5.0 100-N RIVERBANK SPRINGS MONITORING

In 2002, water samples were taken only at the riverbank springs in the 100-N Area. All radiological analyses were performed onsite at the WSCF. Analyses for riverbank springs water included tritium, strontium-90, and gamma-emitting radionuclides. Sampling locations are illustrated in Figure 5-1.

Riverbank springs and/or shoreline seepage wells along the 100-N Area shoreline are sampled annually to verify that the reported radionuclide releases to the Columbia River are conservative (i.e., not underreported). In the past, radioactive effluent streams sent to the 1301-N and 1325-N Liquid Waste Disposal Facilities (LWDFs) in the 100-N Area contributed to the release of radionuclides to the Columbia River through their migration with the groundwater. Radionuclides from these facilities enter the Columbia River along the riverbank region commonly called N Springs.

The amount of radionuclides entering the river at these springs is calculated based on analyses of samples routinely collected from monitoring well 199-N-46, located near the shoreline. To calculate these releases, conservatively high radionuclide activities in samples collected from well 199-N-46 are multiplied by the estimated groundwater discharged into the river. The estimated groundwater flow rate used to calculate 2002 releases from the springs was 43 L/min (11 gal/min). The results of the annual riverbank spring samples can then be compared to the activities measured in well 199-N-46 to ensure that activities in the well reflect the highest activities of radionuclides in the groundwater. Additional discussion of the release calculations may be found in *Environmental Releases for Calendar Year 2002*, HNF-EP-0527-12 (Dyekman 2003).

In October 2002, 11 samples were collected from the 13 shoreline wells. Two wells were dry and could not be sampled. The shoreline seepage well samples were collected using a bailer, carefully lowered into each well water column to avoid sediment suspension, and a 4-L (1-gal) sample was obtained. The sampling methods are discussed in more detail in DFSNW-OEM-001.

In 2002, the levels of strontium-90 detected in samples from riverbank springs were highest in N Springs wells Y302, Y303 (near well 199-N-46), and Y311 (downstream of well 199-N-46). Strontium-90 concentrations did not exceed the DOE DCG value at any well. Tritium and gamma-emitting radionuclide concentrations were below analytical detection limits in 2002. The 2002 data results from riverbank springs sampling are summarized in Table 5-1. Historical tritium and strontium-90 sampling results are provided in Tables 5-2 and 5-3.

Figure 5-1. 100-N Area Shoreline Seepage Well Locations.

