List of Leaks and Spills at U.S. Commercial Nuclear Power Plants

September, 2018

Introduction

This is a list of operating reactor sites that experienced a radioactive leak or spill to the onsite owner controlled area at some time since initial startup. The term "leaks and spills" includes all types of non-routine releases in which tritium from reactor operations contacted the soil. The list only includes leaks or spills where the concentration of tritium in the leak source, or in a groundwater sample was greater than 20,000 picocuries per liter (pCi/L). A tritium concentration of 20,000 pCi/L is used as the threshold for inclusion in the list because it is the drinking water standard in EPA's Safe Drinking Water Act. This version updates the September 2017 list of leaks and spills.

Source of Information

Recent information was compiled by NRC staff based on input from the nuclear power plant staff, Annual Radioactive Effluent Release Reports and Annual Radiological Environmental Operating Reports (see the NRC's web site for each site's detailed annual reports at https://www.nrc.gov/reactors/operating/ops-experience/tritium/plant-info.html). Historical information is based on Annual Radioactive Effluent Release Reports, Annual Radiological Environmental Operating Reports, Groundwater Questionnaires, Preliminary Notifications, Event Notifications, Licensee Event Reports, NRC Inspection Reports, Special Reports, and other documents submitted by the licensees to the NRC.

Contents

The tritium concentrations for each plant documented in the list below consist of (1) the historical maximum concentration and (2) the "current" concentration. These values provide a reasonable approximation of the magnitude and extent of the historical leaks and spills as well as the current conditions.

The value listed as the "Historical Maximum Concentration of Tritium" is an approximate historical maximum tritium concentration from abnormal releases in which tritium from reactor operations contacted the soil in an unintended fashion since initial startup. The timeframe in which the historical maximum tritium releases occurred is listed next to the maximum concentration value.

The value listed as the "Current Concentration of Tritium" is a reasonable approximation of the current maximum tritium concentrations based on samples that have been collected and analyzed by the licensee. If a value has not been updated from the one listed in the previous version, it indicates the value continues to be a good approximation of the current conditions.

As documented in the licensee annual reports, samples were collected from onsite locations and analyzed including both drinking water wells and non-drinking water sample points (e.g., ground water monitoring wells, storm drains, man holes, bore holes, piezometer tubes, surface water, puddles, and rain water). Although some values in the list exceed 20,000 pCi/L, none of those samples were collected from a drinking water well or from a municipal drinking water system. None of the samples collected from drinking water wells and municipal drinking water systems have ever exceeded the EPA drinking water standard of 20,000 pCi/L.

After a radioactive leak or spill, tritium is generally the first radionuclide to be identified in groundwater. This is because tritium travels as a form of water through the soil faster than other radionuclides.

Summary

There are 60 nuclear power plant sites in the United States that are currently operating. Records indicate 43 of these sites at one time or another have had leaks or spills that involved tritium concentrations greater than or equal to 20,000 pCi/L. Ten sites are currently reporting tritium, from a leak or spill, in excess of 20,000 pCi/L. Although many sites have had leaks or spills involving tritium, no site is currently detecting tritium in the offsite environment, or in drinking water, in excess of 20,000 pCi/L. Tritium rapidly disperses and dissipates in the environment, and as a result, tritium from leaks and spills is typically not detected outside the facility boundary.

List of Historical Leaks and Spills at U.S. Commercial Nuclear Power Plants

It is important that the preceding paragraphs accompany any reproduction of this list so that the information is communicated in the proper context.

September, 2018 updates

Plant	Historical Maximum Concentration of Tritium, pCi/L	Timeframe of Historical Maximum Concentration of Tritium	Current Concentration of Tritium, pCi/L
Beaver Valley	25,583	September, 2010	15,516
Braidwood	247,000	1998	4,630
Browns Ferry	7,520,000	January, 2015	10,500
Brunswick	19,000,000	December, 2010	317,000
Byron	82,000	February, 2006	554
Callaway	1,600,000	July, 2014	711
Catawba	47,500	October, 2007	3,490
Columbia	270,000	March, 1993	12,600
Davis-Besse	37,500	October, 2008	1,360
Dresden	10,312,000	July, 2004	114,000
Duane Arnold	2,150,000	October, 2012	49,957
Fitzpatrick, J.A.	105,000	April, 2010	Not detectable
Ginna, R.E.	20,000	1995	Not detectable
Grand Gulf	2,240,000	March, 2014	3,630
Hatch, E.I.	6,840,000	September, 2011	21,600
Indian Point	14,800,000	February, 2016	65,900
Limerick	3,950,000	February, 2009	700
LaSalle	1,230,000	July, 2010	7,020
Millstone	4,000,000	November, 2007	6,160
Monticello	21,300	September, 2009	943
Nine Mile Point	44,000	August, 2012	435
North Anna	79,559	August, 2013	1,620
Oconee	45,000	December, 2011	6,770
Oyster Creek	10,000,000	2009	2,120
Palisades	217,351	December, 2009	7,258
Palo Verde	4,200,000	March, 1993	Not detectable
Peach Bottom	196,000	March, 2010	12,800
Perry	59,900	2006	264
Pilgrim	69,000	December, 2013	25,900
Quad Cities	7,500,000	2008	941,000

River Bend	1,135,000	February, 2013	610,000
Salem	15,000,000	April, 2003	43,300
Seabrook	750,000	1999	2,790
Sequoyah	25,060	2015	4,610
St. Lucie	161,000	2000	3,080
Summer	23,000	July, 2011	2,510
Surry	31,900	October, 2007	59,300
Susquehanna	>20,000	1995	236
Three Mile Island	900,000	1981	7,480
Turkey Point	>20,000	1979	13,600
Vogtle	>20,000	1990s	1,660
Waterford	22,000	1997	Not detectable
Watts Bar	550,000	February, 2005	4,990