VERMONT
DEPARTMENT OF HEALTH

Tritium Investigation Report 2010

The following information was presented on the Health Department website to inform the public about an investigation into radioactive contamination from the Vermont Yankee Nuclear Power Plant in 2010.

To view maps and diagrams related to this investigation, see our Investigation Graphics document.

DECEMBER:

December 21, 2010 – Vermont Yankee Agrees to Re-Start Groundwater Extraction
At the direct request of Governor-elect Shumlin, by letter on Dec. 7 and during a tour of the plant on Dec. 17, Entergy Vermont Yankee agreed to re-start its groundwater extraction operation by the end of December. The Vermont Department of Health has encouraged continuing groundwater extraction to remove as much tritium. Vermont Yankee first started pumping out tritium-contaminated groundwater using special extraction wells in late March 2010 to remediate a portion of a contaminated plume of tritium that had leaked from the Advanced Off-Gas (AOG) Building. The plant stopped extracting groundwater on Nov. 18, when it reached its own goal of removing 300,000 gallons. According to Vermont Yankee reports, approximately 309,000 gallons have been extracted to date. Approximately 9,000 gallons were cleaned and returned for re-use at the plant. The remaining extracted groundwater was trucked to a licensed radioactive waste processing facility in Tennessee.

Contaminated Soils Being Shipped
Entergy Vermont Yankee has also dug up about 310,000 pounds of soil, as a result of well-drilling and excavation around the Advanced Off-Gas (AOG) Building where the tritium leak was found.

According to Vermont Yankee, 10 containers of soil that have the low levels of radioactivity typical of most soils on site have been shipped to a licensed radioactive waste disposal facility over the past several weeks.

Three containers of soils that were contaminated by the leak at the AOG Building are ready for shipment to a separate licensed radioactive waste disposal facility. These soils, which were excavated from the point where the leak entered the soil to a depth of about six feet, are contaminated with radioactive metals that are found in the plant condensate water – cesium-137, cobalt-60, strontium-90, manganese-54 and zinc-65. The concentrations of radioactive materials in these soils are much higher than the soils that came from well-drilling and the larger AOG excavation, and must be removed to prevent further migration of these radioactive metals into the environment.

Groundwater Monitoring Well Results
The results that follow are as reported by Vermont Yankee for tritium on December 15, 2010.
As has been the trend over the past several months, tritium concentrations in groundwater near plant structures, systems and components are generally decreasing, while tritium concentrations in the wells near the Connecticut River continue their trend of slowly increasing in concentration. As reported on December 3, two of seven new groundwater monitoring wells were found to be contaminated with tritium. Wells GZ-12D and GZ-22D were found to be contaminated, while GZ-23S, 24S, 25S, 26S and 27S were found not to have tritium levels

above the lower limit of detection. These conditions persist, and well GZ-22D now has the highest levels of tritium measurements on site. This well is a deep well, though it is still above bedrock. It is also located adjacent to the former drinking water well called the Construction Office Building (COB) well.

To date, gamma spectroscopy and special analyses for hard-to-detect radionuclides have not identified any other nuclear power plant-related radioactive materials in groundwater, drinking water or river water.

GZ-1:	<LLD on 11/1/10
GZ-2:	<LLD on 12/6/10
GZ-3:	181,200 on 12/13/10, up from 160,000 on 11/8/10
GZ-4:	49,100 on 12/13/10, down from 60,300 on 11/8/10
GZ-5:	<LLD on 12/6/10
GZ-6:	<LLD on 12/13/10
GZ-7:	4,700 on 12/13/10, up from 4,640 on 11/10/10
GZ-8:	No sample; dry well
GZ-9:	<LLD on 12/6/10
GZ-10:	<LLD on 12/6/10
GZ-11:	<LLD on 11/1/10
GZ-12S:	3,300 on 12/13/10, down from 7,100 on 11/8/10
GZ-12D:	74,500 on 12/06/10, up from 65,000 on 11/29/10
GZ-13S:	<LLD on 12/6/10
GZ-13D:	1,100 on 12/6/10, down from 1,170 on 11/8/10
GZ-14S:	508,800 on 12/9/10, up from 462,000 on 11/8/10
GZ-14D:	<LLD on 12/6/10
GZ-15:	112,900 on 12/9/10, up from 28,400 on 11/10/10
GZ-16:	<LLD on 12/6/10
GZ-17:	<LLD on 12/6/10
GZ-18S:	<LLD on 12/6/10
GZ-18D:	<LLD on 12/6/10, down from 755 on 11/8/10
GZ-19S:	<LLD on 11/1/10
GZ-19D:	<LLD on 11/1/10
GZ-20:	<LLD on 12/6/10
GZ-21:	14,100 on 12/13/10, down from 15,200 on 11/8/10

GZ-22D:	558,600 on 12/6/10, up from 500,000 on 11/29/10
GZ-23S:	<LLD on 12/6/10
GZ-24S:	<LLD on 12/6/10
GZ-25S:	<LLD on 12/6/10
GZ-26S:	<LLD on 12/6/10
GZ-27S:	<LLD on 12/6/10
GZ-18S:	<LLD on 12/6/10

December 3, 2010

More Tritium Contamination Detected in Deeper Groundwater Monitoring Wells

Vermont Yankee notified the Health Department late afternoon on Dec. 3 about high concentrations of tritium detected in samples taken Nov. 29 from two of its nine newest groundwater monitoring wells.

Both are deeper wells, about 60 feet below ground level and just above bedrock:

- GZ-12D, located near the Containment Access Building (CAB), measured tritium concentration at 65,000 picocuries per liter (pCi/L)
- GZ-22D, located near the Construction Office Building (COB), measured tritium concentration of 500,000 pCi/L

Split samples are being sent to the Vermont Department of Health Laboratory for independent analysis.

The finding of tritium in GZ-22D is of particular concern because it is near the former COB drinking water well. On Oct. 8 the COB well, about 360 feet deep, was found to be contaminated with tritium. Samples taken from a depth of 200 to 220 feet measured about 1,040 pCi/L. Independent testing by the Vermont Department of Health Lab confirmed tritium contamination at about 1,050 pCi/L, comparable to Vermont Yankee's findings.

This was the first finding of tritium contamination in a drinking water well on site or off site. No other drinking water sources on site or off site have shown tritium above the lower limit of detection, nor have they measured any other nuclear power plant-radioactive materials.

According to Vermont Yankee, the seven other new wells are located outside of the current plume area, and show no indication of tritium.

NOVEMBER:

November 23, 2010

NRC Concludes Groundwater Inspection

The US Nuclear Regulatory Commission (NRC) held an exit meeting at Vermont Yankee on November 18 concerning the results of its groundwater protection program inspection that was initiated August 14. The purpose of the exit meeting was to brief plant staff and conclude the inspection. A written inspection report must be published by the NRC within 30 days of the exit meeting. Until that report is completed, all inspection findings are considered preliminary.

This inspection focused on Entergy Vermont Yankee's efforts to meet the criteria of the Nuclear Energy Institute (NEI) voluntary groundwater protection initiative. A health physicist from the Vermont Department of Health participated in many aspects of the inspection. The NRC investigation covered Vermont Yankee's:

- **Site Conceptual Model –** to depict likely groundwater flows, the interface between the bedrock and the overburden above it, the connection between groundwater in the overburden and drinking water sources in the bedrock below, characteristics of the soils on site, and flow of groundwater to the Connecticut River.
- **Groundwater Monitoring –** processes and methods to monitor plant structures, systems and components for leaks of plant materials that could enter the environment.
- **Tritium Investigation –** to identify and remediate the source(s) of tritium in the groundwater and radioactive metals in the soils near the leakage points on site.

Groundwater Extraction Terminated

On November 18, Entergy Vermont Yankee officials told the Health Department that the 300,000 gallon objective for groundwater remediation had been met, and groundwater extraction has been terminated. Approximately 309,000 gallons had been extracted, and about 9,000 gallons were cleaned and returned for re-use at the plant. The remaining extracted groundwater is being trucked to a licensed radioactive waste processing facility in Tennessee. Final truckloads are scheduled for the end of November.

A separate water shipping process was completed on November 18. About 140,000 gallons of radioactive water generated during the April and May 2010 refueling outage was shipped to a different waste processing facility in Tennessee. This water (like water in the Condensate Storage Tank and many plant systems, including the reactor coolant system) is contaminated with radionuclides such as cobalt-60 and cesium-137, in addition to tritium.

Both volumes of water had been stored in frac tanks on site. These tanks are about the size of the trailer portion of a tractor-trailer. Each holds about 20,000 gallons of water, and after they are decontaminated, these frac tanks will be shipped back to the vendor. Seven frac tanks were used to store condensate water on the west side of the plant within the Protected Area of the plant, which is heavily secured. The tritium frac tanks were outside the Protected Area on the south side, near the cooling towers.

New Groundwater Monitoring Wells in Service

Groundwater monitoring wells GZ-12D, 22D, 23S, 24S, 25S, 26S and 27S have been completed and were sampled for radioactivity on November 15. The Health Department will receive results of these samples once the results are validated. The Health Department will also get split samples from these wells to verify the analytical results. GZ-22D, where the D designates a deep well that goes to bedrock (about 30 to 70 feet below ground level), is near the Construction Office Building (COB) well. The COB well has not been used as a drinking water well since February 2010. The other new wells run along the length of underground piping from the Advanced Off-Gas Building to the plant stack, and are intended to detect leaks from this piping system into the groundwater. The S designation on most of these wells is because they are shallow wells that do not go all the way to bedrock. They are drilled to depths of 25 to 35 feet.

Groundwater Monitoring Well Results

The results that follow are as reported by Vermont Yankee for tritium on November 18, 2010. As has been the trend over the past few months, tritium concentrations in groundwater near plant structures, systems and

components are generally decreasing, while tritium concentrations in the wells near the Connecticut River continue their trend of slowly increasing in concentration. Since early August, GZ-14 on the river's edge is where the highest tritium concentrations have been measured.

To date, gamma spectroscopy and special analyses for hard-to-detect radionuclides have not identified any other nuclear power plant-related radioactive materials in groundwater, drinking water or river water.

GZ-1:	<LLD on 11/1/10
GZ-2:	<LLD on 11/1/10
GZ-3:	160,000 on 11/8/10, up from 151,009 on 11/1/10
GZ-4:	60,300 on 11/8/10, down from 75,223 on 11/1/10
GZ-5:	<LLD on 11/1/10
GZ-6:	<LLD on 11/8/10
GZ-7:	4,640 on 11/10/10, up from 4,286 on 11/1/10
GZ-8:	No sample; dry well
GZ-9:	<LLD on 11/1/10
GZ-10:	<LLD on 11/8/10
GZ-11:	<LLD, down from 743 on 10/25/10
GZ-12:	7,100 on 11/8/10, down from 7,993 on 11/1/10
GZ-13S:	<LLD on 11/8/10
GZ-13D:	1,170 on 11/8/10, up from 1,064 on 10/25/10
GZ-14S:	462,000 on 11/8/10, down from 473,074 on 11/1/10
GZ-14D:	<LLD on 11/1/10
GZ-15:	28,400 on 11/10/10, down from 55,835 on 11/1/10
GZ-16:	<LLD on 11/8/10
GZ-17:	<LLD on 11/2/10
GZ-18S:	<LLD on 11/8/10
GZ-18D:	755 on 11/8/10, up from <LLD on 10/25/10
GZ-19S:	<LLD on 11/1/10
GZ-19D:	<LLD on 11/1/10
GZ-20:	<LLD on 11/1/10
GZ-21:	15,200 on 11/8/10, down from 19,072 on 11/1/10

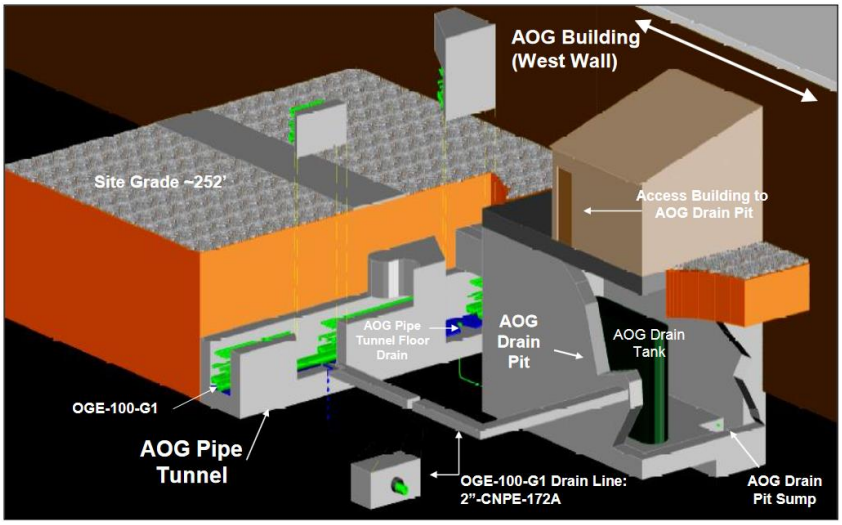
November 10, 2010

Leaks from Radioactive Materials Systems

On Nov. 7, Vermont Yankee reported that it was shutting down to repair a leaking feed water line. This 24-inch diameter pipe is the primary pathway for pumping water back to the reactor after it has been heated to steam and used to drive the turbines. This system is contained entirely within the turbine and reactor buildings, with little possibility of a leak contaminating the outside environment. The leak was found to be at a two-inch plug that is used to allow access to pipes for visual inspection. According to Vermont Yankee, this leak has now been repaired.

Other leaks in plant systems that carry radioactive materials have been reported in the recent past. Only the Advanced Off-Gas (AOG) system leaks identified in February and May 2010 have shown evidence of leaking into the environment, as extensively documented here.

Schematic of AOG System Area:



The leak discovered in February was from piping in the AOG tunnel, a structure that links systems within the AOG and turbine buildings. Two runs of piping in the AOG tunnel had eroded over time, and the steam-and-water mix that ran out of these pipes filled the AOG tunnel to a point where flaws in a rebuilt wall of the tunnel allowed the radioactive water to leak out into the surrounding soils. The leaking water contained tritium and the radioactive metals cobalt-60, cesium-137, strontium-90, zinc-65 and manganese-54. Tritiated water passed through the soils and into the groundwater, where it was detected in a monitoring well near the Connecticut River. Radioactive metals have been found in soils within about six feet of the AOG tunnel leak pathway.

The leak discovered in May was from an AOG drain line that ran from the AOG tunnel to the AOG drain tank in the AOG building. The AOG drain line leaked directly into soils in the excavation that was made to find the AOG tunnel leak. This leak occurred during the initial start-up of the reactor following the refueling outage of April and May 2010. Isolating the drain line from the AOG system eliminated this pathway.

The Health Department has asked Vermont Yankee to monitor the AOG tunnel and drain line for leaks during reactor start-up after repair to the feed water line.

Soils around both leak pathways have been excavated for disposal at a licensed facility out of state. This will prevent contamination from migrating further.

Groundwater Extraction and Disposal

As of Nov. 4, 296,000 gallons of groundwater have been pumped out from the site. The groundwater is being pumped by wells at three locations now – at extraction well EW-2 and groundwater monitoring well GZ-14 near the banks of the Connecticut River, and at groundwater monitoring well GZ-15. The tritium concentration of extracted water is in the range of 55,835 picocuries per liter (pCi/L) at GZ-15, 473,074 pCi/L at GZ-14, and 128,209 pCi/L at EW-2. With these three extraction wells, it may be possible to remove the greatest amount of tritium from the remaining contaminated groundwater in the shortest time.

A total of 196,400 gallons of the extracted tritiated groundwater have been shipped to a licensed disposal facility out of state. In addition, 115,000 gallons of condensate water that had been stored on site since the 2010 refueling outage has been shipped to a separate facility for licensed disposal. The condensate water contains tritium as well as other radionuclides generated by operation of the reactor.

Construction Office Building (COB) Well

The Construction Office Building has been served by a temporary drinking water supply from two other drinking water wells on site. Vermont Yankee informed the Health Department on November 4 that a new heated temporary system that will not freeze over the winter will be installed. The Health Department has asked Vermont Yankee about sampling from the COB well again, as it would serve as a sentinel well into the bedrock there.

Groundwater Monitoring Well Results

The results that follow are as reported by Vermont Yankee for tritium on November 4, 2010. As has been the trend over the past few months, tritium concentrations in groundwater near plant structures, systems and components are generally decreasing, while tritium concentrations in the wells near the Connecticut River continue their trend of slowly increasing concentrations. Since early August, GZ-14 on the river's edge is where the highest tritium concentrations have been measured. GZ-20 has been less than the lower limit of detection (<LLD) for two weeks now, and may be useful for detecting new leaks should they occur in that area. New wells GZ-18 S and GZ-18D remain less than the lower limit of detection as well. They are new monitoring wells between GZ-2 and GZ-3 along the riverbank. The shallow well and deep well coupling provide data about vertical flow patterns in the soils there.

To date, gamma spectroscopy and special analyses for hard-to-detect radionuclides have not identified any other nuclear power plant-related radioactive materials in groundwater, drinking water or river water.

GZ-1:	<LLD on 11/1/10
GZ-2:	<LLD on 10/4/10
GZ-3:	151,009 on 11/1/10, up from 102,912 on 10/14/10
GZ-4:	75,223 on 11/1/10, up from 35,258 on 10/14/10
GZ-5:	<LLD on 11/1/10
GZ-6:	<LLD on 10/25/10

GZ-7:	4,286 on 11/1/10, up slightly from 4,201 on 10/14/10
GZ-8:	No sample; dry well
GZ-9:	<LLD on 11/1/10
GZ-10:	<LLD on 10/25/10
GZ-11:	743 on 10/25/10, up slightly from <LLD on 10/12/10
GZ-12:	7,993 on 11/1/10, down from 13,856 on 10/12/10
GZ-13S:	<LLD on 10/25/10
GZ-13D:	1,064 on 10/25/10, up slightly from 1,057 on 10/12/10
GZ-14S:	473,074 on 11/1/10, down from 494,511 on 10/14/10
GZ-14D:	<LLD on 11/1/10
GZ-15:	55,835 on 11/1/10, down from 166,293 on 10/12/10
GZ-16:	<LLD on 11/1/10
GZ-17:	<LLD on 10/4/10
GZ-18S:	<LLD on 10/25/10
GZ-18D:	<LLD on 10/25/10
GZ-19S:	<LLD on 10/4/10
GZ-19D:	<LLD on 10/4/10
GZ-20:	<LLD on 11/1/10
GZ-21:	19,072 on 11/1/10, up from 15,279 on 10/12/10

OCTOBER:

October 27, 2010

Health Department Lab Confirms Tritium in COB Well

Independent tests completed last week by the Vermont Department of Health Laboratory confirm tritium contamination of the former drinking water well at the Construction Office Building (COB), as reported by Entergy Vermont Yankee on Oct. 8. The COB well is about 360 feet deep.

The Health Department Laboratory measured tritium at 1,050 picocuries per liter (PCi/L) in a split water sample taken from the COB well at a depth of 200 to 220 feet. This is comparable to 1,040 pCi/L measured by Vermont Yankee in a water sample taken from the same depth.

A split water sample taken from a depth of 300 to 320 feet tested below the lower limit of detection (LLD) by Vermont Yankee and the Health Department Laboratory. No other radioactive materials that can be attributed to Vermont Yankee operations were detected by gamma spectroscopy.

Gamma Spectroscopy is an analytical method used by the Department of Health Laboratory to identify specific radioisotopes in a sample. Gamma spectroscopy measures energies and intensities of gamma radiation emitted from samples to identify specific radioisotopes. Each gamma radiation-emitting radioisotope has unique gamma radiation energies and intensities, like a fingerprint, allowing comparison of sample results to a library of known radioisotopes in the identification process.

Common Natural Gamma Radiation Emitters:

Actinium-228	Americium-241	Beryllium-7

Bismuth-212	Bismuth-214	Lead-210
Lead-212	Lead-214	Polonium-210
Potassium-40	Protactinium-234m	Radium-224
Radium-226	Radium-228	Radon-222
Technetium-99	Thallium-208	Thorium-228
Thorium-229	Thorium-230	Thorium-231
Thorium-232	Thorium-234	Uranium-233
Uranium-234	Uranium-235	Uranium-238

Nuclear Facility Gamma Radiation Emitters:

Antimony – 124	Antimony – 126	Barium – 140 / Lanthanum – 140
Cerium – 144 / Promethium – 144	Cobalt – 56	Cobalt – 60
Chromium – 51	Cesium – 134	Cesium – 136
Cesium – 137	Iodine – 131	Iodine – 132
Iodine – 133	Iodine – 135	Krypton – 85
Krypton – 88	Manganese – 54	Plutonium – 239
Plutonium – 240	Ruthenium – 103	Strontium – 85
Strontium – 89	Tellerium – 132	Xenon – 133
Xenon – 133m	Xenon – 135	Zinc – 65
Zirconium – 95 / Niubium - 95		

According to Vermont Yankee, the COB well has not been used as a drinking water well since February 25. Tests of the well before that date showed tritium concentrations below the lower limit of detection. The lower limit of detection is usually less than 500 pCi/L. The Environmental Protection Agency limit for tritium in drinking water is 20,000 pCi/L.

This is the first finding of tritium contamination in a drinking water well on site or off site. Vermont Department of Health samples from the Vernon Elementary School and numerous private residences near the plant have not shown tritium above the lower limit of detection, nor have they measured any other nuclear power plant-related radioactive materials.

Groundwater Extraction

As of Oct. 21, approximately 272,000 gallons of tritium-contaminated groundwater have been pumped out from the site. Two extraction wells are now being used for this purpose, EW-2 and GZ-14S. The current concentration of tritium in the extracted groundwater is in the range of 244,000 to 494,000 pCi/L. The water is being trucked to a licensed facility in Tennessee for processing and disposal. The Health Department monitors transportation as part of its regulatory authority for all radioactive shipments in state.

New Groundwater Monitoring Test Results Vermont Yankee has been reporting tritium test results for groundwater monitoring wells GZ-18S and GZ-18D for some weeks now. These wells have consistently tested below the lower limit of detection. This set of coupled wells, one shallow well next to one deep well located north of wells GZ-13S and GZ-13D, give evidence that tritium is not moving northward, at shallow or at deeper depths.

Groundwater Monitoring Well Results

The results that follow are as reported by Vermont Yankee for tritium on October 20, 2010. As has been the trend over the past few months, tritium concentrations in groundwater are generally decreasing. The one exception to this trend is GZ-15. This well as previously used as an extraction well, and had reached tritium contamination levels of 60,000 pCi/L. Vermont Yankee officials believe the increase at this well is due to its previous use as an extraction well.

Tritium concentrations levels in the wells near the Connecticut River continue their trend of slowly increasing, especially at GZ-14. Since early August, this is where the highest tritium concentrations have been measured. To date, gamma spectroscopy and special analyses for hard-to-detect radionuclides have not identified any other nuclear power plant-related radioactive materials in groundwater, drinking water or river water.

GZ-1:	<LLD on 10/4/10
GZ-2:	<LLD on 10/4/10
GZ-3:	102,912 on 10/14/10, down from 116,000 on 9/7/10
GZ-4:	35,258 on 10/14/10, down from 44,000 on 9/7/10
GZ-5:	<LLD on 10/4/10
GZ-6:	<LLD on 10/12/10
GZ-7:	4,201 on 10/14/10, down from 6,800 on 9/7/10
GZ-8:	No sample; dry well
GZ-9:	<LLD on 10/4/10
GZ-10:	<LLD on 10/12/10
GZ-11:	<LLD on 10/12/10
GZ-12:	13,856 on 10/12/10, down from 24,000 on 9/7/10
GZ-13S:	<LLD on 10/12/10

GZ-13D:	1,057 on 10/12/10, down from 1,900 on 8/30/10
GZ-14S:	494,511 on 10/14/10, up from 386,000 on 9/7/10 (an extraction well)
GZ-14D:	<LLD on 10/12/10
GZ-15:	166,293 on 10/12/10, up from 53,000 on 9/7/10
GZ-16:	<LLD on 10/12/10
GZ-17:	<LLD on 10/4/10
GZ-18S:	<LLD on 10/12/10
GZ-18D:	<LLD on 10/12/10
GZ-19S:	<LLD on 10/4/10
GZ-19D:	<LLD on 10/4/10
GZ-20:	<LLD on 10/12/10, down from 2,000 on 9/7/10
GZ-21:	15,279 on 10/12/10, down from 32,000 on 9/7/10

October 8, 2010

Construction Office Building Sample Tests Positive for Tritium

Entergy Vermont Yankee officials notified the Department of Health this afternoon about a positive tritium sample from the Construction Office Building (COB) well. This well had been used in the past for drinking water, but it was taken out of service in March 2010 and is not being used for drinking water. The sample measured at a tritium concentration of 1,040 picocuries per liter (pCi/L).

