

**North-South Diversion Ditch (Sections 3, 4, and 5)  
Solid Waste Management Unit (SWMU) Assessment Report**

**SWMU/AOC NUMBER:** 58

**REGULATORY STATUS:** SWMU

**LOCATION:** This SWMU consists of Sections 3, 4, and 5 of the North-South Diversion Ditch (NSDD). The entire NSDD is located on property owned by the U.S. Department of Energy at the Paducah Gaseous Diffusion Plant (PDGP). Sections 3, 4, and 5 of the NSDD originate at the north-central portion of PGDP outside the controlled access area.

**APPROXIMATE DIMENSION OR CAPACITY:** The portion of the NSDD outside the security-fenced area (SWMU 58) is approximately 2560 meters (m) (8400 feet [ft]) long. This portion of the ditch varies in width from approximately 4.6 to 11m (15 to 36 ft), and the depth ranges from approximately 1.5 to 4.6m (5 to 15 ft). The banks of the NSDD outside of the security-fenced area are generally vegetated with grass, brush, and trees lining some sections of the bank. Approximately 914 m (3000 ft) of the NSDD (i.e. that portion nearest to Little Bayou Creek) falls within the 500-year floodplain of Little Bayou Creek, and some portions of this segment fall within the 100-year floodplain. Section 5 of the NSDD, downstream of the C-746-U Landfill access road, is a natural, relatively unmodified stream channel. Stream flow in this channel is intermittent in the southernmost reaches, but becomes perennial as it approaches Little Bayou Creek. Upstream of the C-746-U Landfill access road, the NSDD is channeled and bordered by mown grasses (Section 4), except for a short wooded segment immediately downstream of the security fence (Section 5). The NSDD outside of the security-fenced area is posted for radiological contamination.

**PRESENT FUNCTION:** Sections 3, 4, and 5 of the NSDD serve as a surface water runoff ditch for discharge of surface/storm water. The NSDD discharges into Little Bayou Creek to the north of PGDP. Little Bayou Creek originates within the West Kentucky Wildlife Management Area, south of PGDP, and flows northward to the Ohio River.

**PRESENT OPERATIONAL STATUS:** Active

**DATES OPERATED:** 1951 to Present.

**BRIEF HISTORY:** Historically, the NSDD received wastewater from the C-400 Cleaning Building, coal pile runoff, and storm water. The primary functions of the C-400 Cleaning Building included cleaning, metal plating, metals recovery, radioactive materials stabilization and recovery, uranium trioxide production, diffusion process equipment testing, and uranium tetrafluoride (green salt) pulverization. Sources of storm water runoff to the ditch included a steam plant (C-600), process buildings (C-335 and C-337), a cooling tower (C-635), electrical switchyards (C-535 and C-537), a neutralizing pit (C-403), and a feed plant (C-410). As a consequence, the soil and sediment in the ditch have been contaminated with various metals, polychlorinated biphenyls (PCBs), polyaromatic hydrocarbons, and radionuclides.

In 2003 and early 2004, the remediation of Section 2 of the NSDD was accomplished by the excavation and disposal of all soil in that section of the ditch to a depth of 1.2 m (4 ft) below ground surface (bgs), and the excavated area was restored to grade with clay and/or soil. The distal end of Section 2 was plugged to prevent further discharge of any type of flow to downstream portions of the NSDD ditch. A surge basin was constructed surrounding the C-616-Lift Station to contain all flow from Sections 1 and 2 of the NSDD, including effluent of the

C-335 and C-337 Process Buildings and the C-535 and C-537 Switchyards. The flow into the basin transferred from the NSDD by the C-616 Lift Station (Ditch 001 Lift Station), now is transmitted to the C-616-F Full Flow Lagoon for settlement of suspended solids prior to discharge through the Kentucky Pollutant Discharge Elimination System Outfall 001 ditch system to Bayou Creek. Remediation of Section 1 began in the spring of 2004.

Previous investigations and responses for Sections 3, 4, and 5 of the ditch have included the following items:

#### **Key Actions**

- In 1982, a portion of the NSDD located north of Ogden Landing Road was relocated to its present configuration to facilitate construction of the C-746-S and C-746-T Landfills. The former segment of the NSDD was filled and abandoned and now is located under the C-746-S and C-746-T Landfills (SWMU 145). The abandoned segment of the ditch is now a portion of SWMU 145.
- In 1992, an Interim Corrective Measure included the installation of fencing and signs to restrict access to Sections 3, 4, and 5 of the NSDD. Warning signs were installed along the NSDD north of the PGDP security fence to Ogden Landing Road. These signs indicate that the ditch is contaminated with various metals, polychlorinated biphenyls (PCBs), polyaromatic hydrocarbons, and radionuclides and should not be used for drinking, recreational, or fishing purposes.
- In 1994, a Record of Decision was signed for an interim action at the NSDD as an incremental step toward addressing site-wide problems. The primary objectives of the interim action were to mitigate the discharge of contaminants into the NSDD, decrease the off-site migration of contaminants already present in the NSDD, and decrease the potential for worker exposure (i.e., direct human contact) to the contaminants within the ditch. As a result a lift station was constructed near the southern end of the NSDD.
- In 1999, institutional controls were erected along Sections 3 and 4 of the NSDD to comply with 10 CFR 835 (Occupational Radiation Protection). These controls consisted of radiological barriers, "Fixed Contamination Area" signs, and "10 CFR 835" explanation signs.

