baseline M<sub>Q</sub>**

<b>EDL</b>	<b>2023 second quarter M<sub>Q</sub> (mrem)</b>	<b>2023 third quarter M<sub>Q</sub> (mrem)</b>	<b>2023 fourth quarter M<sub>Q</sub> (mrem)</b>	<b>2024 first quarter M<sub>Q</sub> (mrem)</b>	<b>2024 second quarter M<sub>Q</sub> (mrem)</b>	<b>2024 third quarter M<sub>Q</sub> (mrem)</b>	<b>2024 fourth quarter M<sub>Q</sub> (mrem)</b>
22	20.3	24.0	23.8	23.2	23.2	23.7	22.1
87	18.3	25.2	17.6	22.3	20.0	20.5	20.5
87	18.3	25.2	17.6	22.3	20.0	20.5	20.5
88	20.7	27.3	18.3	23.6	22.8	24.9	21.2
89	16.9	24.4	20.7	24.5	20.5	25.0	20.0
90	19.1	24.7	17.2	21.4	21.7	23.4	21.7
91	18.2	25.4	18.5	22.6	18.5	20.1	20.1
92	17.4	24.7	18.8	21.2	20.7	22.8	19.8
93	20.3	26.1	20.6	25.2	20.5	23.7	23.3
94	23.1	28.1	21.6	24.5	22.4	25.2	23.1
95	19.6	23.6	20.3	26.2	21.4	23.9	22.0
86	19.8	26.2	20.2	22.6	21.3	24.4	22.9

**5.3.1 Baseline Quarterly Information**

The baseline quarterly dose (B<sub>Q</sub>), baseline standard deviation dose (S<sub>Q</sub>), and coefficient of variation (CV) for each monitoring location were determined using the following equations.

$$B_Q = \text{AVERAGE} (M_{Q1} + M_{Q2} \dots M_{QN})$$

Where:

M<sub>Q</sub> = each quarter’s M<sub>Q</sub>, shown in Table 3  
 N = number of data points for the location

$$S_Q = \text{STDEV} (M_{Q1} + M_{Q2} \dots M_{QN})$$

Where:

M<sub>Q</sub> = each quarter’s M<sub>Q</sub>, shown in Table 3  
 N = number of data points for the location

$$CV = S_Q \div B_Q$$

Table 4 shows the baseline B<sub>Q</sub>, S<sub>Q</sub>, and CV for each monitoring location and includes decimal places not shown when rounding.

**Table 4. Baseline B<sub>Q</sub>, S<sub>Q</sub>, and CV**

<b>EDL</b>	<b>B<sub>Q</sub> (mrem)</b>	<b>S<sub>Q</sub> (mrem)</b>	<b>CV S<sub>Q</sub> ÷ B<sub>Q</sub></b>
22	22.9	1.3	0.06
86	22.5	2.3	0.10
87	20.6	2.5	0.12
88	22.7	2.9	0.13
89	21.7	3.0	0.14

**Table 4. Baseline B<sub>Q</sub>, S<sub>Q</sub>, and CV (Continued)**

<b>EDL</b>	<b>B<sub>Q</sub> (mrem)</b>	<b>S<sub>Q</sub> (mrem)</b>	<b>CV S<sub>Q</sub> ÷ B<sub>Q</sub></b>
90	21.3	2.5	0.12
91	20.5	2.6	0.13
92	20.8	2.4	0.12
93	22.8	2.4	0.10
94	24.0	2.2	0.09
95	22.4	2.3	0.10

The B<sub>Q</sub> and S<sub>Q</sub> values shown in Table 4 were used to determine the 90<sup>th</sup> percentile values for the background. The 90<sup>th</sup> percentile was chosen to account for inherent variability in the range of normal environmental measurements.

The 90<sup>th</sup> percentile (σB<sub>Q</sub>) value of 22.9 mrem was used as the representative baseline quarterly background dose for comparison to the normalized 2024 dose at each monitoring location and was determined using the following equation.

$$\sigma B_Q = \text{PERCENTILE.INC}(B_{Q1}:B_{QN},0.9)$$

Where:

B<sub>Q1</sub>:B<sub>QN</sub> = the range from the first B<sub>Q</sub> value to the last B<sub>Q</sub> value, shown in Table 4  
 0.9 = the 90<sup>th</sup> percentile of the range given in the equation

The 90<sup>th</sup> percentile (σS<sub>Q</sub>) value of 2.95 mrem was used as the representative baseline standard deviation to determine the minimum differential dose for the quarterly measurements and was determined using the following equation

$$\sigma S_Q = \text{PERCENTILE.INC}(S_{Q1}:S_{QN},0.9)$$

Where:

S<sub>Q1</sub>:S<sub>QN</sub> = the range from the first S<sub>Q</sub> first value to the last S<sub>Q</sub> value, shown in Table 4  
 0.9 = the 90<sup>th</sup> percentile of the range given in the equation

The quarterly minimum differential (MDD<sub>Q</sub>) dose is the smallest facility-related dose that can be detected during a quarter above the baseline quarterly background. The calculated MDD<sub>Q</sub> was 8.8 mrem and was determined using the following equation.

$$MDD_Q = 3 \times \sigma S_Q$$

### 5.3.2 Baseline Annual Information

The M<sub>A</sub> was determined by summing the quarterly M<sub>Q</sub> results shown in Table 3 for each year.

The annual baseline (B<sub>A</sub>) was determined for each monitoring location using the following equation.

$$B_A = \text{AVERAGE}(M_{A1} + M_{A2} \dots M_{AN})$$

Where:

$M_A$  = each annual E  
 $N$  = number of data points for the location

The standard deviation ( $S_A$ ) of the  $B_A$  was determined using the following equation

$$S_A = \text{STDEV} (M_{A1} + M_{A2} \dots M_{AN})$$

Where:

$M_A$  = each annual E  
 $N$  = number of data points for the location

$$CV = S_A \div B_A$$

Table 5 shows the baseline  $M_A$ ,  $B_A$ ,  $S_A$ , and CV for each monitoring location and includes decimal places not shown when rounding.

**Table 5. Baseline  $M_A$ ,  $B_A$ ,  $S_A$ , and CV**

<b>EDL</b>	<b>2023 <math>M_A</math> (mrem)*</b>	<b>2024 <math>M_A</math> (mrem)</b>	<b><math>B_A</math> (mrem)</b>	<b><math>S_A</math> (mrem)</b>	<b>CV <math>S_A \div B_A</math></b>
22	90.8	92.2	91.5	1.0	0.01
86	88.3	91.3	89.8	2.1	0.02
87	81.5	83.3	82.4	1.3	0.02
88	88.4	92.5	90.5	2.9	0.03
89	82.7	90.1	86.4	5.2	0.06
90	81.3	88.2	84.7	4.9	0.06
91	82.8	81.3	82.1	1.0	0.01
92	81.1	84.5	82.8	2.4	0.03
93	89.3	92.7	91.0	2.4	0.03
94	96.9	95.2	96.1	1.2	0.01
95	84.7	93.5	89.1	6.2	0.07

\*In order to provide  $M_A$  information equivalent to a full year for 2023, the  $B_Q$  for the three quarters of 2023 was determined. Then, that value was added to the  $B_Q$  result to get the  $M_A$  value.

The  $B_A$  and  $S_A$  values shown in Table 5 were used to determine the 90<sup>th</sup> percentile values for the background. The 90<sup>th</sup> percentile was chosen to account for inherent variability in the range of normal environmental measurements.

The 90<sup>th</sup> percentile ( $\sigma B_A$ ) value of 91.5 mrem was used as the representative baseline annual background dose for comparison to the normalized 2024 dose at each monitoring location and was determined using the following equation.

$$\sigma B_A = \text{PERCENTILE.INC} (B_{A1}:B_{AN},0.9)$$

Where:

$B_{A1}:B_{AN}$  = the range from the first  $B_A$  value to the last  $B_A$  value, shown in Table 5  
0.9 = the 90<sup>th</sup> percentile of the range given in the equation

The 90<sup>th</sup> percentile ( $\sigma S_A$ ) value of 5.2 mrem was used as the representative baseline standard deviation to determine the minimum differential dose for the annual measurements and was determined using the following equation.

$$\sigma S_A = \text{PERCENTILE.INC}(S_{A1}:S_{AN}, 0.9)$$

Where:

$S_{A1}:S_{AN}$  = the range from the first  $S_A$  value to the last  $S_A$  value, shown in Table 5  
 0.9 = the 90<sup>th</sup> percentile of the range given in the equation

The annual minimum differential ( $MDD_A$ ) dose is the smallest facility-related dose that can be detected during a year above the baseline annual background. The calculated  $MDD_A$  was 15.6 mrem. The  $MDD_A$  was determined using the following equation:  $MDD_A = 3 \times \sigma S_A$

### 5.3.3 Facility-related Dose

The quarterly facility-related dose ( $F_Q$ ) is the dose received during a quarter by a field dosimeter at a monitoring location due to radiation from the monitored facility.  $F_Q$  excludes the background quarterly radiation dose of 22.9 mrem plus the  $MDD_Q$  of 8.8 mrem. The  $F_Q$  is represented as follows:

If  $M_Q > (\sigma B_Q + MDD_Q)$ , then  $F_Q = M_Q - \sigma B_Q$   
 If  $M_Q \leq (\sigma B_Q + MDD_Q)$ , then  $F_Q = \text{not detected (ND)}$

The annual facility-related dose ( $F_A$ ) is the dose received during a year by a field dosimeter at a monitoring location due to radiation from the monitored facility.  $F_A$  excludes the background annual radiation dose of 91.5 mrem plus the  $MDD_A$  of 15.6 mrem. The  $F_A$  is represented as follows:

If  $M_A > (\sigma B_A + MDD_A)$ , then  $F_A = M_A - \sigma B_A$   
 If  $M_A \leq (\sigma B_A + MDD_A)$ , then  $F_A = \text{ND}$

## 5.4 GROUP 1 FACILITY-RELATED DOSE

Group 1 collected gamma data from 11 locations. These locations were unaffected by Paducah Site operations or other site-specific radiation sources.

Table 6 shows the Group 1  $F_Q$  and  $F_A$  for each monitoring location and includes decimal places not shown when rounding.

**Table 6. Group 1 Facility-related Dose**

EDL	$\sigma B_Q$ (mrem)	$M_Q$ (mrem)				$F_Q = M_Q - \sigma B_Q$ (mrem)				$\sigma B_A$ (mrem)	$M_A$ (mrem)	$F_A = M_A - \sigma B_A$ (mrem)
		1	2	3	4	1	2	3	4			
22	22.9	23.2	23.2	23.8	22.1	ND	ND	ND	ND	91.5	92.2	ND
86		22.6	21.3	24.4	22.9	ND	ND	ND	ND		91.3	ND
87		22.3	20.0	20.5	20.5	ND	ND	ND	ND		83.3	ND
88		23.6	22.8	24.9	21.2	ND	ND	ND	ND		92.5	ND
89		24.5	20.5	25.0	20.0	ND	ND	ND	ND		90.1	ND
90		21.4	21.7	23.4	21.7	ND	ND	ND	ND		88.2	ND
91		22.6	18.5	20.1	20.1	ND	ND	ND	ND		81.3	ND

**Table 6. Group 1 Facility-related Dose (Continued)**

EDL	$\sigma B_Q$ (mrem)	$M_Q$ (mrem)				$F_Q = M_Q - \sigma B_Q$ (mrem)				$\sigma B_A$ (mrem)	$M_A$ (mrem)	$F_A = M_A - \sigma B_A$ (mrem)
		1	2	3	4	1	2	3	4			
92	22.9	21.2	20.7	22.8	19.8	ND	ND	ND	ND	91.5	84.6	ND
93		25.2	20.5	23.7	23.3	ND	ND	ND	ND		92.7	ND
94		24.5	22.4	25.2	23.1	ND	ND	ND	ND		95.2	ND
95		26.2	21.4	23.9	22.0	ND	ND	ND	ND		93.5	ND

NOTES:

ND = Not detected, where  $M_Q \leq (\sigma B_Q + MDD_Q)$

ND = Not detected, where  $M_A \leq (\sigma B_A + MDD_A)$

## 6. GROUP 2

Group 2 collected gamma data from 10 locations inside or on the perimeter of the LA.

