7 Nonradiological Effluent Monitoring

Abstract

In 2004, two KPDES outfalls at the Paducah Site experienced exceedences for toxicity. Outfall 001 exceeded reportable KPDES effluent discharge permit limits for chronic toxicity. Outfall 017 exceeded reportable KPDES effluent discharge permit limits for acute toxicity. The DOE had two point sources and several fugitive sources for nonradiological air emissions. The combined emissions from these DOE sources were small; therefore, the Paducah Site is considered a minor source in accordance with the CAA.

Introduction

Responsibility for nearly all nonradioactive airborne emission sources at PGDP was turned over to USEC as a result of the 1993 lease agreement between USEC and DOE. Only a few fugitive sources, such as gravel roads, spoil piles (resulting from construction excavation), metal scrap pile windage, and three point sources remained the responsibility of DOE in 2004. The small amount of emissions from DOE sources results in CAA classification of the Paducah Site as a minor air emissions source.

Monitoring of nonradiological parameters in liquid effluents is summarized in the *Paducah Site Environmental Monitoring Plan* (BJC 2003a) and is based on KPDES Permit KY0004049, and KDWM landfill permits 073-00014, 073-00015, and 073-00045. Effluents are monitored for nonradiological parameters listed on the permit governing the discharge.

Airborne Effluents

Airborne Effluent Applicable Regulations

The KDAQ administers much of the CAA at the Paducah Site. The DOE has responsibility only for air emission sources under DOE program control; therefore, this report does not address emissions from the PGDP sources leased to USEC.

Airborne Effluent Monitoring Program

The point sources of air emissions other than radionuclides (Section 4) for the Paducah Site in 2004 were the NWPGS and the NEPCS. These systems, combined, removed approximately 1854 pounds (0.93 tons) of TCE, which is a VOC and HAP, from approximately 114,000,000 gallons of groundwater. These facilities remove TCE contamination from the groundwater by air stripping. At the NWPGS, TCE-laden air passes through activated carbon to remove TCE. The air stream is then released to the atmosphere where any remaining TCE naturally breaks down. The NEPCS uses the existing C-637-2A Cooling Tower at PGDP for stripping the TCE from groundwater.

The NWPGS and NEPCS facilities operated in compliance with CERCLA decision documents during 2004.

Liquid Effluents

Liquid Effluent Applicable Regulations

The KDOW, through the KPDES Wastewater Discharge Permitting Program, administers the CWA for the Paducah Site. The site-wide KPDES permit (KY0004049) was effective April 1, 1998. A renewal permit application has been submitted to KDOW. A new permit has not been issued; therefore, the expired permit is still in effect. This site-wide KPDES permit contains discharge limits based on water quality criteria for a zero-flow receiving stream.

The KDWM specifies in landfill permits 073-00014, 073-00015, and 073-00045 that surface runoff will be analyzed to ensure that landfill constituents are not discharging into nearby receiving streams.

Liquid Effluent Monitoring Program

The DOE conducts nonradiological effluent monitoring for outfalls under its jurisdiction (Section 4, Figure 4.2). Outfalls 001, 015, 017, and 019 were monitored for KPDES permit parameters. The specific sample collection, preservation, and analytical methods acceptable for the types of pollutants analyzed are listed in the permit and applicable regulations.

Surface runoff from the closed C-746-S Residential Landfill, the closed C-746-T Inert Landfill, and the operating C-746-U Landfill was monitored quarterly. Grab samples were monitored for chemical oxygen demand, chloride, conductivity, dissolved oxygen, dissolved solids, flow rate, iron, hydrogen-ion concentration (pH), sodium, sulfate, suspended solids, temperature, total organic carbon, and total solids. The samples taken included landfill runoff, the receiving ditch upstream of the runoff discharge point, and the receiving ditch downstream of the runoff discharge point (Section 4, Figure 4.2). Sampling was performed in compliance with the KDWM requirements for operation of the contained landfill.

Liquid Effluent Monitoring Results

Analytical results from the four DOE outfalls are reported to KDOW in monthly and quarterly discharge monitoring reports. One exceedance of permit limits was reported in 2004 for DOE Outfall 001. Three exceedances of permit limits were reported in 2004 for Outfall 017 (Table 7.1 and Section 2). Table 7.2 summarizes the maximum detected nonradiological analyses for samples collected as part of the required KPDES permit sampling. None of the detects reported in Table 7.2 resulted in KPDES permit violations.

Data for the KPDES samples and the surface runoff samples from the landfills are presented in Section 3, tables 3.1 through 3.4 of the *Environmental Monitoring Results Annual Site Environmental Report for Calendar Year 2004, Paducah Gaseous Diffusion Plant, Paducah, Kentucky* (DOE/OR/07-2233 Volume II).

Table 7.1 KPDES permit exceedence summary for 2004

Location	Noncompliance Parameter	Species	Month Sampled	Result	KPDES Limit
Outfall 001	Chronic Toxicity	*Daphnids*[1]	April	1.76 TUc	1.0 TUc
Outfall 017	Acute Toxicity	*Daphnids*[1]	April	8.0 TUc	1.0 TUc
Outfall 017	Acute Toxicity	*Daphnids*[1]	April	4.3 TUc	1.0 TUc
Outfall 017	Acute Toxicity	*Daphnids*[1]	May	4.0 TUc	1.0 TUc

1 – *Ceriodaphnia dubia* (water fleas)
TUc – chronic toxicity unit

Table 7.2 KPDES permit sampling routine nonradiological maximum detected analyses

Parameter	K001	K015	K017	K019
Chlorine, Total Residual (mg/L)	.060	.030	.030	.040
Copper (mg/L)	.0079	.0067	.0096	.0071
Flow Rate (mgd)	7.6	1.0	3.4	.80
Hardness - Total as CaCO3 (mg/L)	318	220	121	100
Iron (mg/L)	.51	1.1	.42	1.7
Nickel (mg/L)	.011	.0093	ND	ND
PCB-1248 (µg/L)	.26	ND	ND	ND
Phosphorous (mg/L)	.55	NR	NR	NR
Suspended Solids (mg/L)	ND	ND	ND	28.
Uranium (mg/L)	.22	.21	.0025	ND
Zinc (mg/L)	ND	.048	.46	.021

ND – not detected
NR – not reported/collected