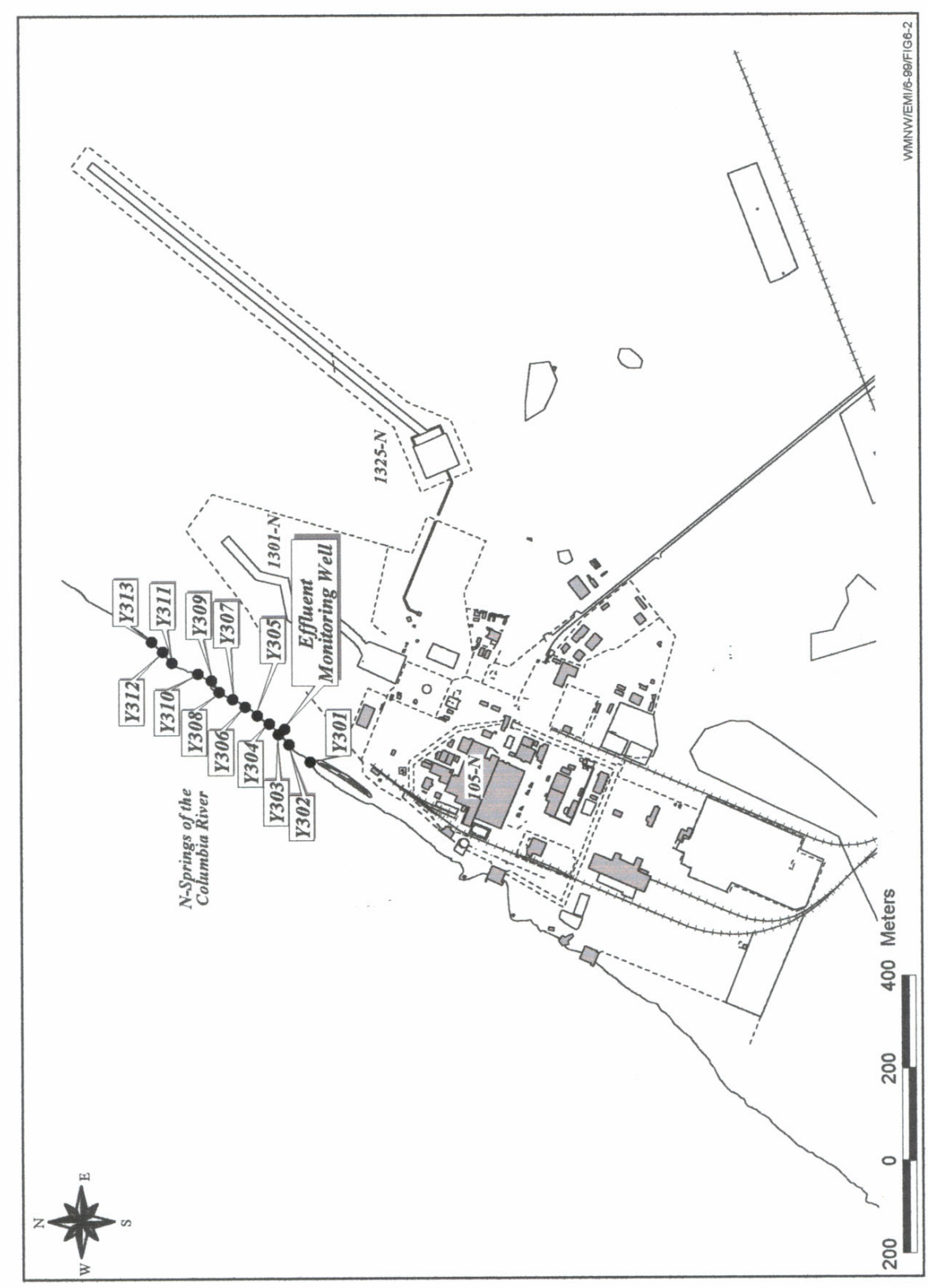

Table 5-1. 2002 Radiological Results for N-Springs Water Samples
(pCi/L ± total analytical uncertainty).

Location	Isotope	Result	± Uncertainty	RQ*
Y301	^{144}Ce	-1.7E+01	± 6.9E+01	U
	^{60}Co	6.1E+00	± 5.8E+00	U
	^{134}Cs	1.5E+00	± 6.8E+00	U
	^{137}Cs	-1.3E+00	± 6.1E+00	U
	^{152}Eu	7.7E+00	± 1.7E+01	U
	^{154}Eu	1.2E+00	± 1.2E+01	U
	^{155}Eu	-9.0E+00	± 2.0E+01	U
	^{3}H	-3.0E+02	± 4.8E+02	U
	^{103}Ru	3.3E-01	± 3.3E+00	U
	^{106}Ru	2.1E+01	± 5.5E+01	U
	^{125}Sb	9.4E-01	± 9.4E+00	U
	^{113}Sn	2.4E+00	± 7.0E+00	U
	^{90}Sr	5.2E+00	± 1.0E+00	
	^{65}Zn	1.4E+01	± 1.4E+01	U
Y303	^{144}Ce	-7.3E+00	± 6.3E+01	U
	^{60}Co	-1.6E-01	± 1.6E+00	U
	^{134}Cs	6.8E-01	± 5.1E+00	U
	^{137}Cs	-5.6E+00	± 5.6E+00	U
	^{152}Eu	-1.9E+01	± 1.9E+01	U
	^{154}Eu	-3.4E+00	± 1.1E+01	U
	^{155}Eu	6.6E-01	± 6.6E+00	U
	^{3}H	-4.7E+02	± 8.0E+02	U
	^{103}Ru	-1.7E+00	± 5.2E+00	U
	^{106}Ru	1.7E+01	± 3.9E+01	U
	^{125}Sb	3.2E+00	± 1.3E+01	U
	^{113}Sn	3.2E-01	± 3.2E+00	U
	^{90}Sr	8.2E+01	± 1.6E+01	
	^{65}Zn	-2.2E+00	± 1.0E+01	U
Y306	^{144}Ce	5.6E+00	± 5.6E+01	U
	^{60}Co	-4.4E-01	± 4.4E+00	U
	^{134}Cs	-1.9E+00	± 6.1E+00	U
	^{137}Cs	-1.3E+00	± 6.8E+00	U
	^{152}Eu	-1.2E+01	± 1.7E+01	U
	^{154}Eu	7.9E+00	± 1.6E+01	U
	^{155}Eu	-1.8E+01	± 1.9E+01	U
	^{3}H	-3.6E+02	± 3.6E+02	U
	^{103}Ru	-1.6E+00	± 5.5E+00	U
	^{106}Ru	-1.6E+01	± 5.4E+01	U
	^{125}Sb	-7.0E+00	± 1.5E+01	U
	^{113}Sn	-4.4E-01	± 4.3E+00	U
	^{90}Sr	1.6E+00	± 5.6E-01	
	^{65}Zn	1.2E+01	± 1.3E+01	U

