# C-747-A Burial Ground
# Solid Waste Management Unit (SWMU) Assessment Report

**SWMU/AOC NUMBER:** 7

**DATE OF ORIGINAL SAR:** 8/24/1987

**DATE OF SAR REVISION:** 12/18/2009

**REGULATORY STATUS:** SWMU

**LOCATION:** The C-747-A area is located in the northwest corner of the Paducah Gaseous Diffusion Plant (PGDP) secured area. SWMU 7 is bounded on the north and south sides by perimeter ditches, on the west side by the C-747-A Burn Area (SWMU 30), and on the east side by the C-746-E Contaminated Scrap Yard. This SWMU comprises the eastern two-thirds of C-747-A.

**APPROXIMATE DIMENSION OR CAPACITY:** The original SWMU boundary included approximately 108,000 $ft^2$ with six discrete burial pit areas (Burial Pits B, C, D, E, F, and G). The SWMU boundary has been expanded to approximately 185,300 $ft^2$ to include additional anomalies. (See Attached Map)

**FUNCTION:** This SWMU consists of burial pits used for disposal of waste and additional scrap metal staged aboveground.

**BRIEF HISTORY:** PGDP used the burial pits for disposal of wastes from 1957 to 1979. Burial Pits B, C, and G were used for disposal of noncombustible, contaminated and uncontaminated trash, material, and equipment. Contaminated concrete removed from the C 410 Feed Plant during May and June 1960 was placed in Burial Pits D and E. Burial Pit F was used for disposal of uranium-contaminated scrap metal and equipment. Empty uranium and magnesium powder drums also were reported to have been buried in Burial Pit F (Union Carbide 1978).

The following summarizes what is known about the disposed waste in the burial pits.

- Pit B—Buried material includes noncombustible trash and contaminated and noncombustible material and equipment (however, no specific disposal records exist).
- Pit C—Historic records indicate that both Pit B and C received the same material.
- Pit D—Documented buried material consists of uranium-contaminated concrete pieces of reactor tray bases from C 410 used during the fluorination process of uranium tetrafluoride to uranium hexafluoride.
- Pit E—Documented buried material consists of uranium-contaminated concrete pieces of reactor tray bases.
- Pits F1–F5—Documented buried material consists of uranium-contaminated scrap metal and equipment and empty uranium and magnesium powder drums (engineering drawings indicate there was a sixth “F” pit that was not numbered).
- Pit G—Documented buried material consists of noncombustible trash and contaminated and noncombustible material and equipment.

In addition to these burial pits, the Phase II SI geophysical investigation also identified another anomaly in the shape of a rough circular area (15 ft diameter) between SWMU 30 and SWMU 7, west of the F 4 and F 5 Pits

**PRESENT OPERATIONAL STATUS:** Inactive

**DATES OPERATED:** 1957 to 1979

**SITE/PROCESS DESCRIPTION:** The land surface slopes within SWMU 7. Burial Pits B and C form a slight hill on the north side of SWMU 7, and Burial Pit F forms a lesser mound on the south side of the SWMU. Pit D underlies a level area north of where Drum Mountain once was located. Shallow drainage swales occur on the west side of Burial Pit B and between Burial Pits C and D. The ground surface is covered by grassy vegetation, except where gravel roads extend through the site.

Infrastructure has been placed in the area in support of the Scrap Metal Removal Action project. This infrastructure includes an extensive gravel pad constructed to support a truck scale in the area of Burial Pit G.

**WASTE DESCRIPTION:** Pits B, C, and G contain buried material that includes noncombustible trash and contaminated and noncombustible material and equipment. Pits D and E contain buried material consisting of uranium-contaminated concrete pieces of reactor tray bases from C-410 that were used during the fluorination process of uranium tetrafluoride to uranium hexafluoride. Pits F1–F5 contain buried material consisting of uranium-contaminated scrap metal and equipment and empty uranium and magnesium powder drums.

**WASTE QUANTITY:** Burial Areas B, C, F, and G contain unknown quantities of waste. Burial Areas D & E contain approximately 10 tons each of contaminated concrete.

**SUMMARY OF ENVIRONMENTAL SAMPLING DATA:** See attached table

**DESCRIPTION OF RELEASE AND MEDIA AFFECTED:**

**GROUNDWATER:** See Summary of Environmental Sampling Data above
**SURFACE WATER:** See Documentation of No Release below
**SOIL:** See Summary of Environmental Sampling Data above
**ECOLOGY AFFECTED (i.e., threatened or endangered species):** None known

**DOCUMENTATION OF NO RELEASE:** Based on the environmental sampling data, releases of volatiles, metals, semivolatiles, PCBs, and radionuclides to soil and groundwater likley have occurred.

**IMPACT ON OR BY OTHER SWMUS OR AOCS:** SWMUs 12 and 14 were scrap metal yards above this SWMU. Some small pieces may have been covered with dirt during removal of the scrap metal and may remain within SWMU 7 boundaries. SWMU 30 is immediately adjacent to the east and may impact SWMU 7.