The COB well is about 360 feet deep, and the sample that tested positive for tritium was taken at a depth of 200 to 220 feet while hydrogeological contractors were conducting what is called packer testing. Packer testing is used to isolate specific fractures in the bedrock to analyze the water in that fracture. A sample from the COB well at a fracture at 300 to 320 feet in depth tested at less than the lower limit of detection for tritium. The lower limit of detection is usually less than 500 pCi/L.

Packer testing is this well was immediately stopped to allow for investigation into the possibility that the testing equipment or process itself cross-contaminated the well.

The Vermont Department of Health had requested a split sample from the COB well for all packer testing sites. This particular site sample was shipped to the Department of Health today.

Vermont Department of Health samples from the Vernon Elementary School and numerous private residences off-site near the plant have not shown tritium levels greater than the lower limit of detection, nor have they measured any other nuclear power plant-related radioactive materials since this tritium investigation began in January.

The Environmental Protection Agency limit for tritium in drinking water is 20,000 pCi/L.

SEPTEMBER:

September 22, 2010

2009 Vermont Yankee Environmental Surveillance Report

The Vermont Department of Health has published its annual environmental surveillance report of Vermont Yankee Nuclear Power Station for 2009. The report details more than 1,300 separate measurements of air, water, milk, soil, vegetation, sediment and fish samples taken during the year at the site boundary, from the Connecticut River, and in the towns surrounding the power station. Overall, these samples and measurements

continue to provide evidence that no significant adverse health effects from radiological exposures have resulted from the operation of Vermont Yankee during 2009. The full report is available at our website. Surveillance of Vermont Yankee for 2009 is most notable for one groundwater well result. On November 17, water samples were taken by Vermont Yankee from its groundwater monitoring well GZ-3. On January 6, 2010, laboratory results showed concentrations of radioactive tritium above the lower limit of detection. The investigation to find the sources and extent of contamination at Vermont Yankee that has been reported by the Health Department since January 2010 is an extension of the annual environmental surveillance program, and will be included in the surveillance report for 2010.

Groundwater Extraction

As of September 17, approximately 263,000 gallons of tritium-contaminated groundwater have been pumped from the soils on site. Groundwater is now being pumped out by extraction well EW-2, which is near groundwater monitoring well GZ-14. This area is close to the centerline of the underground plume of tritium-contaminated groundwater, and about 75 feet west of the Connecticut River. The current concentration of tritium measured in the extracted groundwater is in the range of 386,000 picocuries per liter (pCi/L). This is much higher than the tritium concentration of the water that was being extracted at GZ-15 (about 53,000 pCi/L). The new well is reported to be pumping at about half a gallon per minute. Vermont Yankee set a goal of extracting at least 300,000 gallons of tritium-contaminated groundwater from the site.

New Groundwater Monitoring Wells

Vermont Yankee reports progress on four new groundwater monitoring wells: GZ-12D, GZ-18S, GZ-18D and GZ-22D. The “S” designates a shallow well, which is drilled to about 30 feet in depth. The “D” designates a deep well, which is drilled to 40 feet or more. Both are above bedrock. Drilling has been completed on each, but well GZ-22D must be filled and re-drilled because part of the drill broke off and blocked the well hole. Samples from these wells will be used to tell if there are any new leaks from plant components near these well locations, while the coupled shallow and deep wells will help assess how deep into the ground tritium has migrated. Samples from each well will be split with the Health Department for laboratory analysis.

During the drilling, soil samples were taken. These soil samples and other data from the combination of deep and shallow wells at a particular location help scientists understand the forces on, and the movement of, the groundwater.

GZ-12D is next to GZ-12; GZ-18S and GZ-18D are north of well GZ-13; and well GZ-22 is outside the Construction Office Building (COB) next to the COB well. Five other groundwater monitoring wells are planned. They will be set along the length of buried underground piping that runs from the Advanced Off-Gas Building to the plant stack.

Drinking Water Testing at the Construction Office Building Well

Vermont Yankee contractors will begin special testing of the COB well the week of September 20. This “packer testing” will identify the best locations for two to three new sample pumps to be installed in the 360 foot-deep former drinking water well. The pumps will draw water samples for testing to verify that drinking water sources remain free of contamination. Ten areas that have minor or major fractures in the bedrock capable of yielding drinking water may be tested. The fractures in the bedrock that provide the greatest amount of drinking water will likely be those sampled long-term. Vermont Yankee has agreed to split samples from the COB well with the Health Department.

The COB well has not been used for drinking water since February 25, and there are no plans to use it in the future for anything but a drinking water tritium sampling site. To date, all water samples taken from it have tested below the lower limit of detection for tritium.

NRC Groundwater Protection Inspection

The NRC continued its inspection of the Vermont Yankee groundwater protection program with a teleconference on September 16. Vermont Yankee's contract hydrogeologists reviewed pressure transducer data from most of the groundwater monitoring wells on site with hydrogeologists and health physicists from the NRC, a hydrogeologist from the United States Geological Survey and a health physicist from the Health Department. The contractor also presented an update to its conceptual site model. Because sample data from the COB well is not yet available, the NRC inspection remains open.

September 10, 2010

Groundwater Extraction

As of September 9, approximately 261,000 gallons of tritium-contaminated groundwater has been pumped out from the site. The current concentration of groundwater being removed is in the 53,000 picocuries per liter (pCi/L) range (compared to a concentration of about 76,000 pCi/L reported as of August 26). As expected, new extraction well GZ-EW2, located near GZ-14S, started pumping Sept. 7, and should take over groundwater extraction over the next few days.

New Groundwater Monitoring Wells Being Installed

Vermont Yankee reports three new groundwater monitoring wells have been hydroexcavated. These are GZ-18S, GZ-18D and GZ-22D ("S" designation is for a shallow well, drilled to about 30 feet in depth; "D" means a deep well, drilled to 40 feet). Drilling has begun on well GZ-18S, which may be fully operational by September 13.

The combination of deep and shallow wells at a particular location helps scientists understand the forces on and movement of the groundwater. GZ-18S and GZ-18D are north of well GZ-13. Well GZ-22 is in the Construction Office Building. At least six other groundwater monitoring wells are planned during this current phase of groundwater protection activity. Soils from the well excavation and drilling are being sampled for radioactivity and stored for future disposition.

Drinking Water Testing at the Construction Office Building Well

Vermont Yankee contractors will begin special testing of the Construction Office Building (COB) well September 13. This "packer testing" will identify the best locations for the two to three new sample pumps to be installed in the 360 foot-deep former drinking water well. Packer testing helps verify fractures in the bedrock that provide the greatest amount of drinking water. The pumps will be used to draw water samples for testing to verify that these drinking water sources remain free of contamination. Vermont Yankee has agreed to split samples from the COB well with the Health Department.

The COB well has not been used for drinking water since February 25, and there are no plans to use it in the future for anything but a drinking water tritium sampling site. All samples taken from it, to date, have tested below the lower limit of detection for tritium.

NRC Groundwater Protection Inspection

The NRC still expects to complete its inspection of the Vermont Yankee groundwater protection program the

week of September 13. The NRC is working with Vermont Yankee/Entergy officials to obtain and review pressure transducer data from most of the groundwater monitoring wells that form part of the station's groundwater protection program. This pressure data - that has been logged in each of the on-site wells since their installation - along with other groundwater physical and chemical data, will be analyzed by the NRC's hydrogeologists for evidence that public drinking water remains protected from tritium contaminated groundwater.

Groundwater Monitoring Well Results

The results that follow are as reported by Vermont Yankee for tritium. As has been the trend over the past few months, concentrations of tritium in wells near plant structures, systems, and components that may leak and contaminate the groundwater are generally decreasing. Tritium concentration levels in the wells near the Connecticut River continue their recent trend of leveling off, perhaps indicating the concentration levels have peaked. To date, gamma spectroscopy and special analyses for hard-to-detect radionuclides have not identified any other nuclear power plant-related radioactive materials in groundwater, drinking water, or river water.

All results for tritium concentrations are expressed in terms of picocuries per liter (pCi/L), or below the lower level of detection (<LLD):

GZ-1:	<LLD on 8/2/10
GZ-2:	<LLD on 9/7/10
GZ-3:	116,000 on 9/7/10, up from 115,000 on 8/23/10
GZ-4:	44,000 on 9/7/10, up from 33,000 on 8/23/10
GZ-5:	<LLD on 9/7/10
GZ-6:	<LLD on 9/7/10
GZ-7:	6,800 on 9/7/10, up from 4,700 on 8/25/10
GZ-8:	No sample; dry well
GZ-9:	<LLD on 9/7/10
GZ-10:	<LLD on 9/7/10
GZ-11:	<LLD on 8/23/10
GZ-12:	24,000 on 9/7/10, up from 23,000 on 8/16/10
GZ-13S:	<LLD on 8/23/10
GZ-13D:	1,900 on 8/30/10, up from 1,700 on 8/23/10
GZ-14S:	386,000 on 9/7/10, up from 370,000 on 8/25/10
GZ-14D:	<LLD on 9/7/10
GZ-15:	53,000 on 9/7/10, down from 76,000 on 8/25/10 (as extraction well)
GZ-16:	<LLD on 8/23/10
GZ-17:	<LLD on 9/7/10
GZ-19S:	<LLD on 9/7/10
GZ-19D:	<LLD on 9/7/10
GZ-20:	2,000 on 9/7/10, down from 3,000 on 8/23/10
GZ-21:	32,000 on 9/7/10, up from 26,000 on 8/23/10

September 1, 2010

Groundwater Extraction

As of August 26, approximately 245,000 gallons of tritium-contaminated groundwater has been pumped out from the site. Vermont Yankee has set a goal of removing 300,000 gallons of contaminated water to help remediate soils. The current concentration of groundwater being removed is in the 76,000 picocurie per liter (pCi/L) range. Over the past five months, three wells have been used for extraction: GZ-EW1, GZ-EW1A and GZ-15. A new extraction well, GZ-EW2, located near GZ-14S, may be operational soon. This new well would make it possible to extract groundwater with tritium concentrations near 370,000 pCi/L.

Groundwater Monitoring Phase 3

Vermont Yankee reported on August 26 that funding for four to five more groundwater monitoring wells has been approved by Entergy, but the start of drilling the wells is behind schedule. The new wells are to be located next to buried underground pipes that run from the Advanced Off-Gas (AOG) Building to the plant stack. The wells will be used to monitor for potential leaks of radioactive materials.

Plans for this phase of groundwater monitoring also call for testing the COB well, and installing at least two new sampling pumps into the well. The testing, called packer testing, will identify the best locations for the new sample pumps in the 360 foot-deep former drinking water well. Packer testing helps verify fractures in the bedrock that provide the greatest amount of drinking water. The new pumps will be used to draw water samples for testing to verify that these drinking water sources remain free of contamination. The COB well has not been used for drinking water since February 25, and there are no plans to use it in the future for anything but a drinking water tritium sampling site. All samples taken from it, to date, have tested below the lower limit of detection (<LLD) for tritium.

NRC Groundwater Protection Inspection

The NRC reported on August 26 that it has not completed its inspection of the Vermont Yankee groundwater protection program. The NRC has been working with Entergy officials to obtain and review information to complete the inspection the week of September 13. The information needed is being gathered over the coming weeks by Vermont Yankee's hydrogeological contractors. This includes pressure data that has been logged in each of the on-site wells since their installation, and other groundwater physical and chemical data.

Groundwater Monitoring Well Results

The results that follow are as reported by Vermont Yankee for tritium. As has been the trend over the past few months, concentrations of tritium in wells near plant structures, systems and components that may leak and contaminate the groundwater are generally decreasing. Wells near the Connecticut River continue their recent trend of leveling off with tritium concentration, perhaps indicating a peak. To date, gamma spectroscopy and special analyses for hard-to-detect radionuclides have not identified any other nuclear power plant-related radioactive materials in groundwater, drinking water, or river water.

All results for tritium concentrations are expressed in terms of picocuries per liter (pCi/L), or below the lower level of detection (<LLD):

GZ-1:	<LLD on 8/2/10
GZ-2:	<LLD on 8/2/10
GZ-3:	115,000 on 8/23/10, up from 112,000 on 8/16/10
GZ-4:	33,000 on 8/23/10, up from 30,000 on 8/16/10

GZ-5:	<LLD on 8/2/10
GZ-6:	<LLD on 8/23/10
GZ-7:	4,700 on 8/25/10, up from 4,000 on 8/18/10
GZ-8:	No sample; dry well
GZ-9:	<LLD on 8/2/10
GZ-10:	<LLD on 8/23/10
GZ-11:	<LLD on 8/23/10
GZ-12:	23,000 on 8/16/10, with no change (23,000) on 8/16/10
GZ-13S:	<LLD on 8/23/10
GZ-13D:	1,700 on 8/23/10, up from <LLD on 8/16/10
GZ-14S:	370,000 on 8/25/10, up from 353,000 on 8/16/10
GZ-14D:	<LLD on 8/23/10
GZ-15:	76,000 on 8/25/10, down from 86,000 on 8/16/10 (as extraction well)
GZ-16:	<LLD on 8/23/10
GZ-17:	<LLD on 8/2/10
GZ-18:	no sampling site yet
GZ-19S:	<LLD on 8/2/10
GZ-19D:	<LLD on 8/2/10
GZ-20:	3,000 on 8/23/10, up from 2,600 on 8/16/10
GZ-21:	26,000 on 8/23/10, down from 43,000 on 8/16/10

AUGUST:

August 25, 2010

Nuclear Regulatory Commission Inspection

Inspectors from the NRC returned to Vermont Yankee August 17 through August 20 to continue the groundwater protection inspection, and to begin the annual inspection of radiological effluents. Neither inspection is yet complete, nor are final results expected until later this year.

A health physicist from the Vermont Department of Health accompanied two NRC health physicists and two NRC hydrogeologists on the inspection, and at meetings with Vermont Yankee's chemistry director, chemistry supervisor, its environmental monitoring program lead, radiation protection manager, and Entergy's contract hydrogeologist and health physicist. Major areas of discussion included Vermont Yankee's conceptual site model and dose assessments based on the tritium release.

The **conceptual site model** is being clarified by "down-hole" geophysical testing of drinking water wells used for drinking water at the plant, and at drinking water wells on Entergy-owned properties on Governor Hunt Road. This testing is used to more precisely characterize the bedrock, and the separation of groundwater above the bedrock from drinking water under or within it. Pressure transducer data from the groundwater sampling wells will also be downloaded and analyzed in the coming weeks to help further define the site model. This model should allow more accurate estimates of transport times for the movement of groundwater from buildings on site to the Connecticut River, and the total activity of radioactive tritium released from the leaking structures,

systems and components. On August 19, the NRC obtained split samples from groundwater monitoring wells for independent radiochemical analysis.

Bounding dose assessments conducted by Vermont Yankee and Entergy consultants were also reviewed. These estimated doses to the public are small fractions of the state regulatory limits for public doses from liquid effluents and the NRC limits for offsite dose to the public. In particular, the dose estimated with current models is 0.00035 millirem per year. The Vermont Department of Health's limit for all radiological liquid effluents, including tritium, is 5.0 millirem per year. Further definition of the conceptual site model will allow for improvements in the dose assessment modeled for the tritium release. This is expected to be completed in 2010. The tritium dose assessment will be included in Vermont Yankee's complete effluent monitoring report by May 15, 2011.

Groundwater Monitoring Phase 3

Vermont Yankee also provided some details about the next phase of its groundwater protection program. Beginning the week of August 23, the plant will install four new groundwater monitoring wells, and a new groundwater extraction well. The four monitoring wells will be GZ-18S and GZ-18D to be located north of the existing plume and north of wells GZ-13S and GZ-13D, with GZ-22 to be located within the Construction Office Building (COB) and GZ-12D to be drilled adjacent to well GZ-12S. (S designates a shallow well 25 to 30 feet deep, while D designates a deep well 35 to 40 feet deep.) The new extraction well is to be located near groundwater monitoring well GZ-14.

In addition to these five new wells, testing and installation of at least two new sampling pumps in the COB well is planned. This will further the understanding of two major fractures in the bedrock that previously provided drinking water to the COB well (the well has not been used for drinking water since February 25, 2010). The sampling will also help verify that the drinking water available from this location near the centerline of the plume remains free of tritium, as seen in measurements taken before February 25.

Groundwater Monitoring Well Results

The results that follow are as reported by Vermont Yankee for tritium. As has been the trend over the past few months, concentrations of tritium in wells near plant structures, systems and components that may leak and contaminate the groundwater are generally decreasing. Wells near the Connecticut River continue their recent trend of leveling off with tritium concentration, perhaps indicating a peak. To date, gamma spectroscopy and special analyses for hard-to-detect radionuclides have not identified any other nuclear power plant-related radioactive materials in groundwater, drinking water or river water.

All results for tritium concentrations are expressed in terms of picocuries per liter (pCi/L), or below the lower level of detection (<LLD):

GZ-1:	<LLD on 8/2/10
GZ-2:	<LLD on 8/2/10
GZ-3:	112,000 on 8/16/10, down from 124,000 on 8/12/10
GZ-4:	30,000 on 8/16/10, up from 26,900 on 8/12/10
GZ-5:	<LLD on 8/2/10
GZ-6:	<LLD on 8/16/10
GZ-7:	4,000 on 8/18/10, up slightly from 3,700 on 8/12/10

GZ-8:	No sample; dry well
GZ-9:	<LLD on 8/2/10
GZ-10:	<LLD on 8/16/10
GZ-11:	<LLD, down from 2,200 on 8/9/10
GZ-12:	23,000 on 8/16/10, down from 36,000 on 8/12/10
GZ-13S:	<LLD on 8/16/10
GZ-13D:	<LLD on 8/16/10, down slightly from 865 on 8/9/10
GZ-14S:	353,000 on 8/16/10, up from 335,000 on 8/12/10
GZ-14D:	<LLD on 8/16/10
GZ-15:	86,000 on 8/16/10, up from 77,000 on 8/9/10 (serving as extraction well)
GZ-16:	<LLD on 8/16/10
GZ-17:	<LLD on 8/2/10
GZ-18:	no sampling site yet
GZ-19S:	<LLD on 8/2/10
GZ-19D:	<LLD on 8/2/10
GZ-20:	2,600 on 8/16/10, up from <LLD on 8/9/10
GZ-21:	43,000 on 8/16/10, down from 85,000 on 8/12/10

August 19, 2010

NRC Groundwater Protection and Radiation Protection Inspection

The US Nuclear Regulatory Commission is conducting an inspection this week of progress associated with the Vermont Yankee groundwater protection program. The NRC will also obtain split samples from 20 water sites, in order to do its own independent analysis of the same water samples analyzed by Vermont Yankee.

The inspection includes a progress evaluation of the site conceptual model for groundwater and drinking water. The model will be updated with information from Vermont Yankee's hydrogeological contractor, including information from the “down-hole” geophysical testing of drinking water wells used for drinking water at the plant, and at drinking water wells on Entergy-owned properties on Governor Hunt Road. Down-hole geophysical testing is used to more precisely characterize the bedrock, and the separation of groundwater above the bedrock from drinking water under or within it. The model may also be useful in helping develop transport estimates of the movement of groundwater down from buildings on-site to the Connecticut River.

Vermont Yankee Groundwater Monitoring Phase 3

On August 12, Vermont Yankee officials outlined "Phase 3" of its groundwater protection program. As described, Phase 3 anticipates the addition of four new groundwater monitoring wells, and a third groundwater extraction well to be located near the groundwater monitoring well GZ-14.

Fire Protection Intake Upgrade to Provide Winter Sample Point

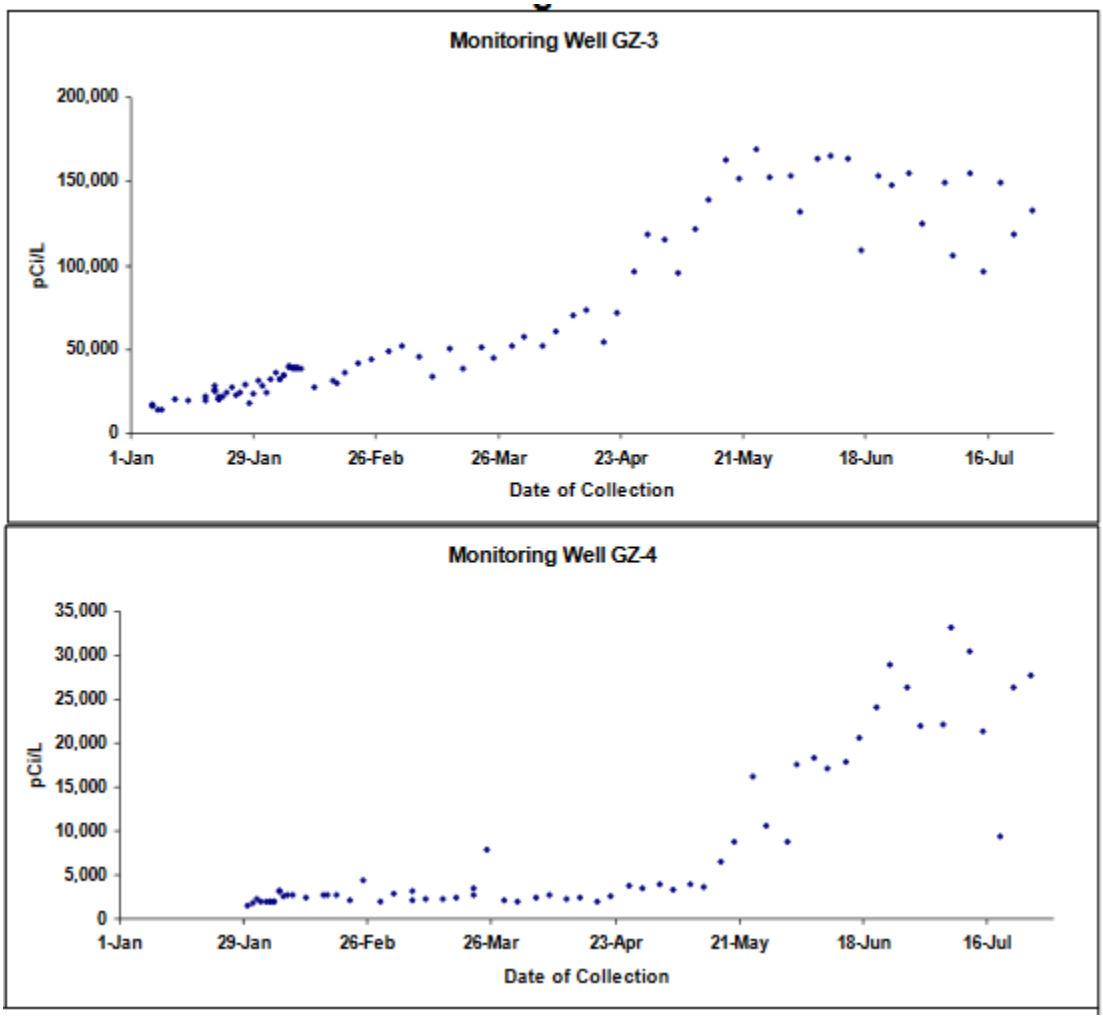
Vermont Yankee reported that a sampling provision for the river near the centerline of the plume is planned for installation around November 30.