Location	Isotope	Result	± Uncertainty	RQ*
Y302	^{144}Ce	-5.6E+00	± 5.6E+01	U
	^{60}Co	9.7E-01	± 5.0E+00	U
	^{134}Cs	4.4E+00	± 8.6E+00	U
	^{137}Cs	-3.8E+00	± 5.4E+00	U
	^{152}Eu	2.7E-01	± 2.7E+00	U
	^{154}Eu	-8.2E+00	± 1.5E+01	U
	^{155}Eu	6.3E+00	± 1.7E+01	U
	^{3}H	-3.2E+02	± 5.1E+02	U
	^{103}Ru	-1.4E+00	± 5.1E+00	U
	^{106}Ru	7.9E+00	± 4.7E+01	U
	^{125}Sb	-1.8E+00	± 1.4E+01	U
	^{113}Sn	5.1E+00	± 6.3E+00	U
	^{90}Sr	2.2E+01	± 4.4E+00	
	^{65}Zn	-6.1E-02	± 6.1E-01	U
Y305	^{144}Ce	2.4E+01	± 6.9E+01	U
	^{60}Co	-1.9E+00	± 4.2E+00	U
	^{134}Cs	-5.1E-01	± 4.7E+00	U
	^{137}Cs	-2.1E+00	± 5.1E+00	U
	^{152}Eu	2.6E+00	± 1.5E+01	U
	^{154}Eu	-3.3E+00	± 1.4E+01	U
	^{155}Eu	1.1E+00	± 1.1E+01	U
	^{3}H	-4.9E+02	± 4.9E+02	U
	^{103}Ru	-2.5E-01	± 2.5E+00	U
	^{106}Ru	1.6E+01	± 4.0E+01	U
	^{125}Sb	-1.3E+01	± 1.4E+01	U
	^{113}Sn	-5.1E+00	± 6.5E+00	U
	^{90}Sr	5.2E+00	± 1.0E+00	
	^{65}Zn	1.1E+01	± 1.0E+01	U
Y307	^{144}Ce	5.7E+01	± 7.5E+01	U
	^{60}Co	-4.5E+00	± 5.9E+00	U
	^{134}Cs	-3.8E+00	± 6.5E+00	U
	^{137}Cs	8.1E-01	± 6.2E+00	U
	^{152}Eu	1.5E+01	± 1.8E+01	U
	^{154}Eu	1.3E+01	± 2.0E+01	U
	^{155}Eu	3.2E+00	± 2.1E+01	U
	^{3}H	-4.3E+02	± 4.3E+02	U
	^{103}Ru	-3.2E+00	± 6.0E+00	U
	^{106}Ru	3.2E+01	± 5.6E+01	U
	^{125}Sb	7.9E+00	± 1.6E+01	U
	^{113}Sn	1.4E+00	± 7.7E+00	U
	^{90}Sr	6.0E-01	± 5.1E-01	U
	^{65}Zn	-6.3E+00	± 1.5E+01	U

RQ = Result Qualifier. U = The analyte was analyzed for but not detected.