**PRG COMPARISON:** See attached tables

**RFI NECESSARY:** Yes. This is to be completed under the Burial Grounds Operable Unit.

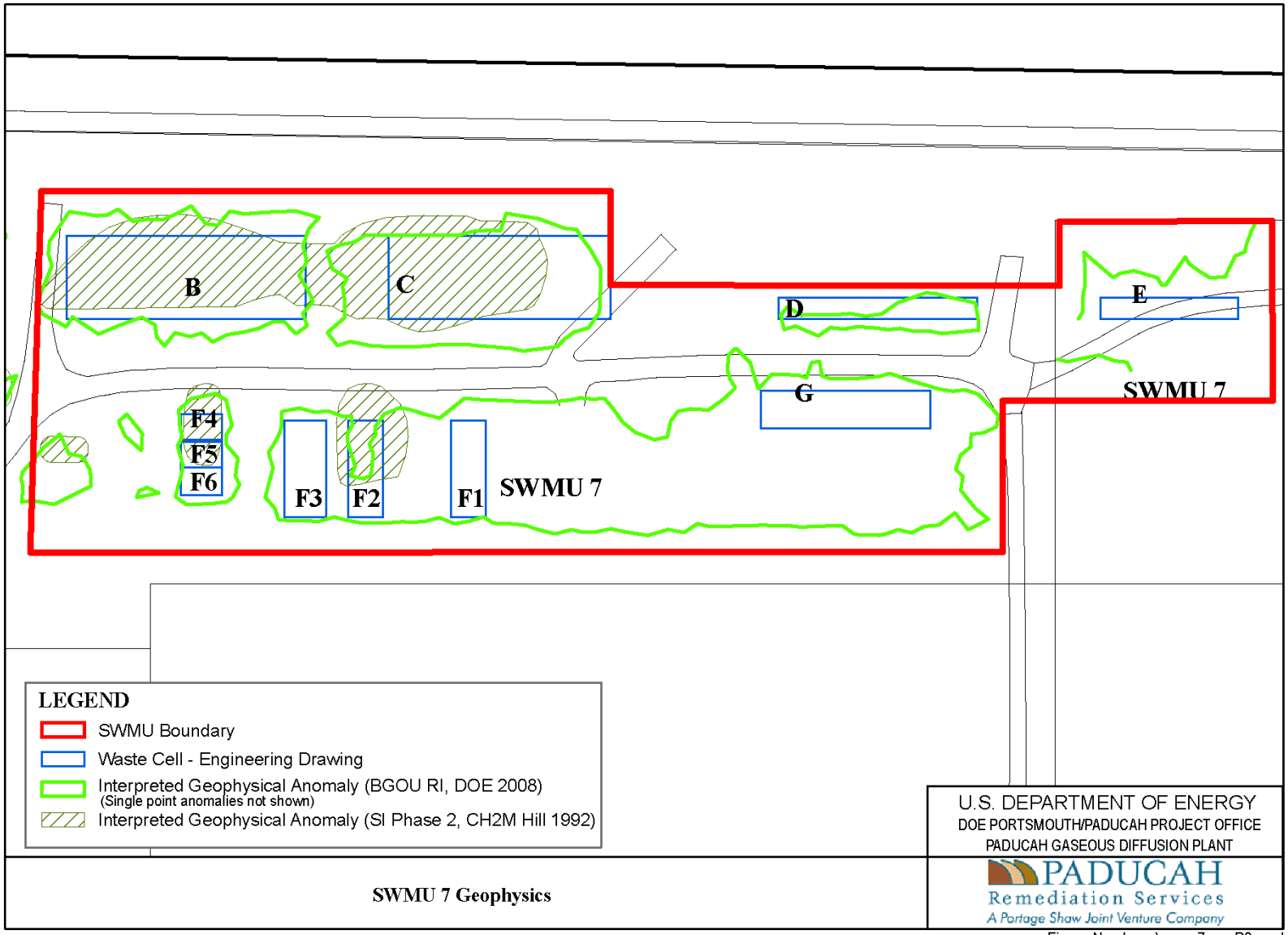
**OPERABLE UNIT ASSIGNMENT:** Burial Grounds Operable Unit