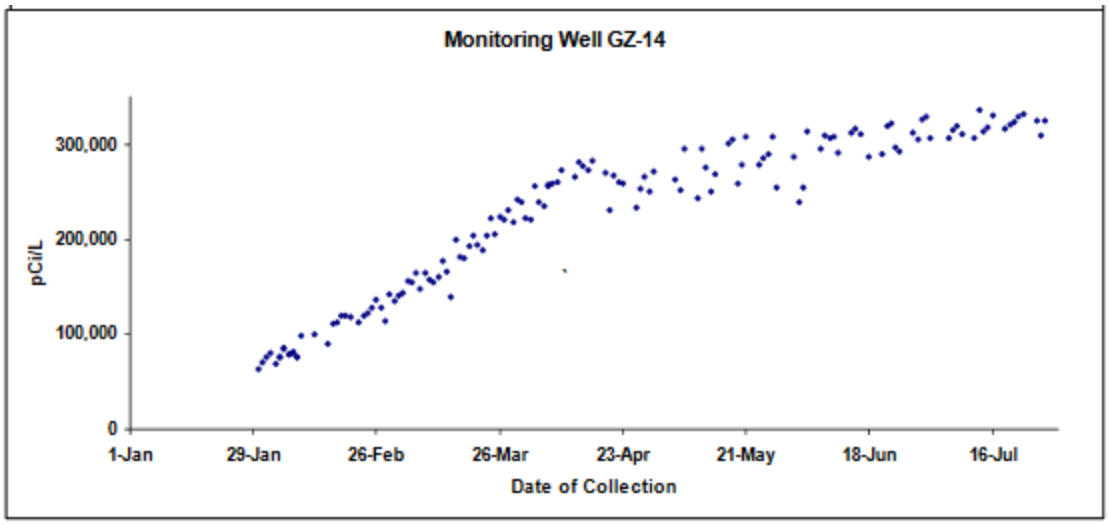
The effort will happen in association with an upgrade to the station's Fire Protection Intake, which allows suction of water from the river for fire protection purposes. It also will serve as a means for periodic sampling of the river - even when the river is frozen over during winter.

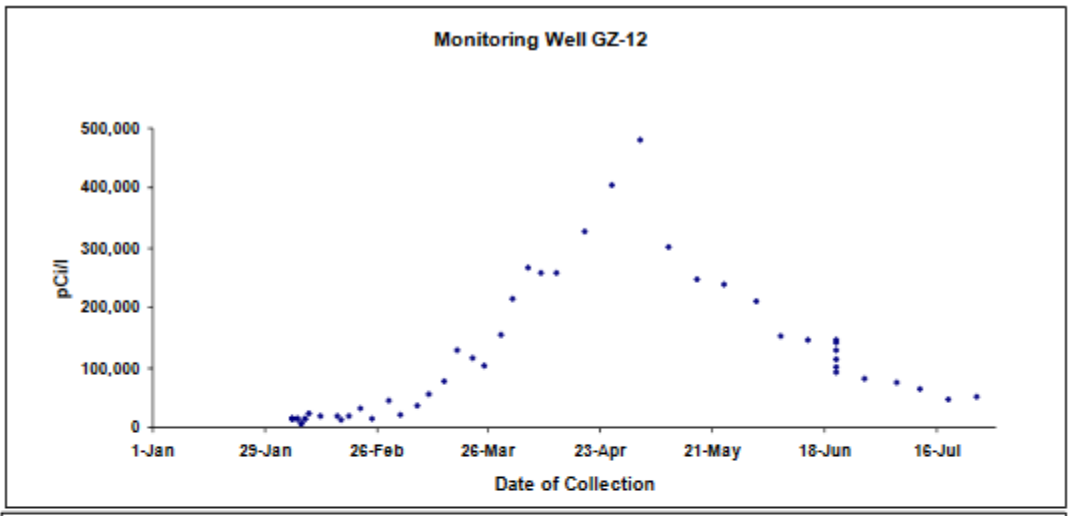
Groundwater Monitoring Well Results

The results that follow are as reported by Vermont Yankee for tritium. As has been the trend over the past few months, concentrations of tritium in wells near plant structures, systems and components that may leak and contaminate the groundwater are generally decreasing. Wells near the Connecticut River continue their recent trend of leveling off with tritium concentration, perhaps indicating a peak. To date, gamma spectroscopy and special analyses for hard-to-detect radionuclides have not identified any other nuclear power plant-related radioactive materials in groundwater, drinking water or river water.

Tritium Concentration Graphs




Monitoring Well GZ-14
300,000
200,000
100,000
0
pCi/L
1-Jan
29-Jan
26-Feb
26-Mar
23-Apr
21-May
18-Jun
16-Jul
Date of Collection


Monitoring Well GZ-12
500,000
400,000
300,000
200,000
100,000
0
pCi/l
1-Jan
29-Jan
26-Feb
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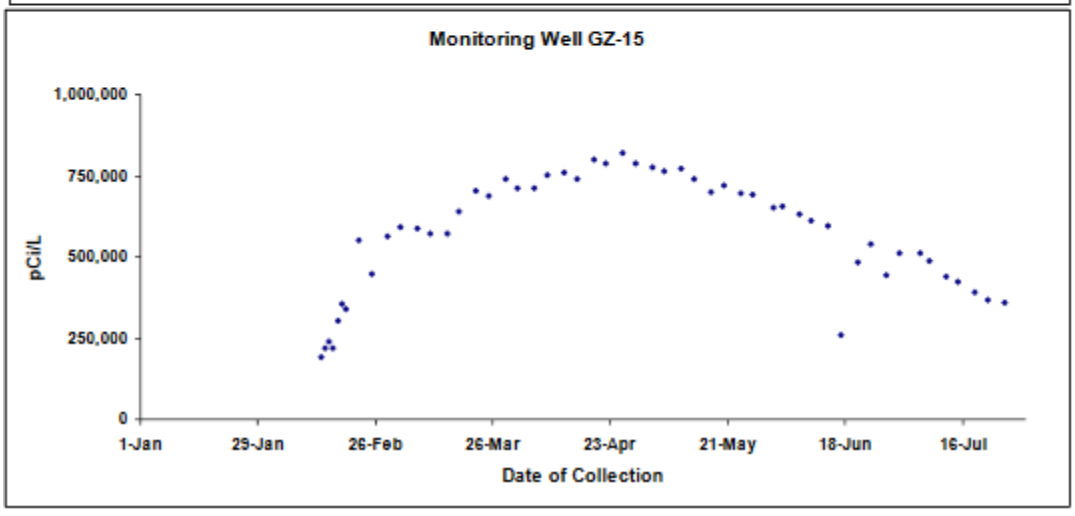
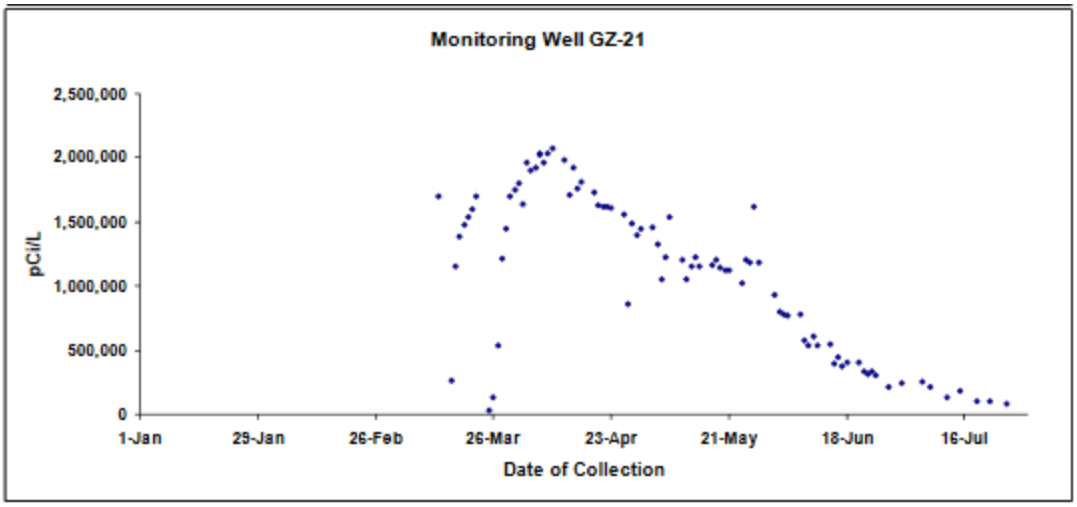
21-May
18-Jun
16-Jul
Date of Collection


Monitoring Well GZ-15
1,000,000
750,000
500,000
250,000
0
pCi/L
1-Jan
29-Jan
26-Feb
26-Mar
23-Apr
21-May
18-Jun
16-Jul
Date of Collection


Monitoring Well GZ-21
2,500,000
2,000,000
1,500,000
1,000,000
500,000
0
pCi/L
1-Jan
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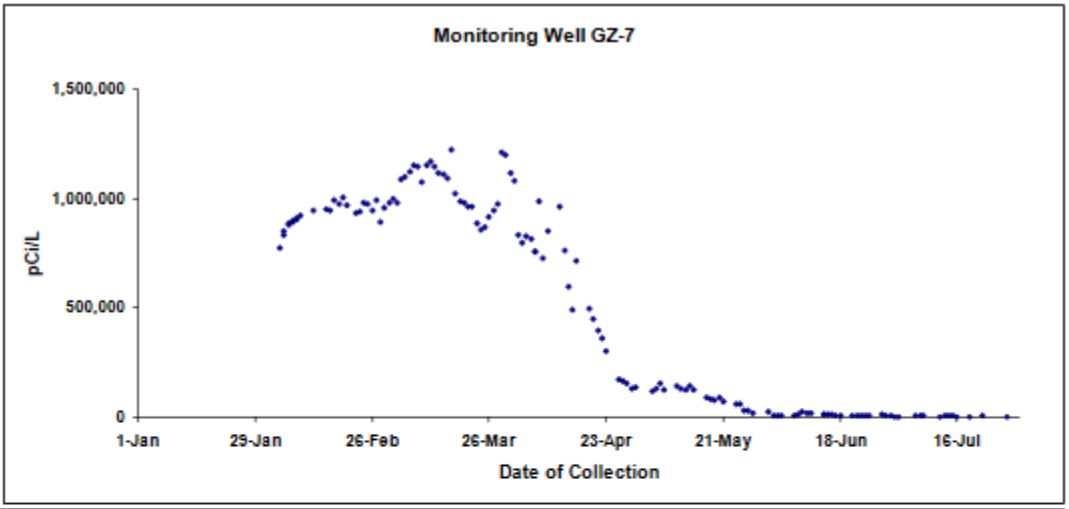
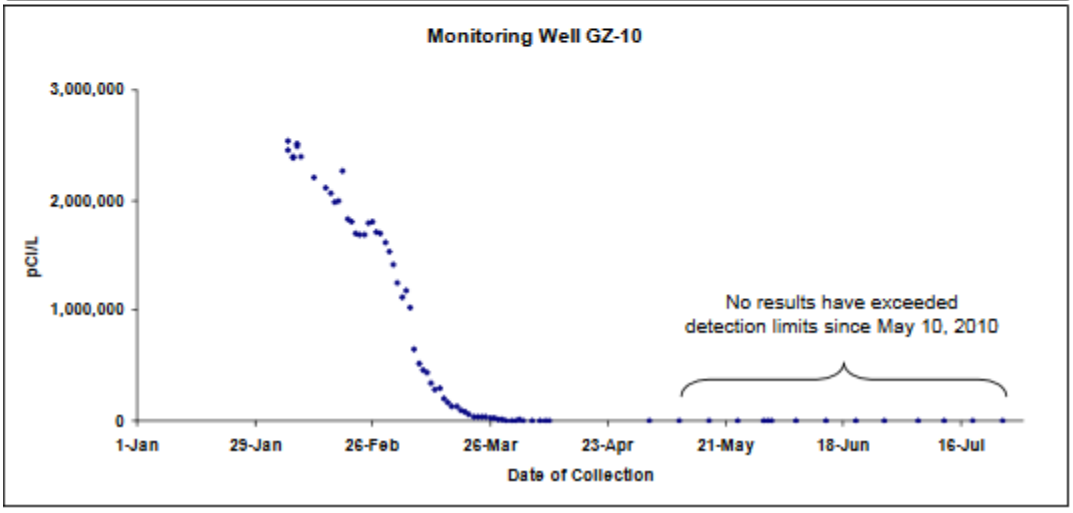
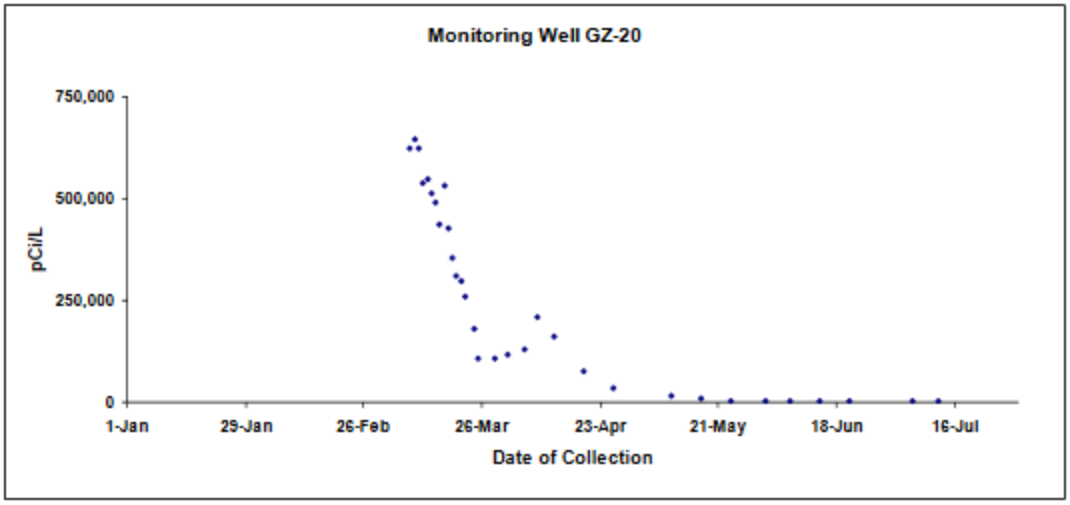
26-Feb
26-Mar
23-Apr
21-May
18-Jun
16-Jul
Date of Collection


Monitoring Well GZ-7
1,500,000
1,000,000
500,000
0
pCi/L
1-Jan
25-Jan
26-Feb
26-Mar
23-Apr
21-May
18-Jun
16-Jul
Date of Collection


Monitoring Well GZ-10
3,000,000
2,000,000
1,000,000
0
pCi/L
No results have exceeded
detection limits since May 10, 2010
1-Jan
25-Jan
26-Feb
26-Mar
23-Apr
21-May
18-Jun
16-Jul
Date of Collection



All results for tritium concentrations are expressed in terms of picocuries per liter (pCi/L), or below the lower level of detection (<LLD):

GZ-1:	<LLD on 8/2/10
GZ-2:	<LLD on 8/2/10
GZ-3:	124,000 on 8/12/10, up from 118,000 on 8/2/10
GZ-4:	26,900 on 8/12/10, down from 27,000 on 8/9/10
GZ-5:	<LLD on 8/2/10
GZ-6:	<LLD on 8/9/10
GZ-7:	3,700 on 8/12/10, down from 5,000 on 8/9/10
GZ-8:	No sample; dry well
GZ-9:	<LLD on 8/2/10
GZ-10:	<LLD on 8/2/10
GZ-11:	2,200 on 8/9/10, up from <LLD on 8/2/10
GZ-12:	36,000 on 8/12/10, up from 31,000 on 8/9/10
GZ-13S:	<LLD on 8/9/10
GZ-13D:	865 on 8/9/10
GZ-14S:	335,000 on 8/12/10, down from 345,000 on 8/11/10
GZ-14D:	<LLD on 8/9/10
GZ-15:	77,000 on 8/9/10 (serving as an extraction well)
GZ-16:	<LLD on 8/9/10
GZ-17:	<LLD on 8/2/10
GZ-18:	no sampling site yet
GZ-19S:	<LLD on 8/2/10
GZ-19D:	<LLD on 8/2/10

GZ-20:	<LLD on 8/9/10
GZ-21:	85,000 on 8/12/10, up from 41,000 on 8/9/10

August 11, 2010

State Long-term Monitoring Inspection for July

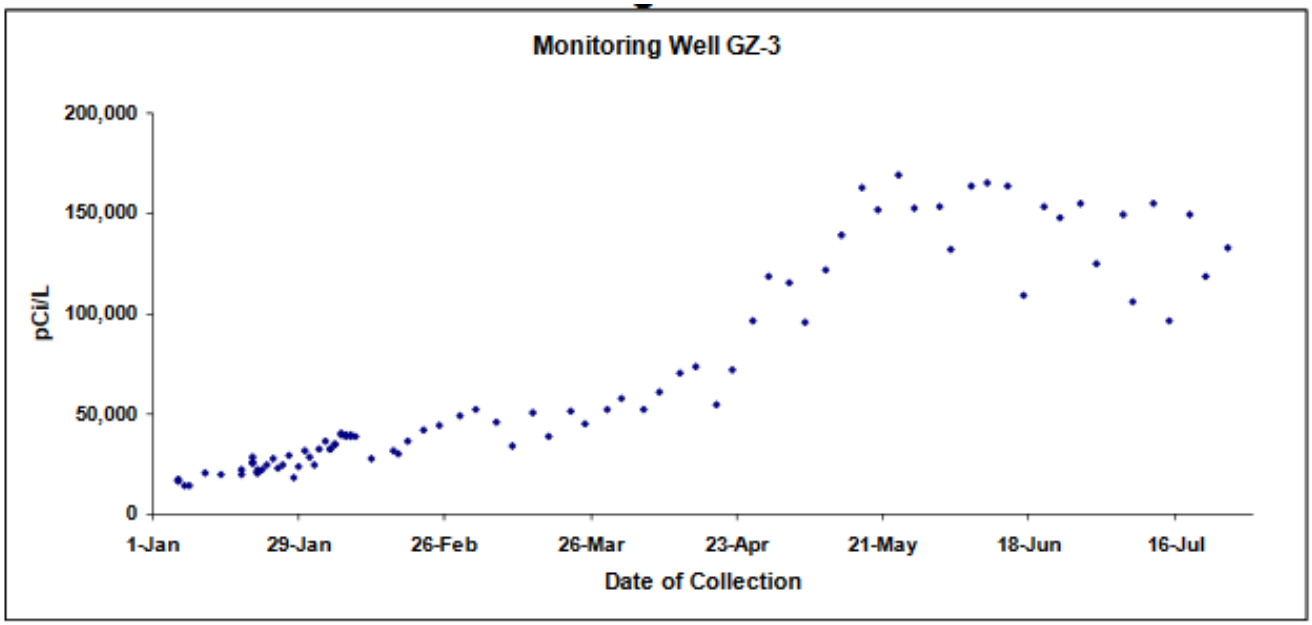
The state's quality control inspection in July found that water samples used for long-term monitoring are generally being processed, stored and shipped in accordance with industry standards and state expectations. The inspection verified current on-site storage locations of contaminated soil that was taken from the AOG excavation and is now awaiting shipment to a licensed radioactive waste disposal facility. On-site storage locations of tritium-contaminated groundwater that has been extracted from the soil around the AOG building and excavation were also verified. Vermont Yankee plans to re-use the tritium-contaminated water in normal plant operations.

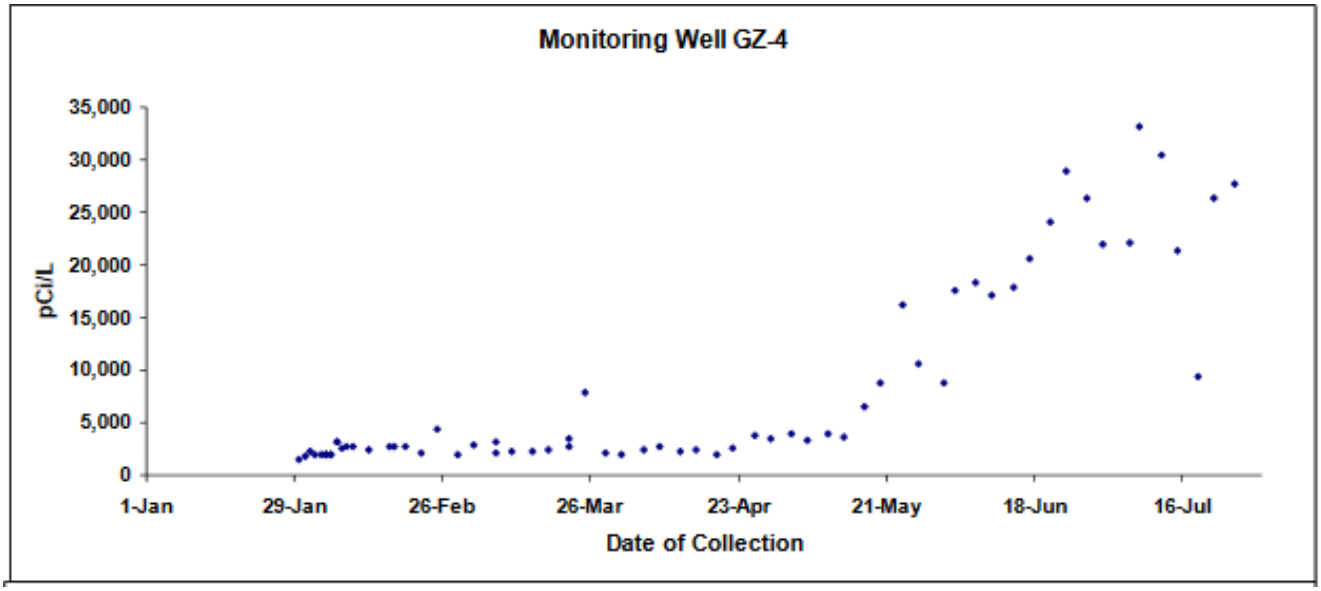
Groundwater Monitoring Well Results

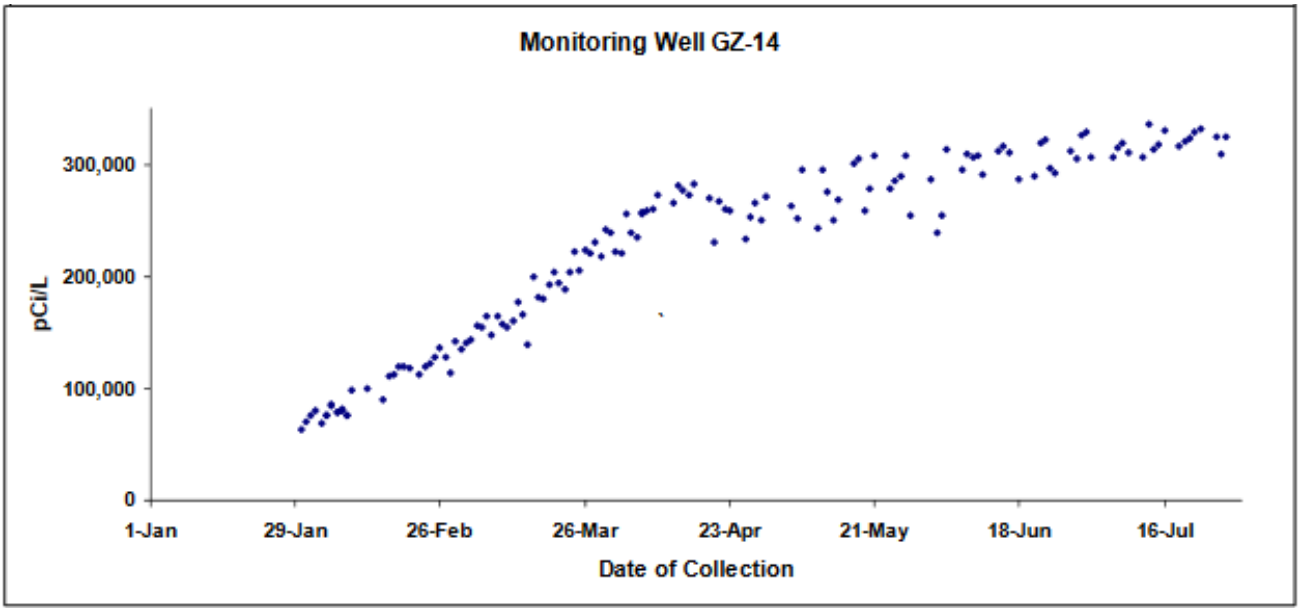
The results that follow are as reported by Vermont Yankee for tritium. As has been the trend over the past few months, concentrations of tritium in wells near plant structures, systems and components that may leak and contaminate the groundwater are generally decreasing. These are wells GZ-12, GZ-15 and GZ-21. Previously contaminated well sites GZ-10 and GZ-20 have been testing at near, or less than, the lower limit of detection for several weeks. Wells near the Connecticut River continue their trend since January 2010 of generally increasing tritium concentration, although the rate of increase appears to be slowing. These are wells GZ-3, GZ-4 and GZ-14S.