Table 5-1. 2002 Radiological Results for N-Springs Water Samples (pCi/L ± total analytical uncertainty). (cont)

Location	Isotope	Result	± Uncertainty		RQ*
Y308	^{144}Ce	2.3E+01	±	6.3E+01	U
	^{60}Co	2.4E+00	±	5.6E+00	U
	^{134}Cs	8.7E-01	±	5.8E+00	U
	^{137}Cs	-1.1E+00	±	5.6E+00	U
	^{152}Eu	-6.9E-01	±	6.9E+00	U
	^{154}Eu	-1.5E+01	±	1.6E+01	U
	^{155}Eu	5.4E+00	±	1.7E+01	U
	^{3}H	-3.2E+02	±	3.8E+02	U
	^{103}Ru	-2.8E+00	±	5.4E+00	U
	^{106}Ru	-2.8E+01	±	5.0E+01	U
	^{125}Sb	6.5E+00	±	1.5E+01	U
	^{113}Sn	8.5E-01	±	6.5E+00	U
	^{90}Sr	6.9E+00	±	1.4E+00	
	^{65}Zn	1.4E+01	±	1.3E+01	U
Y310	^{144}Ce	2.1E+01	±	7.3E+01	U
	^{60}Co	2.6E+00	±	5.9E+00	U
	^{134}Cs	1.0E+00	±	5.1E+00	U
	^{137}Cs	-8.9E+00	±	8.9E+00	U
	^{152}Eu	-4.6E+00	±	1.6E+01	U
	^{154}Eu	-3.1E+00	±	1.8E+01	U
	^{155}Eu	1.1E+01	±	1.8E+01	U
	^{3}H	-3.4E+02	±	3.4E+02	U
	^{103}Ru	-5.8E-01	±	5.4E+00	U
	^{106}Ru	-1.2E+01	±	4.2E+01	U
	^{125}Sb	9.0E+00	±	1.5E+01	U
	^{113}Sn	-2.5E-01	±	2.5E+00	U
	^{90}Sr	1.2E+00	±	6.6E-01	
	^{65}Zn	1.2E+01	±	1.1E+01	U
Y312	^{144}Ce	2.4E+01	±	6.1E+01	U
	^{60}Co	3.3E+00	±	3.9E+00	U
	^{134}Cs	-1.5E+00	±	4.3E+00	U
	^{137}Cs	1.7E+00	±	4.6E+00	U
	^{152}Eu	9.2E+00	±	1.4E+01	U
	^{154}Eu	-1.2E+01	±	1.2E+01	U
	^{155}Eu	-4.8E+00	±	1.5E+01	U
	^{3}H	-2.3E+02	±	4.3E+02	U
	^{103}Ru	-4.3E+00	±	4.5E+00	U
	^{106}Ru	-1.1E+01	±	3.7E+01	U
	^{125}Sb	6.6E+00	±	1.2E+01	U
	^{113}Sn	1.7E+00	±	5.8E+00	U
	^{90}Sr	8.6E+00	±	1.7E+00	
	^{65}Zn	-6.4E-01	±	6.4E+00	U

Location	Isotope	Result	± Uncertainty		RQ*
Y309	^{144}Ce	2.1E+01	±	7.7E+01	U
	^{60}Co	-1.5E+00	±	5.6E+00	U
	^{134}Cs	3.1E+00	±	6.4E+00	U
	^{137}Cs	2.7E+00	±	5.9E+00	U
	^{152}Eu	-6.0E+00	±	2.1E+01	U
	^{154}Eu	-1.5E+01	±	1.7E+01	U
	^{155}Eu	2.7E+01	±	2.2E+01	U
	^{3}H	-3.5E+02	±	3.9E+02	U
	^{103}Ru	2.0E+00	±	5.9E+00	U
	^{106}Ru	-4.8E+00	±	4.8E+01	U
	^{125}Sb	4.1E-01	±	4.1E+00	U
	^{113}Sn	-1.9E+00	±	7.5E+00	U
	^{90}Sr	1.9E+00	±	5.7E-01	
	^{65}Zn	1.8E+01	±	1.3E+01	U
Y311	^{144}Ce	-2.6E+01	±	6.3E+01	U
	^{60}Co	4.2E-01	±	4.1E+00	U
	^{134}Cs	9.1E-01	±	4.4E+00	U
	^{137}Cs	2.3E+00	±	4.9E+00	U
	^{152}Eu	-3.4E+00	±	1.5E+01	U
	^{154}Eu	-5.2E+00	±	1.3E+01	U
	^{155}Eu	6.3E+00	±	1.5E+01	U
	^{3}H	-2.6E+02	±	3.6E+02	U
	^{103}Ru	-2.6E+00	±	4.8E+00	U
	^{106}Ru	3.9E+00	±	3.9E+01	U
	^{125}Sb	6.4E-01	±	6.4E+00	U
	^{113}Sn	1.6E+00	±	6.1E+00	U
	^{90}Sr	3.1E+01	±	4.7E+00	
	^{65}Zn	1.2E+00	±	9.7E+00	U

RQ = Result Qualifier. U = The analyte was analyzed for but not detected.