Two recent risk assessments are available for the NSDD. These are the screening human health risk assessment (SHHRA) and screening ecological risk assessment performed in support of the Record of Decision for the NSDD, and a second SHHRA performed to support discussions with the regulators in 2003. The hazards and cancer risks for the NSDD reported in the early SHHRA [maximum Hazard Index (HI) and maximum excess lifetime cancer risk (ELCR) to a recreational user are 50 and  $6 \times 10^{-4}$ , respectively] indicate that use of the area containing Sections 3, 4, and 5 of the NSDD may need to be controlled to reduce risks below the benchmarks used at PGDP to determine area of concern (i.e., HI = 1 and ELCR =  $1 \times 10^{-6}$ ) and below or within EPA's generally acceptable risk range for site-related exposure (i.e., a cumulative HI less than 1 and a cumulative ELCR of  $10^{-6}$  to  $10^{-4}$ ).

**SITE/PROCESS DESCRIPTION:** The NSDD was used for the drainage of storm water and effluent streams from PGDP to Little Bayou Creek from 1951 to 1977.

**WASTE DESCRIPTION:** Disposal to NSDD include storm water and waste streams containing metals, (arsenic, manganese, mercury, iron, thallium, uranium, and vanadium) PCBs, polyaromatic hydrocarbons, and radionuclides (cesium-137, neptunium-237, thorium-230, uranium-235, and uranium-238).

**WASTE QUANTITY:** Unknown.

**SUMMARY OF ENVIRONMENTAL SAMPLING DATA:** Prior environmental sampling data indicate the presence of metals (i.e., arsenic, manganese, mercury, iron, thallium, uranium, and vanadium), PCBs, polyaromatic hydrocarbons, and radionuclides (i.e., cesium-137, neptunium-237, thorium-230, uranium-235, and uranium-238).

**RELEASE SUSPECTED:** The unit was used for discharging storm waters, which became contaminated from historical releases at the facility.

**DESCRIPTION OF RELEASE AND MEDIA AFFECTED:**

<b>GROUNDWATER:</b>	None known.
<b>SURFACE WATER:</b>	Potentially affected due to nature of unit and contaminants present.
<b>SOIL:</b>	Potentially affected due to nature of unit and contaminants present.
<b>ECOLOGY:</b>	Potentially affected due to nature of unit and contaminants present.

**DOCUMENTATION OF NO RELEASE:** No documented releases from this unit, contamination from upstream sources.

**PRG COMPARISON:** N/A.

**IMPACT ON OR BY OTHER SWMUS OR AOCS:** SWMU 59 (NSDD Sections 1 and 2) is located adjacent and upstream to this SWMU. The distal end of Section 2 of the NSDD was plugged in 2003 to prevent further discharge of any type of flow to downstream portions of the NSDD.

**WASTE AREA GROUPING ASSIGNMENT:** N/A.

**OPERABLE UNIT ASSIGNMENT:** Surface Water Operable Unit (SWOU)

- This unit has been placed in the SWOU for further evaluation and/or remediation.

**REFERENCES:** *Interim Measures Report and Operation and Maintenance Plan for the North-South Diversion Ditch, Paducah Gaseous Diffusion Plant Paducah, Kentucky, DOE/OR/06-1213&D3, 1995*

*Record of Decision for Interim Remedial Action at the North-South Diversion Ditch at the Paducah Gaseous Diffusion Plant Paducah, Kentucky, DOE/OR/07-1948&D2, August 2002*

*Site Management Plan, Paducah Gaseous Diffusion Plant Paducah, Kentucky, Annual Revision – FY 2004, DOE/OR/07-1849&D1, April 2004*

*Sampling and Analysis Plan for Site Investigation and Risk Assessment  
of the Surface Water Operable Unit (On-Site) at the Paducah Gaseous  
Diffusion Plant Paducah, Kentucky, DOE/OR/07-2137&D1, April 2004*