To date, gamma spectroscopy and special analyses for hard-to-detect radionuclides have not identified any other nuclear power plant-related radioactive materials in groundwater, drinking water or river water.

Tritium Concentration Graphs




Monitoring Well GZ-4
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
pCi/L
1-Jan
29-Jan
26-Feb
26-Mar
23-Apr
21-May
18-Jun
16-Jul
Date of Collection


Monitoring Well GZ-14
300,000
200,000
100,000
0
pCi/L
1-Jan
29-Jan
26-Feb
26-Mar
23-Apr
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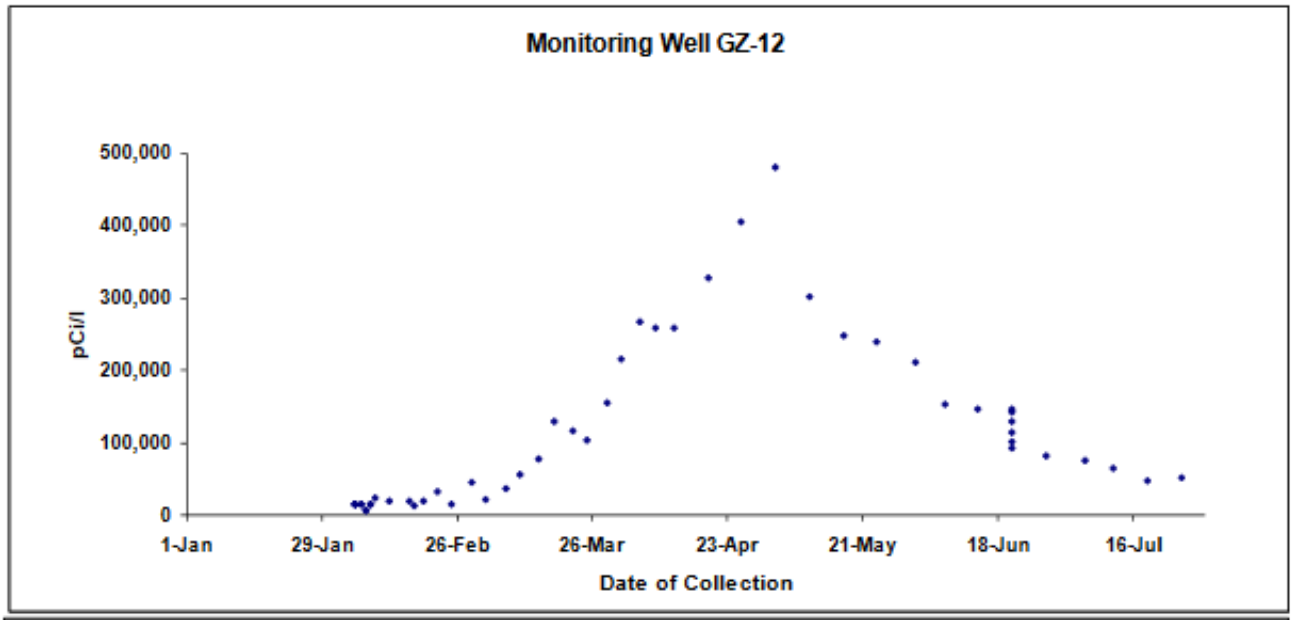
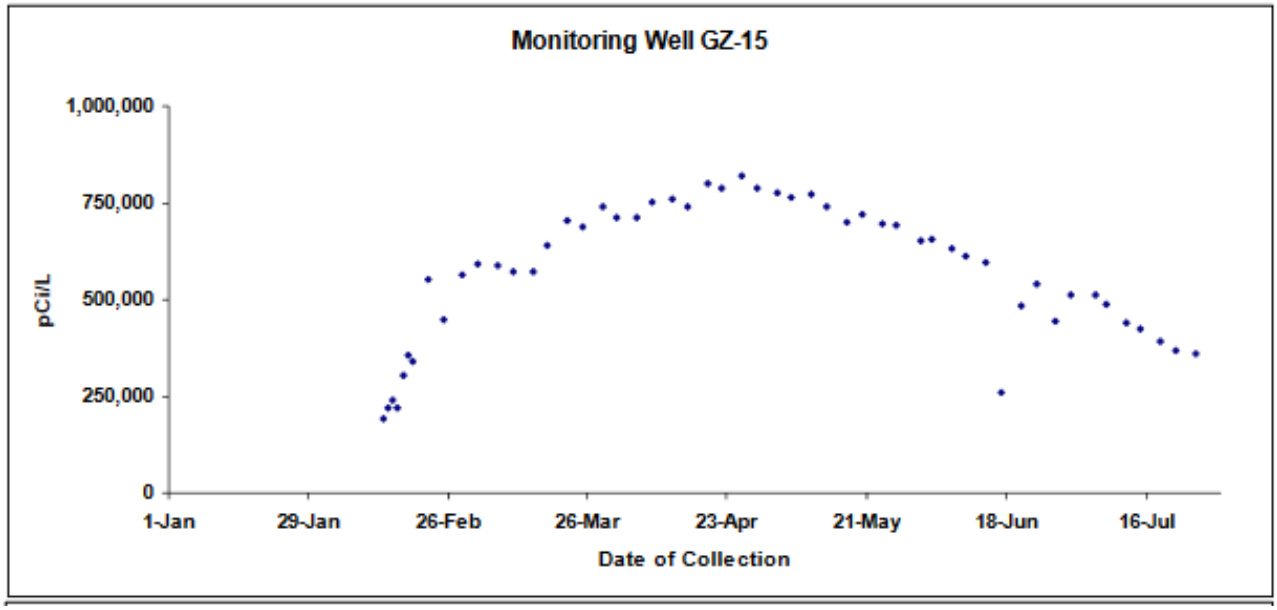
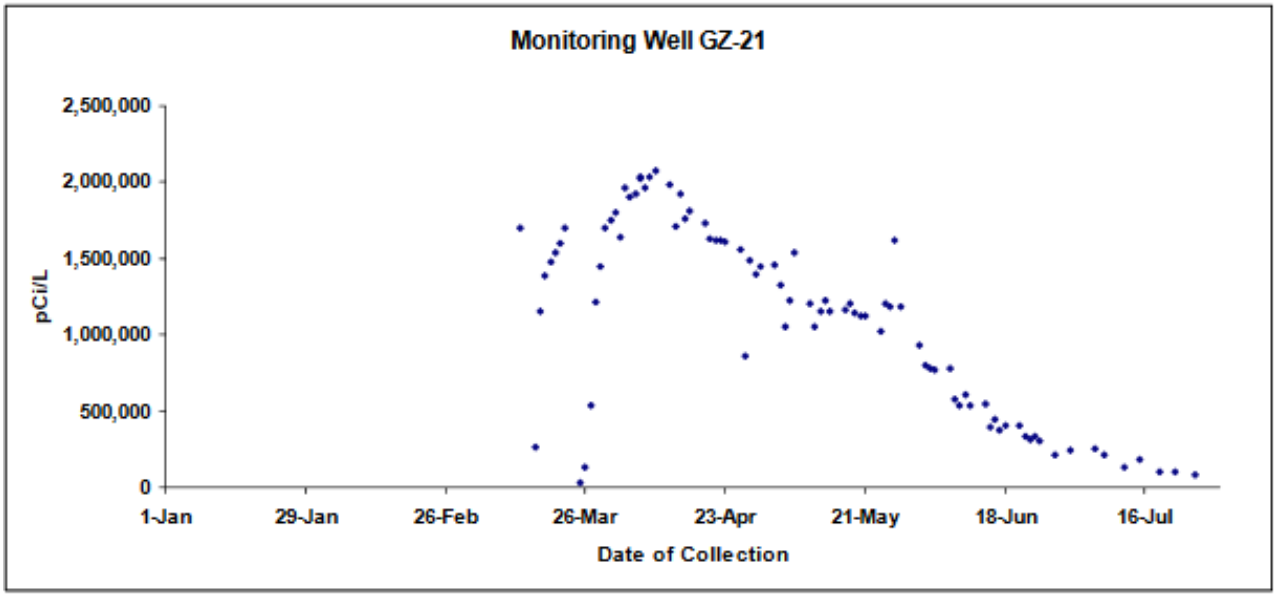
18-Jun
16-Jul
Date of Collection


Monitoring Well GZ-12
500,000
400,000
300,000
200,000
100,000
0
pCi/l
1-Jan
29-Jan
26-Feb
26-Mar
23-Apr
21-May
18-Jun
16-Jul
Date of Collection


Monitoring Well GZ-15
1,000,000
750,000
500,000
250,000
0
pCi/L
1-Jan
29-Jan
26-Feb
26-Mar
23-Apr
21-May
18-Jun
16-Jul
Date of Collection


Monitoring Well GZ-21
2,500,000
2,000,000
1,500,000
1,000,000
500,000
0
pCi/L
1-Jan
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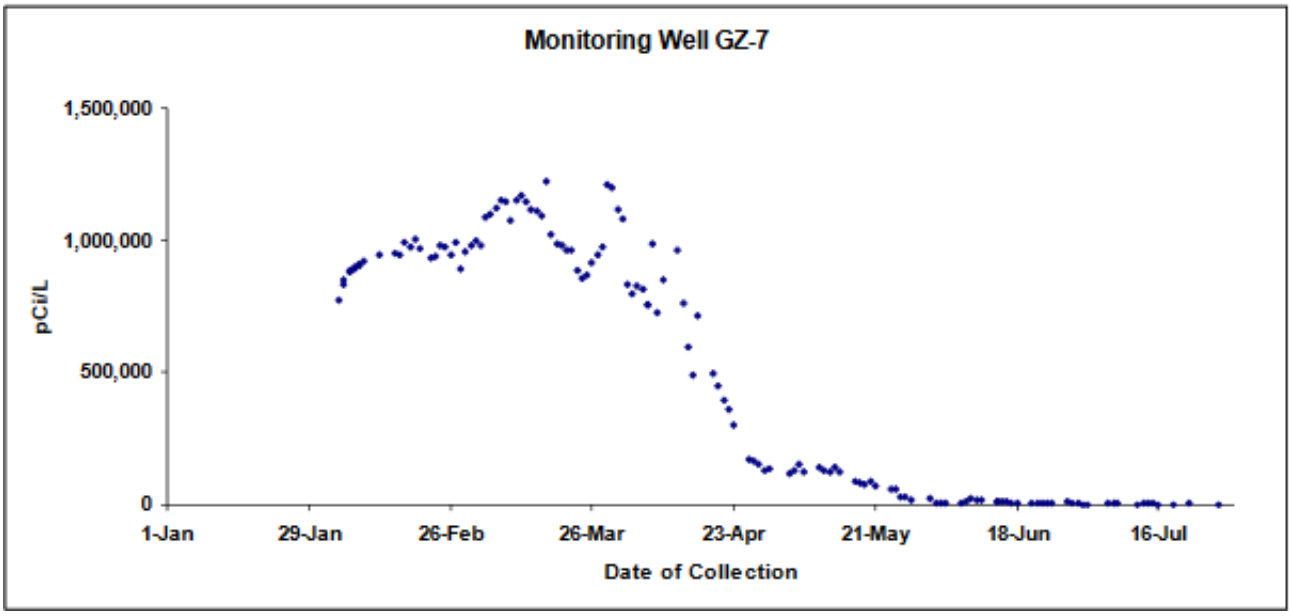
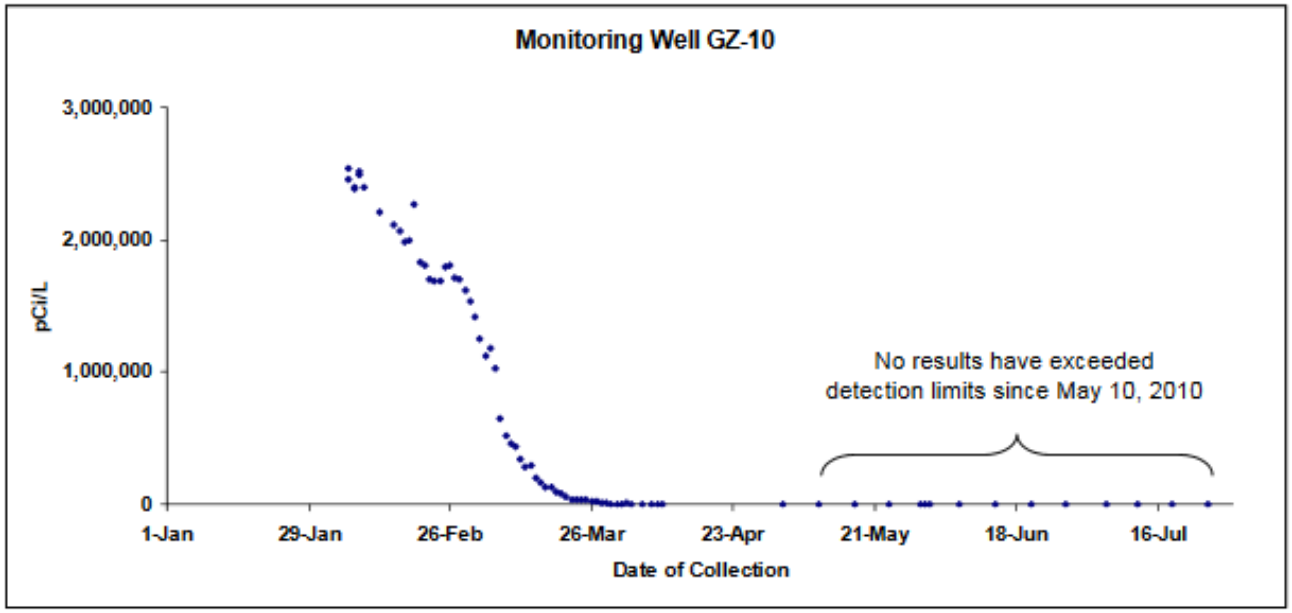
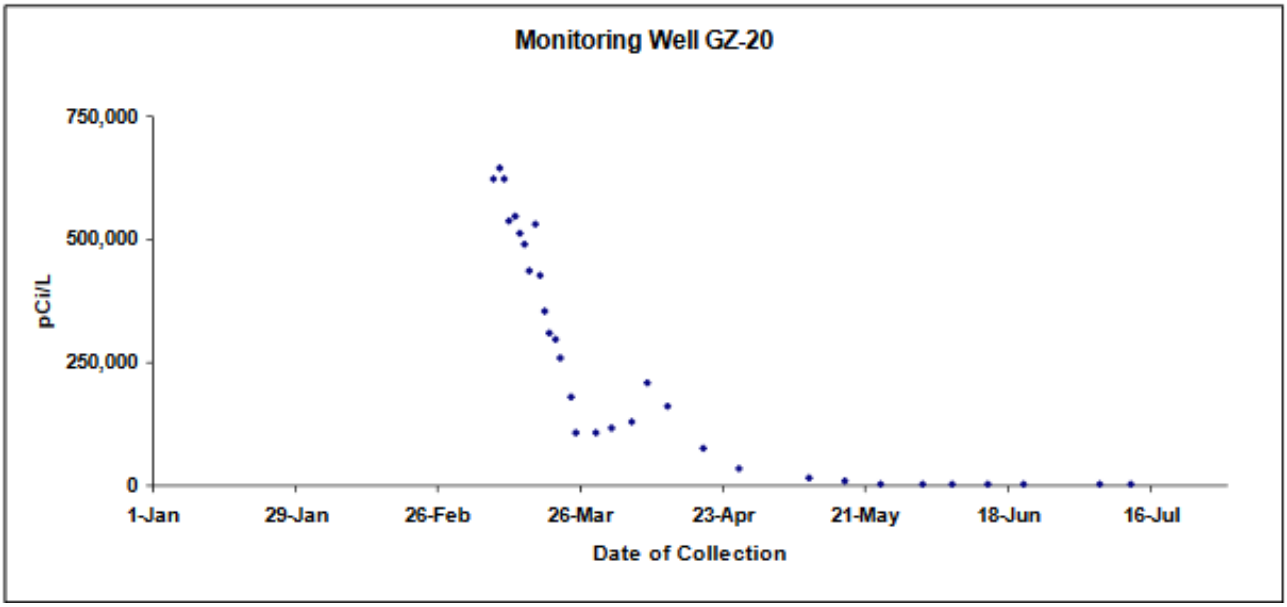
26-Feb
26-Mar
23-Apr
21-May
18-Jun
16-Jul
Date of Collection


Monitoring Well GZ-7
1,500,000
1,000,000
500,000
0
pCi/L
1-Jan
29-Jan
26-Feb
26-Mar
23-Apr
21-May
18-Jun
16-Jul
Date of Collection





All results for tritium concentrations are expressed in terms of picocuries per liter (pCi/L), or below the lower level of detection (<LLD):

GZ-1:	<LLD on 8/2/10
GZ-2:	<LLD on 8/2/10
GZ-3:	118,000 on 8/2/10, down from 150,000 on 7/19/10
GZ-4:	28,400 on 8/2/10, up from 9,400 on 7/19/10
GZ-5:	<LLD on 8/2/10
GZ-6:	<LLD on 8/2/10

GZ-7:	6,700 on 8/3/10, up from <LLD on 7/27/10
GZ-8:	No sample; dry well
GZ-9:	<LLD on 8/2/10
GZ-10:	<LLD on 8/2/10
GZ-11:	<LLD on 8/2/10
GZ-12:	36,000 on 8/2/10, down from 51,000 on 7/26/10
GZ-13S:	<LLD on 8/2/10
GZ-13D:	868 on 8/2/10, down from 1,700 on 7/26/10
GZ-14S:	326,000 on 8/2/10, up from 309,000 on 7/27/10
GZ-14D:	<LLD on 8/2/10
GZ-15:	122,000 on 8/3/10, but being used as an extraction well, not a sampling well per se
GZ-16:	<LLD on 8/2/10
GZ-17:	<LLD on 8/2/10
GZ-18:	no sampling site yet
GZ-19S:	<LLD on 8/2/10
GZ-19D:	<LLD on 8/2/10
GZ-20:	<LLD on 8/2/10
GZ-21:	85,000 on 8/2/10, up from 80,000 on 7/26/10

August 2, 2010

New Groundwater Extraction Well in Operation

Entergy Vermont Yankee has shifted groundwater extraction operations from the original extraction well, GZ-EW1A, to groundwater monitoring well GZ-15. This has been done because tritium concentrations measured in groundwater pumped out by GZ-EW1A have been steadily decreasing. The most recent measurement there was 28,000 picocuries (pCi/L). Wells GZ-7, GZ-10 and GZ-20 also located in that area have tested most recently at less than the lower limit of detection (<LLD). The highest measurements are now at GZ-15, at 358,000 pCi/L. These findings track the plume of tritium-contaminated groundwater as it moves from the AOG Building, where a major leak of tritium was discovered in February 2010, toward the Connecticut River.

GZ-15, which pumps at about one gallon per minute, is less efficient than GZ-EW1A, which pumped at about three gallons per minute. Despite the fact that the new extraction well will take longer to pump out a given volume of water, there should be a net gain on total tritium activity extracted. As of July 28, a total of 180,000 gallons of tritium-contaminated groundwater have been extracted. Vermont Yankee has set a goal of 300,000 gallons to remediate the soils.

NRC Groundwater Protection Program Inspection Set for August 16

On August 16, Region 1 of the Nuclear Regulatory Commission (NRC) will begin a four-day inspection at Vermont Yankee to follow up on issues associated with groundwater protection. A team of geologists and health physicists will evaluate progress made by Entergy Vermont Yankee on developing a site conceptual model of the hydrogeology in Vernon. The team will also take split samples from many of the site's wells.

The site conceptual model was last described in documents published in March 2010, and is due to be updated.

The most important new information regarding drinking water protection may come from the "down-hole" geophysical testing of drinking water wells. This testing occurred several months ago at wells used for drinking water at the plant, and at drinking water wells on properties on Governor Hunt Road owned by Entergy. Down-hole geophysical testing is used to more precisely characterize the bedrock, and the separation of groundwater above the bedrock from drinking water under or within it.

Split samples (more accurately called field duplicates) of water are taken to enable the NRC laboratory to analyze the same water samples that Entergy Vermont Yankee analyzes. This is a procedure similar to that used by the Vermont Department of Health for most of the life of the plant. The NRC has indicated it will obtain split samples from 20 wells at Vermont Yankee.

Groundwater Monitoring Well Results

The results that follow are as reported by Vermont Yankee for tritium. As has been true the last few months, concentrations of tritium in wells near structures, systems and components that may leak and contaminate the groundwater are decreasing. These are wells GZ-12, GZ-15, GZ-20 and GZ-21. Wells near the Connecticut River continue their trend since January 2010 to increase in concentration. Wells GZ-3, GZ-4 and GZ-14S continue to increase in tritium concentrations, although more slowly than before. There are graphs on this web site showing these trends.

To date, gamma spectroscopy and special analyses for hard-to-detect radionuclides have not identified any other nuclear power plant-related radioactive materials in groundwater, drinking water or river water.

All results are expressed in terms of picocuries per liter (pCi/L), or below the lower level of detection (<LLD):

GZ-1:	<LLD on 6/2/10
GZ-2:	<LLD on 6/28/10
GZ-3:	150,000 on 7/19/10, down from 155,000 on 7/12/10
GZ-4:	9,400 on 7/19/10, down from 30,000 on 7/12/10
GZ-5:	<LLD on 6/28/10
GZ-6:	<LLD on 7/26/10
GZ-7:	<LLD on 7/27/10
GZ-8:	No sample; dry well
GZ-9:	<LLD on 6/28/10
GZ-10:	<LLD on 7/26/10
GZ-11:	<LLD on 7/26/10, down from 2,200 last week
GZ-12:	51,000 on 7/26/10, up from 47,000 last week
GZ-13S:	<LLD on 7/26/10
GZ-13D:	1,700 on 7/26/10, up from 900 last week
GZ-14S:	309,000 on 7/27/10, down from 324,000 last week
GZ-14D:	<LLD on 7/26/10
GZ-15:	358,000 on 7/26/10, down from 391,000 last week
GZ-16:	<LLD on 7/26/10
GZ-17:	<LLD on 6/28/10

GZ-18:	no sampling site yet
GZ-19S:	<LLD on 7/26/10
GZ-19D:	<LLD on 6/28/10
GZ-20:	<LLD on 7/26/10
GZ-21:	80,000 on 7/26/10, down from 99,000 last week

JULY:

July 26, 2010

Long Term Monitoring

The state's quality control inspection in June found that water samples used for long-term monitoring are generally being processed, stored and shipped in accordance with industry standards and state expectations. The Health Department is currently awaiting shipment of more than 200 water samples from Vermont Yankee to the Health Department laboratory for confirmatory analysis. We are working to improve the efficiency of the shipping operation at this time.

Quality control inspections have been useful to track sample frequencies, groundwater remediation, and soil remediation and disposal. The inspections have also provided important information for siting new wells, such as siting a sampling station near the centerline of the plume at the edge of the Connecticut River east of well GZ-14. The inspections may also aid in the siting of a new extraction well to enhance contaminated groundwater remediation.

Groundwater Extraction

Vermont Yankee reports that extraction well GZ-EW1A continues to pump out tritium-contaminated groundwater from the soils near the Advanced Off Gas (AOG) building. The latest measurement of tritium concentration of extracted groundwater is 28,000 picocuries per liter (pCi/L). Last week, approximately 162,000 gallons had been extracted, and tritium concentration was measured at approximately 26,000 pCi/L. Vermont Yankee did not update the actual volume of groundwater pumped out as of this week, but weekly increases have been in the 8,000 gallon range. There are no firm plans yet to develop a second extraction well to meet the goal of extracting 300,000 gallons of tritium-contaminated groundwater.