Table 5-2. Historical N-Springs Shoreline Tritium Concentrations (pCi/L ± overall analytical uncertainty).

Year	Y301	Y302	Effluent monitoring well	Y303	Y304	Y305	Y306
1987	6.8E+04	7.6E+04	9.5E+04	9.2E+04	9.4E+04	8.8E+04	7.9E+04
1988	5.7E+03	2.8E+04	7.5E+04	6.9E+04	7.4E+04	NS	NS
1989	2.5E+04	2.8E+04	3.9E+04	3.6E+04	5.0E+04	NS	6.8E+04
1990	2.9E+04	3.2E+04	3.8E+04	3.6E+04	NS	NS	3.4E+03
1991	2.2E+02	8.4E+01	3.7E+04	2.6E+03	3.4E+04	NS	4.0E+02
1992	7.2E+02	NS	5.0E+04	9.5E-01	NS	NS	1.5E+02
1993	2.8E+02	1.3E+02	2.7E+04 ± 2.1E+03	1.4E+02	5.6E+02	1.0E+02	1.8E+02
1994	NS	4.0E+01 ± 1.9E+02	2.6E+04 ± 2.1E+03	4.0E+01	NS	NS	1.2E+02 ± 2.0E+02
1995	NS	NS	5.2E+03	-1.2E+01 ± 1.2E+02	NS	NS	-4.4E+01 ± 1.5E+02
1996	2.5E+02	8.5E+02 ± 2.5E+02	2.0E+04 ± 1.6E+03	1.6E+04 ± 1.3E+03	4.2E+03 ± 5.0E+02	1.6E+02 ± 2.2E+02	2.2E+02 ± 2.1E+02
1997	-4.3E+01 ± 5.6E+01	3.6E+01 ± 3.2E+01	1.6E+04 ± 1.3E+03	3.0E+03 ± 6.0E+02	-6.3E+02 ± 1.1E+03	-5.7E+01 ± 9.1E+01	-1.1E+02 ± 5.4E+02
1998	NS	4.6E+02 ± 2.1E+02	1.6E+04 ± 5.1E+03	1.4E+02 ± 3.6E+01	NS	3.7E+02 ± 2.6E+02	4.3E+02 ± 2.2E+02
1999	9.7E+01 ± 7.4E+01	1.0E+02 ± 7.0E+01	1.3E+02 ± 7.9E+01	1.9E+02 ± 9.7E+01	NS	4.7E+01 ± 4.7E+01	3.6E+00 ± 7.6E+00
2000	1.3E+03 ± 3.3E+02	2.8E+02 ± 1.5E+02	7.0E+03 ± 3.1E+03	2.8E+02 ± 1.5E+02	2.8E+02 ± 1.4E+02	2.0E+02 ± 1.4E+02	2.0E+02 ± 1.4E+02
2001	9.9E-01 ± 8.9E-01	9.9E-01 ± 7.9E-01	5.0E+03 ± 5.1E+02	9.6E+01 ± 6.7E+01	NS	5.9E+01 ± 6.2E+01	5.0E+01 ± 6.5E+01
2002	-3.0E+02 ± 4.8E+02	-3.2E+02 ± 5.1E+02	6.8E+02 ± 6.8E+01	-4.7E+02 ± 8.0E+02	NS	-4.9E+02 ± 4.9E+02	-3.6E+02 ± 3.6E+02