### 6.1 GROUP 2 QUARTERLY MEASURED FIELD DOSE

The  $M_F$  was successfully obtained from the Group 2 locations for all four quarters. Table 7 shows the Group 2 quarterly  $M_F$  and includes decimal places not shown when rounding.

**Table 7. Group 2 Quarterly  $M_F$**

Quarter	1		2		3		4	
EDL Number	Days in Field	$M_F$ (mrem)	Days in Field	$M_F$ (mrem)	Days in Field	$M_F$ (mrem)	Days in Field	$M_F$ (mrem)
3	90	26.0	93	19.9	84	21.2	96	22.1
4	90	24.5	93	18.3	84	18.6	96	21.6
5	90	23.4	93	23.0	84	23.1	96	23.7
6	90	21.5	92	18.0	85	18.1	96	17.4
52	90	20.6	92	18.2	85	18.2	96	18.5
59	89	18.5	93	15.8	90	14.4	92	16.3
60	89	390.5	93	417.7	90	402.5	92	359.6
61	89	551.0	93	536.1	90	640.2	92	581.6
63	89	16.7	93	15.0	90	17.5	92	16.4
65	90	19.2	92	18.3	85	17.9	96	17.3

### 6.2 GROUP 2 NORMALIZED QUARTERLY FIELD DOSE

The  $M_F$  in Table 7 was adjusted for a standardized 91-day period. This correction adjusts for the actual number of days of field deployment, which varied due to weather, holidays, and the fact that the number of days in a year is not exactly divisible by four. The  $M_Q$  is determined by the following equation.

$$M_Q = M_F \times 91 \text{ days} \div \text{number of days in the field}$$

The corresponding  $M_A$ , then, is the sum of the four normalized quarterly doses. Table 8 shows the Group 2  $M_Q$  and  $M_A$  and includes decimal places not shown when rounding.



**Table 8. Group 2 M<sub>Q</sub> and M<sub>A</sub>**

Quarter	1	2	3	4	
EDL Number	M <sub>Q</sub> (mrem)	M <sub>Q</sub> (mrem)	M <sub>Q</sub> (mrem)	M <sub>Q</sub> (mrem)	M <sub>A</sub> (mrem)
3	26.4	19.5	23.0	20.9	89.9
4	24.8	18.0	20.2	20.5	83.5
5	23.7	22.6	25.1	22.5	93.9
6	21.8	17.9	19.4	16.5	75.6
52	20.9	18.1	19.5	17.5	76.0
59	19.0	15.5	14.6	16.1	65.2
60	400.4	409.8	408.1	355.7	1574.0
61	564.9	526.0	649.1	575.3	2315.3
63	17.1	14.7	17.7	16.2	65.8
65	19.5	18.2	19.2	16.4	73.2

**6.3 GROUP 2 FACILITY-RELATED DOSE**

Group 2 collected gamma data from the LA and consisted of 10 locations. The LA is not regularly accessible to members of the public and does not represent actual E to members of the public. Locations 60 and 61 indicated a facility-related dose during the monitoring period. Locations 60 and 61 are close to the perimeter of the depleted uranium hexafluoride (DUF<sub>6</sub>) facility or its operations, so gamma dose rates at these locations are subject to change. Historically, these locations have shown a facility-related dose.

Table 9 shows the Group 2 F<sub>Q</sub> and F<sub>A</sub> for each monitoring location and includes decimal places not shown when rounding.

**Table 9. Group 2 Facility-related Dose**

EDL	σB <sub>Q</sub> (mrem)	M <sub>Q</sub> (mrem)				F <sub>Q</sub> = M <sub>Q</sub> - σB <sub>Q</sub> (mrem)				σB <sub>A</sub> (mrem)	M <sub>A</sub> (mrem)	F <sub>A</sub> = M <sub>A</sub> - σB <sub>A</sub> (mrem)
		1	2	3	4	1	2	3	4			
3	22.9	26.4	19.5	23.0	20.9	ND	ND	ND	ND	91.5	89.9	ND
4		24.8	18.0	20.2	20.5	ND	ND	ND	ND		83.5	ND
5		23.7	22.6	25.1	22.5	ND	ND	ND	ND		93.9	ND
6		21.8	17.9	19.4	16.5	ND	ND	ND	ND		75.6	ND
52		20.9	18.1	19.5	17.5	ND	ND	ND	ND		76.0	ND
59		19.0	15.5	14.6	16.1	ND	ND	ND	ND		65.2	ND
60		400.4	409.8	408.1	355.7	377.5	386.9	385.2	332.8		1574.0	1482.5
61		564.9	526.0	649.1	575.3	542.0	503.1	626.2	552.4		2315.3	2223.8
63		17.1	14.7	17.7	16.2	ND	ND	ND	ND		65.8	ND
65		19.5	18.2	19.2	16.4	ND	ND	ND	ND		73.2	ND

NOTES:

ND = Not detected, where M<sub>Q</sub> ≤ (σB<sub>Q</sub> + MDD<sub>Q</sub>)

ND = Not detected, where M<sub>A</sub> ≤ (σB<sub>A</sub> + MDD<sub>A</sub>)

**7. GROUP 3**

Group 3 collected gamma data from 25 locations outside the LA boundary and inside the PPA boundary.

## 7.1 GROUP 3 QUARTERLY MEASURED FIELD DOSE

The  $M_F$  was successfully obtained from the Group 3 locations for all four quarters.

Table 10 shows the Group 3 quarterly  $M_F$  and includes decimal places not shown when rounding.

**Table 10. Group 3 Quarterly  $M_F$**

Quarter	1		2		3		4	
EDL Number	Days in Field	$M_F$ (mrem)	Days in Field	$M_F$ (mrem)	Days in Field	$M_F$ (mrem)	Days in Field	$M_F$ (mrem)
1	89	184.9	92	231.7	85	208.8	96	216.7
2	89	286.1	93	309.4	84	257.2	96	331.9
7	90	34.7	92	30.1	85	29.5	96	33.8
13	90	26.4	92	22.1	84	24.7	96	26.1
15	90	20.5	92	18.3	85	17.0	96	17.4
25	90	29.2	93	26.0	84	27.6	96	25.6
35	91	26.9	91	26.0	85	26.0	96	27.0
37	90	23.9	92	18.8	85	18.5	96	19.1
46	90	23.8	92	18.6	85	20.1	96	21.5
50	90	41.9	92	40.9	85	31.1	96	38.6
53	89	104.7	93	113.2	84	103.7	96	114.2
58	90	17.4	92	15.5	85	15.3	96	16.6
62	89	19.6	93	17.6	85	17.2	96	18.8
64	91	21.4	91	15.8	85	20.2	96	16.4
68	90	23.0	92	22.0	85	21.6	96	23.0
69	90	21.4	92	17.0	85	16.1	96	18.1
70	89	46.0	92	50.7	85	53.3	96	46.7
71	89	44.3	92	46.4	85	55.4	96	64.0
72	89	24.7	92	22.6	85	20.3	96	23.5
78	90	24.4	92	23.1	84	21.2	96	24.0
81	89	94.8	92	101.7	85	96.2	96	81.1
82	89	27.5	92	26.4	85	32.9	96	29.1
83	90	48.0	93	47.5	84	46.8	96	53.9
96	89	19.4	92	20.0	85	20.3	96	22.2
97	89	21.2	93	17.5	90	19.3	91	19.7

## 7.2 GROUP 3 NORMALIZED QUARTERLY FIELD DOSE

The  $M_F$  in Table 10 was adjusted for a standardized 91-day period. This correction adjusts for the actual number of days of field deployment, which varied due to weather, holidays, and the fact that the number of days in a year is not exactly divisible by four. The  $M_Q$  is determined by the following equation.

$$M_Q = M_F \times 91 \text{ days} \div \text{number of days in the field}$$

The corresponding  $M_A$ , then, is the sum of the four normalized quarterly doses. Table 11 shows the Group 3  $M_Q$  and  $M_A$  and includes decimal places not shown when rounding.

**Table 11. Group 3 M<sub>Q</sub> and M<sub>A</sub>**

Quarter	1	2	3	4	
EDL Number	M <sub>Q</sub> (mrem)	M <sub>Q</sub> (mrem)	M <sub>Q</sub> (mrem)	M <sub>Q</sub> (mrem)	M <sub>A</sub> (mrem)
1	189.6	229.8	224.2	205.4	848.9
2	293.3	303.6	279.4	314.6	1190.9
7	35.2	29.9	31.7	32.0	128.7
13	26.8	21.9	26.8	24.7	100.3
15	20.8	18.2	18.2	16.5	73.7
25	29.6	25.5	30.0	24.3	109.4
35	27.0	26.1	27.9	25.6	106.6
37	24.2	18.6	19.9	18.1	80.8
46	24.1	18.4	21.6	20.4	84.5
50	42.5	40.6	33.4	36.6	153.0
53	107.3	111.1	112.6	108.3	439.3
58	17.6	15.4	16.4	15.7	65.2
62	20.1	17.3	18.5	17.8	73.6
64	21.5	15.8	21.7	15.5	74.5
68	23.3	21.8	23.2	21.8	90.1
69	21.7	16.9	17.3	17.2	73.0
70	47.2	50.3	57.2	44.3	198.9
71	45.4	46.0	59.5	60.7	211.6
72	25.3	22.4	21.8	22.3	91.8
78	24.7	22.9	23.0	22.8	93.4
81	97.2	100.9	103.3	76.9	378.2
82	28.2	26.2	35.3	27.6	117.3
83	48.7	46.6	50.8	51.1	197.2
96	19.9	19.8	21.8	21.0	82.6
97	21.7	17.2	19.6	19.7	78.2

**7.3 GROUP 3 FACILITY-RELATED DOSE**

Group 3 collected gamma data from 25 locations outside the LA boundary and inside the PPA boundary. This area is not regularly accessible to members of the public and does not represent actual E to members of the public. Locations 1, 2, 7, 25, 50, 53, 70, 71, 81, 82, and 83 indicated a facility-related dose during the monitoring period. These locations are close to the perimeter of the DUF<sub>6</sub> facility or its operations, so gamma dose rates at these locations are subject to change. This may explain the fluctuations in dose throughout the monitoring period. Historically, these locations have shown a facility-related dose.

Table 12 shows the Group 3 F<sub>Q</sub> and F<sub>A</sub> for each monitoring location and includes decimal places not shown when rounding.