Groundwater Monitoring Well Results

The results that follow are as reported by Vermont Yankee for tritium. As has been true the last few months, concentrations of tritium in wells near structures, systems and components that may leak and contaminate the groundwater are decreasing. These are wells GZ-7, GZ-12, GZ-15, GZ-20 and GZ-21. Wells near the Connecticut River continue their trend since January 2010 to increase in concentration. Wells GZ-3, GZ-4 and GZ-14S continue to increase in tritium concentrations, although more slowly than before. To date, gamma spectroscopy and special analyses for hard-to-detect radionuclides have not identified any other nuclear power plant-related radioactive materials in groundwater, drinking water or river water.

All results are expressed in terms of picocuries per liter (pCi/L), or below the lower level of detection (<LLD):

GZ-1:	<LLD on 6/2/10
GZ-2:	<LLD on 6/28/10

GZ-3:	150,000 on 7/19/10, down from 155,000 last week
GZ-4:	9,400 on 7/19/10, down from 30,000 last week
GZ-5:	<LLD on 6/28/10
GZ-6:	<LLD on 7/19/10
GZ-7:	<LLD on 7/21/10, down from 2,600 last week
GZ-8:	No sample; dry well
GZ-9:	<LLD on 6/28/10
GZ-10:	<LLD on 7/19/10
GZ-11:	2,200 on 7/19/10, up from 1,400 last week
GZ-12:	47,000 on 7/19/10, down from 64,000 last week
GZ-13S:	<LLD on 7/19/10
GZ-13D:	900 on 7/19/10, up from <LLD last week
GZ-14S:	324,000 on 7/21/10, up from 306,000 last week
GZ-14D:	<LLD on 7/19/10
GZ-15:	391,000 on 7/19/10, down from 441,000 last week
GZ-16:	<LLD on 7/19/10
GZ-17:	<LLD on 6/28/10
GZ-18:	no well yet
GZ-19S:	<LLD on 6/28/10
GZ-19D:	<LLD on 6/28/10
GZ-20:	<LLD on 7/19/10, down from 2,400 last week
GZ-21:	99,000 on 7/19/10, down from 209,000 last week

July 19, 2010

Long Term Monitoring Underway

The Department of Health and Agency of Natural Resources have completed the first month of long-term monitoring following the identification and remediation of leaks in the Advanced Off-Gas (AOG) systems. This approach is similar to the approach used before the leak was confirmed on Jan. 7, 2010, but of much greater scope. On-site groundwater samples are taken by an independent contractor employed by Entergy Vermont Yankee, rather than by state government staff. State staff validate that the sampling is being done in accordance with appropriate standards by conducting monthly quality control inspections. The State's first quality control inspection was completed on June 22, with the finding that sample collection, storage and shipping procedures are the same as documented earlier this year when State staff worked on site as much as several days a week.

Overall, the State is managing a long-term monitoring program of significantly greater scope than before the leaks were identified. Previously, the Health Department obtained samples for analysis from three groundwater monitoring wells every three months. Now we are analyzing samples from 22 groundwater monitoring wells, with most of these samples collected weekly. We had previously analyzed drinking water samples from four locations every month. Now we analyze 10 samples twice a month. Numerous other special sample collections and analyses are conducted now that had not been done previously. These include analyzing and reporting:

- on-site drinking water samples
- more Connecticut River samples taken more often

- several batches of excavation and remediation soil samples
- monthly samples of fish from the Connecticut River
- hard-to-detect radionuclides like strontium-90 in water, soil and fish samples

NRC Chair Hosts Public Meeting

On July 14 in Brattleboro, U.S. Nuclear Regulatory Commission Chairman Gregory Jaczko held a public round table discussion with representatives from the Citizens Awareness Network, Safe and Green Campaign, New England Coalition, Vermont Yankee Decommissioning Alliance, Nuclear Free Vermont, and the Vermont Public Interest Research Group.

Concerns discussed included:

- allocation of sufficient resources to ensure a safe shut down if Vermont Yankee is decommissioned in 2012
- submerged safety-related cables that are not designed to be submerged in water
- inaccessibility of information in Vermont Yankee's corrective action program
- lack of epidemiological studies of health outcomes among people who live near nuclear power plants
- disposition of spent nuclear fuel
- adequacy of emergency plans
- NRC's reliance on a voluntary program for groundwater protection

Groundwater Extraction

To date, Vermont Yankee reports that one extraction well has pumped out approximately 162,000 gallons of groundwater from the soils near the A0G building. The latest measurement of tritium concentration of extracted groundwater is 26,000 picocuries per liter (pCi/L). Last week, approximately 153,000 gallons had been extracted, and tritium concentration was measured at approximately 40,000 pCi/L. There are no firm plans yet to develop a second extraction well to meet the goal of extracting 300,000 gallons of tritium-contaminated groundwater.

Groundwater Monitoring Well Results

The results that follow are as reported by Vermont Yankee for tritium. as with the past couple of months, concentrations of tritium in wells near structures, systems and components that may leak and contaminate the groundwater are decreasing. These are wells GZ-7, GZ-12, GZ-15, GZ-20 and GZ-21. Wells near the Connecticut River continue their trend since January 2010, to increase in concentration. Wells GZ-3, GZ-4 and GZ-14S continue to increase in tritium concentrations, though the increases appear to be decelerating. To date, gamma spectroscopy and special analyses for hard to detect radionuclides have not identified any other nuclear power plant related radioactive materials in groundwater, drinking water or river water.

All results are expressed in terms of picocuries per liter (pCi/L), or below the lower level of detection (<LLD):

GZ-1:	<LLD
GZ-2:	<LLD
GZ-3:	155,000, up from 150,000
GZ-4:	30,000, up from 22,000
GZ-5:	<LLD
GZ-6:	<LLD

GZ-7:	2,600, down from 5,000
GZ-8:	No sample; dry well
GZ-9:	<LLD
GZ-10:	<LLD
GZ-11:	1,400, up from <LLD
GZ-12:	64,000, down from 75,000
GZ-13S:	<LLD
GZ-13D:	<LLD
GZ-14S:	306,000, down from 307,000
GZ-14D:	<LLD
GZ-15:	441,000, down from 512,000
GZ-16:	<LLD
GZ-17:	<LLD
GZ-18:	no well yet
GZ-19S:	<LLD
GZ-19D:	<LLD
GZ-20:	2,400, down from 3,500
GZ-21:	209,000, down from 244,000

July 12, 2010

NRC Chairman Visits Vermont - Public Meeting in Brattleboro on July 14

Nuclear Regulatory Chairman Gregory Jaczko will host a roundtable discussion about Vermont Yankee on Wednesday, July 14 to listen to concerns from stakeholders – including Citizens Awareness Network, Safe and Green Campaign, Conservation Law Foundation, VPIRG and others. The meeting, which is open to the public, will be held from 9:30 to 11 a.m. at the Ramada Hotel and Conference Center in Brattleboro. Chairman Jaczko will also tour the Vermont Yankee site and meet with Entergy employees there.

Groundwater Removal

Extraction of tritium-contaminated groundwater continues at Vermont Yankee, with approximately 153,000 gallons pumped out as of July 8. This is a little more than half Vermont Yankee's goal of 300,000 gallons. The latest tritium concentration for this water has been measured at 39,000 picocuries per liter (pCi/L). The concentration of tritium in extracted groundwater has been as high as about 1 million pCi/L. Entergy Vermont Yankee officials have said they are considering another extraction well at a site where higher concentrations of tritium contaminated groundwater can be extracted.

Soil Remediation

Entergy Vermont Yankee staff have itemized two categories of soils being prepared for disposal. The first is about 310,000 pounds of general excavation material that has resulted from drilling wells and digging up areas of the site to identify sources of radioactive materials from leaks. This material is stored in 10 tractor-trailer size containers measuring 8 feet tall by 8 feet wide by 18 feet long. The exact radioactivity characteristics of this material will be determined before it is shipped to a licensed radioactive waste disposal site. The second category is the soil that was removed from the Advanced Off-Gas (AOG) excavation. This is the soil contaminated with low concentrations of the radioactive metals cobalt-60, cesium-137, strontium-90,

manganese-54 and zinc-65. There are about 240 cubic feet of these soils, and they are stored in three B-25 shipping containers, each measuring 4 feet tall by 4 feet wide by 6 feet long.

Groundwater Monitoring Well Results

The results that follow are as reported by Vermont Yankee for tritium. To date, gamma spectroscopy and special analyses for hard to detect radionuclides have not identified any other nuclear power plant related radioactive materials in groundwater, drinking water or river water.

All results are expressed in terms of picocuries per liter (pCi/L), or below the lower level of detection (<LLD):

GZ-1:	<LLD
GZ-2:	<LLD
GZ-3:	150,000
GZ-4:	22,000
GZ-5:	<LLD
GZ-6:	<LLD
GZ-7:	5,000
GZ-8:	No sample; dry well
GZ-9:	<LLD
GZ-10:	<LLD
GZ-11:	<LLD
GZ-12:	75,000
GZ-13S:	<LLD
GZ-13D:	<LLD
GZ-14S:	307,000
GZ-14D:	<LLD
GZ-15:	512,000
GZ-16:	<LLD
GZ-17:	<LLD
GZ-18:	no well yet
GZ-19S:	<LLD
GZ-19D:	<LLD
GZ-20:	3,500
GZ-21:	244,000

July 2, 2010

More fish test positive for Sr-90, but not due to Vermont Yankee

New fish samples taken from the Connecticut River on April 23 and analyzed by Vermont Yankee's contract laboratory have tested positive for strontium-90 (Sr-90).

Concentrations of Sr-90 detected in the inedible portions of these fish are in the range of what would be expected as a result of fallout from nuclear weapons testing in the 1950s, and the Chernobyl release in 1986. Specifically, the laboratory results for Sr-90 were 70 pCi/kg from fish taken near the plant in the Vernon Pool, and 100 pCi/kg from fish taken about 5 miles upstream, near the Route 9 bridge as it crosses the river north of

Brattleboro. A New York study found background levels of Sr-90 in fish to be in the range of 120 to 360 pCi/kg (see New York Fish Study below).
Vermont Yankee reported these latest test results to the Health Department on June 30. The first samples of fish to be analyzed were taken in February 2010 from the same locations, and these fish also tested positive for Sr-90. In both cases, concentrations are within the expected range. Sr-90 has not been detected in edible parts of the fish. Like calcium, strontium accumulates almost entirely in bone.
Because the Sr-90 results are all within what is considered to be the normal "background" range, and because no Sr-90 has been measured above the lower limit of detection in groundwater on site at the plant, the Health Department considers it unlikely that these findings in fish are a result of recent events at Vermont Yankee.
Fish caught from the Connecticut River are among the many samples being analyzed for radioactive materials by the Vermont Department of Health, Vermont Yankee, and by contract laboratories employed by both.
So far, soil samples analyzed by the Health Department's contract laboratory for hard-to-detect radionuclides are the only samples to be positive for Sr-90, or for any other radioactive materials, that can be associated with Vermont Yankee operations. Should other radioactive materials such as cobalt-60 or cesium-137 be detected in groundwater or fish, this would be evidence that the strontium in fish was strontium from Vermont Yankee.
To date only tritium, which moves easily through the soil as tritiated water, has been detected in groundwater samples, and only in groundwater on site at Vermont Yankee. No drinking water on site or off site, nor any river water has been found to be contaminated with tritium above the laboratory's lower limit of detection.

New York Fish Study

The amount of Sr-90 in fish as a result of nuclear weapons testing and Chernobyl is in the range of 120 to 360 pCi/kg, according to a study published by the New York Department of Environmental Conservation in November 2009.
The New York study results were published after radioactive materials leaked from the Indian Point nuclear power station on the lower Hudson River. These levels, presumed to be background, are based on Sr-90 results from more than 150 fish caught about 70 miles north and upstream from the Indian Point plant.

Groundwater Extraction

Vermont Yankee officials have indicated that another extraction well will be in operation soon. This will be either be a new extraction well, or modification of an existing monitoring well such as GZ-15, which is located in the area of the plume that now has the highest tritium concentration. Vermont Yankee has set a goal of pumping out 300,000 gallons of tritium-contaminated groundwater. The original extraction well has so far pumped out about half that volume, and tritium concentrations in groundwater still being pumped from the original extraction well are now approaching the lower limit of detection.

Monitoring Well Test Results - as of July 2, 2010

For the first time, groundwater samples from well GZ-20, which is located near the condensate storage tank and northeast of the Advanced Off-Gas (AOG) pipe tunnel and drain line, are showing measurements for tritium below the lower limit of detection (<LLD).
This means that GZ-20, along with other wells no longer located within the plume of contamination from the AOG leak, can now serve to detect any new leaks that may occur. At the height of the AOG leak investigation, as many as 12 groundwater monitoring wells were showing tritium contamination. This week, only seven wells are showing tritium contamination above the level of detection, and only three of them–all located next to the

Connecticut River–have increasing tritium concentrations. The other wells that are still contaminated have decreasing tritium concentrations.

The results that follow are as reported by Vermont Yankee for tritium. To date, gamma spectroscopy and special analyses for hard to detect radionuclides have not identified any other nuclear power plant related radioactive materials in groundwater, drinking water or river water. Note that well GZ-6 which had not been sampled for about 6 weeks, is back on a weekly sampling schedule.

All results are expressed in terms of picocuries per liter (pCi/l), or below the lower level of detection (<LLD):

GZ-1:	<LLD
GZ-2:	<LLD
GZ-3:	155,000
GZ-4:	26,000
GZ-5:	<LLD
GZ-6:	<LLD
GZ-7:	6,600
GZ-8:	No sample; dry well
GZ-9:	<LLD
GZ-10:	<LLD
GZ-11:	<LLD
GZ-12:	83,000
GZ-13S:	<LLD
GZ-13D:	<LLD
GZ-14S:	326,000
GZ-14D:	<LLD
GZ-15:	445,000
GZ-16:	<LLD
GZ-17:	<LLD
GZ-18:	no well yet
GZ-19S:	<LLD
GZ-19D:	<LLD
GZ-20:	<LLD
GZ-21:	215,000

JUNE:

June 25, 2010

Root Cause Analysis Results Reported on June 22

Vermont Yankee released the results of its root cause analysis of the radioactive material leak that occurred in the Advanced Off-Gas (AOG) building, at a stakeholders meeting and press conference on the morning of June 22. The report was also discussed at the NRC public meeting held the same day.

The report itself was not made available to the public by Vermont Yankee. Based on a reading of the final draft, the Health Department has prepared a summary:

The root cause analysis report describes two "root" causes of the ground water contamination at Vermont Yankee: 1) poor housekeeping, design and installation practices when the original AOG building was constructed in the late 1960s and early 1970s, and when the AOG drain line was added in 1978; and 2) ineffective monitoring and inspection of the AOG pipe tunnel. The report also describes other contributing and organizational/programmatic causes, the extent of the problem and conditions, operating experience, safety significance, the root cause and failure mode analysis process, safety culture comparison – and corrective actions to be taken by Vermont Yankee now through February 2011.

At the meeting, Vermont Yankee officials detailed several important corrective actions to be taken:

- Of the 111 piping runs that carry radioactive materials either buried underground or within pipe tunnels, five are to be replaced with above-ground systems because they are impossible to inspect.
- The sump in the AOG pit is the only one of 19 sumps that handle radioactive liquids that does not have a steel liner. This is to be corrected.
- Six of the 36 tanks that handle radioactive materials were found to lack an automated means to verify their integrity. These will be inspected.

NRC Open House/Public Meeting on June 22

The Nuclear Regulatory Commission hosted its second open house and public meeting this year at Brattleboro Union High School.

Major topics addressed:

- Annual Assessment of Vermont Yankee. The NRC found that Vermont Yankee met all its major objectives for 2009, and determined that the level of reactor oversight for the plant need not be increased for 2010.
- Demand for Information Report. In this report, NRC finds that Entergy Vermont Yankee employees – including those recently investigated for giving incomplete or inaccurate information to state regulators – had not given incomplete or inaccurate information to the NRC.
- Groundwater Task Force Report. This report describes how many stakeholders have disagreed with the way NRC regulates leaks of radioactivity into the environment, and how this has eroded public confidence in the NRC. During the concluding question-and-answer session, many questions from participants reinforced the findings of the Groundwater Task Force report.
- New Leaks in Cooling Tower. NRC's response to one question revealed that NRC and Entergy officials had discussed, but had not reported to state regulators or the public, two new leaks of non-radioactive water in pipes the east cooling tower. The leaks were identified during the latest of twice-monthly routine inspections of the tower.

'Unusual Event' Declared at Vermont Yankee on June 23

Vermont Yankee declared an Unusual Event due to the earthquake that was felt at the plant and elsewhere in Vermont during the early afternoon of June 23. The Unusual Event was terminated at 5:25 p.m. after a walk down of the plant showed there was no evidence of impact to components, systems or structures.

Soil Removal

Vermont Yankee officials also updated the situation regarding soils removed during well drilling operations and site excavations. Approximately 310,000 pounds of soil and other solid waste from the groundwater contamination investigation have been packed into 10 tractor-trailer like containers for shipment to a licensed radioactive waste disposal facility.

Groundwater Extraction

To date, the extraction well has pumped out approximately 136,000 gallons of tritium contaminated groundwater from soils near groundwater monitoring well GZ-7. The most recent measurement of this extracted water shows tritium concentrations of approximately 45,000 picocuries per liter (pCi/L).

The Vermont Department of Health, along with the Agency of Natural Resources, Agency of Agriculture, Food & Markets, and Vermont Emergency Management, have formally requested Entergy Vermont Yankee to drill a new extraction well. This request was made because it appears that the current extraction well will not by itself be capable of extracting 300,000 gallons of contaminated water, the groundwater remediation goal.

Groundwater Monitoring

The Health Department is also asking Vermont Yankee to consider drilling well GZ-18. This is a groundwater monitoring well that was planned early in 2010, but never installed. It was to be sited at the edge of the Connecticut River near the centerline of the tritium plume. Groundwater samples from this location will be important during the coming winter, when peak tritium concentrations are expected to move to the river. Vermont Yankee's director of engineering said that a fire protection pump will be installed at this location, and this pump could provide water samples year-round.

Monitoring Well Test Results - as of June 18, 2010

At this time, only three groundwater monitoring wells located next to the Connecticut River have increasing tritium concentrations. Other wells that are still contaminated have decreasing tritium concentrations. The groundwater monitoring wells near the extraction well have tritium concentrations that are decreasing rapidly and are expected to show less than the lower limits of detection soon. This trend is especially true of GZ-7 and GZ-20.

The Department of Health recently confirmed that well GZ-6 had not been sampled since May 17. Vermont Yankee officials said there had been an over conservative termination of sampling from this well because of soil subsidences (depressions) that have appeared near the well. Renewed sampling from this well that is located near the radioactive waste and reactor buildings is expected immediately.

The results that follow are as reported by Vermont Yankee for tritium. To date, gamma spectroscopy and special analyses for hard to detect radionuclides have not identified any other nuclear power plant related radioactive materials in groundwater, drinking water or river water.

All results are expressed in terms of picocuries per liter (pCi/l), or below the lower level of detection (<LLD):

GZ-1:	<LLD
GZ-2:	<LLD
GZ-3:	153,000
GZ-4:	24,000
GZ-5:	<LLD
GZ-6:	<LLD
GZ-7:	3,100
GZ-8:	No sample; dry well
GZ-9:	<LLD

GZ-10:	<LLD
GZ-11:	<LLD
GZ-12:	147,000
GZ-13S:	<LLD
GZ-13D:	<LLD
GZ-14S:	320,000
GZ-14D:	<LLD
GZ-15:	482,000
GZ-16:	<LLD
GZ-17:	<LLD
GZ-18:	no well yet
GZ-19S:	<LLD
GZ-19D:	<LLD
GZ-20:	2,700
GZ-21:	330,000

June 22, 2010

Root Cause Analysis

On June 22, 2010, Vermont Yankee released the results of its root cause analysis of the radioactive material leak that occurred in the Advanced Off-Gas (AOG) building.

NRC Public Meeting on June 22

The Nuclear Regulatory Commission will host an open house (4:00 to 6 p.m.) and public meeting (6:00 to 9:00 p.m.) on June 22 at Brattleboro Union High School.

NRC staff will discuss the NRC Demand for Information and Groundwater Protection reports, an annual assessment of Vermont Yankee, and other information about the Vermont Yankee tritium investigation and groundwater protection efforts.

NRC Demand for Information Report

The U.S. Nuclear Regulatory Commission released its report following a formal Demand For Information (DFI). This report describes the results of an extensive investigation that the NRC undertook to ensure that Entergy Vermont Yankee staff did not provide the NRC with inaccurate or incomplete information. This DFI followed the disciplinary actions taken by Entergy officials with regard to several Vermont Yankee employees. Those employees routinely provided regulators plant-related information. According to the report, the investigation found information provided to the NRC over the previous five years by these employees was complete and accurate. Two of sources of information of particular interest were related to license renewal and the station's aging management program for structures, systems and components. The investigation included a review of documents and interviews and concluded that Vermont Yankee meets the criteria of a "safety conscious work environment."

NRC Groundwater Task Force Report

Thirteen NRC staff members from its Washington headquarters and five regional offices were appointed to review the NRC's completeness in responding to groundwater contamination events in the U.S. Their final report

was released on June 17. Its release appears to have been accelerated by recent events at Vermont Yankee and two other nuclear power plants. The document reports on four themes: 1) reassessing the NRC regulatory framework for groundwater protection, 2) maintaining barriers as designed to confine radioactive materials at licensed facilities, 3) assuring a more reliable NRC response, and 4) strengthening trust.
The report finds that some stakeholders (the general public, legislators, state and local government officials, the media, etc.) disagree with the NRC's human dose-based approach to protecting groundwater. Some stakeholders view the NRC's response to leaks that do not violate regulatory dose limits as disregarding the failure to maintain the integrity of the plant. The report generally finds significant differences in NRC's approach to environmental protection compared to the approaches of many states and the Environmental Protection Agency (EPA).
On the other hand, the NRC must live by its own "backfit" standard. A backfit is a change in plant structures, systems or components required by a new rule. The backfit standard requires "that any backfitting would achieve a substantial increase in the overall protection of the public health and safety or common defense and security and that the costs of the backfitting, both direct and indirect, are justified in light of the overall increased protection." This standard is difficult to meet in groundwater protection where a dose limit is not violated by an unintended discharge of radioactive materials.
The report also describes some of the inconsistent responses by NRC at various sites that have had radioactive leaks, as well as the difficulty that some stakeholders have experienced trying to learn more about groundwater protection and radioactive leaks at NRC-licensed facilities through the NRC's communication outlets. The report also notes that the issue is a challenge to regulators in other countries. In closing, the report recommends that the NRC Reactor Oversight Program might be revised to reflect the findings of the report, as well as in consideration of perspectives from the EPA, the states and international regulators.

- EDO Memo with Task Force Report (2010)

Groundwater Extraction
To date, extraction well GZ-EW-1A has pumped out approximately 126,000 gallons of tritium contaminated groundwater. Vermont Yankee's goal for groundwater remediation is 300,000 gallons. The most recent measurement of tritium concentration in this extracted groundwater has dropped to about 67,000 picocuries per liter (pCi/L) from concentrations several weeks ago of about 1 million pCi/L. The Health Department is requesting Vermont Yankee to install another well where ground water is still showing high concentrations of tritium.

Soil Remediation
Vermont Yankee reports that 10 large tractor-trailer like cargo boxes of soils and other solid radioactive materials resulting from the well drilling, excavation and remediation activities are being prepared for shipment to a licensed radioactive waste disposal facility. The Agency of Natural Resources and Health Department have asked for information about the volume, weight and radioactivity of the materials.

Monitoring Well Test Results
The results that follow are as reported by Vermont Yankee for tritium. To date, gamma spectroscopy and special analyses for hard to detect radionuclides have not identified any other nuclear power plant related radioactive materials in groundwater, drinking water or river water.

All results are expressed in terms of picocuries per liter (pCi/l), or below the lower level of detection (<LLD):

GZ-1:	<LLD
GZ-2:	<LLD
GZ-3:	163,000
GZ-4:	18,000
GZ-5:	<LLD
GZ-6:	<LLD
GZ-7:	9,700
GZ-8:	No sample; dry well
GZ-9:	<LLD
GZ-10:	<LLD
GZ-11:	<LLD
GZ-12:	146,000
GZ-13S:	<LLD
GZ-13D:	736
GZ-14S:	312,000
GZ-14D:	<LLD
GZ-15:	597,000
GZ-16:	<LLD
GZ-17:	<LLD
GZ-18:	no well yet
GZ-19S:	<LLD
GZ-19D:	<LLD
GZ-20:	4,200
GZ-21:	548,000

June 11, 2010

Tri-States Conference Held in Concord, NH

Public health and emergency management officials from the three states with emergency preparedness responsibilities for Vermont Yankee meet regularly to discuss common issues. New Hampshire hosted the most recent conference in Concord on June 4, with representatives from the Nuclear Regulatory Commission and the Federal Emergency Management Agency also in attendance.