**C-747-A Burial Ground Looking from East to West**

**November 22, 2005**

**C-747-A Burial Ground Looking from West to East**

**November 22, 2005**




SWMU 7 Geophysics

Figure No. bgou\swmu7_sarR2.mxd
DATE 09-09-09

## SUMMARY OF ENVIRONMENTAL SAMPLING DATA

### Surface Soil Summary

| Analysis | Maximum Result | Frequency of Detection[a] | Frequency of Detection | | Reference Values | |
|---|---|---|---|---|---|---|
| | | | Above Background Value | Above Excavation Worker NAL | Background Value | Excavation Worker NAL |
| ***Inorganics (mg/kg)*** | | | | | | |
| Aluminum | 14,000 | 14/14 | 1/14 | 11/14 | 13,000 | 5,250 |
| Antimony | 1.7 | 11/14 | 11/14 | 10/14 | 0.21 | 0.492 |
| Arsenic | 16 | 14/14 | 1/14 | 14/14 | 12 | 0.324 |
| Beryllium | 1.3 | 10/16 | 2/16 | 1/16 | 0.67 | 1.26 |
| Cadmium | 1.3 | 8/14 | 6/14 | 0/14 | 0.21 | 15.2 |
| Calcium | 210,000 | 14/14 | 1/14 | N/A | 200,000 | N/A |
| Chromium | 55.8 | 16/16 | 14/16 | 0/16 | 16 | 476 |
| Copper | 99 | 14/14 | 5/14 | 0/14 | 19 | 427 |
| Iron | 30,000 | 14/14 | 1/14 | 14/14 | 28,000 | 2,170 |
| Lead | 120 | 14/14 | 1/14 | 1/14 | 36 | 50 |
| Manganese | 900 | 14/14 | 0/14 | 14/14 | 1,500 | 56.6 |
| Nickel | 140 | 14/14 | 6/14 | 0/14 | 21 | 216 |
| Selenium | 0.88 | 4/14 | 1/14 | 0/14 | 0.8 | 71.3 |
| Thallium | 2 | 9/14 | 9/14 | 8/14 | 0.21 | 0.711 |
| Uranium | 1,270 | 15/16 | 15/16 | 15/16 | 4.9 | 11.3 |
| Vanadium | 52 | 14/14 | 1/14 | 14/14 | 38 | 4.4 |
| Zinc | 240 | 14/14 | 7/14 | 0/14 | 65 | 2,660 |
| ***Organics—Volatiles (mg/kg)*** | | | | | | |
| Benz(a)anthracene | 4.3 | 7/11 | N/A | 1/11 | N/A | 0.232 |
| Benzo(a)pyrene | 4.1 | 7/11 | N/A | 6/11 | N/A | 0.0232 |
| Benzo(b)fluoranthene | 5.2 | 7/11 | N/A | 2/11 | N/A | 0.232 |
| Dibenz(a,h)anthracene | 0.92 | 1/11 | N/A | 1/11 | N/A | 0.0232 |
| Indeno(1,2,3-cd)pyrene | 3.8 | 3/11 | N/A | 1/11 | N/A | 0.232 |
| ***Organics—PCBs (mg/kg)*** | | | | | | |
| PCB, Total | 14.8 | 14/17 | N/A | 9/17 | N/A | 0.168 |
| PCB-1248 | 14.8 | 1/17 | N/A | 1/17 | N/A | 0.168 |
| PCB-1260 | 3.1 | 12/17 | N/A | 7/17 | N/A | 0.168 |
| ***Radionuclides (pCi/g)*** | | | | | | |
| Americium-241 | 2 | 2/5 | N/A | 1/5 | N/A | 1.74 |
| Cesium-137 | 0.183 | 3/5 | 0/5 | 1/5 | 0.49 | 0.115 |
| Neptunium-237 | 0.72 | 15/19 | 12/19 | 6/19 | 0.1 | 0.328 |
| Plutonium-239 | 0.68 | 12/12 | 10/12 | 0/12 | 0.025 | 1.63 |
| Plutonium-239/240 | 0.283 | 5/7 | 5/7 | 0/7 | 0.025 | 1.63 |
| Radium-226 | 0.83 | 2/2 | 0/2 | 2/2 | 1.5 | 0.033 |
| Technetium-99 | 406 | 17/17 | 10/17 | 4/17 | 2.5 | 57.9 |
| Thorium-228 | 3.36 | 6/6 | 1/6 | 6/6 | 1.6 | 0.0357 |
| Thorium-230 | 3.94 | 17/17 | 9/17 | 3/17 | 1.5 | 2.22 |
| Uranium-234 | 318 | 18/18 | 18/18 | 18/18 | 2.5 | 2.84 |
| Uranium-235 | 42.1 | 4/4 | 4/4 | 4/4 | 0.14 | 0.455 |

| Analysis | Maximum Result | Frequency of Detection[a] | Frequency of Detection | | Reference Values | |
|---|---|---|---|---|---|---|
| | | | Above Background Value | Above Excavation Worker NAL | Background Value | Excavation Worker NAL |
| Uranium-235/236 | 6.03 | 12/12 | 12/12 | 12/12 | 0.14 | 0.455 |
| Uranium-238 | 2,390 | 18/18 | 18/18 | 18/18 | 1.2 | 1.17 |

[a] Frequency of detection is the number of detections of an analyte per number of analyses (includes regular and duplicate samples).
N/A = not applicable NAL = no action level
Reference values for background and NAL taken from *Methods for Conducting Risk Assessments and Risk Evaluations at the Paducah Gaseous Diffusion Plant Paducah, Kentucky, Volume 1. Human Health* DOE/OR/07-1506&D2 Paducah, Kentucky 2001. Background values are provisional background concentrations. NALs are for the excavation worker scenario.