Year	Y307	Y308	Y309	Y310	Y311	Y312	Y313
1987	7.3E+04	4.6E+04	7.5E+04	4.0E+03	5.8E+04	2.1E+04	1.3E+03
1988	1.1E+04	3.0E+04	1.0E+04	NS	2.9E+04	1.9E+04	3.0E+03
1989	NS	7.7E+04	7.0E+04	3.5E+04	4.2E+04	NS	NS
1990	NS	1.4E+04	3.5E+03	9.7E+03	3.8E+04	2.0E+04	NS
1991	8.1E+02	2.1E+03	6.5E+03	7.9E+02	7.1E+02	2.4E+03	9.3E+00
1992	NS	NS	3.0E+02	4.3E+02	6.5E+02	1.7E+02	NS
1993	NS	NS	NS	NS	NS	NS	NS
1994	8.5E+01 ± 1.9E+02	1.3E+02 ± 2.0E+02	8.4E+01 ± 1.9E+02	4.0E+02 ± 2.1E+02	4.5E+02 ± 2.1E+02	2.9E+02 ± 2.0E+02	NS
1995	-2.1E+00 ± 2.1E+01	-2.3E+01 ± 1.4E+02	-3.1E+01 ± 1.4E+02	-1.2E+01 ± 1.2E+02	3.2E+02 ± 1.6E+02	5.0E+02 ± 1.8E+02	NS
1996	1.9E+02 ± 2.1E+02	2.4E+02 ± 2.1E+02	NS	NS	2.2E+02 ± 2.1E+02	NS	NS
1997	-1.4E+02 ± 1.4E+03	-1.2E+02 ± 8.2E+02	-6.4E+01 ± 1.0E+02	-1.1E+02 ± 5.4E+02	2.6E+01 ± 2.1E+01	NS	NS
1998	3.5E+02 ± 2.6E+02	NS	3.5E+02 ± 2.7E+02	3.0E+02 ± 2.1E+02	5.6E+02 ± 2.5E+02	6.2E+02 ± 2.5E+02	5.2E+02 ± 2.6E+02
1999	2.7E+02 ± 1.1E+02	1.1E+02 ± 8.8E+01	NS	1.3E+02 ± 8.5E+01	1.8E+02 ± 9.9E+01	1.5E+02 ± 9.8E+01	NS
2000	3.0E+02 ± 1.5E+02	2.4E+02 ± 1.4E+02	1.9E+02 ± 1.3E+02	2.4E+02 ± 1.4E+02	4.0E+02 ± 1.6E+02	3.7E+02 ± 1.7E+02	2.5E+02 ± 1.4E+02
2001	9.7E+01 ± 9.9E+01	NS	1.9E+02 ± 1.1E+02	8.8E+01 ± 9.7E+01	5.3E+01 ± 8.5E+01	9.9E-01 ± 2.4E+00	NS
2002	-4.3E+02 ± 4.3E+02	-3.2E+02 ± 3.8E+02	-3.5E+02 ± 3.9E+02	-3.4E+02 ± 3.4E+02	-2.6E+02 ± 3.6E+02	-2.3E+02 ± 4.3E+02	NS

NS - Not sampled.

Table 5-3. Historical N-Springs Shoreline Strontium-90 Concentrations (pCi/L ± overall analytical uncertainty).

Year	Y301	Y302	Effluent monitoring well	Y303	Y304	Y305	Y306
1987	1.7E+03	2.7E+03	6.1E+03	8.3E+03	4.1E+03	9.5E+02	7.2E+02
1988	8.7E+02	3.0E+03	7.9E+03	9.1E+03	3.5E+03	NS	NS
1989	9.8E+02	2.1E+03	6.5E+03	5.4E+03	3.8E+03	NS	8.9E+02
1990	2.4E+03	2.9E+03	4.9E+03	7.1E+03	NS	NS	1.5E+02
1991	1.6E+01	2.4E+01	6.9E+03	1.4E+03	3.2E+03	NS	8.6E+01
1992	NS	NS	6.3E+03	1.5E+02	NS	NS	9.6E+00
1993	1.2E+01	8.3E+01	7.4E+03 ± 1.3E+03	1.2E+02	4.1E+03	4.1E+01	1.3E+01
1994	NS	1.1E+02 ± 2.6E+01	6.6E+03 ± 1.4E+03	1.2+E02	NS	NS	6.4E+00 ± 1.7E+00
1995	NS	NS	5.7E+03 ± 1.4E+03	3.0E+02 ± 5.1E+01	NS	NS	7.0E+00 ± 1.4E+00
1996	5.8E+01	2.6E+02 ± 6.5E+01	1.4E+04 ± 4.1E+03	5.8E+03 ± 1.6E+03	9.5E+02 ± 2.6E+02	3.7E+01 ± 1.0E+01	1.6E+01 ± 4.2E+00
1997	3.1E+01 ± 4.7E+00	2.0E+02 ± 2.8E+01	1.0E+04 ± 3.5E+03	3.2E+03 ± 3.8E+02	1.7E+02 ± 2.2E+01	2.6E+01 ± 4.7E+00	3.1E+00 ± 1.6E+00
1998	NS	1.1E+02 ± 1.3E+01	1.4E+04 ± 2.1E+03	1.9E+03 ± 2.3E+02	NS	1.7E+01 ± 2.6E+00	7.7E+00 ± 1.5E+00
1999	7.1E+00 ± 1.4E+00	4.9E+01 ± 7.4E+00	3.2E+03 ± 4.8E+02	1.3E+03 ± 2.0E+02	NS	3.0E+01 ± 4.5E+00	8.1E+00 ± 1.6E+00
2000	8.3E+00 ± 1.7E+00	1.1E+01 ± 1.6E+00	1.3E+04 ± 4.0E+03	1.3E+02 ± 2.6E+01	1.8E+02 ± 2.7E+01	7.1E+00 ± 1.4E+00	4.0E+00 ± 1.0E+00
2001	4.3E+00 ± 8.6E-01	1.9E+01 ± 2.8E+00	9.7E+03 ± 2.2E+03	4.5E+01 ± 6.8E+00	NS	9.6E+00 ± 1.9E+00	3.3E+00 ± 8.2E-01
2002	5.2E+00 ± 1.0E+00	2.2E+01 ± 4.4E+00	4.8E+03 ± 4.8E+02	8.2E+01 ± 1.6E+01	NS	5.2E+00 ± 1.0E+00	1.6E+00 ± 5.6E-01