**Table 12. Group 3 Facility-related Dose**

EDL	σB <sub>Q</sub> (mrem)	M <sub>Q</sub> (mrem)				F <sub>Q</sub> = M <sub>Q</sub> - σB <sub>Q</sub> (mrem)				σB <sub>A</sub> (mrem)	M <sub>A</sub> (mrem)	F <sub>A</sub> = M <sub>A</sub> - σB <sub>A</sub> (mrem)
		1	2	3	4	1	2	3	4			
1	22.9	189.6	229.8	224.2	205.4	166.7	206.9	201.3	182.5	91.5	848.9	757.4
2		293.3	303.6	279.4	314.6	270.4	280.7	256.5	291.7		1190.9	1099.4
7		35.2	29.9	31.7	32.0	12.3	ND	ND	9.1		128.7	37.2
13		26.8	21.9	26.8	24.7	ND	ND	ND	ND		100.3	ND
15		20.8	18.2	18.2	16.5	ND	ND	ND	ND		73.7	ND

**Table 12. Group 3 Facility-related Dose (Continued)**

EDL	$\sigma B_Q$ (mrem)	$M_Q$ (mrem)				$F_Q = M_Q - \sigma B_Q$ (mrem)				$\sigma B_A$ (mrem)	$M_A$ (mrem)	$F_A = M_A - \sigma B_A$ (mrem)
		1	2	3	4	1	2	3	4			
25	22.9	29.6	25.5	30.0	24.3	ND	ND	ND	ND	91.5	109.4	17.9
35		27.0	26.1	27.9	25.6	ND	ND	ND	ND		106.6	ND
37		24.2	18.6	19.9	18.1	ND	ND	ND	ND		80.8	ND
46		24.1	18.4	21.6	20.4	ND	ND	ND	ND		84.5	ND
50		42.5	40.6	33.4	36.6	19.6	17.7	10.5	13.7		153.0	61.5
53		107.3	111.1	112.6	108.3	84.4	88.2	89.7	85.4		439.3	347.8
58		17.6	15.4	16.4	15.7	ND	ND	ND	ND		65.2	ND
62		20.1	17.3	18.5	17.8	ND	ND	ND	ND		73.6	ND
64		21.5	15.8	21.7	15.5	ND	ND	ND	ND		74.5	ND
68		23.3	21.8	23.2	21.8	ND	ND	ND	ND		90.1	ND
69		21.7	16.9	17.3	17.2	ND	ND	ND	ND		73.0	ND
70		47.2	50.3	57.2	44.3	24.3	27.4	34.3	21.4		198.9	107.4
71		45.4	46.0	59.5	60.7	22.5	23.1	36.6	37.8		211.6	120.1
72		25.3	22.4	21.8	22.3	ND	ND	ND	ND		91.8	ND
78		24.7	22.9	23.0	22.8	ND	ND	ND	ND		93.4	ND
81		97.2	100.9	103.3	76.9	74.3	78.0	80.4	54.0		378.2	286.7
82		28.2	26.2	35.3	27.6	ND	ND	12.4	ND		117.3	25.8
83		48.7	46.6	50.8	51.1	25.8	23.7	27.9	28.2		197.2	105.7
96		19.9	19.8	21.8	21.0	ND	ND	ND	ND		82.6	ND
97		21.7	17.2	19.6	19.7	ND	ND	ND	ND		78.2	ND

NOTES:

ND = Not detected, where  $M_Q \leq (\sigma B_Q + MDD_Q)$

ND = Not detected, where  $M_A \leq (\sigma B_A + MDD_A)$

## 7.4 FOOD VENDOR ESTIMATED NORMALIZED DOSE

Group 3 locations 96 and 97 were food vendor locations. In 2024, no food vendors used location 96, and five food vendors used location 97. Location 97 did not show a facility-related dose, but an estimated E was calculated to show that the food vendors did not receive dose from DOE operations.

### 7.4.1 Equations Used to Determine Food Vendor Estimated Normalized Dose

Location 97  $M_Q$  for each quarter shown in Table 12 was divided by 2,184 hours (91 days  $\times$  24 hours) to determine an  $M_Q$ /hour for the location.

$$\text{Food Vendor } M_Q \text{ at the location} = (M_Q/\text{hour at location} \times \text{Number of days Food Vendor at location}) \times \text{Number of hours/day at location}$$

The background  $M_Q$ /hour for each quarter was determined by dividing the baseline background by 2,184 hours.

$$\text{Background } M_Q \text{ for time Food Vendor at location} = (\text{Background } M_Q/\text{hour at location} \times \text{Number of days Food Vendor at location}) \times \text{Number of hours/day Food Vendor at location}$$

$$\text{Net Estimated } M_Q = \text{Calculated Food Vendor } M_Q - \text{Calculated Background } M_Q$$

$$\text{Estimated } M_Q \text{ for Food Vendor} = (\text{First quarter Net Estimated } M_Q + \text{Second quarter Net Estimated } M_Q + \text{Third quarter Net estimated } M_Q + \text{Fourth quarter Net Estimated } M_Q)$$

### 7.4.2 Food Vendor 1 Estimated Normalized Dose

Food Vendor 1 was at location 97 from January 15, 2024, through January 9, 2025.

The estimated  $M_Q$  for Food Vendor 1 was determined using the equations shown in Section 7.4.1.

Table 13 shows the estimated  $M_Q$  for Food Vendor 1 at location 97 and includes decimal places not shown when rounding. Because the calculated estimated  $M_Q$  is a negative value, 0.0 mrem was assigned to the food vendor.

**Table 13. Food Vendor 1 Estimated  $M_Q$**

	<b>First Quarter</b>	<b>Second Quarter</b>	<b>Third Quarter</b>	<b>Fourth Quarter</b>
$M_Q$ /hour at location (mrem)	0.010	0.008	0.009	0.009
Number of days Food Vendor at location	11	11	12	8
Number of hours/day Food Vendor at location	2.5	2.5	2.5	2.5
Food Vendor $M_Q$ at location (mrem)	0.274	0.216	0.269	0.180
Background $M_Q$ /hour at location (mrem)	0.010	0.010	0.010	0.010
Background $M_Q$ for time Food Vendor at location (mrem)	0.288	0.288	0.315	0.210
Net Estimated $M_Q$ (mrem)	-0.015	-0.072	-0.046	-0.029
<b>Estimated <math>M_Q</math> for Food Vendor</b>	<b>-0.162</b>			

### 7.4.3 Food Vendor 2 Estimated Normalized Dose

Food Vendor 2 was at location 97 from January 15, 2024, through January 9, 2025.

The estimated  $M_Q$  for Food Vendor 2 was determined using the equations shown in Section 7.4.1.

Table 14 shows the estimated  $M_Q$  for Food Vendor 2 at location 97 and includes decimal places not shown when rounding. Because the calculated estimated  $M_Q$  is a negative value, 0.0 mrem was assigned to the food vendor.

**Table 14. Food Vendor 2 Estimated  $M_Q$**

	<b>First Quarter</b>	<b>Second Quarter</b>	<b>Third Quarter</b>	<b>Fourth Quarter</b>
$M_Q$ /hour at location (mrem)	0.010	0.008	0.009	0.009
Number of days Food Vendor at location	12	9	10	10
Number of hours/day Food Vendor at location	3	3	3	3
Food Vendor $M_Q$ at location (mrem)	0.358	0.212	0.269	0.271
Background $M_Q$ /hour at location (mrem)	0.010	0.010	0.010	0.010
Background $M_Q$ for time Food Vendor at location (mrem)	0.377	0.283	0.315	0.315
Net Estimated $M_Q$ (mrem)	-0.019	-0.071	-0.046	-0.044
<b>Estimated <math>M_Q</math> for Food Vendor</b>	<b>-0.180</b>			

### 7.4.4 Food Vendor 3 Estimated Normalized Dose

Food Vendor 3 was at location 97 from January 15, 2024, through January 9, 2025.

The estimated  $M_Q$  for Food Vendor 3 was determined using the equations shown in Section 7.4.1.

Table 15 shows the estimated  $M_Q$  for Food Vendor 3 at location 97 and includes decimal places not shown when rounding. Because the calculated estimated  $M_Q$  is a negative value, 0.0 mrem was assigned to the food vendor.

**Table 15. Food Vendor 3 Estimated  $M_Q$**

	<b>First Quarter</b>	<b>Second Quarter</b>	<b>Third Quarter</b>	<b>Fourth Quarter</b>
$M_Q$ /hour at location (mrem)	0.010	0.008	0.009	0.009
Number of days Food Vendor at location	10	12	10	10
Number of hours/day Food Vendor at location	2.5	2.5	2.5	2.5
Food Vendor $M_Q$ at location (mrem)	0.249	0.236	0.244	0.226
Background $M_Q$ /hour at location (mrem)	0.010	0.010	0.010	0.010
Background $M_Q$ for time Food Vendor at location (mrem)	0.262	0.315	0.262	0.262
Net Estimated $M_Q$ (mrem)	-0.013	-0.079	-0.038	-0.037
<b>Estimated <math>M_Q</math> for Food Vendor</b>	<b>-0.167</b>			

#### 7.4.5 Food Vendor 4 Estimated Normalized Dose

Food Vendor 4 was at location 97 from July 2, 2024, through September 26, 2024.

The estimated  $M_Q$  for Food Vendor 4 was determined using the equations shown in Section 7.4.1.

Table 16 shows estimated  $M_Q$  for Food Vendor 4 at location 97 and includes decimal places not shown when rounding. Because the calculated estimated  $M_Q$  is a negative value, 0.0 mrem was assigned to the food vendor.

**Table 16. Food Vendor 4 Estimated  $M_Q$**

	<b>First Quarter</b>	<b>Second Quarter</b>	<b>Third Quarter</b>	<b>Fourth Quarter</b>
$M_Q$ /hour at location (mrem)	N/A	0.008	0.009	N/A
Number of days Food Vendor at location	N/A	1	11	N/A
Number of hours/day Food Vendor at location	N/A	2.5	2.5	N/A
Food Vendor $M_Q$ at location (mrem)	N/A	0.020	0.246	N/A
Background $M_Q$ /hour at location (mrem)	N/A	0.010	0.010	N/A
Background $M_Q$ for time Food Vendor at location (mrem)	N/A	0.026	0.288	N/A
Net Estimated $M_Q$ (mrem)	N/A	-0.007	-0.042	N/A
<b>Estimated <math>M_Q</math> for Food Vendor</b>	<b>-0.049</b>			

#### 7.4.6 Food Vendor 5 Estimated Normalized Dose

Food Vendor 5 was at location 97 from October 7, 2024, through January 9, 2025.

The estimated  $M_Q$  for Food Vendor 5 was determined using the equations shown in Section 7.4.1.

Table 17 shows estimated  $M_Q$  for Food Vendor 5 at location 97 and includes decimal places not shown when rounding. Because the calculated estimated  $M_Q$  is a negative value, 0.0 mrem was assigned to the food vendor.

**Table 17. Food Vendor 5 Estimated M<sub>Q</sub>**

	<b>First Quarter</b>	<b>Second Quarter</b>	<b>Third Quarter</b>	<b>Fourth Quarter</b>
M <sub>Q</sub> /hour at location (mrem)	N/A	N/A	N/A	0.009
Number of days Food Vendor at location	N/A	N/A	N/A	11
Number of hours/day Food Vendor at location	N/A	N/A	N/A	3.0
Food Vendor M <sub>Q</sub> at location (mrem)	N/A	N/A	N/A	0.298
Background M <sub>Q</sub> /hour at location (mrem)	N/A	N/A	N/A	0.010
Background M <sub>Q</sub> for time Food Vendor at location (mrem)	N/A	N/A	N/A	0.346
Net Estimated M <sub>Q</sub> (mrem)	N/A	N/A	N/A	-0.048
<b>Estimated M<sub>Q</sub> for Food Vendor</b>	<b>-0.048</b>			

## 8. GROUP 4

Group 4 collected gamma data from 11 locations outside the PPA boundary and inside the DOE boundary.

### 8.1 GROUP 4 QUARTERLY MEASURED FIELD DOSE

The M<sub>F</sub> was successfully obtained from all of the Group 4 locations for all four quarters.

Table 18 shows the Group 4 quarterly M<sub>F</sub> and includes decimal places not shown when rounding.

**Table 18. Group 4 Quarterly M<sub>F</sub>**

<b>Quarter</b>	<b>1</b>		<b>2</b>		<b>3</b>		<b>4</b>	
<b>EDL Number</b>	<b>Days in Field</b>	<b>M<sub>F</sub> (mrem)</b>	<b>Days in Field</b>	<b>M<sub>F</sub> (mrem)</b>	<b>Days in Field</b>	<b>M<sub>F</sub> (mrem)</b>	<b>Days in Field</b>	<b>M<sub>F</sub> (mrem)</b>
9	90	26.8	92	23.4	89	19.9	92	23.1
12	91	20.9	92	18.4	84	20.2	96	19.7
14	90	20.0	93	19.7	84	22.0	96	20.1
19	90	23.0	92	21.3	89	18.5	91	21.2
38	90	20.4	92	22.7	84	22.9	96	20.3
66	90	22.5	93	20.0	84	22.1	96	21.9
67	90	22.9	93	21.0	84	20.3	96	22.5
76	91	23.2	92	20.7	84	19.3	96	19.8
77	91	25.2	92	20.7	84	22.9	96	21.5
79	90	21.0	92	18.8	85	17.7	96	20.6
84	90	21.6	93	21.3	84	24.5	96	22.2

### 8.2 GROUP 4 NORMALIZED QUARTERLY FIELD DOSE

The M<sub>F</sub> in Table 18 was adjusted for a standardized 91-day period. This correction adjusts for the actual number of days of field deployment, which varied due to weather, holidays, and the fact that the number of days in a year is not exactly divisible by four. The M<sub>Q</sub> is determined by the following equation.

$$M_Q = M_F \times 91 \text{ days} \div \text{number of days in the field}$$

The corresponding  $M_A$ , then, is the sum of the four normalized quarterly doses. Table 19 shows the Group 4  $M_Q$  and  $M_A$  and includes decimal places not shown when rounding.