**Subsurface Soil Summary**

| Analysis | Maximum Result | Frequency of Detection[a] | Frequency of Detection: Above Background Value | Frequency of Detection: Above Excavation Worker NAL | Reference Values: Background Value | Reference Values: Excavation Worker NAL |
|---|---|---|---|---|---|---|
| ***Inorganics (mg/kg)*** | | | | | | |
| Aluminum | 16,000 | 69/69 | 1/69 | 42/69 | 12,000 | 5,250 |
| Arsenic | 13.9 | 50/69 | 1/69 | 50/69 | 7.9 | 0.324 |
| Barium | 180 | 69/69 | 1/69 | 0/69 | 170 | 272 |
| Beryllium | 1.55 | 7/69 | 3/69 | 1/69 | 0.69 | 1.26 |
| Cobalt | 17.7 | 42/69 | 2/69 | 0/69 | 13 | 1,110 |
| Copper | 27 | 56/69 | 1/69 | 0/69 | 25 | 427 |
| Iron | 34,700 | 69/69 | 1/69 | 65/69 | 28,000 | 2,170 |
| Manganese | 1,200 | 69/69 | 1/69 | 44/69 | 820 | 56.6 |
| Nickel | 40 | 44/69 | 1/69 | 0/69 | 22 | 216 |
| Selenium | 0.72 | 4/69 | 1/69 | 0/69 | 0.7 | 71.3 |
| Sodium | 342 | 28/69 | 1/69 | 0/69 | 340 | N/A |
| Uranium | 45 | 12/69 | 3/69 | 1/69 | 4.6 | 11.3 |
| Vanadium | 34 | 62/69 | 0/69 | 56/69 | 37 | 4.4 |
| ***Organics--Volatiles (mg/kg)*** | | | | | | |
| 1,1-Dichloroethene | 1.66 | 4/69 | N/A | 2/69 | N/A | 0.119 |
| Vinyl chloride | 0.585 | 5/69 | N/A | 1/69 | N/A | 0.141 |
| ***Organics--PCBs (mg/kg)*** | | | | | | |
| PCB, Total | 2.45 | 5/69 | N/A | 2/69 | N/A | 0.168 |
| PCB-1248 | 0.41 | 1/69 | N/A | 1/69 | N/A | 0.168 |
| PCB-1260 | 2.45 | 1/69 | N/A | 1/69 | N/A | 0.168 |
| ***Radionuclides(pCi/g)*** | | | | | | |
| Technetium-99 | 8.23 | 19/67 | 5/67 | 0/67 | 2.8 | 57.9 |
| Thorium-228 | 1.38 | 57/59 | 0/59 | 57/59 | 1.6 | 0.0357 |
| Thorium-230 | 3.7 | 39/67 | 3/67 | 2/67 | 1.4 | 2.22 |
| Uranium | 240 | 14/68 | N/A | N/A | N/A | N/A |
| Uranium-234 | 115 | 41/76 | 10/76 | 8/76 | 2.4 | 2.84 |
| Uranium-235/236 | 1.03 | 8/8 | 6/8 | 3/8 | 0.14 | 0.455 |
| Uranium-238 | 150 | 35/76 | 22/76 | 22/76 | 1.2 | 1.17 |

[a] Frequency of detection is the number of detections of an analyte per number of analyses (includes regular and duplicate samples).
N/A = not applicable NAL = no action level
Reference values for background and NAL taken from *Methods for Conducting Risk Assessments and Risk Evaluations at the Paducah Gaseous Diffusion Plant Paducah, Kentucky, Volume 1. Human Health* DOE/OR/07-1506&D2 Paducah, Kentucky 2001. Background values are provisional background concentrations. NALs are for the excavation worker scenario.

**UCRS Groundwater Summary**

| Analysis | Maximum Detection | Frequency of Detection[a] | Frequency of Detection | | | Reference Values | | |
|---|---|---|---|---|---|---|---|---|
| | | | Above Background | Above NAL | Above MCL | Background | NAL | MCL |
| ***Metals (mg/L)*** | | | | | | | | |
| Aluminum | 1,980 | 16/17 | N/A | 14/17 | N/A | N/A | 1.49 | N/A |
| Antimony | 0.0027 | 2/14 | N/A | 2/14 | 0/14 | N/A | 0.000564 | 0.006 |
| Arsenic | 0.31 | 20/24 | N/A | 20/24 | 16/24 | N/A | 0.000035 | 0.01 |
| Arsenic, Dissolved | 0.316 | 14/15 | N/A | 14/15 | 7/15 | N/A | 0.000035 | 0.01 |
| Barium | 9.2 | 24/24 | N/A | 24/24 | 5/24 | N/A | 0.104 | 2 |
| Barium, Dissolved | 1.01 | 15/15 | N/A | 12/15 | 0/15 | N/A | 0.104 | 2 |
| Beryllium | 0.039 | 11/24 | N/A | 8/24 | 8/24 | N/A | 0.00264 | 0.004 |
| Cadmium | 0.03 | 9/24 | N/A | 9/24 | 4/24 | N/A | 0.000661 | 0.005 |
| Chromium | 2.43 | 14/22 | N/A | 1/22 | 8/22 | N/A | 1.76 | 0.1 |
| Cobalt | 0.52 | 11/24 | N/A | 5/24 | N/A | N/A | 0.0906 | N/A |
| Copper | 1.8 | 4/24 | N/A | 4/24 | 1/24 | N/A | 0.0557 | 1.3 |
| Iron | 1200 | 24/24 | N/A | 22/24 | N/A | N/A | 0.449 | N/A |
| Iron, Dissolved | 53.4 | 11/15 | N/A | 9/15 | N/A | N/A | 0.449 | N/A |
| Lead | 1.1 | 14/17 | N/A | 10/17 | 10/17 | N/A | 0.015 | 0.015 |
| Manganese | 28 | 24/24 | N/A | 24/24 | N/A | N/A | 0.035 | N/A |
| Manganese, Dissolved | 2.9 | 15/15 | N/A | 15/15 | N/A | N/A | 0.035 | N/A |
| Mercury | 0.0028 | 9/21 | N/A | 5/21 | 1/21 | N/A | 0.000444 | 0.002 |
| Molybdenum | 1.4 | 11/17 | N/A | 10/17 | N/A | N/A | 0.00753 | N/A |
| Molybdenum, Dissolved | 0.0471 | 8/9 | N/A | 8/9 | N/A | N/A | 0.00753 | N/A |
| Nickel | 7.6 | 16/22 | N/A | 15/22 | N/A | N/A | 0.0301 | N/A |
| Nickel, Dissolved | 1.2 | 11/14 | N/A | 9/14 | N/A | N/A | 0.0301 | N/A |
| Selenium | 0.032 | 7/24 | N/A | 6/24 | 0/24 | N/A | 0.00754 | 0.05 |
| Selenium, Dissolved | 0.0246 | 9/9 | N/A | 6/9 | 0/9 | N/A | 0.00754 | 0.05 |
| Thallium | 0.051 | 4/17 | N/A | 4/17 | 4/17 | N/A | 0.00012 | 0.002 |
| Uranium | 83 | 28/117 | N/A | 28/117 | 21/117 | N/A | 0.000906 | 0.03 |
| Uranium, Dissolved | 0.0366 | 2/9 | N/A | 2/9 | 1/9 | N/A | 0.000906 | 0.03 |
| Vanadium | 1.8 | 8/17 | N/A | 7/17 | N/A | N/A | 0.00925 | N/A |
| Zinc | 4.23 | 17/24 | N/A | 9/24 | N/A | N/A | 0.45 | N/A |
| Zinc, Dissolved | 1.12 | 10/15 | N/A | 3/15 | N/A | N/A | 0.45 | N/A |
| ***Radionuclides (pCi/L)*** | | | | | | | | |
| Neptunium-237 | 1.46 | 5/24 | N/A | 1/24 | N/A | N/A | 0.573 | N/A |
| Plutonium-239 | 1.72 | 5/9 | N/A | 3/9 | N/A | N/A | 0.286 | N/A |
| Radon-222 | 801 | 6/7 | N/A | 6/7 | N/A | N/A | 0.866 | N/A |
| Technetium-99 | 415 | 50/98 | N/A | 42/98 | 0/98 | N/A | 14 | 900 |
| Thorium-228 | 0.328 | 5/21 | N/A | 5/21 | N/A | N/A | 0.129 | N/A |
| Thorium-230 | 6.61 | 11/30 | N/A | 9/30 | N/A | N/A | 0.424 | N/A |
| Uranium-234 | 764 | 24/32 | N/A | 22/32 | N/A | N/A | 0.546 | N/A |
| Uranium-235 | 2.28 | 10/26 | N/A | 2/26 | N/A | N/A | 0.538 | N/A |
| Uranium-238 | 4910 | 27/32 | N/A | 22/32 | N/A | N/A | 0.443 | N/A |
| ***PCBs (mg/L)*** | | | | | | | | |
| PCB, Total | 0.00022 | 1/6 | N/A | 1/6 | 0/6 | N/A | 0.0000793 | 0.0005 |
| PCB-1016 | 0.00075 | 1/14 | N/A | 1/14 | 1/14 | N/A | 0.0000468 | 0.0005 |
| PCB-1248 | 0.016 | 4/14 | N/A | 4/14 | 3/14 | N/A | 0.0000775 | 0.0005 |