Year	Y307	Y308	Y309	Y310	Y311	Y312	Y313
1987	1.3E+01	4.2E+01	2.4E+02	5.7E+01	6.6E+02	5.8E+01	5.0E+01
1988	1.5E+01	3.2E+01	4.1E+01	NS	3.4E+02	4.0E+01	5.8E+01
1989	NS	7.8E+01	2.9E+02	1.6E+02	9.5E+02	NS	NS
1990	NS	9.0E+01	4.4E+01	3.1E+01	5.8E+02	5.4E+01	NS
1991	1.4E+01	2.8E+01	1.0E+02	1.5E+01	4.0E+02	8.9E+00	8.1E+00
1992	NS	NS	8.1E+00	6.7E+00	1.1E+02	7.1E+00	NS
1993	NS	NS	NS	NS	NS	NS	NS
1994	3.8E+00 ± 8.7E-01	1.2E+01 ± 2.5E+00	3.4E+00 ± 9.2E-01	3.8E+00 ± 1.0E+00	5.1E+01 ± 1.1E+01	1.8E+01 ± 4.3E+00	NS
1995	3.8E+00 ± 8.0E-01	1.4E+01 ± 2.7E+00	5.5E+00 ± 1.2E+00	7.0E+00 ± 1.4E+00	7.1E+01 ± 1.3E+01	1.9E+01 ± 3.6E+00	NS
1996	6.5E+00 ± 1.8E+00	2.2E+01 ± 5.7E+00	NS	NS	1.7E+02 ± 4.9E+01	NS	NS
1997	3.6E-01 ± 1.9E+00	1.1E+01 ± 2.2E+00	5.6E+00 ± 1.7E+00	7.6E-01 ± 2.0E+00	1.5E+02 ± 2.0E+01	NS	NS
1998	1.5E+01 ± 2.3E+00	NS	5.1E+00 ± 1.0E+00	2.9E+00 ± 8.7E-01	1.1E+02 ± 1.4E+01	1.8E+01 ± 2.3E+00	3.6E+00 ± 1.1E+00
1999	1.9E+00 ± 7.6E-01	2.5E+00 ± 7.5E-01	NS	4.0E+00 ± 8.8E-01	4.3E+01 ± 6.5E+00	9.2E+00 ± 1.5E+00	NS
2000	3.3E+00 ± 8.2E-01	4.5E+00 ± 1.1E+00	2.2E+00 ± 6.6E-01	7.0E-01 ± 5.6E-01	4.8E+01 ± 1.2E+01	3.8E+00 ± 7.6E-01	2.0E-01 ± 4.4E-01
2001	3.4E+00 ± 8.5E-01	NS	2.5E+00 ± 7.5E-01	2.8E+00 ± 8.4E-01	3.4E+01 ± 5.1E+00	6.0E+00 ± 1.2E+00	NS
2002	6.0E-01 ± 5.1E-01	6.9E+00 ± 1.4E+00	1.9E+00 ± 5.7E-01	1.2E+00 ± 6.6E-01	3.1E+01 ± 4.7E+00	8.6E+00 ± 1.7E+00	NS

NS - Not sampled.