**Table 19. Group 4  $M_Q$  and  $M_A$**

Quarter	1	2	3	4	
EDL Number	$M_Q$ (mrem)	$M_Q$ (mrem)	$M_Q$ (mrem)	$M_Q$ (mrem)	$M_A$ (mrem)
9	27.2	23.2	20.4	22.8	93.6
12	21.0	18.2	21.9	18.7	79.8
14	20.3	19.3	23.9	19.1	82.6
19	23.3	21.1	19.0	21.2	84.6
38	20.7	22.5	24.9	19.2	87.3
66	22.8	19.6	24.0	20.8	87.2
67	23.2	20.6	22.1	21.3	87.2
76	23.3	20.5	21.0	18.8	83.5
77	25.3	20.5	24.9	20.4	91.1
79	21.3	18.6	19.0	19.5	78.5
84	21.9	20.9	26.6	21.0	90.5

### 8.3 GROUP 4 FACILITY-RELATED DOSE

Group 4 collected gamma data from 11 locations outside the PPA boundary and inside the DOE boundary. None of the locations indicated a facility-related dose.

Table 20 shows the Group 4  $F_Q$  and  $F_A$  for each monitoring location and includes decimal places not shown when rounding.

**Table 20. Group 4 Facility-related Dose**

EDL	$\sigma B_Q$ (mrem)	$M_Q$ (mrem)				$F_Q = M_Q - \sigma B_Q$ (mrem)				$\sigma B_A$ (mrem)	$M_A$ (mrem)	$F_A = M_A - \sigma B_A$ (mrem)
		1	2	3	4	1	2	3	4			
9	22.9	27.2	23.2	20.4	22.8	ND	ND	ND	ND	91.5	93.6	ND
12		21.0	18.2	21.9	18.7	ND	ND	ND	ND		79.8	ND
14		20.3	19.3	23.9	19.1	ND	ND	ND	ND		82.6	ND
19		23.3	21.1	19.0	21.2	ND	ND	ND	ND		84.6	ND
38		20.7	22.5	24.9	19.2	ND	ND	ND	ND		87.3	ND
66		22.8	19.6	24.0	20.8	ND	ND	ND	ND		87.2	ND
67		23.2	20.6	22.1	21.3	ND	ND	ND	ND		87.2	ND
76		23.3	20.5	21.0	18.8	ND	ND	ND	ND		83.5	ND
77		25.3	20.5	24.9	20.4	ND	ND	ND	ND		91.1	ND
79		21.3	18.6	19.0	19.5	ND	ND	ND	ND		78.5	ND
84		21.9	20.9	26.6	21.0	ND	ND	ND	ND		90.5	ND

NOTES:

ND = Not detected, where  $M_Q \leq (\sigma B_Q + MDD_Q)$

ND = Not detected, where  $M_A \leq (\sigma B_A + MDD_A)$



## 9. GROUP 5

Group 5 collected gamma data from seven locations outside the DOE boundary.

### 9.1 GROUP 5 QUARTERLY MEASURED FIELD DOSE

The  $M_F$  was successfully obtained from all Group 5 locations for all four quarters.

Table 21 shows the Group 5 quarterly  $M_F$  and includes decimal places not shown when rounding.

**Table 21. Group 5 Quarterly  $M_F$**

Quarter	1		2		3		4	
EDL Number	Days in Field	$M_F$ (mrem)	Days in Field	$M_F$ (mrem)	Days in Field	$M_F$ (mrem)	Days in Field	$M_F$ (mrem)
16	90	26.3	92	21.3	84	21.0	96	23.4
30	90	24.3	92	23.0	84	19.4	96	23.7
40	89	23.8	92	25.2	85	25.1	96	25.9
73	90	19.8	92	17.3	84	20.4	96	20.9
74	91	27.1	92	21.6	84	26.2	96	24.3
75	91	22.5	92	21.6	84	19.2	96	23.6
80	90	18.6	92	19.4	84	19.0	96	20.7

### 9.2 GROUP 5 NORMALIZED QUARTERLY FIELD DOSE

The  $M_F$  in Table 21 was adjusted for a standardized 91-day period. This correction adjusts for the actual number of days of field deployment, which varied due to weather, holidays, and the fact that the number of days in a year is not exactly divisible by four. The  $M_Q$  is determined by the following equation.

$$M_Q = M_F \times 91 \text{ days} \div \text{number of days in the field}$$

The corresponding  $M_A$ , then, is the sum of the four normalized quarterly doses. Table 22 shows the Group 5  $M_Q$  and  $M_A$  and includes decimal places not shown when rounding.

**Table 22. Group 5  $M_Q$  and  $M_A$**

Quarter	1	2	3	4	
EDL Number	$M_Q$ (mrem)	$M_Q$ (mrem)	$M_Q$ (mrem)	$M_Q$ (mrem)	$M_A$ (mrem)
16	26.7	21.1	22.8	22.2	92.8
30	24.6	22.8	21.1	22.5	91.0
40	24.4	25.0	26.9	24.6	100.9
73	20.1	17.2	22.2	19.8	79.2
74	27.2	21.4	28.5	23.0	100.1
75	22.6	21.4	20.9	22.4	87.2
80	18.9	19.2	20.6	19.6	78.4

### 9.3 GROUP 5 FACILITY-RELATED DOSE

Group 5 collected gamma data from seven locations outside the DOE boundary and in the licensed portion of the DOE Reservation. None of the locations indicated a facility-related dose.

Table 23 shows the Group 5  $F_Q$  and  $F_A$  for each monitoring location and includes decimal places not shown when rounding.

**Table 23. Group 5 Facility-related Dose**

EDL	$\sigma B_Q$ (mrem)	$M_Q$ (mrem)				$F_Q = M_Q - \sigma B_Q$ (mrem)				$\sigma B_A$ (mrem)	$M_A$ (mrem)	$F_A = M_A - \sigma B_A$ (mrem)
		1	2	3	4	1	2	3	4			
16	22.9	26.7	21.1	22.8	22.2	ND	ND	ND	ND	91.5	92.8	ND
30		24.6	22.8	21.1	22.5	ND	ND	ND	ND		91.0	ND
40		24.4	25.0	26.9	24.6	ND	ND	ND	ND		100.9	ND
73		20.1	17.2	22.2	19.8	ND	ND	ND	ND		79.2	ND
74		27.2	21.4	28.5	23.0	ND	ND	ND	ND		100.1	ND
75		22.6	21.4	20.9	22.4	ND	ND	ND	ND		87.2	ND
80		18.9	19.2	20.6	19.6	ND	ND	ND	ND		78.4	ND

NOTES:

ND = Not detected, where  $M_Q \leq (\sigma B_Q + MDD_Q)$

ND = Not detected, where  $M_A \leq (\sigma B_A + MDD_A)$

## 10. NEUTRON MONITORING AND RESULTS

Locations 2, 3, 50, 65, 68, 81, and 83 were monitored for external neutron radiation for information only. All neutron results were reported as “M” (i.e., dose equivalents below the minimum measurable quantity); therefore, analysis of neutron dose was not required and no dose equations were used.

## 11. ANALYSIS AND CONCLUSION

Since the fall of 2001, security controls have been in place to restrict public access to areas adjacent to the LA. In 2019, a PPA boundary fence was added to restrict public access to areas between the LA boundary and the PPA boundary.

In 2024, 13 out of 64 locations showed facility-related dose. All 13 were either within the LA boundary or between the LA boundary and the PPA boundary, which is not regularly accessible to the public. This means the potential external radiation dose calculated from these locations was not representative of the actual public external radiation dose. All 13 locations were the areas with the highest historically measured doses throughout the monitoring period. These locations were adjacent to or in close proximity to the UF<sub>6</sub> cylinder storage yards.

### 11.1 PUBLIC DOSE FROM DIRECT EXPOSURE TO DOE OPERATIONS

As stated in Section 11, all the locations with facility-related dose were located within the LA boundary or between the LA boundary and PPA boundary, which is not regularly accessible to the public. The West

Kentucky Wildlife Management Area (WKWMA) is adjacent to the PPA boundary. There are no residences or businesses located in the WKWMA, but this area is open for recreational use.

Group 4 locations collected gamma data in the area outside the PPA boundary and inside the DOE boundary within the WKWMA. Section 8.3, Table 20 shows these locations did not receive any facility-related dose.

Because it is possible for a member of the public to walk up to a section of the PPA boundary, a review was performed of the dose assigned to the locations closest to the PPA boundary that indicated a facility-related dose.

The locations along the PPA boundary that indicated a facility-related dose are 25, 53, 82, and 83. These locations are located in close proximity to the C-745 UF<sub>6</sub> cylinder storage yard and inside the PPA boundary along Dyke Road.

Because dose is inversely proportional to the square of the distance from the source, the potential E to a member of the public was determined using the shortest distance between the EDL and the closest point to the PPA boundary.

$$\text{Inverse square law} = \text{mrem}_{\text{PPA boundary}} = \text{mrem}_{\text{EDL}} \times \text{distance}_{\text{EDL}}^2 \div \text{distance}_{\text{PPA boundary}}^2$$

The starting distance from the EDL is 1 inch or 0.08 ft. The distance from the EDL starting point to the closest point of the PPA boundary was determined by GPS coordinates. Table 24 shows the calculated results and includes decimal places not shown when rounding.

**Table 24. Calculated Dose at Locations along PPA Boundary with a Facility-related Dose**

<b>EDL-25</b>	<b>2024</b>
mrem at EDL	1.79E+01
Starting distance from EDL (ft)	0.08
Shortest distance to PPA boundary (ft)	137
mrem at PPA boundary	6.09E-06
<b>EDL-53</b>	
mrem at EDL	3.48E+02
Starting distance from EDL (ft)	0.08
Shortest distance to PPA boundary (ft)	452
mrem at PPA boundary	1.09E-05
<b>EDL-82</b>	
mrem at EDL	2.58E+01
Starting distance from EDL (ft)	0.08
Shortest distance to PPA boundary (ft)	0.21
mrem at PPA boundary	3.74E+00
<b>EDL-83</b>	
mrem at EDL	1.06E+02
Starting distance from EDL (ft)	0.08
Shortest distance to PPA boundary (ft)	383
mrem at PPA boundary	4.61E-06

Table 24 shows that EDL 82 represents the maximum dose along the PPA boundary based on the inverse square law at 3.74E+00 mrem per year.

*Methods for Conducting Risk Assessments and Risk Evaluations at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky, Volume 1. Human Health, DOE/LX/07-0107&D2/R15/V1, (RMD)* was used to determine a reasonable maximum exposure at this location. RMD Table B.5 lists an adult recreational user exposure frequency of 104 days per year and exposure duration of 10 hours per day (DOE 2024).

Using this information and the following equation, a potential E was determined.

$$(3.74 \text{ mrem} \times 104 \text{ days/year} \times 10 \text{ hours/day}) \div (365 \text{ days/year} \times 24 \text{ hours/day}) = 0.44 \text{ mrem}$$

A member of the public would receive a potential E of 4.4E-01 mrem per year along the PPA boundary at location 82.

## **11.2 PUBLIC DOSE IN AREAS FREELY ACCESSIBLE**

In 2024, location 14 was freely accessible to members of the public. Location 14 is near Harmony Cemetery and is located north of the LA boundary and south of Ogden Landing Road. The  $M_A$  for location 14 was statistically equivalent to naturally occurring background but below the calculated background for the site; therefore, the potential E to a member of the public at this location was 0.0E+00 mrem.

## **11.3 PUBLIC DOSE AT THE DOE BOUNDARY**

The monitoring location along the DOE boundary with the maximum annual dose was location 40, which is located outside the DOE boundary and within the WKWMA off Dyke Road.

The RMD was used to determine a reasonable maximum exposure at this location. RMD Table B.5 lists an adult recreational user exposure frequency of 104 days per year and exposure duration of 10 hours per day (DOE 2024).

Table 22 shows an  $M_A$  of 100.9 mrem at location 40. Subtracting background of 91.5 mrem shows a dose of 9.4 mrem above background.