| Analysis | Maximum Detection | Frequency of Detection[a] | Frequency of Detection | | | Reference Values | | |
|---|---|---|---|---|---|---|---|---|
| | | | Above Background | Above NAL | Above MCL | Background | NAL | MCL |
| PCB-1254 | 0.00089 | 1/14 | N/A | 1/14 | 1/14 | N/A | 0.0000194 | 0.0005 |
| PCB-1260 | 0.00024 | 1/14 | N/A | 1/14 | 0/14 | N/A | 0.0000428 | 0.0005 |
| ***Semivolatiles (mg/L)*** | | | | | | | | |
| 1,3-Dichlorobenzene | 0.00055 | 1/26 | N/A | 1/26 | N/A | N/A | 0.000241 | N/A |
| 1,4-Dichlorobenzene | 0.00074 | 2/26 | N/A | 1/26 | 0/26 | N/A | 0.000578 | 0.075 |
| 2,4-Dimethylphenol | 0.24 | 6/16 | N/A | 3/16 | N/A | N/A | 0.023 | N/A |
| Bis(2-ethylhexyl)phthalate | 0.0072 | 2/16 | N/A | 1/16 | 1/16 | N/A | 0.00312 | 0.006 |
| Naphthalene | 0.0042 | 3/16 | N/A | 3/16 | N/A | N/A | 0.000285 | N/A |
| ***Volatiles (mg/L)*** | | | | | | | | |
| 1,1,2-Trichloroethane | 0.014 | 2/33 | N/A | 2/33 | 2/33 | N/A | 0.000238 | 0.005 |
| 1,1-Dichloroethane | 0.099 | 10/99 | N/A | 1/99 | N/A | N/A | 0.0363 | N/A |
| 1,1-Dichloroethene | 0.0094 | 3/31 | N/A | 3/31 | 1/31 | N/A | 0.000047 | 0.007 |
| 1,2-Dichloroethane | 0.04 | 2/33 | N/A | 2/33 | 2/33 | N/A | 0.000147 | 0.005 |
| Acetone | 1.7 | 7/20 | N/A | 4/20 | N/A | N/A | 0.0275 | N/A |
| Benzene | 0.012 | 10/43 | N/A | 10/43 | 6/43 | N/A | 0.000385 | 0.005 |
| Chloroethane | 0.019 | 3/21 | N/A | 3/21 | N/A | N/A | 0.00461 | N/A |
| cis-1,2-Dichloroethene | 6.5 | 63/101 | N/A | 61/101 | 50/101 | N/A | 0.00273 | 0.07 |
| Ethylbenzene | 0.043 | 5/93 | N/A | 3/93 | 0/93 | N/A | 0.00468 | 0.7 |
| Tetrachloroethene | 0.00071 | 1/74 | N/A | 1/74 | 0/74 | N/A | 0.000582 | 0.005 |
| Total Xylene | 0.21 | 4/89 | N/A | 1/89 | 0/89 | N/A | 0.0653 | 10 |
| Trichloroethene | 12 | 89/100 | N/A | 87/100 | 86/100 | N/A | 0.0016 | 0.005 |
| Vinyl chloride | 3.8 | 44/63 | N/A | 44/63 | 44/63 | N/A | 0.000035 | 0.002 |