NRC Public Meeting on June 22

An open house (4:00 to 6 p.m.) and public meeting (6:00 to 9:00 p.m.) will be held on June 22 at Brattleboro Union High School, hosted by the Nuclear Regulatory Commission. NRC staff will discuss Vermont Yankee operations, safety performance, a groundwater contamination task force, and Entergy response to a demand for information issued to Vermont Yankee. On August 16, the NRC plans to send a team of health physicists and hydrogeologists to conduct a new inspection to further evaluate the situation at Vermont Yankee.

Root Cause Analysis Report Delayed

Vermont Yankee reported Thursday that the root cause analysis will not be published this week. This

document is expected to analyze the specific causes of the leak of radioactive materials at the Advanced Off-Gas tunnel, detail corrective actions to prevent recurrence, and evaluate the "extent of conditions" that could lead to another unmonitored leak of nuclear process water into the environment.

Soil Removal

Vermont Yankee has reported that during the April 24 through May 23 refueling outage, approximately 180 cubic feet of soil was removed from the north and south ends of the AOG excavation. On June 1, following the leak that was identified during reactor start-up on May 28, approximately 64 cubic feet of soil was removed from the location of this new leak.

All together a total of about 244 cubic feet of contaminated soil has been removed, so that the radionuclides deposited in the soil by the leak of nuclear process water cannot move further through the soil. After soil was removed, Vermont Yankee took additional soil samples for analysis by their laboratory and by the Vermont Department of Health Laboratory to help verify that radioactive materials have been successfully removed. Contaminated soil is being shipped by Vermont Yankee to a licensed nuclear waste facility, EnergySolutions in Clive, Utah. A "catch containment" is now in place again to prevent further contamination in case there are more leaks.

Soil Contamination

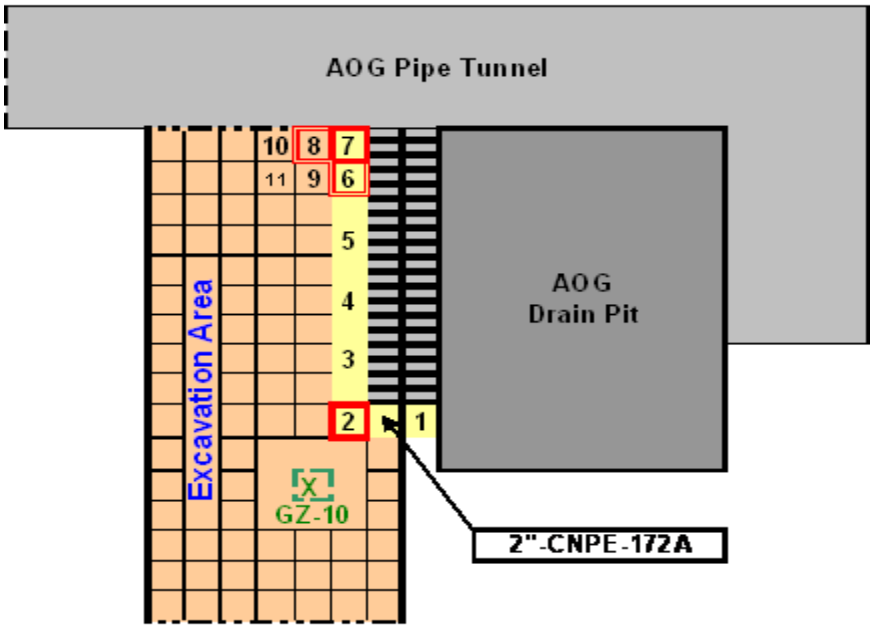
Strontium-90, cesium-137, zinc-65, manganese-54 and cobalt-60 have all been detected in soil that was collected for laboratory analysis on Feb. 26 and on March 17. Soil samples were taken from various locations and depths below the excavation area outside the AOG pipe tunnel that was found to have caused this leak. Soil testing done by Vermont Yankee immediately after another leak was discovered on May 28 at the AOG drain line also detected these same radioisotopes, along with a number of others that decay quickly and are no longer detectable within hours or days. These are chromium-51, cobalt-58, zinc-69, niobium-95, rhodium-105, barium-140, lanthanum-140 (all metals), and xenon-131 (a noble gas).

The latest soil analysis results from Vermont Yankee and the Vermont Department of Health, detailed by date and location are presented in the Soil Analysis document, along with more information about the radioisotopes of most concern.

Vermont Yankee and Health Department analyses show similar results to date, and document the leak pathway. Analysis of the Feb. 26 soil samples generally show that concentrations of radioactive metals decrease the deeper away from the point of the original leak. Concentrations at four feet deep are less than concentrations at two-foot deep, and concentrations at two feet deep are much less than concentrations very close to where the leaking water left the AOG pipe tunnel.

Analysis of the March 17 soil samples include the first measurements of strontium-90 by a contract laboratory hired by Vermont Yankee. This radionuclide is hard to detect, and few radiochemistry laboratories can perform this analysis. The Health Department has also hired a contract laboratory to conduct these analyses, and will report results as they come in.

The March 17 soil sample analyses provide more extensive documentation of the leak pathway. This soil study used a grid of 11 locations from the northern end of the AOG excavation to the southern end.



Soils closest to the surface of the excavation and closest to the depth where the known leak entered the soil was fairly uniformly contaminated from north to south. Concentrations of radioactive metals generally decreased at greater depths. Concentrations are highest, and contamination appears to be deeper, at both ends of the pipe tunnel where they connect to a building, as well as at the point where the pipe tunnel makes at 90-degree turn. This could be evidence of multiple leak points.
Vermont Yankee has taken two more soil samples for analysis in the area where the first 160 cubic feet of soil was removed. Additional soil samples were taken for analysis following the May 28 leak that occurred during the refueling start-up.

Ground Water Extraction
To date, extraction well GZ-EW-1A has pumped out approximately 110,000 gallons of ground water contaminated with tritium. Vermont Yankee's goal is 300,000 gallons. The last measurement of tritium concentration in this extracted ground water was 331,000 picocuries per liter (pCi/L), steadily decreasing from a high of about 1 million pCi/L. The Health Department is requesting Vermont Yankee to install another well, for example near GZ-15, where ground water is still showing high concentrations of tritium.

Monitoring Well Test Results - as of June 11, 2010:
Tritium contamination in the ground water at the point of the original leak, near well GZ-10, is moving eastward toward the Connecticut River. Tritium concentrations in samples taken from wells GZ-20 and GZ-7 are declining rapidly, showing that the tritium plume is moving eastward from the Condensate Storage Tank. Decreasing tritium concentrations in wells located in this area help verify that there is no apparent leakage from this 500,000 gallon source of radioactive water. The Condensate Storage Tank has other, more direct indicators of leakage, including a "tell-tale" pipe for sampling water collecting under the tank.

Another trend in ground water monitoring wells is the continuous gradual increase in concentrations near the river. This will likely continue for several months. Samples from wells GZ-21 and GZ-15 are decreasing, but concentrations of tritium would hide evidence of any new leaks in the AOG Building. Results that are less than the lower limit of detection (<LLD) indicate that structures, systems and components containing radioactive materials near them are likely not leaking radioactivity into the environment.

The results that follow are as reported by Vermont Yankee for tritium. To date, gamma spectroscopy and special analyses for hard to detect radionuclides have not identified any other nuclear power plant related radioactive materials in groundwater, drinking water or river water.

All results are expressed in terms of picocuries per liter (pCi/l), or below the lower level of detection (<LLD):

GZ-1:	<LLD
GZ-2:	<LLD
GZ-3:	163,000 (up from last report of 153,000 pCi/l)
GZ-4:	21,000 (up from last report of 8,700 pCi/l)
GZ-5:	<LLD
GZ-6:	<LLD
GZ-7:	8,600 (down from last report of 23,000 pCi/l)
GZ-8:	No sample; dry well
GZ-9:	<LLD
GZ-10:	<LLD
GZ-11:	<LLD (down from last report of 7,600, which VY thought was an error)
GZ-12:	153,000 (down from last report of 211,000 pCi/l)
GZ-13S:	<LLD
GZ-13D:	736 (up from last report of <LLD)
GZ-14S:	295,000 (up from last report of 286,000 pCi/L)
GZ-14D:	<LLD
GZ-15:	633,000 (down from last report of 653,000 pCi/L)
GZ-16:	<LLD
GZ-17:	<LLD
GZ-18:	no well yet
GZ-19S:	<LLD
GZ-19D:	<LLD
GZ-20:	3,700 (down from last report of 4,700 pCi/L)
GZ-21:	777,000 (down from last report of 927,000 pCi/L)

June 4, 2010

NRC Public Meeting on June 22

The Nuclear Regulatory Commission has announced an open house and public meeting on June 22 at Brattleboro Union High School. The open house is scheduled for 4:00 to 6:00 p.m. NRC staff will be there to discuss their agency's role in ensuring safe plant operations, and NRC's assessment of the safety performace of

Vermont Yankee during 2009. The public meeting is scheduled for 6:00 to 9 p.m., starting with presentations on NRC's assessment of Vermont Yankee's safety performance, their groundwater contamination task force, and the inspection of the Entergy response to the demand for information issued to Vermont Yankee. Presentations will be followed by a Q&A session.

New NRC Inspection on August 16

On August 16, the NRC plans to send a team of health physicists and hydrogeologists to conduct a new inspection at Vermont Yankee to further evaluate the release of tritium and other radioisotopes.

Strontium-90, cesium-137, zinc-65, manganese-54 and cobalt-60 have all been detected in soil that was collected for laboratory analysis on Feb. 26 and on March 17 and 18. Soil samples were taken from various locations and depths below the excavation area outside the AOG pipe tunnel that was found to have caused this leak.

The latest soil analysis results from Vermont Yankee and the Vermont Department of Health, detailed by date and location, are presented here, along with more information about each of these radioisotopes. Since then, approximately 180 cubic feet of this soil has been removed.

Soil testing done by Vermont Yankee immediately after another leak was discovered on May 28 at the AOG drain line also detected the same radioisotopes as before, along with a number of others that decay quickly and are no longer detectable within hours or days. These are chromium-51, cobalt-58, zinc-69, niobium-95, rhodium-105, barium-140, lanthanum-140 (all metals), and xenon-131 (a noble gas).

A "catch containment" that had been removed from the AOG excavation area has been replaced to prevent further contamination in case there are more leaks.

Ground Water Extraction

To date, extraction well GZEW-1A has pumped out approximately 100,000 gallons of ground water contaminated with tritium. Vermont Yankee's goal is 300,000 gallons.

Monitoring Well Test Results

The well test results reported by Vermont Yankee as of June 01, 2010 are listed below.

All results are expressed in terms of picocuries per liter (pCi/l), or below the lower level of detection (<LLD):

GZ-1:	<LLD
GZ-2:	<LLD
GZ-3:	153,000 (down from last report of 169,000 pCi/l)
GZ-4:	8,700 (down from last report of 16,200 pCi/l)
GZ-5:	<LLD
GZ-6:	<LLD
GZ-7:	23,000 (down from last report of 59,800 pCi/l)
GZ-8:	No sample; dry well
GZ-9:	<LLD
GZ-10:	<LLD
GZ-11:	7,600 (up from last report of <LLD)

GZ-12:	211,000 (down from last report of 240,000 pCi/l)
GZ-13S:	<LLD
GZ-13D:	1,100 (up from last report of <LLD)
GZ-14S:	286,000 (up from last report of 278,000 pCi/L)
GZ-14D:	<LLD
GZ-15:	653,000 (down from last report of 698,000 pCi/L)
GZ-16:	<LLD
GZ-17:	<LLD
GZ-18:	no well yet
GZ-19S:	<LLD
GZ-19D:	<LLD
GZ-20:	4,700 (up from last report of 4,300 pCi/L)
GZ-21:	927,000 (down from last report of 1.02 million pCi/L)

June 1, 2010

New Leak Identified May 28

Entergy Vermont Yankee officials notified the Vermont Department of Health at approximately 8:45 p.m. on Saturday, May 29 about a new leak that was identified on Friday, May 28.

This new leak occurred in the Advanced Off-Gas (AOG) drain line. This drain line is the 2" carbon steel and concrete encased piping that runs from the AOG pipe tunnel to the AOG pit and drain tank. The pipe tunnel is at the north end of the excavation that was started in February 2010 following the discovery of tritium in a ground water monitoring well near the Connecticut River. The AOG pit and drain tank are at the south end of this excavation, and this is where the new leak was found. According to Vermont Yankee, this leak was identified by plant operators when they heard vacuum sounds coming from within the excavation. After entering the excavation, they found that a chunk of the concrete encasement around the drain line had fallen off. The leak was found to be coming from what Vermont Yankee describes as a 1/8" diameter hole in the pipe where the concrete had fallen off.

According to Vermont Yankee, this new leak was stopped within four hours of starting. This AOG drain line generally only drains condensate from the main AOG line (OGE-100, a 12" diameter pipe that runs from the main condenser to the AOG system through the AOG pipe tunnel) when the AOG system is being warmed up and after it has cooled down. These conditions existed this past week when Vermont Yankee was starting up after its refueling outage. The AOG drain lines allow for the drainage of condensate in the AOG system when the AOG systems are at much lower temperatures than the steam and condensate flowing from the main condenser. Entergy Vermont Yankee says that the drain line stopped being a source of contamination soon after the AOG warmed up. Reinforcing the argument that the leak was recent is the mix of radioactive materials in the soil where the new leak occurred. Included with the long half-life radionuclides were several with very short half-lives. Radionuclides with very short half-lives would decay away to non-detectable levels in a matter of minutes or hours.

MAY:

Leak Repaired on May 31

To repair the leak, Vermont Yankee reports that on Monday, May 31 plant personnel installed a three part "dam" into the AOG drain line. The dam was put in near where the AOG drain line connects to the AOG line OGE-100. They also closed the valve where the AOG drain line connects to the AOG drain tank. This is to prevent further leaking from the AOG drain line into the environment.

Preventing Recurring Leaks

This AOG drain line may be damaged in other places along its length, but the concrete encasement prevents visual inspection. Other nuclear power plants that have had these kinds of releases have continued to find leaks over time, and have eventually replaced piping and brought most or all buried and inaccessible piping above ground, enabling periodic testing and inspection.

Entergy Vermont Yankee has stated that they are considering possible solutions.

New Soil Contamination

According to Vermont Yankee, this new leak has contaminated the previously clean soil that was used to re-fill the area where contaminated soil from the earlier leak had been removed. The new leak has contaminated a volume of soil at least one foot in radius and about one foot deep. Vermont Yankee now plans to remove soil of at least two foot in radius and two feet in depth. The soil will be sampled at that two foot depth and again at a four foot depth to verify that the soil newly contaminated has been removed. The Health Department has requested split samples from the soil for independent analysis.

The AOG drain line should be considered a potential source of leaks for its entire length. A catch containment that had been installed in the AOG excavation area to catch leaks and prevent ground contamination had been removed in order to take away contaminated soil during the refueling outage. Vermont Yankee has now reinstalled a partial containment in the area of the new leak, and has committed to expanding containment to the rest of the excavation area.

Well GZ-10, which has been free of tritium contamination for most samples of the past few weeks, was sampled again Monday, May 31 and no tritium above detectable levels was found. The sample from May 30 was also less than the lower level of detection. This indicates that tritium from the new leak has not reached the ground water at the GZ-10 monitoring well, which is located about five feet from the newest leak.

May 28, 2010

Reactor shutdown followed by severe weather problems May 26 - May 28

Vermont Yankee completed its refueling outage and started powering up the reactor on Saturday, May 22. On Wednesday, May 26, with the reactor at nearly 70 percent power, a malfunction in the switchyard apparently caused an automatic reactor trip. The switchyard is where power that is produced by Vermont Yankee is connected to the Vermont Electric Company transmission grid. The cause of that malfunction was identified and corrected, and the plant was preparing for reactor re-start. Late that night, severe thunderstorms pushed through the Vernon area, causing power and communication outages at the plant and in the surrounding communities. These conditions began around 2 a.m. and persisted for more than 24 hours.

At the height of the event, most communications to and from the plant were unavailable. Wireless telephone and microwave telephone connections were used to maintain links to state and federal agencies. With power outages throughout the emergency planning zone and compromised communications, reactor re-start was delayed until power and communications were restored. Communications were restored late on May 27. Power

was restored in the emergency planning zone sufficient to support emergency services by mid-morning on May 28. The reactor was re-started by late afternoon.

The Vermont Department of Health was notified the afternoon of May 26 of the reactor trip and, along with Vermont Emergency Management, has been monitoring plant conditions throughout to ensure that public health and safety are protected.

Strontium-90 and Fish

Fish caught from the Connecticut River are among the samples being analyzed for radioactive materials. So far, a small number of fish samples have been taken from the Vernon Pool, (the large pool of the Connecticut River near the discharge structure at Vermont Yankee formed by the Vernon Dam) and upstream further away from the plant. In February 2010, two sets of fish samples were obtained by Vermont Yankee. The edible portions and the inedible portions (bones and internal organs) of each of these samples were analyzed by Vermont Yankee's contract laboratory for strontium-90 (Sr-90). That analysis showed Sr-90 concentrations of about 59 pCi/kg in inedible portions of fish taken upstream, and no Sr-90 above detectable levels in fish from the Vernon Pool. Sr-90 concentrations in the edible portions of fish are all below the detectable levels for fish from both locations. The Sr-90 measured in the upstream fish is assumed to be a result of fallout from nuclear weapons testing and Chernobyl, but more samples need to be tested. The New York State Department of Environmental Conservation published a report in November 2009 analyzing more than 150 fish and found Sr-90 concentrations in the range of 120 to 360 picocuries per kilogram (pCi/kg). In general, the report describes no difference in Sr-90 measurements in fish caught near the Indian Point Nuclear Power Station and those caught more than 70 miles north.

Click HERE To read the report.

Soil remediation

Vermont Yankee reports that they have removed approximately 180 cubic feet of contaminated soil from the excavation at the Advanced Off-Gas (AOG) pipe tunnel. Testing has revealed that this soil was contaminated with cobalt-60, zinc-65, manganese-54, cesium-137 and strontium-90. These soils have been removed from the ground to prevent these radioactive metals in this volume of soil from migrating from the AOG pipe tunnel where the leak occurred. Following removal of soil from the AOG excavation, soil samples were taken from the excavation area that remained. Some of the samples were analyzed by Vermont Yankee, and some have been sent to the Vermont Department of Health Laboratory for analysis. These analyses will be used to determine whether additional soil removal is needed.

Groundwater remediation

Vermont Yankee reports that extraction well GZ-EW1A is continuing to pump tritium-contaminated water from the ground. So far, about 70,000 gallons have been pumped from the ground into separate "frac" tanks. From an inlet frac tank connected directly to GZ-EW1A, the water is filtered and then stored in other frac tanks. There are now a total of six tanks on site. A recent water sample of the inlet frac tank had a concentration of 800,000 picocuries per liter (pCi/L), indicating that the water being removed from the ground is still highly contaminated. Given the plant's objective to extract up to 300,000 gallons of contaminated water from the ground, the Health Department has suggested that another extraction well be installed. So far, plant officials say they have no

specific plans to add a new extraction well.

Root Cause Analysis

Vermont Yankee reports that the root cause analysis has passed its Corrective Action Review Board and will likely be released the week of May 31. This report will analyze the causes of the leaks of radioactive water into the environment at the Advanced Off-Gas (AOG) pipe tunnel. The report will also review whether the "extent of conditions" that led to leaks might exist elsewhere on site, and what actions are possible to prevent future occurrences. It is also expected to present similar operating experiences across the industry. These analyses are required by the NRC as part of its corrective action system. Vermont Yankee is not obligated to provide the final report to the NRC or state agencies, but the Health Department expects to review and critique the report when it is published.

Monitoring Well Test Results

Testing by the Vermont Department of Health and Vermont Yankee of on-site and off-site drinking water well samples, as well as water taken from the Connecticut River, continues to show no tritium in excess of the lower limit of detection (<LLD). No on-site or off-site wells show any other radioactive materials related to nuclear power plant operations.

The most recent well results reported by Vermont Yankee are listed below. All results are expressed in terms of picocuries per liter (pCi/l), or below the lower level of detection (<LLD). Wells that are nearest the river now have concentrations of tritium trending upward. These are wells GZ-3 at the northern edge of the plume, GZ-4 at the southern edge, and GZ-14 at the centerline. Overall, the tritium plume is decreasing in concentration where the leakage pathway originated near the AOG Building. This decrease in concentration is also occurring near the extraction well that has been used to remove contaminated water from the soils near groundwater monitoring well GZ-7.

Results as of May 24, 2010:

GZ-1:	<LLD
GZ-2:	<LLD
GZ-3:	169,000 (up significantly from 121,000 pCi/l 10 days ago)
GZ-4:	16,200 (up significantly from 4,000 pCi/l 10 days ago)
GZ-5:	<LLD
GZ-6:	<LLD
GZ-7:	59,800 (down significantly from 140,000 pCi/l 10 days ago)
GZ-8:	No sample; dry well
GZ-9:	<LLD
GZ-10:	<LLD
GZ-11:	< LLD (compared to 811 pCi/l 10 days ago)
GZ-12:	240,000 (down significantly from 302,000 pCi/l 10 days ago)
GZ-13S:	<LLD
GZ-13D:	<LLD (compared to 961 pCi/l 10 days ago)
GZ-14S:	278,000
GZ-14D:	<LLD

GZ-15:	698,000
GZ-16:	<LLD
GZ-17:	<LLD
GZ-18:	no well yet
GZ-19S:	<LLD
GZ-19D:	<LLD
GZ-20:	4,300
GZ-21:	1.02 million

May 21, 2010

Strontium-90 Detected in Soils at Vermont Yankee

A May 14, 2010 radiochemical analysis of soil samples taken on March 17 from the Advanced Off-Gas (AOG) pipe tunnel excavation shows the presence of strontium-90 (Sr-90). Vermont Yankee shared these results with the Vermont Department of Health on May 20.

Sr-90 is a metal by-product of the fission of uranium in nuclear reactors, and is found in waste from nuclear reactors. The finding of Sr-90 in this area may be the result of fuel failures that occurred at Vermont Yankee in the 1970s.

Sr-90 is considered one of the more hazardous constituents of nuclear wastes because it is a very strong beta radiation emitter, with a long half-life (29.1 years). This means it takes a long time to decay naturally. If Sr-90 gets into the body (by inhaling contaminated dust or ingesting contaminated soil or water), it behaves chemically much like calcium, concentrating in the bones and teeth. Sr-90 differs from the other radioactive solids found in the soils at Vermont Yankee in that it is more soluble than those other materials. The more soluble a material is, the more likely it is to travel with groundwater.

The Vermont Department of Health, as well as Entergy-Vermont Yankee, is monitoring the environment for Sr-90 to verify that it is not found in groundwater, drinking water, river water or fish. A ground water sample from well GZ-10 immediately adjacent to the soils taken on February 8 when the well was measuring 2.5 M picocuries per liter of tritium was negative for Sr-90.

Sr-90 has been found only in soils so far, and only in soils near the point of origin for leakage from specific plant systems near specific plant structures. This radionuclide and all others found to have leaked from the plant have not to date been measured in any drinking water, river water or fish. Only tritium has been found in ground water.

Measuring Sr-90

Tritium from the nuclear reactor water that leaked from the AOG pipe tunnel through the ground water, flowing east into the Connecticut River, has been measured in ground water monitoring wells at the site. In addition, other radioactive materials in particulate form have been filtered by the soils near the AOG pipe tunnel. These include the metals cobalt-60, cesium-137, manganese-54, and zinc-65. Tritium and these particulate radioactive materials can be measured with instruments at the Entergy-Vermont Yankee on-site environmental laboratory, and at the Vermont Department of Health Laboratory.