Using this information above and the following equation, a potential E was determined.

$$(9.4 \text{ mrem} \times 104 \text{ days/year} \times 10 \text{ hours/day}) \div (365 \text{ days/year} \times 24 \text{ hours/day}) = 1.1 \text{ mrem}$$

A member of the public would receive a potential E of 1.1E+00 mrem per year at the DOE boundary.

## **11.4 MAXIMALLY EXPOSED INDIVIDUAL DOSE**

Based on the results in this section, location 40 represented the MEI location. As shown in Section 11.3, the potential E at location 40 was 1.1E+00 mrem.

An estimated potential collective population E was calculated by multiplying the dose to the MEI by a total estimated number of visitors hiking within the WKWMA annually (i.e., 150 persons as listed in the RMD), which resulted in a representative collective dose of 1.7E-01 person-rem, as shown by the following equation.

$$1.1 \text{ mrem} \times 1 \text{ rem}/1000 \text{ mrem} \times 150 \text{ persons} = 0.17 \text{ person-rem}$$

The data for the past five years shows that location 40 was the representative MEI location during this time. Table 25 shows the results from 2020 through 2024 and includes decimal places not shown when rounding.

**Table 25. Comparison of MEI and Collective Population Potential E**

	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>
<b>MEI calculated E (mrem)</b>	1.9E+00	2.1E+00	1.8E+00	6.3E-01	1.1E+00
<b>Percent of DOE 25 mrem radioactive waste public dose constraint</b>	7.6%	8.5%	7.1%	2.5%	4.5%
<b>Percent of DOE 100 mrem public dose limit</b>	1.9%	2.1%	1.8%	0.63%	1.1%
<b>Population</b>	150	150	150	150	150
<b>Collective population E (person-rem)</b>	2.8E-01	3.2E-01	2.7E-01	9.4E-02	1.7E-01

## 11.5 CONCLUSION

The dose from the direct radiation pathway is evaluated by its contribution to the DOE total dose limit of 100 mrem per year from all relevant pathways (i.e., air, surface water, sediment, direct radiation). In 2024, the estimated dose to the MEI from the direct radiation pathway at the Paducah Site was 1.1E+00 mrem, which represents 1.1% of the DOE annual dose limit and 4.5% of the 25 mrem radioactive waste public dose constraint.

## 12. REFERENCES

- DOE (U.S. Department of Energy) 2024. *Methods for Conducting Risk Assessments and Risk Evaluations at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky, Volume 1. Human Health*, DOE/LX/07-0107&D2/R15/V1, U.S. Department of Energy, Paducah, KY, June.
- FRNP (Four Rivers Nuclear Partnership, LLC) 2021. *Annual Report on External Radiation Monitoring for Calendar Year 2020 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, FRNP-RPT-0178, Four Rivers Nuclear Partnership, LLC, Paducah, KY, October.
- FRNP 2022. *2021 Annual External Radiation Monitoring Report Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, FRNP-RPT-0227, Four Rivers Nuclear Partnership, LLC, Paducah, KY, July.
- FRNP 2023. *2022 Annual External Radiation Monitoring Report Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, FRNP-RPT-0275, Four Rivers Nuclear Partnership, LLC, Paducah, KY, March.
- FRNP 2024. *2023 Annual External Radiation Monitoring Report Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, FRNP-RPT-0333, Four Rivers Nuclear Partnership, LLC, Paducah, KY, March.
- FRNP 2025. *2024 Annual External Radiation Monitoring Report*, DAC-ENV-FA5950-0144, Four Rivers Nuclear Partnership, LLC, Paducah, KY, February.

**APPENDIX**

**DOSIMETER LOCATIONS AND COLLECTION DATES**

**THIS PAGE INTENTIONALLY LEFT BLANK**

## ACRONYMS

DOE	U.S. Department of Energy
EDL	environmental dosimeter location
KOW	Kentucky Ordnance Works
KPDES	Kentucky Pollutant Discharge Elimination System
N/A	not applicable
NSDD	North-South Diversion Ditch
PGDP	Paducah Gaseous Diffusion Plant
WKWMA	West Kentucky Wildlife Management Area



**Table A.1 Location Name, Description, and Coordinates**

<b>Location Name</b>	<b>Location Description</b>	<b>North Latitude (DMS)</b>	<b>West or East Longitude (DMS)</b>	<b>X Coordinate (ft)</b>	<b>Y Coordinate (ft)</b>
Environmental dosimeter location (EDL)-1	Paducah Gaseous Diffusion Plant (PGDP) security fence west of C-745-M Cylinder Storage Yard near intersection of Patrol Road and Alabama Avenue near pole 21-20. Outside fence behind the depleted uranium hexafluoride (DUF <sub>6</sub> ) dirt pile.	N 37 06 16.66	W 088 48 55.18	-4172	-5856
EDL-2	PGDP security fence south of C-745-T Cylinder Storage Yard near pole T20-6J. South cylinder yard perimeter fence.	N 37 06 02.15	W 088 48 43.07	-2740	-6427
EDL-3	PGDP security fence east of C-745-H Cylinder Storage Yard near pole 23-31. Perimeter fence northeast corner.	N 37 07 04.17	W 088 47 57.21	-1399	739
EDL-4	North PGDP security fence near the North-South Diversion Ditch (NSDD).	N 37 07 15.74	W 088 48 25.56	-3957	1052
EDL-5	North PGDP security fence north of C-747-A Burial Area near pole T53A1P26G. North perimeter fence between lagoons.	N 37 07 24.38	W 088 48 54.58	-6464	1068
EDL-6	PGDP security fence west of C-746-P1 Scrap Metal Yard (West) near pole 22-4. C-612 Northwest Plume Groundwater System perimeter fence.	N 37 07 20.85	W 088 49 07.22	-7303	382
EDL-7	PGDP perimeter fence adjacent to Curlee Road near entrance to U.S. Department of Energy (DOE) building (C-103DOE Site Office and Annex). Perimeter fence across from entrance to DOE building.	N 37 06 29.15	W 088 49 02.49	-5153	-4400
EDL-9	Northeast corner of fence of old Kentucky Ordnance Works (KOW) water treatment plant, near MW309. Gate to MW305.	N 37 06 37.12	W 088 49 48.11	-8901	-4907
EDL-12	Institutional controls fence near MW191 where Little Bayou Creek crosses U.S. Highway 358. MW191, Little Bayou, and Ogden Landing Road.	N 37 06 49.62	W 088 47 11.44	2588	626

**Table A.1 Location Name, Description, and Coordinates (Continued)**

<b>Location Name</b>	<b>Location Description</b>	<b>North Latitude (DMS)</b>	<b>West or East Longitude (DMS)</b>	<b>X Coordinate (ft)</b>	<b>Y Coordinate (ft)</b>
EDL-13	West fence of C-746-U Contained Landfill near entrance gate.	N 37 07 48.17	W 088 48 00.61	-3182	4825
EDL-14	Institutional controls fence along the NSDD on west side of 14th street extension near Highway 358 (K003). Fence at NSDD, north of MW353.	N 37 07 29.75	W 088 48 10.58	-3302	2798
EDL-15	Northeast corner of C-755 Trailer Complex fence behind C-755-D Electrical Storage.	N 37 06 45.01	W 088 47 58.91	-864	-1129
EDL-16	West Kentucky Wildlife Management Area (WKWMA) Clubhouse on northwest corner porch post. On porch WKWMA headquarters.	N 37 07 59.44	W 088 48 49.76	-7311	4533
EDL-19	Past pond on right "A" sign next to MW426.	N 37 07 24.43	W 088 49 33.11	-9398	2
EDL-22	Outside of the fence of the locked air sampling station at the rear corner of the Bethel Cumberland Presbyterian Church Cemetery.	N 37 00 05.36	W 088 52 36.29	-8159	-46801
EDL-25	On power line tower nearest Dyke Road southeast of C-745-T Cylinder Storage Yard.	N 37 06 00.02	W 088 48 26.49	-1401	-6172
EDL-30	Take the road by the PGDP landfills, drive past MW98 and MW235. At intersection, the environmental dosimeter located on the inside of the "Warning Fiber Optic" sign at Boldry School Road, west of MW381.	N 37 08 21.060	W 088 45 09.060	-4836	7876
EDL-35	KPDES Pollutant Discharge Elimination System (KPDES) Outfall 017 off of the plant access road. KPDES Outfall 017 DUF <sub>6</sub> laydown yard.	N 37 06 21.480	W 088 49 03.960	-4773	-5806
EDL-37	KPDES Outfall 001 behind the Vortec site. K001.	N 37 07 18.600	W 088 49 15.660	-8202	138
EDL-38	Five-Points Creek with concrete bridge, on tree behind the "2A" sign.	N 37 06 43.320	W 088 50 09.000	-10630	-4528
EDL-40	Turn north on Kelley Road off Woodville Road, go about ½ mile on Kelly Road and then turn left, go about ½ mile. Environmental dosimeter placed within trees on left. Orange sign on blocked road, east of 57 off Dyke Road.	N 37 05 52.200	W 088 48 52.20	-2818	-7551

**Table A.1 Location Name, Description, and Coordinates (Continued)**

<b>Location Name</b>	<b>Location Description</b>	<b>North Latitude (DMS)</b>	<b>West or East Longitude (DMS)</b>	<b>X Coordinate (ft)</b>	<b>Y Coordinate (ft)</b>
EDL-46	Truck entrance at receiving C-720 Maintenance and Storage Building.	N 37 06 44.700	W 088 49 00.120	-5198	-2865
EDL-50	West Patrol Road fence across from C-745-A Cylinder Storage Yard.	N 37 07 02.88	W 088 49.15.18	-7287	-1547
EDL-52	East Patrol Road fence across from C-745-E Cylinder Storage Yard.	N 37 06 42.18	W 088 48.07.20	-1397	-1628
EDL-53	Security fence at southeast corner of C-745-T Cylinder Storage Yard. Down fence line away from EDL-2.	N 37 06 00.42	W 088 48.37.02	-2220	-6423
EDL-58	West central C-755 Trailer Complex.	N 59 07 98.00	E 22 88 70.74	-1209	-1422
EDL-59	C-752-A Waste Storage Facility break area.	N 59 15 61.62	E 22 78 55.79	-5234	-339
EDL-60	C-333-A Feed Vaporization Facility light pole on fence pole #16.	N 59 02 07.10	E 22 80 71.62	-2919	-4199
EDL-61	West of C-746-Q Hazardous and LLW Storage Facility light pole #14.	N 59 01 58.14	E 22 80 98.35	-2778	-4315
EDL-62	C-743 Office Building light pole #336, behind trailer #3.	N 59 10 20.18	E 22 73 49.81	-6111	-2607
EDL-63	C-412 Trailer Complex, health physics break trailer.	N 59 08 36.46	E 22 79 46.95	-4069	-2435
EDL-64	C-764 T06 Office Trailer.	N 59 11 77.55	E 22 70 88.88	-7098	-2447
EDL-65	Located outside of north security fence north of C-745-H Cylinder Storage Yard; south of C-762 Gravel Laydown Area with Metal Shed.	N 37 07 08.54386	W 088 48 00.45376	-1795	1062
EDL-66	Located on tree at southeast corner of New Harmony Cemetery; adjacent to last concrete barrier and large metal post.	N 37 07 15.80859	W 088 48 11.08836	-2856	1457
EDL-67	Located on "No Trespassing" sign, north side of Dyke Road, next to security fence north of C-762 Gravel Laydown Area with Metal Shed.	N 37 07 12.70502	W 088 47 56.75697	-1658	1560
EDL-68	West security fence west of C-745-B Cylinder Storage Yard and southeast of the Vortec site.	N 37 07 11.60797	W 088 49 11.43416	-7302	-617