[a] Frequency of detection is the number of detections of an analyte per number of analyses (includes regular and duplicate samples).
N/A = not applicable NAL = no action level MCL = maximum contaminant level
Reference values for background and NAL taken from *Methods for Conducting Risk Assessments and Risk Evaluations at the Paducah Gaseous Diffusion Plant Paducah, Kentucky, Volume 1. Human Health* DOE/OR/07-1506&D2 Paducah, Kentucky 2001. Background values are provisional background concentrations over all observations. NALs are for the child resident scenario.
MCLs are taken from *Remedial Investigation Report for the Burial Grounds Operable Unit at the Paducah Gaseous Diffusion Plant Paducah, Kentucky,* DOE/LX/07-0030&D1/R1 Paducah, Kentucky 2009

**RGA Groundwater Summary**

| Analysis | Maximum Detection | Frequency of Detection[a] | Frequency of Detection | | | Reference Values | | |
|---|---|---|---|---|---|---|---|---|
| | | | Above Background | Above NAL | Above MCL | Background | NAL | MCL |
| ***Metals (mg/L)*** | | | | | | | | |
| Aluminum | 1,500 | 42/49 | 35/49 | 35/49 | N/A | 2.189 | 1.49 | N/A |
| Antimony | 0.0043 | 3/22 | 0/22 | 3/22 | 0/22 | 0.06 | 0.000564 | 0.006 |
| Arsenic | 0.481 | 48/55 | 44/55 | 48/55 | 32/55 | 0.005 | 0.000035 | 0.01 |
| Arsenic, Dissolved | 0.12 | 26/30 | 17/30 | 26/30 | 12/30 | 0.005 | 0.000035 | 0.01 |
| Barium | 10.7 | 51/51 | 35/51 | 48/51 | 15/51 | 0.235 | 0.104 | 2 |
| Barium, Dissolved | 1.26 | 30/30 | 20/30 | 29/30 | 0/30 | 0.2 | 0.104 | 2 |
| Beryllium | 0.0732 | 33/49 | 22/49 | 25/49 | 22/49 | 0.004 | 0.00264 | 0.004 |
| Cadmium | 0.02 | 24/47 | 10/47 | 24/47 | 11/47 | 0.01 | 0.000661 | 0.005 |
| Cadmium, Dissolved | 0.000809 | 4/30 | 0/30 | 4/30 | 0/30 | 0.01 | 0.000661 | 0.005 |
| Calcium | 500 | 58/58 | 23/58 | N/A | N/A | 41.238 | N/A | N/A |
| Calcium, Dissolved | 160 | 30/30 | 6/30 | N/A | N/A | 38.166 | N/A | N/A |
| Chromium | 2 | 34/42 | 28/42 | 2/42 | 29/42 | 0.144 | 1.76 | 0.1 |
| Cobalt | 2.07 | 32/47 | 25/47 | 20/47 | N/A | 0.045 | 0.0906 | N/A |
| Cobalt, Dissolved | 0.108 | 24/30 | 10/30 | 2/30 | N/A | 0.045 | 0.0906 | N/A |
| Copper | 1.3 | 13/49 | 11/49 | 11/49 | 0/49 | 0.036 | 0.0557 | 1.3 |
| Iron | 2,460 | 57/57 | 46/57 | 57/57 | N/A | 5.03 | 0.449 | N/A |
| Iron, Dissolved | 57.6 | 22/30 | 20/30 | 20/30 | N/A | 0.267 | 0.449 | N/A |
| Lead | 1.6 | 35/39 | 13/39 | 27/39 | 27/39 | 0.129 | 0.015 | 0.015 |
| Magnesium | 120 | 56/56 | 23/56 | 0/56 | N/A | 16.262 | N/A | N/A |
| Magnesium, Dissolved | 72.9 | 30/30 | 4/30 | 0/30 | N/A | 16.215 | N/A | N/A |
| Manganese | 72.4 | 56/56 | 43/56 | 53/56 | N/A | 0.119 | 0.035 | N/A |
| Manganese, Dissolved | 12.8 | 29/30 | 25/30 | 26/30 | N/A | 0.068 | 0.035 | N/A |
| Mercury | 0.0008 | 27/43 | 12/43 | 5/43 | 0/43 | 0.0002 | 0.000444 | 0.002 |
| Molybdenum | 0.33 | 31/39 | 15/39 | 29/39 | N/A | 0.05 | 0.00753 | N/A |
| Molybdenum, Dissolved | 0.0269 | 19/26 | 0/26 | 12/26 | N/A | 0.05 | 0.00753 | N/A |
| Nickel | 1.6 | 37/48 | 9/48 | 36/48 | N/A | 0.682 | 0.0301 | N/A |
| Nickel, Dissolved | 0.25 | 28/30 | 0/30 | 16/30 | N/A | 0.305 | 0.0301 | N/A |
| Potassium | 89 | 15/28 | 10/28 | N/A | N/A | 5.195 | N/A | N/A |
| Selenium | 0.0377 | 15/47 | 15/47 | 9/47 | 0/47 | 0.005 | 0.00754 | 0.05 |
| Selenium, Dissolved | 0.0266 | 15/26 | 15/26 | 7/26 | 0/26 | 0.005 | 0.00754 | 0.05 |
| Sodium | 320 | 55/61 | 4/61 | 0/61 | N/A | 59.45 | N/A | N/A |
| Sodium, Dissolved | 312 | 30/30 | 4/30 | 0/30 | N/A | 60.433 | N/A | N/A |
| Thallium | 0.13 | 15/41 | 5/41 | 15/41 | 15/41 | 0.056 | 0.00012 | 0.002 |
| Tin | 1 | 10/13 | N/A | 3/13 | N/A | N/A | 0.894 | N/A |
| Uranium | 0.093 | 26/156 | 24/156 | 26/156 | 8/156 | 0.002 | 0.000906 | 0.03 |
| Uranium, Dissolved | 0.00132 | 2/26 | 0/26 | 2/26 | 0/26 | 0.002 | 0.000906 | 0.03 |
| Vanadium | 2.7 | 14/43 | 9/43 | 13/43 | N/A | 0.134 | 0.00925 | N/A |
| Zinc | 9.8 | 33/47 | 32/47 | 25/47 | N/A | 0.054 | 0.45 | N/A |
| Zinc, Dissolved | 0.555 | 23/30 | 17/30 | 2/30 | N/A | 0.049 | 0.45 | N/A |
| ***Radionuclides (pCi/L)*** | | | | | | | | |
| Americium-241 | 0.41 | 1/35 | N/A | 1/35 | N/A | N/A | 0.371 | N/A |
| Neptunium-237 | 1.55 | 3/48 | 1/48 | 1/48 | N/A | 0.8 | 0.573 | N/A |
| Plutonium-239 | 0.78 | 2/15 | 2/15 | 1/15 | N/A | 0.1 | 0.286 | N/A |