Sr-90 is called a “hard to detect” radioactive material because special laboratory techniques must be used to separate the soft metal for analysis. Laboratories that practice these techniques are relatively few in number. The preliminary results of the hard to detect analysis performed by Vermont Yankee’s contract laboratory, Teledyne Brown Engineering indicate Sr-90 concentrations from 152 to 8,290 picocuries per kilogram. The highest concentrations were found closer to the point of origin, and lower concentrations were found further

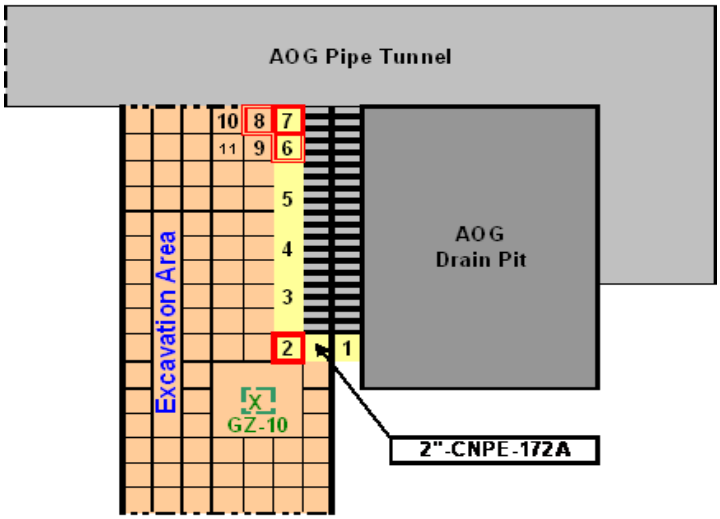
from the point of origin. This indicates that the soil may be filtering the Sr-90 as well as it did the other particulates.

The Sr-90 data was reported along with other radiochemical analysis data for tritium and gamma radiation-emitting materials, including cobalt-60, cesium-137, manganese-54 and zinc-65. The measurements from Teledyne Brown are generally consistent with measurements from the same sample locations made by Entergy-Vermont Yankee's on-site environmental laboratory, and by the Vermont Department of Health Laboratory.

Diagram of the Soil Sampling Sites

A diagram of the soil study area shows sites where soil samples taken on March 17 have shown concentrations of Sr-90:

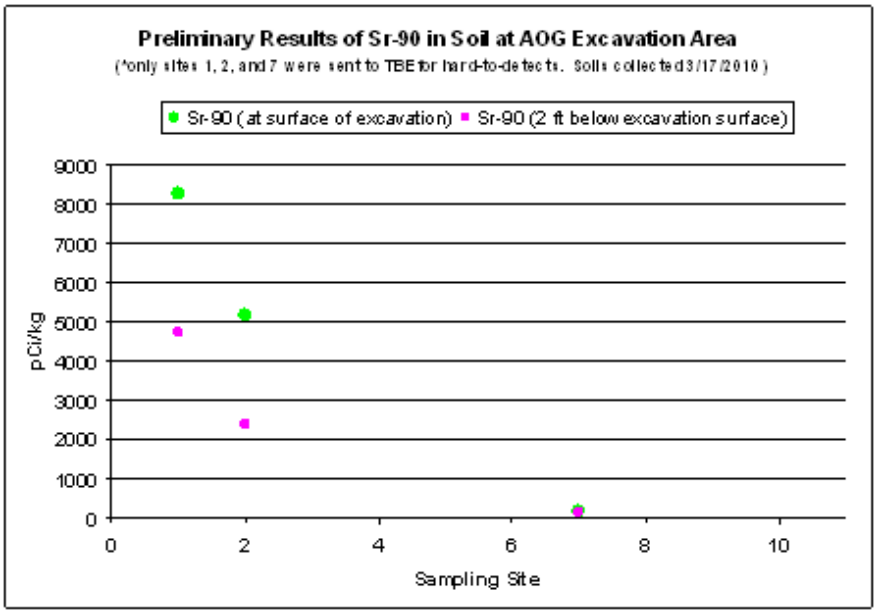
- Site #1 is where the AOG drain line enters the AOG pit for drainage into the AOG drain tank.
- Site #2 is at the elbow where the AOG drain line goes from a north-south direction to direct flow east a few feet to the AOG pit.
- Site #7 is where the AOG drain line connects to the AOG lines in the AOG pipe tunnel.



Soil Sampling Laboratory Test Result Graphs

The graph of preliminary results of Sr-90 shows that the highest concentrations are found closest to the AOG drain tank. This is only a few feet away from GZ-10, the ground water monitoring well that has registered the highest tritium concentration levels, around 2.5 million picocuries per liter (pCi/L). This means that Sr-90 analysis of ground water sampled from this well will give a good indication of whether any Sr-90 may have been taken up into ground water. So far, results are negative.

The graph also shows that at sites #1, #2 and #7, the concentrations of Sr-90 decrease as the contaminated water moved deeper into the soils. Soil samples taken the week of May 9 are now being analyzed. These samples were taken at greater depths than the March samples. If this trend holds true, the May samples, which the Vermont Department of Health Laboratory will analyze separately, should show lower concentrations of Sr-90.



NRC Ground Water Monitoring Inspection Report

Also on May 20, the U.S. Nuclear Regulatory Commission (NRC) released its Vermont Yankee Nuclear Power Station – Ground Water Monitoring Inspection Report detailing its findings regarding Vermont Yankee's implementation of the Nuclear Energy Institute's (NEI) Groundwater Protection Initiative and investigation to find and remediate the tritium leak.

The NRC identified no "findings of significance" and stated that Entergy-Vermont Yankee had not violated any NRC requirements. The NRC did, however, state that there were elements of the NEI Groundwater Protection Initiative that Entergy-Vermont Yankee had not completed within the specified time frame.

In particular, Vermont Yankee had not yet implemented a formal site-specific ground water monitoring program, had not incorporated site-specific hydrogeological information identified in a 2007 assessment, and had not updated its risk assessment and leak detection program for plant structures, systems and components. The last element includes enhancements in leak detection methods, spill prevention, barriers to leakage reaching groundwater, preventive maintenance, and frequent reviews of vulnerable structures, systems and components – all to have been implemented by August 2008.

The report reviews the timetable of events and actions to investigate the source of tritium leakage and to remediate the contaminated groundwater, contaminated soils and damaged structures, systems and components involved in this leak.

The report also includes an estimation of the plume size – an approximate triangle with a length from its point of origin of about 400 feet, a base about 300 feet wide at the edge of the Connecticut River, and a depth that varies from 5 to 9 feet. This yields an estimated volume of between 600,000 and 1,080,000 cubic feet. In addition, a total release of about 2.8 curies is estimated. 2.8 curies is equal to 2,800,000,000,000 picocuries.

The NRC concurred with Entergy-Vermont Yankee's estimate of off-site dose from the tritium contamination – estimated to be between 0.00026 and 0.00035 millirem. To put this in perspective, 20,000 picocuries per liter of tritium in drinking water is generally equated to a dose of 4 millirem, so this is a very small dose.

Given the content of the inspection report, the Vermont Department of Health has asked both Entergy-Vermont Yankee and the NRC a number of follow-up questions, which we expect to be answered in the upcoming week.

These questions generally seek opinions from the NRC about:

- How Vermont Yankee can identify any new leaks from buried piping, when wells that might identify these leaks are sampling from a volume of the groundwater already contaminated with high concentrations of tritium
- Whether the Construction Office Building (COB) well should be used again, but only to test for contamination in drinking water sources near the centerline of the tritium plume
- Whether Vermont Yankee is monitoring buried underground piping and the condensate storage tank often enough to ensure that ground water is protected

We are also requesting from Entergy-Vermont Yankee a specific condition report from February 2010, the pending root cause analysis when completed, an updated hydrogeological report from Vermont Yankee's contractor, and an updated dose assessment using Vermont Yankee's off-site dose calculation manual.

Refueling Outage Ends

Vermont Yankee reports that it is closing out its remaining refueling outage activities and planning to begin start-up Saturday May 22. The AOG systems that were remediated to prevent further leakage from these systems into the environment are being warmed up for the start-up.

May 14, 2010

Pipe Remediation

Vermont Yankee reports that work to replace and reroute the failed piping continues, with an estimated completion date of May 16, 2010.

Soil Remediation

Plant officials reported on May 13 that approximately 150 cubic feet of soil has been removed from the area around the Advanced Off-Gas (AOG) Building pipe tunnel where radioactively contaminated plant water leaked from AOG piping inside the tunnel. The soil was removed at the north and south end of the excavation which runs the length of the AOG drain line. Samples from the remaining soil were taken for radiochemical analysis. The results of these analyses, which are not yet complete, will be used to characterize the extent of radioactive metals contamination in the soil near the water leakage pathway

AOG Pipe Tunnel Drain Remediation

Cleaning of the Advanced Off-Gas (AOG) pipe tunnel floor and other surfaces in the tunnel was scheduled for May 13 and 14. This should prevent recurrence of the situation wherein construction debris and silt clogging the pipe tunnel drain allowed for radioactive materials to leak from within the plant structure into the environment. The Department of Health has requested split samples of this construction debris as it is removed from the tunnel.

Tritiated Groundwater Remediation
Extraction of contaminated groundwater has been temporarily suspended, because all the available storage containers are full. An additional storage tank is scheduled for delivery this weekend (May 15-16), and extraction efforts will then resume.

Yankee officials report that approximately 55,000 gallons of water have been removed from the ground where the tritium plume resides. Highly concentrated tritiated groundwater still remains near the extraction well, as evidenced by tritium concentration levels at groundwater monitoring wells GZ-7, GZ-15, GZ-20 and GZ-21, which range from 15,000 to 1,201,000 picocuries per liter (pCi/L).

Vermont Yankee does not yet plan to install a new extraction well to supplement the current well GZ-EW1A. The Department of Health has asked for weekly test results from the extraction collection tanks to monitor trends in concentration of water removed from the ground. For the week of May 6, concentration results were 982,000 pCi/L.

Root Cause Analysis
Vermont Yankee/Entergy's internal management review of the Root Cause Analysis is still underway. Plant officials have stated they anticipate the report will be finalized in the coming days. Vermont Yankee is not obligated to provide the final report to the Nuclear Regulatory Commission, however, the Health Department expects to have the opportunity to review and critique the report.

Nuclear Regulatory Commission (NRC)
The NRC next week is expected to release the evaluation inspection report of Vermont Yankee's implementation of the nuclear industry's groundwater protection initiative.

Monitoring Well Test Results
The Department of Health has asked Vermont Yankee officials about taking additional samples from the Construction Office Building (COB) well, in order to verify that tritium has not migrated from the groundwater near this well into the drinking water. The COB well is sited near the centerline of the plume. Vermont Yankee has stated that its hydrogeological contractor, GZA Environmental, has been contacted to begin assessing this option.
Testing by the Vermont Department of Health and Vermont Yankee of on-site and off-site drinking water well samples, as well as water taken from the Connecticut River, continue to show no tritium in excess of the lower limit of detection (<LLD). No on-site or off-site wells show any other radioactive materials related to nuclear power plant operations.
The most recent well results reported by Vermont Yankee are listed below. All results are expressed in terms of picocuries per liter (pCi/l), or below the lower level of detection (<LLD).

Results as of May 13, 2010:

GZ-1:	<LLD
GZ-2:	<LLD
GZ-3:	121,000
GZ-4:	4,000

GZ-5:	<LLD
GZ-6:	<LLD
GZ-7:	140,000
GZ-8:	No sample; dry well
GZ-9:	<LLD
GZ-10:	<LLD
GZ-11:	811
GZ-12:	302,000
GZ-13S:	<LLD
GZ-13D:	961
GZ-14S:	243,000
GZ-14D:	<LLD
GZ-15:	771,000
GZ-16:	<LLD
GZ-17:	<LLD
GZ-18:	no well yet
GZ-19S:	<LLD
GZ-19D:	<LLD
GZ-20:	15,000
GZ-21:	1.201 million

May 7, 2010

Refueling Outage Work Proceeds in Coordination with Investigation Efforts

Vermont Yankee continues its work related to its scheduled refueling and maintenance outage which began April 24. Company officials have committed to continuing work related to this investigation and remediation during this time.

Root Cause Analysis Nearing Completion

Vermont Yankee has been conducting a “root cause analysis” with a report expected soon. This report will analyze the causes of the leaks of radioactive water into the environment at the Advanced Off-Gas (AOG) pipe tunnel. The report will also review whether the “extent of conditions” that led to leaks might exist elsewhere on site, and what actions are possible to prevent future occurrences. The report is also expected to present similar operating experiences across the industry. These analyses are required by the NRC as part of its corrective action system. The final draft of the report has passed internal review at Vermont Yankee, and is being reviewed by Entergy management. Vermont Yankee is not obligated to provide the final report to the NRC, however, the Health Department expects to have the opportunity to review and critique the report.

Groundwater Remediation in Progress

Groundwater extraction well GZ-EW1A, located in the area of groundwater monitoring well GZ-7 and the plume of tritium contamination, is continuing to pump tritium-contaminated water out of the ground. Vermont Yankee reports an estimated 50,000 gallons of groundwater have been pumped out to date. Tritium concentrations in the extracted water have been measured at about one million picocuries per liter (pCi/L). This water will be

filtered and cleaned – but still contaminated with tritium – and stored on site for later re-use in plant operations.

At this time, Vermont Yankee does not plan to install a new extraction well, despite the declining well concentrations near well GZ-EW1A. Samples from Well GZ-7, which weeks ago had concentrations over one million pCi/L, now test at about one-tenth of that. Vermont Yankee officials state they may consider another well, perhaps near GZ-21, where concentrations in the groundwater remain greater than one million pCi/L.

AOG Pipe Tunnel Remediation

Construction debris and silt clogging the Advanced Off-Gas (AOG) pipe tunnel floor drain allowed for radioactive materials to leak from within the plant structure into the environment. Clean-up of the pipe tunnel floor near the drain should make this less likely to happen again. This work is scheduled for around May 12.

Pipe Remediation in Progress

Work continues to remediate failed or vulnerable AOG systems. Two separate trains of two specific piping runs (a total of four piping runs) will be permanently replaced and re-routed:

The first two are the A and B trains of the AOG hydrogen recombiner moisture separator steam trap drain lines. These are the two lines that carried steam and water through the AOG pipe tunnel and were found to be leaking. The A train work is approximately 80 percent complete, and the B train is being readied. Once completed, the two lines will no longer pass through the AOG pipe tunnel.

The second two are the A and B trains of the AOG hydrogen recombiner preheater steam trap drain lines. These are the two lines that run directly through the soil under the AOG Building. According to Vermont Yankee, this is a preventative measure as no leakage has been observed from these two runs. Officials have informed the Department of Health that these are the only buried pipes which carry radioactive materials. The lines are being rerouted through the AOG building in order to be more easily inspected.

Soil Remediation

Preparations for soil remediation in the Advanced Off-Gas (AOG) pipe tunnel excavation continues. A beam set over the AOG excavation will serve as a means to suspend the AOG drain line concrete duct when soil is removed from the excavation. This concrete duct has failed at several points. There are no plans to repair the duct during the current outage. However, recommendations for final repair of the duct may come from the nearly completed Root Cause Analysis.

Vermont Yankee has set a 60-day deadline by which time it will remove approximately 150 cubic feet of contaminated soil at the north end and the south end of the AOG drain line.

Radiochemical analyses to date show that soil in this area is contaminated with radioactive particulates (solids) such as the metals cobalt-60, cesium-137, zinc-65 and manganese-54. These radioactive solids were filtered from the nuclear reactor water that leaked out of the pipe tunnel and into the soil through a faulty concrete joint in the tunnel wall, and through flaws in the concrete duct that surrounds the AOG drain line. These solids have not been found elsewhere on site, and have not been found in groundwater or in drinking water. The soil is not contaminated with tritium.

Monitoring Well Test Results

Testing by the Vermont Department of Health and Vermont Yankee of on-site and off-site drinking water well samples, as well as water taken from the Connecticut River, continue to show no tritium in excess of the lower

limit of detection (<LLD). No on-site or off-site wells show any other radioactive materials related to nuclear power plant operations.

The most recent well results reported by Vermont Yankee are listed below. All results are expressed in terms of picocuries per liter (pCi/l), or below the lower level of detection (<LLD).

Results as of May 6, 2010:

GZ-1:	<LLD
GZ-2:	<LLD
GZ-3:	96,000
GZ-4:	3,300
GZ-5:	<LLD
GZ-6:	<LLD
GZ-7:	151,000
GZ-8:	No sample; dry well
GZ-9:	<LLD
GZ-10:	1,900
GZ-11:	3,000
GZ-12:	481,000
GZ-13S:	<LLD
GZ-13D:	1,000
GZ-14S:	252,000
GZ-14D:	<LLD
GZ-15:	763,000
GZ-16:	<LLD
GZ-17:	<LLD
GZ-18:	no well yet
GZ-19S:	<LLD
GZ-19D:	<LLD
GZ-20:	25,000
GZ-21:	1.226 million

APRIL:

April 30, 2010

Refueling Outage Began April 24

The scheduled refueling and maintenance outage began April 24. Vermont Yankee has committed to continuing work related to this investigation and remediation during this time.

Root Cause Analysis Expected

Vermont Yankee has been conducting a “root cause analysis” with a report still expected soon. This report will analyze the causes of the leaks of radioactive water into the environment at the Advanced Off-Gas (AOG) pipe tunnel. The report will also review whether the “extent of conditions” that led to leaks might exist elsewhere on site, and if there are means to prevent other occurrences. The report is also expected to present lessons learned from similar operating experiences across the industry. These analyses are required by the NRC as part of its

corrective action system. The final draft of the report has passed internal review at Vermont Yankee, and is being reviewed by Entergy management. The Health Department expects to review and critique this report.

Groundwater Remediation in Progress

Groundwater extraction well GZ-EW1A is continuing to pump tritium-contaminated water out of the ground at a rate of about 3 gallons per minute. This well is in the area of the plume of tritium contamination. Wells GZ-7, GZ-20 and GZ-21, all near the extraction well (see well location map), are showing dramatically decreasing tritium concentrations since the extraction well began operating. Some of this decrease may also be explained by the movement of the tritium-contaminated groundwater plume moving eastward to the Connecticut River. For the same reason, tritium concentrations measured in monitoring wells near the river are expected to continue rising.

Vermont Yankee has set a goal to extract 300,000 gallons over the next several months. An estimated 60,000 gallons have been pumped out to date. Tritium concentrations in the extracted water have been measured at about 1 to 1.2 million picocuries per liter. This water will be filtered and cleaned – but still contaminated with tritium – and stored on site for later re-use in plant operations.

Pipe Remediation in Progress

Work has begun to remediate failed or vulnerable Advanced Off-Gas (AOG) systems. Two separate trains of two specific piping runs (a total of four piping runs) are scheduled to be permanently replaced and re-routed:
The first two are the A and B trains of the AOG hydrogen recombiner moisture separator steam trap drain lines. These are the two lines that carried steam and water through the AOG pipe tunnel and were found to be leaking. The failure of these pipes, along with the clogged AOG pipe tunnel floor drain, allowed water to collect in the AOG pipe tunnel until it rose to height where it reached the AOG drain line concrete duct and leaked out, apparently at three distinct points.
The second two are the A and B trains of the AOG hydrogen recombiner preheater steam trap drain lines. These are the two lines that run directly through the soil under the AOG Building. According to Vermont Yankee, these pipe lines are not leaking now, but they will be permanently replaced and re-routed through – rather than under – the AOG building, where they can be easily inspected.

Soil Remediation Plans

Soil remediation in the Advanced Off-Gas (AOG) pipe tunnel excavation is set to begin the first week of May. Vermont Yankee plans to dig out about 150 cubic feet of contaminated soil at the north end and the south end of the AOG drain line (see the 3D AOG diagram).
Vermont Yankee officials have said they will take new core bore samples of soils at new sites after this first soil remediation effort is completed. These new core bore samples will be analyzed to evaluate whether additional soil remediation is needed to get all or most of the radioactive contamination out of the area.
Radiochemical analyses to date show that soil in this area is contaminated with radioactive particulates (solids) that were filtered from the nuclear reactor water that leaked out of the pipe tunnel and into the soil through a faulty concrete joint in the tunnel wall, and through flaws in the concrete duct that surrounds the AOG drain line (labeled 2”-CNPE-172A in the AOG Building Schematic). Vermont Yankee and Vermont Department of Health soil analyses indicate that leaks may have occurred at three locations along the length of the concrete duct.

These radioactive solids include the metals cobalt-60, cesium-137, zinc-65 and manganese-54. These have not been found elsewhere on site, and have not been found in groundwater or in drinking water. Soil samples from this area will also be analyzed for "hard-to-detect" radioactive solids such as strontium-90.
The soil is not contaminated with tritium. The tritium has passed from the area in groundwater moving east to the Connecticut River, as evidenced by test results from well GZ-10. This well once had the highest tritium contamination, at about 2.6 million picocuries per liter (pCi/l) in mid-February. Since April 14, testing has shown results below the lower limit of detection.

Monitoring Well Test Results
Testing by the Vermont Department of Health and Vermont Yankee of on-site and off-site drinking water well samples, as well as water taken from the Connecticut River, continue to show no tritium in excess of the lower limit of detection (<LLD). No on-site or off-site wells show any other radioactive materials related to nuclear power plant operations.
The most recent well results reported by Vermont Yankee are listed below.

All results are expressed in terms of picocuries per liter (pCi/l), or below the lower level of detection (<LLD).

GZ-1:	<LLD
GZ-2:	<LLD
GZ-3:	119,000
GZ-4:	34,000
GZ-5:	<LLD
GZ-6:	<LLD
GZ-7:	131,000
GZ-8:	No sample; dry well
GZ-9:	<LLD
GZ-10:	<LLD
GZ-11:	2,000
GZ-12:	405,000
GZ-13S:	<LLD
GZ-13D:	773
GZ-14S:	250,000
GZ-14D:	<LLD
GZ-15:	787,000
GZ-16:	<LLD
GZ-17:	<LLD
GZ-18:	no well yet
GZ-19S:	<LLD
GZ-19D:	<LLD
GZ-20:	34,000
GZ-21:	1.397 million

April 23, 2010

Refueling Outage Begins April 24

The scheduled refueling and maintenance outage begins April 24. Vermont Yankee has committed to continuing work related to this investigation and remediation during this time.

NRC Open House/Public Meeting

On April 19, the U.S. Nuclear Regulatory Commission (NRC) held an open house, followed by a public question-and-answer session, at Brattleboro Union High School. NRC officials presented information about its voluntary groundwater protection initiative for nuclear power plants, re-licensing, financial requirements for decommissioning, biological effects of exposure to tritium, and the tritium leak and investigation at Vermont Yankee Nuclear Power Station.

EPA, FEMA, Greenpeace and the New England Coalition on Nuclear Pollution also hosted informational tables at the open house. Representatives from the Vermont Department of Health and Agency of Natural Resources, state and local elected officials, Vermont and New Hampshire Congressional delegations, and state public health and environmental agencies of New Hampshire and Massachusetts attended.

Root Cause Analysis Expected

Vermont Yankee has been conducting a "root cause analysis" with a report still expected soon. This report will analyze the causes of the leaks of radioactive water into the environment at the Advanced Off-Gas (AOG) pipe tunnel. The report will also review whether the "exent of conditions" that led to leaks might exist elsewhere on site, and if there are means to prevent other occurrences. The report is also expected to present lessons learned from similar operating experiences across the industry.

These analyses are required by the NRC as part of its corrective action system. The final draft of the report has passed internal review at Vermont Yankee, and is being reviewed by Entergy management. The Health Department expects to review and critique this report.

Groundwater Remediation in Progress

Vermont Yankee reports that groundwater extraction well GZ-EW1A is continuing to pump tritium-contaminated water out of the ground at a rate of about 3 gallons per minute. This well is in the area of the plume of tritium contamination. Wells GZ-7, GZ-20 and GZ-21, all near the extraction well (see well location map), are showing steadily decreasing tritium concentrations since the extraction well began operating. Some of this decrease may also be explained by the movement of the tritium-contaminated groundwater plume moving eastward to the Connecticut River.