**Table A.1 Location Name, Description, and Coordinates (Continued)**

<b>Location Name</b>	<b>Location Description</b>	<b>North Latitude (DMS)</b>	<b>West or East Longitude (DMS)</b>	<b>X Coordinate (ft)</b>	<b>Y Coordinate (ft)</b>
EDL-69	Wooden utility pole (T12-15 H) next to gravel road at northeast corner of pond north of C-611 complex.	N 37 07 13.70394	W 088 49 28.37928	-8664	-888
EDL-70	Outside of west security fence southeast of C-333 Process Building, midway between C-810 Parking Area (C-100) and north DUF <sub>6</sub> security fence.	N 37 06 27.82855	W 088 48 50.25203	-4173	-4189
EDL-71	Outside of west security fence of DUF <sub>6</sub> under security light, northeast of wooden utility pole (11056 KU 78487).	N 37 06 23.05971	W 088 48 59.65074	-4723	-4903
EDL-72	North side of air monitoring station AMD57, northwest of Post 57.	N 37 05 55.32798	W 088 49 15.28582	-4952	-7972
EDL-73	Eastern "Railroad Crossing" sign at train tracks on Acid Road.	N 37 06 06.14205	W 088 50 02.01070	-8883	-8241
EDL-74	Located on "Warning Siren" sign at turnoff north of Magruder Road and Woodville Road intersection.	N 37 05 10.96196	W 088 48 53.61411	-1765	-11586
EDL-75	Located on "Warning Siren" sign north of Kelley Road and Woodville Road intersection.	N 37 05 04.94525	W 088 48 26.65157	496	-11409
EDL-76	Located on "Tract A" sign below power lines, south side of Kelley Road in sharp curve between Woodville Road and McCaw Road.	N 37 05 55.05466	W 088 48 06.27328	310	-6082
EDL-77	Located on "Warning Siren" sign north side of McCaw Road east of Kelley Road intersection.	N 37 06 25.46598	W 088 47 33.66599	1737	-2287
EDL-78	Northeast corner of C-746-U Contained Landfill security fence.	N 37 07 54.00752	W 088 47 37.45924	-1622	6020
EDL-79	Located on left post of the "Wildlife Management" gate on New Waterline Road southwest of plant gate 41A west of C-612 Northwest Plume Groundwater System.	N 37 07 28.86304	W 88 49 12.50003	-7981	993
EDL-80	Located on "cattle" gate west of MW453 and MW454 on gravel road east of New Waterline Road.	N 37 07 47.29850	W 088 48 46.10944	-6612	3477

**Table A.1 Location Name, Description, and Coordinates (Continued)**

<b>Location Name</b>	<b>Location Description</b>	<b>North Latitude (DMS)</b>	<b>West or East Longitude (DMS)</b>	<b>X Coordinate (ft)</b>	<b>Y Coordinate (ft)</b>
EDL-81	Southeast corner of DUF <sub>6</sub> security fence next to gate V1 east of New Waterline east of C-100 Administration Building.	N 37 06 18.33947	W 088 48 56.42591	-4314	-5262
EDL-82	Short pole east of Dyke Road north of KPDES Outfall 013.	N 37 06 10.13175	W 088 48 13.53048	-765	-4851
EDL-83	Large metal power pole west of Dyke Road south of KPDES Outfall 013.	N 37 06 07.30640	W 088 48 20.71726	-1214	-5319
EDL-84	Located at MW496 on the east side of Dyke Road.	N 37 07 03.50589	W 088 47 49.26485	-769	894
EDL-86	Plant entrance, gravel construction road. Right side on "orange warning signal" sign.	N 37 5 18.8622	W 088 49 28.2282	-4676	-11794
EDL-87	KOW entrance north of Woodville Road north of Kevil Eagles. Right side on "orange warning signal" sign.	N 37 05 24.2802	W 088 50 43.9548	-10629	-13381
EDL-88	Bethel Church Road KOW entrance. North of Massey Road, right side on yellow post.	N 37 07 05.4876	W 088 50 37.9608	-13677	-3597
EDL-89	Bobo Road, off Bethel Church Road. Continue east 200 yards past end of asphalt. At intersection on "orange warning signal" sign.	N 37 07 35.9976	W 088 49 44.3922	-10657	788
EDL-90	Bridge on Ogden Landing Road east of Lamb Wheel Alignment, LLC. On northeast corner of bridge on "contaminated creek" sign.	N 37 08 54.6714	W 088 47 27.2472	-12310	7182
EDL-91	Boldry School Road on KOW at Shawnee Fossil Plant entrance. On Cattle Gate Road on hill, right side.	N 37 08 40.9884	W 088 49 36.5232	-2952	12069
EDL-92	Second road on right past C-746-U Contained Landfill, cross Iron Bridge, on ICM-02, DOE notice sign on the left.	N 37 08 23.18	W 088 47 25.41	-1717	9125
EDL-93	MW100, north on Metropolis Lake Road past railroad tracks on left side on well bollard.	N 37 08 09.0744	W 088 46 50.9304	4874	7186
EDL-94	Residence; corner of Ogden Landing Road and Metropolis Lake Road.	N 37 05 48.9294	W 088 47 12.4332	4740	436
EDL-95	West McCracken Healthcare, Metropolis Lake Road. On light pole in southwest corner of parking lot.	N 37 06 40.5468	W 088 46 47.2872	4617	-5167

**Table A.1 Location Name, Description, and Coordinates (Continued)**

<b>Location Name</b>	<b>Location Description</b>	<b>North Latitude (DMS)</b>	<b>West or East Longitude (DMS)</b>	<b>X Coordinate (ft.)</b>	<b>Y Coordinate (ft.)</b>
EDL-96	C-810 Parking Area (C-100) on Swift and Staley Inc. "Operations and Maintenance Parking Only" sign. Fourth sign—environmental dosimeter facing south toward DUF <sub>6</sub> facility.	N 37 06 34.11	W 88 48 50.9616	-4447	-3610
TLD-97	East side of C-100 Administration Building on light pole T13-A.	N 37 06 36.9649	W 88 48 47.1533	-4256	-3233
EDL-FB	Taken along while placing and collecting all other samples—stored in "lead box" at C-101 Cafeteria dosimetry office.	Not applicable (N/A)	N/A	N/A	N/A
EDL-TB	Stored in "lead box" at C-101 dosimetry office.	N/A	N/A	N/A	N/A

**Table A.2 First Quarter Issue and Collection Dates**

<b>Date/Time Issued Badge ID</b>	<b>Issued By</b>	<b>Date/Time Collected</b>	<b>Collected By</b>	<b>Location Name</b>	<b>Comments</b>
1/11/2024 10:26 L-029	BH	4/9/2024 13:53	BH	EDL-1	N/A
1/11/2024 10:10 L-030 022	BH	4/9/2024 13:41	BH	EDL-2	N/A
1/10/2024 10:13 L-031 023	BH	4/9/2024 13:17	BH	EDL-3	N/A
1/10/2024 9:03 L-032	BH	4/9/2024 15:00	BH	EDL-4	N/A
1/10/2024 8:57 L-033	BH	4/9/2024 14:32	BH	EDL-5	N/A
1/10/2024 8:45 L-034	BH	4/9/2024 14:25	BH	EDL-6	N/A
1/10/2024 9:39 L-035	BH	4/9/2024 14:06	BH	EDL-7	N/A
1/11/2024 9:49 L-036	BH	4/10/2024 13:43	FO	EDL-9	N/A
1/10/2024 14:34 L-037	BH	4/10/2024 9:21	BH	EDL-12	N/A
1/11/2024 8:21 L-038	BH	4/10/2024 9:32	BH	EDL-13	N/A
1/10/2024 10:08 L-039	BH	4/9/2024 13:13	BH	EDL-14	N/A
1/10/2024 9:56 L-040	BH	4/9/2024 13:04	BH	EDL-15	N/A
1/11/2024 9:07 L-041	BH	4/10/2024 13:12	FO	EDL-16	N/A
1/11/2024 9:39 L-042	BH	4/10/2024 13:36	FO	EDL-19	N/A
1/10/2024 13:20 L-043	BH	4/10/2024 8:23	FO	EDL-22	N/A
1/10/2024 10:38 L-044	BH	4/9/2024 13:33	BH	EDL-25	N/A
1/11/2024 9:01 L-045	BH	4/10/2024 13:05	FO	EDL-30	N/A
1/10/2024 9:43 L-046	BH	4/10/2024 8:05	FO	EDL-35	N/A
1/10/2024 8:40 L-047	BH	4/9/2024 14:24	BH	EDL-37	N/A
1/11/2024 9:46 L-048	BH	4/10/2024 13:42	FO	EDL-38	N/A
1/11/2024 10:06 L-049	BH	4/9/2024 13:36	BH	EDL-40	N/A
1/10/2024 9:35 L-050	BH	4/9/2024 14:08	BH	EDL-46	N/A
1/10/2024 9:20 L-051 024	BH	4/9/2024 14:19	BH	EDL-50	N/A
1/10/2024 9:50 L-052	BH	4/9/2024 12:57	BH	EDL-52	N/A

**Table A.2 First Quarter Issue and Collection Dates (Continued)**

<b>Date/Time Issued Badge ID</b>	<b>Issued By</b>	<b>Date/Time Collected</b>	<b>Collected By</b>	<b>Location Name</b>	<b>Comments</b>
1/11/2024 10:16 L-053	BH	4/9/2024 13:41	BH	EDL-53	N/A
1/10/2024 9:53 L-054	BH	4/9/2024 13:00	BH	EDL-58	N/A
1/10/2024 8:21 L-055	BH	4/8/2024 15:09	BH	EDL-59	N/A
1/10/2024 14:57 L-056	BH	4/8/2024 14:55	BH	EDL-60	N/A
1/10/2024 14:59 L-057	BH	4/8/2024 14:57	BH	EDL-61	N/A
1/10/2024 8:32 L-058	BH	4/8/2024 15:13	BH	EDL-62	N/A
1/10/2024 14:52 L-059	BH	4/8/2024 15:00	BH	EDL-63	N/A
1/10/2024 12:45 L-060	BH	4/10/2024 7:58	FO	EDL-64	N/A
1/10/2024 10:18 L-061 025	BH	4/9/2024 13:19	BH	EDL-65	N/A
1/10/2024 10:06 L-062	BH	4/9/2024 13:10	BH	EDL-66	N/A
1/10/2024 10:03 L-063	BH	4/9/2024 13:09	BH	EDL-67	N/A
1/10/2024 9:15 L-064 026	BH	4/9/2024 14:21	BH	EDL-68	N/A
1/10/2024 9:28 L-065	BH	4/9/2024 14:13	BH	EDL-69	N/A
1/11/2024 10:39 L-066	BH	4/9/2024 14:00	BH	EDL-70	N/A
1/11/2024 10:29 L-067	BH	4/9/2024 13:58	BH	EDL-71	N/A
1/11/2024 10:23 L-068	BH	4/9/2024 13:50	BH	EDL-72	N/A
1/11/2024 9:54 L-069	BH	4/10/2024 13:56	FO	EDL-73	N/A
1/10/2024 13:47 L-070	BH	4/10/2024 8:41	FO	EDL-74	N/A
1/10/2024 13:51 L-071	BH	4/10/2024 8:49	FO	EDL-75	N/A
1/10/2024 14:10:00 L-072	BH	4/10/2024 9:06	FO	EDL-76	N/A
1/10/2024 14:04 L-073	BH	4/10/2024 9:03	FO	EDL-77	N/A
1/11/2024 8:27 L-074	BH	4/10/2024 9:34	FO	EDL-78	N/A
1/10/2024 8:49 L-075	BH	4/9/2024 14:27	BH	EDL-79	N/A
1/11/2024 9:12 L-076	BH	4/10/2024 13:10	FO	EDL-80	N/A