| Analysis | Maximum Detection | Frequency of Detection[a] | Frequency of Detection | | | Reference Values | | |
|---|---|---|---|---|---|---|---|---|
| | | | Above Background | Above NAL | Above MCL | Background | NAL | MCL |
| Radon-222 | 326 | 4/4 | 0/4 | 4/4 | N/A | 626 | 0.866 | N/A |
| Technetium-99 | 5,116.9 | 137/141 | 130/141 | 133/141 | 43/141 | 22.3 | 14 | 900 |
| Thorium-228 | 0.401 | 15/42 | N/A | 15/42 | N/A | N/A | 0.129 | N/A |
| Thorium-230 | 8.42 | 15/57 | 10/57 | 13/57 | N/A | 1.1 | 0.424 | N/A |
| Uranium-234 | 18.6 | 39/69 | 34/69 | 34/69 | N/A | 0.7 | 0.546 | N/A |
| Uranium-235 | 0.34 | 22/63 | 4/63 | 0/63 | N/A | 0.3 | 0.538 | N/A |
| Uranium-235/236 | 2.07 | 11/15 | 7/15 | N/A | N/A | 0.3 | N/A | N/A |
| Uranium-238 | 20.3 | 48/71 | 34/71 | 34/71 | N/A | 0.7 | 0.443 | N/A |
| ***Semivolatiles (mg/L)*** | | | | | | | | |
| Bis(2-ethylhexyl)phthalate | 0.0052 | 2/24 | N/A | 2/24 | 0/24 | N/A | 0.00312 | 0.006 |
| ***Volatiles (mg/L)*** | | | | | | | | |
| 1,1,2-Trichloroethane | 0.009 | 4/56 | N/A | 4/56 | 1/56 | N/A | 0.000238 | 0.005 |
| 1,1-Dichloroethene | 0.0052 | 12/63 | N/A | 12/63 | 0/63 | N/A | 0.000047 | 0.007 |
| 1,2-Dichloroethane | 0.0011 | 2/56 | N/A | 2/56 | 0/56 | N/A | 0.000147 | 0.005 |
| Acetone | 0.43 | 7/40 | N/A | 4/40 | N/A | N/A | 0.0275 | N/A |
| Carbon tetrachloride | 0.041 | 7/56 | N/A | 7/56 | 5/56 | N/A | 0.000181 | 0.005 |
| Chloroform | 0.012 | 9/54 | N/A | 9/54 | N/A | N/A | 0.0000287 | N/A |
| Chloromethane | 0.014 | 1/40 | N/A | 1/40 | N/A | N/A | 0.00167 | N/A |
| cis-1,2-Dichloroethene | 2.1 | 31/107 | N/A | 31/107 | 13/107 | N/A | 0.00273 | 0.07 |
| Tetrachloroethene | 0.0048 | 6/65 | N/A | 6/65 | 0/65 | N/A | 0.000582 | 0.005 |
| Trichloroethene | 25 | 139/141 | N/A | 136/141 | 136/141 | N/A | 0.0016 | 0.005 |
| Vinyl chloride | 0.3 | 5/66 | N/A | 5/66 | 5/66 | N/A | 0.000035 | 0.002 |

