8.3 Liquid Effluent from Hanford Site Facilities

L. P. Diediker and D. J. Rokkan

Liquid effluent is discharged from some facilities at the Hanford Site. Effluent streams are sampled and analyzed for gross alpha and gross beta concentrations, as well as for concentrations of selected radionuclides.

Contaminant data from liquid effluent sampling and analyses are reported to DOE annually in an environmental releases report (HNF-EP-0527-14). This report also includes summaries of monitoring results on liquid effluent discharged to the Columbia River; activities regulated by the National Pollutant Discharge Elimination System permit and reported quarterly to the EPA; liquid effluent discharges to the soil regulated by WAC 173-216, *State Waste Discharge Program*, and reported quarterly to the Washington State Department of Ecology; and non-radioactive air emissions, which are reported annually to the Washington State Department of Ecology. Short summaries of effluent monitoring data for 2004, with some historical results, are provided in the following sections.

8.3.1 Radionuclides in Liquid Effluent

During 2004, only facilities in the 200 Areas discharged radioactive liquid effluent to the ground, which all went to a single location, the 616-A crib, also known as the State-Approved Land Disposal Site. A summary of radioactive liquid effluent is provided in Table 8.3.1. Table 8.3.2 summarizes data on radionuclides in liquid effluent released from the 100 Areas to the Columbia River, the sources of which include secondary cooling water used at the K Basins and shoreline seepage of groundwater that has passed near the retired 116-N-1 and 116-N-3 cribs in the 100-N Area. Figure 8.3.1 depicts quantities of tritium released to the ground and strontium-90 released to the Columbia River over the past 11 years.

Table 8.3.1. Radionuclides in 200 Areas Liquid Effluent Discharged to the State-Approved Land Disposal Site at the Hanford Site, 2004

Radionuclide	Half-Life	Release, Ci[(a)]
Tritium	12.3 yr	3.5×10^{1}
Technetium-99	2,600,000 yr	2.7×10^{-4}
Neptunium-237	2,140,000 yr	5.7×10^{-6}
Plutonium-238	87.7 yr	6.9×10^{-6}
Plutonium-239/240	24,100 yr	7.5×10^{-6}
Americium-241	432.7 yr	7.2×10^{-6}
Curium-244	18.1 yr	2.5×10^{-5}

(a) 1 Ci = 3.7×10^{10} becquerels.

Table 8.3.2. Radionuclides in Liquid Effluent from the 100 Areas Discharged to the Columbia River, 2004

Radionuclide	Half-Life	Release, Ci[(a)]
Tritium	12.3 yr	4.5×10^{-3}
Strontium-90	29.1 yr	4.8×10^{-2}
Plutonium-239/240	24,100 yr	5.5×10^{-6}

(a) 1 Ci = 3.7×10^{10} becquerels.

8.3.2 Non-Radioactive Hazardous Materials in Liquid Effluent

Non-radioactive hazardous materials in liquid effluent are monitored in the 100, 200, 300, and 400 Areas. The effluent is discharged to the State-Approved Land Disposal Site and to the Columbia River. Effluent entering the environment at designated discharge points is sampled and analyzed to determine compliance with the National

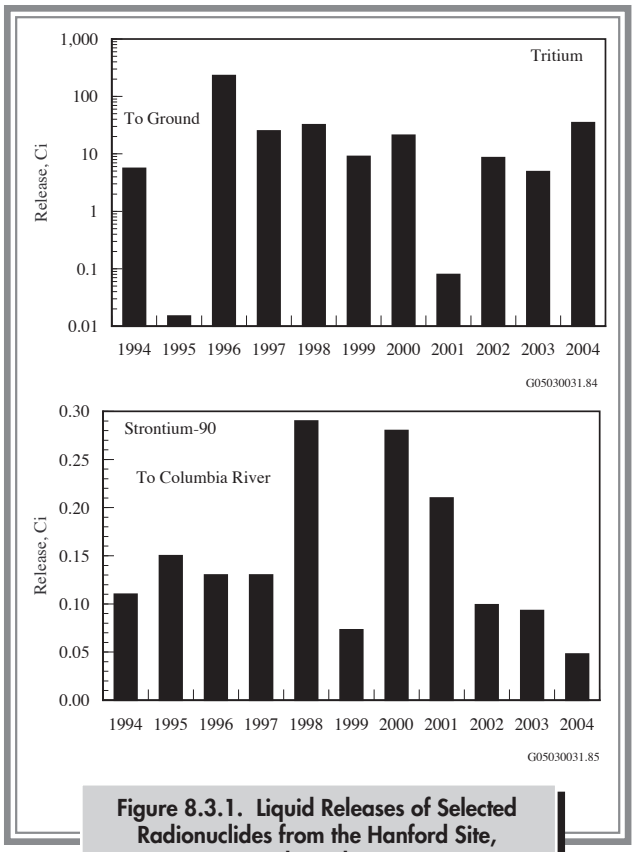

Figure 8.3.1. Liquid Releases of Selected Radionuclides from the Hanford Site, 1994 through 2004

Pollutant Discharge Elimination System permits and the state waste discharge permits for the site (*EPA Administrated Permit Programs: The National Pollutant Discharge Elimination System* [40 CFR 122] and WAC 173-216). Should chemicals in liquid effluent exceed quantities reportable under CERCLA, the release totals are immediately reported to EPA. If effluent remains stable at predicted levels, the release totals may, with EPA's permission, be reported annually. Section 5.4.1 provides a synopsis of the National Pollutant Discharge Elimination System and state waste discharge permit.