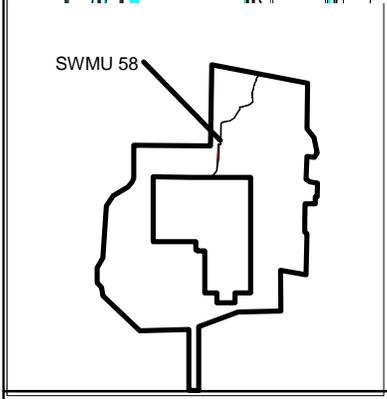
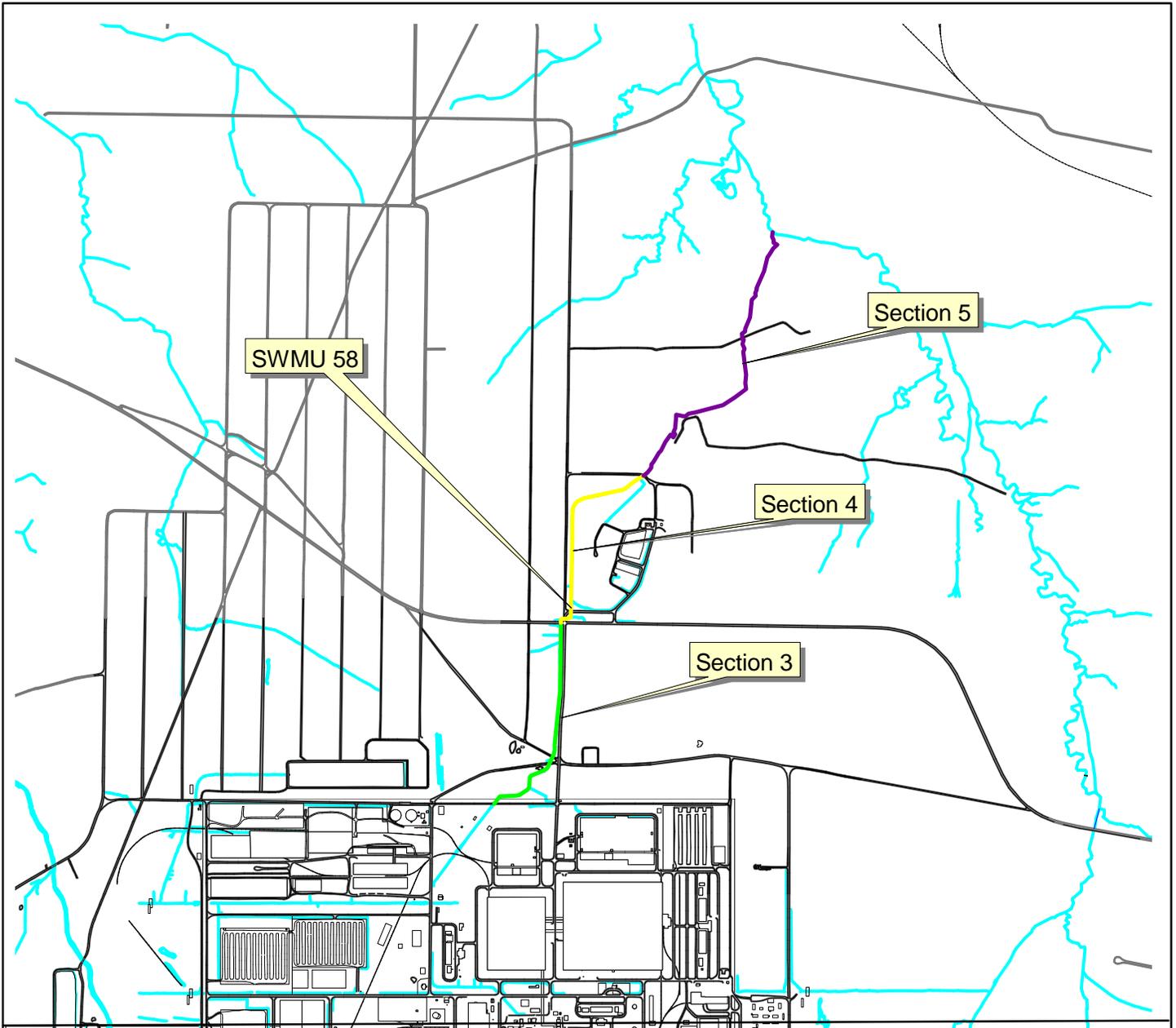
**DATE OF ORIGINAL SAR:** Unknown.

**DATE OF SAR REVISION:** 1/4/05.



June 2004

**North-South Diversion Ditch (Outside Plant Security Fence)  
SWMU 58**



LEGEND:

□ Buildings

0 1000 2000 3000 Feet



U.S. DEPARTMENT OF ENERGY  
 DOE OAK RIDGE OPERATIONS  
 PADUCAH GASEOUS DIFFUSION PLANT



BECHTEL JACOBS COMPANY LLC  
 MANAGED FOR THE US DEPARTMENT OF ENERGY UNDER  
 US GOVERNMENT CONTRACT DE-AC-05-03OR22980  
 Oak Ridge, Tennessee • Paducah, Kentucky • Portsmouth, Ohio



SWMU 58 North-South Diversion Ditch (Outside Plant Security Fence)