[a] Frequency of detection is the number of detections of an analyte per number of analyses (includes regular and duplicate samples).
N/A = not applicable NAL = no action level MCL = maximum contaminant level
Reference values for background and NAL taken from *Methods for Conducting Risk Assessments and Risk Evaluations at the Paducah Gaseous Diffusion Plant Paducah, Kentucky, Volume 1. Human Health* DOE/OR/07-1506&D2 Paducah, Kentucky 2001. Background values are provisional background concentrations over all observations. NALs are for the child resident scenario.
MCLs are taken from *Remedial Investigation Report for the Burial Grounds Operable Unit at the Paducah Gaseous Diffusion Plant Paducah, Kentucky,* DOE/LX/07-0030&D1/R1 Paducah, Kentucky 2009

**McNairy Groundwater Summary**

| Analysis | Maximum Detection | Frequency of Detection[a] | Frequency of Detection | | | Reference Values | | |
|---|---|---|---|---|---|---|---|---|
| | | | Above Background | Above NAL | Above MCL | Background | NAL | MCL |
| ***Metals (mg/L)*** | | | | | | | | |
| Aluminum | 1,600 | 4/4 | 4/4 | 4/4 | N/A | 0.687 | 1.49 | N/A |
| Arsenic | 0.32 | 4/4 | 4/4 | 4/4 | 4/4 | 0.005 | 0.000035 | 0.01 |
| Barium | 9.1 | 4/4 | 4/4 | 4/4 | 3/4 | 0.296 | 0.104 | 2 |
| Beryllium | 0.095 | 4/4 | 3/4 | 4/4 | 4/4 | 0.017 | 0.00264 | 0.004 |
| Cadmium | 0.031 | 3/4 | 3/4 | 3/4 | 3/4 | 0.01 | 0.000661 | 0.005 |
| Calcium | 920 | 4/4 | 4/4 | N/A | N/A | 38.858 | N/A | N/A |
| Chromium | 2.1 | 4/4 | 4/4 | 1/4 | 4/4 | 0.06 | 1.76 | 0.1 |
| Cobalt | 1.3 | 4/4 | 4/4 | 4/4 | N/A | 0.096 | 0.0906 | N/A |
| Copper | 1.5 | 4/4 | 4/4 | 4/4 | 1/4 | 0.057 | 0.0557 | 1.3 |
| Iron | 2,500 | 4/4 | 4/4 | 4/4 | N/A | 18.36 | 0.449 | N/A |
| Lead | 0.71 | 4/4 | 4/4 | 4/4 | 4/4 | 0.05 | 0.015 | 0.015 |
| Magnesium | 110 | 4/4 | 4/4 | 0/4 | N/A | 13.418 | N/A | N/A |
| Manganese | 54 | 4/4 | 4/4 | 4/4 | N/A | 0.941 | 0.035 | N/A |
| Mercury | 0.0012 | 4/4 | 4/4 | 1/4 | 0/4 | 0.0002 | 0.000444 | 0.002 |
| Molybdenum | 0.35 | 2/4 | 2/4 | 2/4 | N/A | 0.05 | 0.00753 | N/A |
| Nickel | 1.4 | 4/4 | 4/4 | 4/4 | N/A | 0.109 | 0.0301 | N/A |
| Potassium | 100 | 4/4 | 1/4 | N/A | N/A | 55.752 | N/A | N/A |
| Selenium | 0.065 | 2/4 | 2/4 | 2/4 | 1/4 | 0.005 | 0.00754 | 0.05 |
| Sodium | 38 | 4/4 | 2/4 | 0/4 | N/A | 29.2 | N/A | N/A |
| Thallium | 0.088 | 3/4 | 0/4 | 3/4 | 3/4 | 0.644 | 0.00012 | 0.002 |
| Tin | 1.1 | 4/4 | N/A | 2/4 | N/A | N/A | 0.894 | N/A |
| Vanadium | 3.8 | 4/4 | 4/4 | 4/4 | N/A | 0.126 | 0.00925 | N/A |
| Zinc | 15 | 4/4 | 4/4 | 4/4 | N/A | 0.142 | 0.45 | N/A |
| ***Radionuclides (pCi/L)*** | | | | | | | | |
| Plutonium-239 | 0.81 | 1/4 | 1/4 | 1/4 | N/A | 0.2 | 0.286 | N/A |
| Technetium-99 | 95.1 | 2/4 | 2/4 | 2/4 | 0/4 | 20.6 | 14 | 900 |
| Thorium-230 | 2 | 4/4 | 1/4 | 4/4 | N/A | 1.5 | 0.424 | N/A |
| Uranium-234 | 4.75 | 4/4 | 3/4 | 3/4 | N/A | 0.3 | 0.546 | N/A |
| Uranium-235/236 | 0.52 | 3/4 | 2/4 | N/A | N/A | 0.2 | N/A | N/A |
| Uranium-238 | 4.73 | 3/4 | 3/4 | 3/4 | N/A | 0.3 | 0.443 | N/A |
| ***Volatiles (mg/L)*** | | | | | | | | |
| Acetone | 0.2 | 1/4 | N/A | 1/4 | N/A | N/A | 0.0275 | N/A |
| Chloroform | 0.0038 | 3/4 | N/A | 3/4 | N/A | N/A | 0.0000287 | N/A |
| cis-1,2-Dichloroethene | 0.0056 | 3/4 | N/A | 1/4 | 0/4 | N/A | 0.00273 | 0.07 |
| Trichloroethene | 0.32 | 4/4 | N/A | 4/4 | 4/4 | N/A | 0.0016 | 0.005 |

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