**Table A.2 First Quarter Issue and Collection Dates (Continued)**

<b>Date/Time Issued Badge ID</b>	<b>Issued By</b>	<b>Date/Time Collected</b>	<b>Collected By</b>	<b>Location Name</b>	<b>Comments</b>
1/11/2024 10:32 L-077 027	BH	4/9/2024 13:55	BH	EDL-81	N/A
1/11/2024 10:27 L-078	BH	4/9/2024 13:25	BH	EDL-82	N/A
1/10/2024 10:30 L-079 028	BH	4/9/2024 13:27	BH	EDL-83	N/A
1/10/2024 10:01 L-080	BH	4/9/2024 13:07	BH	EDL-84	N/A
1/10/2024 1:44 L-081	BH	4/10/2024 8:38	FO	EDL-86	N/A
1/11/2024 10:01 L-082	BH	4/10/2024 14:02	FO	EDL-87	N/A
1/11/2024 9:31 L-083	BH	4/10/2024 13:28	FO	EDL-88	N/A
1/11/2024 9:25 L-084	BH	4/10/2024 13:24	FO	EDL-89	N/A
1/11/2024 9:16 L-085	BH	4/10/2024 13:19	FO	EDL-90	N/A
1/11/2024 8:51 L-086	BH	4/10/2024 9:55	FO	EDL-91	N/A
1/11/2024 8:43 L-087	BH	Not found on collection date	FO	EDL-92	N/A
1/10/2024 14:26 L-088	BH	4/10/2024 9:15	FO	EDL-93	N/A
1/10/2024 14:32 L-089	BH	4/10/2024 9:18	FO	EDL-94	N/A
1/10/2024 14:18 L-090	BH	4/10/2024 8:58	FO	EDL-95	N/A
1/11/2024 10:44 L-091	BH	4/9/2024 14:04	BH	EDL-96	N/A
1/10/2024 8:10 L-092	BH	4/8/2024 15:31	BH	EDL-97	N/A
1/11/2024 12:00 L-Deploy Control	BH	4/10/2024 15:15	BH	EDL-FB	N/A
1/10/2024 6:30 L-093	BH	4/10/2024 15:16	BH	EDL-TB	N/A

**Table A.3 Second Quarter Issue and Collection Dates**

<b>Date/Time Issued Badge ID</b>	<b>Issued By</b>	<b>Date/Time Collected</b>	<b>Collected By</b>	<b>Location Name</b>	<b>Comments</b>
4/9/2024 13:53 L-029	BH	7/10/2024 9:21	BH	EDL-1	N/A
4/9/2024 13:41 L-030 022	BH	7/11/2024 9:06	BH	EDL-2	N/A
4/9/2024 13:17 L-031 023	BH	7/11/2024 8:43	BH	EDL-3	N/A
4/9/2024 15:00 L-032	BH	7/11/2024 9:55	BH	EDL-4	N/A
4/9/2024 14:32 L-033	BH	7/11/2024 9:49	BH	EDL-5	N/A
4/9/2024 14:25 L-034	BH	7/10/2024 8:25	BH	EDL-6	N/A
4/9/2024 14:06 L-035	BH	7/10/2024 7:57	BH	EDL-7	N/A
4/10/2024 13:43 L-036	BH	7/11/2024 14:25	BH	EDL-9	N/A
4/10/2024 9:21 L-037	BH	7/11/2024 12:46	BH	EDL-12	N/A
4/10/2024 9:32 L-038	BH	7/11/2024 12:57	BH	EDL-13	N/A
4/9/2024 13:13 L-039	BH	7/11/2024 8:39	BH	EDL-14	N/A
4/9/2024 13:04 L-040	BH	7/10/2024 9:12	BH	EDL-15	N/A
4/10/2024 13:12 L-041	BH	7/11/2024 13:25	BH	EDL-16	N/A
4/10/2024 13:36 L-042	BH	7/11/2024 13:45	BH	EDL-19	N/A
4/10/2024 8:23 L-043	BH	7/11/2024 9:26	BH	EDL-22	N/A
4/9/2024 13:33 L-044	BH	7/11/2024 8:59	BH	EDL-25	N/A
4/10/2024 13:05 L-045	BH	7/11/2024 13:18	BH	EDL-30	N/A
4/10/2024 8:05 L-046	BH	7/10/2024 8:46	BH	EDL-35	N/A
4/9/2024 14:24 L-047	BH	7/10/2024 8:22	BH	EDL-37	N/A
4/10/2024 13:42 L-048	BH	7/11/2024 13:50	BH	EDL-38	N/A
4/9/2024 13:36 L-049	BH	7/10/2024 8:56	BH	EDL-40	N/A
4/9/2024 14:08 L-050	BH	7/10/2024 8:02	BH	EDL-46	N/A
4/9/2024 14:19 L-051 024	BH	7/10/2024 8:15	BH	EDL-50	N/A
4/9/2024 12:57 L-052	BH	7/10/2024 9:04	BH	EDL-52	N/A

**Table A.3 Second Quarter Issue and Collection Dates (Continued)**

<b>Date/Time Issued Badge ID</b>	<b>Issued By</b>	<b>Date/Time Collected</b>	<b>Collected By</b>	<b>Location Name</b>	<b>Comments</b>
4/9/2024 13:41 L-053	BH	7/11/2024 9:04	BH	EDL-53	N/A
4/9/2024 13:00 L-054	BH	7/10/2024 9:10	BH	EDL-58	N/A
4/8/2024 15:09 L-055	BH	7/10/2024 10:02	BH	EDL-59	N/A
4/8/2024 14:55 L-056	BH	7/10/2024 10:12	BH	EDL-60	N/A
4/8/2024 14:57 L-057	BH	7/10/2024 10:15	BH	EDL-61	N/A
4/8/2024 15:13 L-058	BH	7/10/2024 10:28	BH	EDL-62	N/A
4/8/2024 15:00 L-059	BH	7/10/2024 10:07	BH	EDL-63	N/A
4/10/2024 7:58 L-060	BH	7/10/2024 8:39	BH	EDL-64	N/A
4/9/2024 13:19 L-061 025	BH	7/10/2024 8:45	BH	EDL-65	N/A
4/9/2024 13:10 L-062	BH	7/11/2024 8:36	BH	EDL-66	N/A
4/9/2024 13:09 L-063	BH	7/11/2024 8:35	BH	EDL-67	N/A
4/9/2024 14:21 L-064 026	BH	7/10/2024 8:18	BH	EDL-68	N/A
4/9/2024 14:13 L-065	BH	7/10/2024 8:07	BH	EDL-69	N/A
4/9/2024 14:00 L-066	BH	7/10/2024 9:34	BH	EDL-70	N/A
4/9/2024 13:58 L-067	BH	7/10/2024 9:30	BH	EDL-71	N/A
4/9/2024 13:50 L-068	BH	7/10/2024 8:52	BH	EDL-72	N/A
4/10/2024 13:56 L-069	BH	7/11/2024 14:08	BH	EDL-73	N/A
4/10/2024 8:41 L-070	BH	7/11/2024 12:16	BH	EDL-74	N/A
4/10/2024 8:49 L-071	BH	7/11/2024 12:19	BH	EDL-75	N/A
1/10/2024 14:10 L-072	BH	7/11/2024 12:24	BH	EDL-76	N/A
4/10/2024 9:03 L-073	BH	7/11/2024 12:33	BH	EDL-77	N/A
4/10/2024 9:34 L-074	BH	7/11/2024 13:00	BH	EDL-78	N/A
4/9/2024 14:27 L-075	BH	7/10/2024 8:29	BH	EDL-79	N/A
4/10/2024 13:10 L-076	BH	7/11/2024 13:22	BH	EDL-80	N/A

**Table A.3 Second Quarter Issue and Collection Dates (Continued)**

<b>Date/Time Issued Badge ID</b>	<b>Issued By</b>	<b>Date/Time Collected</b>	<b>Collected By</b>	<b>Location Name</b>	<b>Comments</b>
4/9/2024 13:55 L-077 027	BH	7/10/2024 9:25	BH	EDL-81	N/A
4/9/2024 13:25 L-078	BH	7/10/2024 8:58	BH	EDL-82	N/A
4/9/2024 13:27 L-079 028	BH	7/11/2024 8:56	BH	EDL-83	N/A
4/9/2024 13:07 L-080	BH	7/11/2024 8:33	BH	EDL-84	N/A
4/10/2023 8:38 L-081	BH	7/11/2024 12:14	BH	EDL-86	N/A
4/10/2024 14:02 L-082	BH	7/11/2024 14:03	BH	EDL-87	N/A
4/10/2024 13:28 L-083	BH	7/11/2024 13:39	BH	EDL-88	N/A
4/10/2024 13:24 L-084	BH	7/11/2024 13:35	BH	EDL-89	N/A
4/10/2024 13:19 L-085	BH	7/11/2024 13:28	BH	EDL-90	N/A
4/10/2024 9:55 L-086	BH	7/11/2024 13:12	BH	EDL-91	N/A
4/11/2024 12:50 L-087	BH	7/11/2024 13:09	BH	EDL-92	N/A
4/10/2024 9:15 L-088	BH	7/11/2024 12:39	BH	EDL-93	N/A
4/10/2024 9:18 L-089	BH	7/11/2024 12:44	BH	EDL-94	N/A
4/10/2024 8:58 L-090	BH	7/11/2024 12:35	BH	EDL-95	N/A
4/9/2024 14:04 L-091	BH	7/10/2024 9:37	BH	EDL-96	N/A
4/8/2024 15:31 L-092	BH	7/10/2024 7:50	BH	EDL-97	N/A
4/8/2024 12:05 L-Deploy Control	BH	7/11/2024 15:00	BH	EDL-FB	N/A
4/10/2024 15:16 L-093	BH	7/10/2024 7:30	BH	EDL-TB	N/A

**Table A.4 Third Quarter Issue and Collection Dates**

<b>Date/Time Issued Badge ID</b>	<b>Issued By</b>	<b>Date/Time Collected</b>	<b>Collected By</b>	<b>Location Name</b>	<b>Comments</b>
7/10/2024 9:21 L-029	BH	10/3/2024 9:34	BH	EDL-1	N/A
7/11/2024 9:06 L-030 022	BH	10/3/2024 8:49	BH	EDL-2	N/A
7/11/2024 8:43 L-031 023	BH	10/3/2024 8:11	BH	EDL-3	N/A
7/11/2024 9:55 L-032	BH	10/3/2024 10:34	BH	EDL-4	N/A
7/11/2024 9:49 L-033	BH	10/3/2024 10:29	BH	EDL-5	N/A
7/10/2024 8:25 L-034	BH	10/3/2024 10:19	BH	EDL-6	N/A
7/10/2024 7:57 L-035	BH	10/3/2024 9:54	BH	EDL-7	N/A
7/11/2024 14:25 L-036	BH	10/8/2024 8:13	BH	EDL-9	N/A
7/11/2024 12:46 L-037	BH	10/3/2024 14:07	BH	EDL-12	N/A
7/11/2024 12:57 L-038	BH	10/3/2024 14:12	BH	EDL-13	N/A
7/11/2024 08:39 L-039	BH	10/3/2024 8:00	BH	EDL-14	N/A
7/10/2024 9:12 L-040	BH	10/3/2024 7:48	BH	EDL-15	N/A
7/11/2024 13:25 L-041	BH	10/3/2024 14:44	BH	EDL-16	N/A
7/11/2024 13:45 L-042	BH	10/8/2024 10:18	BH	EDL-19	N/A
7/11/2024 9:26 L-043	BH	10/3/2024 13:02	BH	EDL-22	N/A
7/11/2024 8:59 L-044	BH	10/3/2024 8:37	BH	EDL-25	N/A
7/11/2024 13:18 L-045	BH	10/3/2024 14:36	BH	EDL-30	N/A
7/10/2024 8:46 L-046	BH	10/3/2024 9:49	BH	EDL-35	N/A
7/10/2024 8:22 L-047	BH	10/3/2024 10:14	BH	EDL-37	N/A
7/11/2024 13:50 L-048	BH	10/3/2024 15:19	BH	EDL-38	N/A
7/10/2024 8:56 L-049	BH	10/3/2024 8:41	BH	EDL-40	N/A
7/10/2024 8:02 L-050	BH	10/3/2024 9:57	BH	EDL-46	N/A
7/10/2024 8:15 L-051 024	BH	10/3/2024 10:09	BH	EDL-50	N/A
7/10/2024 9:04 L-052	BH	10/3/2024 7:41	BH	EDL-52	N/A

**Table A.4 Third Quarter Issue and Collection Dates (Continued)**

<b>Date/Time Issued Badge ID</b>	<b>Issued By</b>	<b>Date/Time Collected</b>	<b>Collected By</b>	<b>Location Name</b>	<b>Comments</b>
7/11/2024 9:04 L-053	BH	10/3/2024 8:58	BH	EDL-53	N/A
7/10/2024 9:10 L-054	BH	10/3/2024 7:46	BH	EDL-58	N/A
7/10/2024 10:02 L-055	BH	10/8/2024 9:42	BH	EDL-59	N/A
7/10/2024 10:12 L-056	BH	10/8/2024 9:22	BH	EDL-60	N/A
7/10/2024 10:15 L-057	BH	10/8/2024 9:23	BH	EDL-61	N/A
7/10/2024 10:28 L-058	BH	10/3/2024 10:50	BH	EDL-62	N/A
7/10/2024 10:07 L-059	BH	10/8/2023 9:35	BH	EDL-63	N/A
7/10/2024 8:39 L-060	BH	10/3/2024 10:46	BH	EDL-64	N/A
7/10/2024 8:45 L-061 025	BH	10/3/2024 8:13	BH	EDL-65	N/A
7/11/2024 8:36 L-062	BH	10/3/2024 7:56	BH	EDL-66	N/A
7/11/2024 8:35 L-063	BH	10/3/2024 7:55	BH	EDL-67	N/A
7/10/2024 8:18 L-064 026	BH	10/3/2024 10:11	BH	EDL-68	N/A
7/10/2024 8:07 L-065	BH	10/3/2024 10:03	BH	EDL-69	N/A
7/10/2024 9:34 L-066	BH	10/3/2024 9:42	BH	EDL-70	N/A
7/10/2024 9:30 L-067	BH	10/3/2024 9:39	BH	EDL-71	N/A
7/10/2024 8:52 L-068	BH	10/3/2024 9:03	BH	EDL-72	N/A
7/11/2024 14:08 L-069	BH	10/3/2024 8:18	BH	EDL-73	N/A
7/11/2024 12:16 L-070	BH	10/3/2024 13:23	BH	EDL-74	N/A
7/11/2024 12:19 L-071	BH	10/3/2024 13:26	BH	EDL-75	N/A
7/11/2024 12:24 L-072	BH	10/3/2024 13:30	BH	EDL-76	N/A
7/11/2024 12:33 L-073	BH	10/3/2024 13:34	BH	EDL-77	N/A
7/11/2024 13:00 L-074	BH	10/3/2024 14:17	BH	EDL-78	N/A
7/10/2024 8:29 L-075	BH	10/3/2024 10:22	BH	EDL-79	N/A
7/11/2024 13:22 L-076	BH	10/3/2024 14:42	BH	EDL-80	N/A

**Table A.4 Third Quarter Issue and Collection Dates (Continued)**

<b>Date/Time Issued Badge ID</b>	<b>Issued By</b>	<b>Date/Time Collected</b>	<b>Collected By</b>	<b>Location Name</b>	<b>Comments</b>
7/10/2024 9:25 L-077 027	BH	10/3/2024 9:08	BH	EDL-81	N/A
7/10/2024 8:58 L-078	BH	10/3/2024 8:20	BH	EDL-82	N/A
7/11/2024 8:56 L-079 028	BH	10/3/2024 8:31	BH	EDL-83	N/A
7/11/2024 8:33 L-080	BH	10/3/2024 7:52	BH	EDL-84	N/A
7/11/2024 12:14 L-081	BH	10/3/2024 13:20	BH	EDL-86	N/A
7/11/2024 14:03 L-082	BH	10/8/2024 8:25	BH	EDL-87	N/A
7/11/2024 13:39 L-083	BH	10/3/2024 15:01	BH	EDL-88	N/A
7/11/2024 13:35 L-084	BH	10/3/2024 14:53	BH	EDL-89	N/A
7/11/2024 13:28 L-085	BH	10/3/2024 14:48	BH	EDL-90	N/A
7/11/2024 13:12 L-086	BH	10/3/2024 14:32	BH	EDL-91	N/A
7/11/2024 13:09 L-087	BH	10/3/2024 14:22	BH	EDL-92	N/A
7/11/2024 12:39 L-088	BH	10/3/2024 13:49	BH	EDL-93	N/A
7/11/2024 12:44 L-089	BH	10/3/2024 14:03	BH	EDL-94	N/A
7/11/2024 12:35 L-090	BH	10/3/2024 13:42	BH	EDL-95	N/A
7/10/2024 9:37 L-091	BH	10/3/2024 9:44	BH	EDL-96	N/A
7/10/2024 7:50 L-092	BH	10/8/2024 7:55	BH	EDL-97	N/A
7/11/2024 15:00 L-Deploy Control	BH	10/8/2024 13:30	BH	EDL-FB	N/A
7/10/2024 7:30 L-093	BH	10/8/2024 13:30	BH	EDL-TB	N/A

**Table A.5 Fourth Quarter Issue and Collection Dates**

<b>Date/Time Issued Badge ID</b>	<b>Issued By</b>	<b>Date/Time Collected</b>	<b>Collected By</b>	<b>Location Name</b>	<b>Comments</b>
10/3/2024 09:34 L-029	BH	1/7/2025 10:25	FO	EDL-1	N/A
10/3/2024 08:49 L-030 022	BH	1/7/2025 10:12	FO	EDL-2	N/A
10/3/2024 08:11 L-031 023	BH	1/7/2025 9:39	FO	EDL-3	N/A
10/3/2024 10:34 L-032	BH	1/7/2025 13:06	FO	EDL-4	N/A
10/3/2024 10:29 L-033	BH	1/7/2025 13:00	FO	EDL-5	N/A
10/3/2024 10:19 L-034	BH	1/7/2025 12:44	FO	EDL-6	N/A
10/3/2024 09:54 L-035	BH	1/7/2025 12:17	FO	EDL-7	N/A
10/8/2024 08:13 L-036	BH	1/8/2025 12:15	FO	EDL-9	N/A
10/3/2024 14:07 L-037	BH	1/7/2025 15:04	FO	EDL-12	N/A
10/3/2024 14:12 L-038	BH	1/7/2025 15:07	FO	EDL-13	N/A
10/3/2024 8:00 L-039	BH	1/7/2025 9:30	FO	EDL-14	N/A
10/3/2024 7:48 L-040	BH	1/7/2025 9:24	FO	EDL-15	N/A
10/3/2024 14:44 L-041	BH	1/7/2025 15:32	FO	EDL-16	N/A
10/8/2024 10:18 L-042	BH	1/7/2025 14:52	FO	EDL-19	N/A
10/3/2024 13:02 L-043	BH	1/7/2025 13:43	FO	EDL-22	N/A
10/3/2024 08:37 L-044	BH	1/7/2025 10:04	FO	EDL-25	N/A
10/3/2024 14:36 L-045	BH	1/7/2025 15:26	FO	EDL-30	N/A
10/3/2024 09:49 L-046	BH	1/7/2025 12:14	FO	EDL-35	N/A
10/3/2024 10:14 L-047	BH	1/7/2025 12:41	FO	EDL-37	N/A
10/3/2024 15:19 L-048	BH	1/7/2025 15:58	FO	EDL-38	N/A
10/3/2024 8:41 L-049	BH	1/7/2025 10:06	FO	EDL-40	N/A
10/3/2024 09:57 L-050	BH	1/7/2025 12:20	FO	EDL-46	N/A
10/3/2024 10:09 L-051 024	BH	1/7/2025 12:37	FO	EDL-50	N/A
10/3/2024 07:41 L-052	BH	1/7/2025 9:16	FO	EDL-52	N/A



**Table A.5 Fourth Quarter Issue and Collection Dates (Continued)**

<b>Date/Time Issued Badge ID</b>	<b>Issued By</b>	<b>Date/Time Collected</b>	<b>Collected By</b>	<b>Location Name</b>	<b>Comments</b>
10/3/2024 08:58 L-053	BH	1/7/2025 10:15	FO	EDL-53	N/A
10/3/2024 07:46 L-054	BH	1/7/2025 9:20	FO	EDL-58	N/A
10/8/2024 09:42 L-055	BH	1/8/2025 7:00	FO	EDL-59	N/A
10/8/2024 09:22 L-056	BH	1/8/2025 7:08	FO	EDL-60	N/A
10/8/2024 09:23 L-057	BH	1/8/2025 7:12	FO	EDL-61	N/A
10/3/2024 10:50 L-058	BH	1/7/2025 12:24	FO	EDL-62	N/A
10/8/2023 09:35 L-059	BH	1/8/2025 7:05	FO	EDL-63	N/A
10/3/2024 10:46 L-060	BH	1/7/2025 13:19	FO	EDL-64	N/A
10/3/2024 08:13 L-061 025	BH	1/7/2025 9:44	FO	EDL-65	N/A
10/3/2024 7:56 L-062	BH	1/7/2025 9:31	FO	EDL-66	N/A
10/3/2024 7:55 L-063	BH	1/7/2025 9:30	FO	EDL-67	N/A
10/3/2024 10:11 L-064 026	BH	1/7/2025 12:39	FO	EDL-68	N/A
10/3/2024 10:03 L-065	BH	1/7/2025 12:31	FO	EDL-69	N/A
10/3/2024 09:42 L-066	BH	1/7/2025 10:47	FO	EDL-70	N/A
10/3/2024 09:39 L-067	BH	1/7/2025 10:45	FO	EDL-71	N/A
10/3/2024 09:03 L-068	BH	1/7/2025 10:20	FO	EDL-72	N/A
10/3/2024 08:18 L-069	BH	1/7/2025 14:09	FO	EDL-73	N/A
10/3/2024 13:23 L-070	BH	1/7/2025 14:24	FO	EDL-74	N/A
10/3/2024 13:26 L-071	BH	1/7/2025 14:30	FO	EDL-75	N/A
10/3/2024 13:30 L-072	BH	1/7/2025 14:46	FO	EDL-76	N/A
10/3/2024 13:34 L-073	BH	1/7/2025 14:40	FO	EDL-77	N/A
10/3/2024 14:17 L-074	BH	1/7/2025 15:10	FO	EDL-78	N/A
10/3/2024 10:22 L-075	BH	1/7/2025 12:47	FO	EDL-79	N/A
10/3/2024 14:42 L-076	BH	1/7/2025 15:30	FO	EDL-80	N/A

**Table A.5 Fourth Quarter Issue and Collection Dates (Continued)**

<b>Date/Time Issued Badge ID</b>	<b>Issued By</b>	<b>Date/Time Collected</b>	<b>Collected By</b>	<b>Location Name</b>	<b>Comments</b>
10/3/2024 09:08 L-077 027	BH	1/7/2025 10:32	FO	EDL-81	N/A
10/3/2024 8:20 L-078	BH	1/7/2025 9:57	FO	EDL-82	N/A
10/3/2024 08:31 L-079 028	BH	1/7/2025 9:59	FO	EDL-83	N/A
10/3/2024 07:52 L-080	BH	1/7/2025 9:28	FO	EDL-84	N/A
10/3/2024 13:20 L-081	BH	1/7/2025 14:22	FO	EDL-86	N/A
10/8/2024 08:25 L-082	BH	1/7/2025 14:01	FO	EDL-87	N/A
10/3/2024 15:01 L-083	BH	1/7/2025 15:46	FO	EDL-88	N/A
10/3/2024 14:53 L-084	BH	1/7/2025 15:42	FO	EDL-89	N/A
10/3/2024 14:48 L-085	BH	1/7/2025 15:36	FO	EDL-90	N/A
10/3/2024 14:32 L-086	BH	1/7/2025 15:21	FO	EDL-91	N/A
10/3/2024 14:22 L-087	BH	1/7/2025 15:15	FO	EDL-92	N/A
10/3/2024 13:49 L-088	BH	1/7/2025 14:58	FO	EDL-93	N/A
10/3/2024 14:03 L-089	BH	1/7/2025 15:01	FO	EDL-94	N/A
10/3/2024 13:42 L-090	BH	1/7/2025 14:53	FO	EDL-95	N/A
10/3/2024 09:44 L-091	BH	1/7/2025 10:50	FO	EDL-96	N/A
10/8/2024 07:55 L-092	BH	1/7/2025 8:58	FO	EDL-97	N/A
10/8/2024 13:30 L-Deploy Control	BH	1/8/2025 16:00	FO	EDL-FB	N/A
10/3/2024 07:30 L-093	BH	1/7/2025 7:00	FO	EDL-TB	N/A

**THIS PAGE INTENTIONALLY LEFT BLANK**