Vermont Yankee has set a goal to extract 300,000 gallons over the next several months. An estimated 60,000 gallons have been pumped out to date. Tritium concentrations in the extracted water have been measured at about 1 to 1.2 million picocuries per liter. This water will be filtered and cleaned – but still contaminated with tritium – and stored on site for later re-use in plant operations.

Pipe Remediation Plans

Vermont Yankee reports that large portions of the piping that will replace failed or vulnerable AOG piping have been prefabricated for installation during the refueling outage. Two separate trains of two specific piping runs (a total of four piping runs) are scheduled to be permanently replaced and re-routed:

The first two are the A and B trains of the AOG hydrogen recombiner moisture separator steam trap drain lines. These are the two lines that carried steam and water through the AOG pipe tunnel and were found to be

leaking. The failure of these pipes, along with the clogged AOG pipe tunnel floor drain, allowed water to collect in the AOG pipe tunnel until it rose to height where it reached the AOG drain line concrete duct and leaked out, apparently at three distinct points.

The second two are the A and B trains of the AOG hydrogen recombiner preheater steam trap drain lines. These are the two lines that run directly through the soil under the AOG Building. According to Vermont Yankee, these pipe lines are not leaking now, but they will be permanently replaced and re-routed through – rather than under – the AOG building, where they can be easily inspected.

Soil Remediation Plans

Soil remediation in the Advanced Off-Gas (AOG) pipe tunnel excavation is set to begin the first week of May, during the refueling and maintenance outage that starts April 25. Vermont Yankee plans to dig out about 150 cubic feet of contaminated soil at the north end and the south end of the AOG drain line (see the 3D AOG diagram).

Vermont Yankee officials have said they will take new core bore samples of soils at new sites after this first soil remediation effort is completed. These new core bore samples will be analyzed to evaluate whether additional soil remediation is needed to get all or most of the radioactive contamination out of the area.

Radiochemical analyses to date show that soil in this area is contaminated with radioactive particulates (solids) that were filtered from the nuclear reactor water that leaked out of the pipe tunnel and into the soil through a faulty concrete joint in the tunnel wall, and through flaws in the concrete duct that surrounds the AOG drain line (labeled 2”-CNPE-172A in the AOG Building Schematic). Vermont Yankee and Vermont Department of Health soil analyses indicate that leaks may have occurred at three locations along the length of the concrete duct.

These radioactive solids include the metals cobalt-60, cesium-137, zinc-65 and manganese-54. These have not been found elsewhere on site, and have not been found in groundwater or in drinking water. Soil samples from this area will also be analyzed for “hard-to-detect” radioactive solids such as strontium-90.

The soil is not contaminated with tritium. The tritium has passed from the area in groundwater moving east to the Connecticut River, as evidenced by test results from well GZ-10. This well once had the highest tritium contamination, at about 2.6 million picocuries per liter (pCi/l) in mid-February. Since April 14, testing has shown results below the lower limit of detection.

Monitoring Well Test Results

Testing by the Vermont Department of Health and Vermont Yankee of on-site and off-site drinking water well samples, as well as water taken from the Connecticut River, continue to show no tritium in excess of the lower limit of detection (<LLD). No on-site or off-site wells show any other radioactive materials related to nuclear power plant operations.

The most recent well results reported by Vermont Yankee are listed below.

All results are expressed in terms of picocuries per liter (pCi/l), or below the lower level of detection (<LLD).

GZ-1:	<LLD
GZ-2:	<LLD
GZ-3:	55,000
GZ-4:	2,000
GZ-5:	<LLD

GZ-6:	<LLD
GZ-7:	493,000
GZ-8:	No sample; dry well
GZ-9:	<LLD
GZ-10:	<LLD
GZ-11:	2,000
GZ-12:	328,000
GZ-13S:	<LLD
GZ-13D:	773
GZ-14S:	230,000
GZ-14D:	<LLD
GZ-15:	800,000
GZ-16:	<LLD
GZ-17:	<LLD
GZ-18:	no well yet
GZ-19S:	<LLD
GZ-19D:	<LLD
GZ-20:	75,000
GZ-21:	1.626 million

April 16, 2010

Vermont Yankee and NRC Information Sessions

Entergy and Vermont Yankee staff hosted an information open house about the tritium groundwater contamination investigation and remediation on April 12. The U.S. Nuclear Regulatory Commission is offering an open house and public meeting on April 19 at Brattleboro Union High School.

Root Cause Analysis Report Due

Vermont Yankee has been conducting a “root cause analysis”, with a report expected soon. This report will analyze the causes of the leaks of radioactive water into the environment at the Advanced Off-Gas (AOG) pipe tunnel. The report will also review whether the “extent of conditions” that led to leaks might exist elsewhere on site, and if there are means to prevent other occurrences. The report is also expected to present lessons learned from similar operating experiences across the industry. These analyses are required by the NRC as part of its corrective action system. The final draft of the report has passed internal review at Vermont Yankee, and is being reviewed by Entergy management. Vermont Yankee is also revising its original dose assessment.
The Health Department expects to review and critique both documents.

Groundwater Remediation in Progress

Groundwater extraction well GZ-EW1A is pumping tritium-contaminated water out of the ground at a rate of about 3 gallons per minute. The well delivers water first to a "dirty" frac tank. The dirty water is then processed through filters and ion-exchangers to remove particulate matter. At this point, the water is clean enough to send to the station's radioactive waste processing systems. These systems purify the water further to prepare it for

use in reactor process systems at the station. Throughout these steps, the water remains contaminated with tritium.
Radiochemical analysis indicates that the water extracted from the ground is showing tritium contamination at concentrations of about 1 million picocuries per liter. Vermont Yankee estimates that so far about 35,000 gallons of tritiated water has been removed from the ground. This is a little more than 10 percent of the 300,000 gallon target they have set for groundwater remediation.

Soil Remediation Plans
Soil in the area of the AOG pipe tunnel contains radioactive particulates (solids) that were filtered from the nuclear reactor water that leaked out of the pipe tunnel and into the soil through a faulty concrete joint in the tunnel wall and through flaws in the concrete duct that surrounds the AOG drain line (labeled 2"-CNPE-172A in the AOG Building Schematic).
These radioactive solids include the metals cobalt-60, cesium-137, zinc-65 and manganese-54. These solids have not been found elsewhere on site, and have not been found in groundwater or in drinking water.
Vermont Yankee and Vermont Department of Health soil analyses indicate that leaks may have occurred at three locations along the length of the concrete duct. These locations are where the concrete duct joins the AOG pipe tunnel at the north end of the excavation, where it makes a 90-degree turn to the east at the south end of the excavation, and again where it intersects with the AOG pit, also at the south end of the excavation.
Vermont Yankee officials have said they will take new core bore samples of soils at new sites after the excavation of about 150 cubic feet of soil from the AOG excavation. These new core bore samples will be analyzed to evaluate whether additional soil remediation is needed to get all or most of the radioactive solids out of the area. The Health Department has asked for split samples from these borings to again provide independent radiochemical assessment. It is possible that radioactive solids may have been filtered out of the first four to six feet of soil that the contaminated water passed through after leaking from the AOG drain line concrete duct. If true, that would mean the radioactive materials are confined to soil within a six foot radius of the three leak pathways along the length of the concrete duct (described above).

Soil Analysis To Date
The Department of Health Laboratory has completed analysis of about half of the split samples provided by Vermont Yankee. The analyses that have been completed are from the second soil study conducted on March 17, 2010. Analysis continues on the samples from the February 26, 2010 soil study.
Preliminary review indicates general agreement with results reported by the Vermont Yankee Radiation Protection Department Laboratory. In particular, the Health Department lab has found concentrations of Co-60, Cs-137, Zn-65 and Mn-64 that range from less than the lower limit of detection (<LLD) to 4,550 picocuries per kilogram (pCi/kg) for Co-60, from <LLD to 1,670 pCi/kg for Cs-137, from <LLD to 884 pCi/kg for Zn-65 and from <LLD to 339 pCi/kg for Mn-54.
The Health Department results also show concentrations of each of these is generally higher at the three leak locations - at the concrete joint with the AOG pipe tunnel at the north end of the concrete duct, at the 90-degree elbow in the duct, and at the duct joint with the AOG pit. Health Department results also indicate that radioactivity concentrations decrease as samples are obtained further from the leak sites.

Pipe Remediation Plans
Two separate trains of two specific piping runs (a total of four piping runs) are scheduled to be permanently re-routed during the refueling outage.

The first two to be re-routed are the A and B trains of the AOG hydrogen recombiner moisture separator steam trap drain lines. These are the two lines that previously carried steam and water through the AOG pipe tunnel and had been found to fail. Their failure, along with the clogged AOG pipe tunnel floor drain allowed for the accumulation of water in the AOG pipe tunnel until the contaminated water reached the AOG drain line concrete duct and leaked out its three apparent leakage pathways

The second two runs of piping are from the AOG hydrogen recombiner preheater steam trap drain lines. These two lines, also called the A and B trains, run directly through the soil under the AOG Building. According to Vermont Yankee these pipes are not leaking, but re-routing through rather than under the AOG Building is planned because these lines are vulnerable.

Work during the Refueling Outage

The refueling outage is scheduled to begin April 24. Vermont Yankee has committed to avoid letting outage work interfere with sample collection, sample analysis, sample shipments and investigation updates. Soil excavation is scheduled to begin May 1.

Monitoring Well Test Results

Testing by the Vermont Department of Health and Vermont Yankee of on-site and off-site drinking water well samples, as well as water taken from the Connecticut River, continue to show no tritium in excess of the lower limit of detection (<LLD). No on-site or off-site wells show any other radioactive materials related to nuclear power plant operations.

All results are expressed in terms of picocuries per liter (pCi/l), or below the lower level of detection (<LLD).

GZ-1:	<LLD
GZ-2:	<LLD
GZ-3:	70,600
GZ-4:	2,200
GZ-5:	<LLD
GZ-6:	<LLD
GZ-7:	597,000
GZ-8:	No sample; dry well
GZ-9:	<LLD
GZ-10:	<LLD
GZ-11:	643
GZ-12:	259,000
GZ-13S:	<LLD
GZ-13D:	950
GZ-14S:	277,000
GZ-14D:	<LLD
GZ-15:	761,000
GZ-16:	<LLD
GZ-17:	<LLD
GZ-18:	no well yet

GZ-19S:	<LLD
GZ-19D:	<LLD
GZ-20:	163,000
GZ-21:	1.9 million

April 8, 2010

Vermont Yankee and NRC to hold public meetings

Vermont Yankee has announced a public information session with plant engineers and technical experts to be held April 12 from 4 to 7:30 pm at the Ramada Inn, Putney Road in Brattleboro.

The Nuclear Regulatory Commission (NRC) has also announced a public meeting to be held April 19 at Brattleboro Union High School cafeteria. An open house will be held from 1 - 4 pm and 5 - 6 pm, with a Q&A session from 6 - 9 pm.

Groundwater Remediation

Vermont Yankee reports that the new groundwater extraction well, GZ-EW1A, is now in service. It replaces the first extraction well, GZ-EW1, which was pumping out tritium-contaminated groundwater at less than 1 gallon per minute. The new well is operating at about 3 gallons per minute. So far, approximately 21,000 gallons of tritiated water have been pumped out, to be cleaned and stored for re-use at the plant.

Groundwater Monitoring

Groundwater monitoring well GZ-11, which has so far tested below the lower limit of detection for tritium, has for the first time come up positive for tiritum in an analysis by Vermont Yankee's contract lab. GZ-11 is slightly north of other contaminated wells. Tritium concentration levels are very low, at about 750 pCi/l. This finding does not signify another leak, but rather an expansion out of the plume of contaminated groundwater. GZ-10, where contamination levels once measured more than 2.5 million pCi/l, is for the first time below the lower limit of detection. GZ-21 is now the well with the highest concentration, at 2.028 million pCi/l. These changes are expected to occur at each well as the plume of contaminated groundwater moves generally west to east to the Connecticut River.

Monitoring Well Test Results

Testing by the Vermont Department of Health and Vermont Yankee of on-site and off-site drinking water well samples, as well as water taken from the Connecticut River, continue to show no tritium in excess of the lower limit of detection (<LLD). No on-site or off-site wells show any other radioactive materials related to nuclear power plant operations.

All results are expressed in terms of picocuries per liter (pCi/l), or below the lower level of detection (<LLD).

GZ-1:	<LLD
GZ-2:	<LLD
GZ-3:	52,000
GZ-4:	2,400
GZ-5:	<LLD
GZ-6:	<LLD

GZ-7:	757,000
GZ-8:	No sample; dry well
GZ-9:	<LLD
GZ-10:	<LLD
GZ-11:	750
GZ-12:	267,000
GZ-13S:	<LLD
GZ-13D:	1,200
GZ-14S:	258,000
GZ-14D:	<LLD
GZ-15:	710,000
GZ-16:	<LLD
GZ-17:	<LLD
GZ-18:	no well yet
GZ-19S:	<LLD
GZ-19D:	<LLD
GZ-20:	130,000
GZ-21:	2.028 million

April 5, 2010
Monitoring Well Test Results
Testing by the Vermont Department of Health and Vermont Yankee of on-site and off-site drinking water well samples, as well as water taken from the Connecticut River, continue to show no tritium in excess of the lower limit of detection (<LLD). No on-site or off-site wells show any other radioactive materials related to nuclear power plant operations.

All results are expressed in terms of picocuries per liter (pCi/l), or below the lower level of detection (<LLD).

GZ-1:	<LLD
GZ-2:	<LLD
GZ-3:	58,000
GZ-4:	1,900
GZ-5:	<LLD
GZ-6:	<LLD
GZ-7:	799,000
GZ-8:	No sample; dry well
GZ-9:	<LLD
GZ-10:	2,900
GZ-11:	<LLD
GZ-12:	216,000
GZ-13S:	<LLD
GZ-13D:	1,200
GZ-14S:	255,000

GZ-14D:	<LLD
GZ-15:	714,000
GZ-16:	<LLD
GZ-17:	<LLD
GZ-18:	no well yet
GZ-19S:	<LLD
GZ-19D:	<LLD
GZ-20:	116,000
GZ-21:	1.963 million

April 2, 2010

At the request of the Health Department, Vermont Yankee has completed a radiochemical analysis of mud and debris taken from the Advanced Off-Gas (AOG) pipe tunnel to determine why cesium-137 (Cs-137) was detected in soil samples taken 15 to 20 feet below ground at concentrations much higher than would be expected at ground surface.

The concrete mud and construction debris is the material that clogged the floor drain, causing water from the leaking pipes within the tunnel to rise and leak out of the pipe tunnel. Results from this analysis of mud and debris inside the tunnel show Cs-137 concentration of 2,600 picocuries per kilogram (pCi/kg). This level of concentration is evidence to support one theory that water leaking from the tunnel washed some of the Cs-137 contaminated material into the soil.

Planning for soil remediation is now underway. Vermont Yankee staff is looking at methods to excavate about 150 cubic feet of soil from this area. This excavation will help remove much of the soil that is contaminated with cobalt-60, manganese-54, zinc-65 and cesium-137.

These radioactive metals have to date only been found in soil. The area of soil that has been contaminated appears to be limited within about a 10-foot radius of the leakage pathway from the AOG pipe tunnel.
No groundwater, drinking water, or river water has been found to contain these radioactive materials in Vermont Yankee or Department of Health sample analyses. So far, only tritium has been detected, and only in groundwater from wells in the area (as defined by wells in the list below that are greater than the lower limit of detection, and as seen on our well location map).

Clarification about Cesium-137 Concentrations

Some accounts of this investigation contain inaccuracies. The Department stated previously that cesium-137 concentrations in soils in the immediate vicinity of the leakage pathway at the AOG pipe tunnel are three to 12 times the cesium concentrations in soils found throughout Vermont and around the world. These concentrations arise from atmospheric fallout from above-ground nuclear weapons testing or nuclear reactor accidents like that at Chernobyl. Some accounts state the Vermont Yankee soil concentrations were three to 12 times that of soil concentrations found at Chernobyl. This is incorrect.

Groundwater Remediation

The extraction well identified as GZ-EW1 has pumped up to 10,000 gallons of tritium-contaminated water (at a concentration of about 1.1 million pCi/l) out of the ground around monitoring well GZ-7, but at a slower rate than was expected. A second extraction well is expected to be in service next week.

Independent Lab Analysis

The Health Department will continue to analyze samples as part of the long-term environmental surveillance program, as we have for decades ever since the plant started operating. To date since this investigation began, approximately 430 environmental samples have been collected, and approximately 300 samples have been analyzed by the Vermont Department of Health Laboratory. To date, our independent lab analyses have verified Vermont Yankee results.

Monitoring Well Test Results

Testing by the Vermont Department of Health and Vermont Yankee of on-site and off-site drinking water well samples, as well as water taken from the Connecticut River, continue to show no tritium in excess of the lower limit of detection (<LLD). No on-site or off-site wells show any other radioactive materials related to nuclear power plant operations.

All results are expressed in terms of picocuries per liter (pCi/l), or below the lower level of detection (<LLD).

GZ-1:	<LLD
GZ-2:	<LLD
GZ-3:	52,000
GZ-4:	2,100
GZ-5:	<LLD
GZ-6:	<LLD
GZ-7:	1.117 million
GZ-8:	No sample; dry well
GZ-9:	<LLD
GZ-10:	2,600
GZ-11:	<LLD
GZ-12:	155,000
GZ-13S:	<LLD
GZ-13D:	1,500
GZ-14S:	240,000
GZ-14D:	<LLD
GZ-15:	742,000
GZ-16:	<LLD
GZ-17:	<LLD
GZ-18:	no well yet
GZ-19S:	<LLD
GZ-19D:	<LLD
GZ-20:	106,000

GZ-21:	1.747 million

MARCH:

March 31, 2010

Questions about Cesium-137 in Soil

Vermont Yankee released results from their radiochemical analysis of soils near the leakage pathway at the Advanced Off-Gas (AOG) pipe tunnel. The "core bore" samples were collected on March 17, 2010 from various depths in the excavation, and the analytical results provided to the Vermont Department of Health on March 29. Vermont Yankee's analysis showed contamination of the soil with a number of radioactive materials – manganese-54, cobalt-60, zinc-65, and cesium-137. Split samples of the soil are being shipped to our Laboratory for analysis using gamma spectroscopy. Remaining portions of these samples may be sent to another contracted laboratory for independent analysis for "hard-to-detect" radioactive materials, such as strontium-90.

The finding of cesium-137 (Cs-137) has the following questions:

- **Why is the Health Department looking at these soil results with such interest?**
  Cs-137 does not exist naturally. It is only produced as a result of nuclear reactions, primarily from nuclear reactor fuel fissioning, from major nuclear reactor accidents such as Chernobyl in 1986, or from nuclear weapons fallout. Concentrations found in the environment are usually around 100 picocuries per kilogram (pCi/kg), and usually only found at the earth's surface, not many feet below the surface. The concentration of Cs-137 measured in the soil samples taken at the AOG pipe tunnel 15-foot deep excavation vary from three to 12 times the concentration expected at the surface.
  We are now aware that there have been fuel failures in more recent times that could have resulted in Cs-137 contamination in excess of background levels. In 1990, there were serious defects in a fuel rod at Vermont Yankee, and a number of less serious events involving nuclear fuel since 1990, and as recently as 2001-2002.
  The Health Department is asking Vermont Yankee/Entergy officials for data that explains why Cs-137 has been found 15 to 20 feet below ground at concentrations much higher than would be expected at ground surface.

- **Does this finding of Cs-137 represent a significant health risk?**
  No. The Cs-137 is only found in the soil and not in the water, and at these higher concentrations only in the excavation 15 feet below ground near the AOG pipe tunnel. It is the AOG Pipe Tunnel that leaked nuclear reactor water that contaminated the groundwater with tritium. There is no risk of exposure to the public.

Groundwater Remediation

Vermont Yankee has reported that up to 6,000 gallons of tritiated groundwater at a concentration around 1.1 million pCi/l has been extracted from well GZ-EW1. Vermont Yankee is planning to drill another extraction well, GZ-EW2, to accelerate the rate of extraction.

Monitoring Well Test Results

Testing by the Vermont Department of Health and Vermont Yankee of on-site and off-site drinking water well

samples, as well as water taken from the Connecticut River, continue to show no tritium in excess of the lower limit of detection (<LLD). No on-site or off-site wells show any other radioactive materials related to nuclear power plant operations.

All results are expressed in terms of picocuries per liter (pCi/l), or below the lower level of detection (<LLD).

GZ-1:	<LLD
GZ-2:	<LLD
GZ-3:	52,000
GZ-4:	2,100
GZ-5:	<LLD
GZ-6:	<LLD
GZ-7:	1.2 million
GZ-8:	No sample; dry well
GZ-9:	<LLD
GZ-10:	5,200
GZ-11:	<LLD
GZ-12:	155,000
GZ-13S:	<LLD
GZ-13D:	1,100
GZ-14S:	241,000
GZ-14D:	<LLD
GZ-15:	742,000
GZ-16:	<LLD
GZ-17:	<LLD
GZ-18:	no well yet
GZ-19S:	<LLD
GZ-19D:	<LLD
GZ-20:	106,000
GZ-21:	1.7 million

March 30, 2010

Soil Analysis Confirms Leakage Pathway, Finds Cesium-137

Vermont Yankee has released the results from their radiochemical analysis of soils near the leakage pathway at the Advance Off-Gas (AOG) pipe tunnel. The samples were collected on March 17, 2010 and the analytical results were provided to the Department of Health March 29. Vermont Yankee is shipping split samples of the soil to the Vermont Department of Health Laboratory today, March 30, for independent analysis.

Both Vermont Yankee and the Health Department are sending the samples to private contracted laboratories for confirmatory gamma spectroscopy. This is a method of analyzing samples for most gamma radiation-emitting radioactive materials. Samples will also be analyzed for other radioactive materials that are not easily detectable by gamma spectroscopy. These "hard-to-detect" radioactive materials include strontium-90. The radioactive

materials that have been detected in the Vermont Yankee gamma spectroscopy of soils are manganese-54 (Mn-54), cobalt-60 (Co-60), zinc-65(Zn-65) and cesium-137 (Cs-137). None of these or any other nuclear reactor-related radioactive material other than tritium has been found in groundwater. No reactor-related radioactive materials have been detected in the Connecticut River or in drinking water.

The Vermont Yankee laboratory results show contamination of the soil – both at the concrete joint where the concrete encased AOG drain line (identified as 2-CNPE-172A) joins with the AOG pipe tunnel at the north end of the excavation, and also at the elbow of this AOG drain line where it turns to the east to go into the AOG pit and the AOG drain tank (see AOG 3D illustration). In addition, there is contamination for most of the length of the concrete duct that carries the drain line. Contamination may have spread from one end of the excavation to the other during the digging operations, or contaminated water may have continued flowing along the length of the concrete duct from the north end to the elbow. This contaminated water could even have run within the concrete duct, then out at the elbow. This possibility has not been verified, but there is a crack in the concrete at the elbow.

Another finding of interest is cesium-137. This radioactive material is called a fission product. It does not exist naturally. It is only produced as a result of nuclear reactions, primarily from nuclear reactor fuel fissioning, from major nuclear reactor accidents including Chernobyl in 1986, or from nuclear weapons fallout. Cs-137 is commonly found in soils, sediment and some vegetation. Concentrations are usually around 100 picocuries per kilogram (pCi/kg), and Cs-137 is usually only found at the earth's surface, not deep underground. Given the Cs-137 in these soil samples have been found 15 feet below the ground surface, it is assumed the Cs-137 comes from the VY leakage. Given also that the concentration of Cs-137 in the soil samples are three to 12 times the concentration expected from Chernobyl or nuclear weapons fallout, it again appears likely the Cs-137 comes from Vermont Yankee reactor related sources. The same is true of strontium-90 (Sr-90), which has not yet been detected in any soils, sediment or water.

However, Vermont Yankee officials have said that water from the systems that leaked into the AOG pipe tunnel are not contaminated with Cs-137. They have said that Vermont Yankee reactor process water and condensate have not indicated Cs-137 content for many years, not since the plant had minor fuel rod leakage in the late 1970s and early 1980s when many plants had similar problems with "pin-hole" leaks in fuel rods. Given these points, it may be that the Cs-137 found in the soil samples came from surface contamination within the AOG pipe tunnel. This surface contamination may have been washed from the AOG pipe tunnel walls, floor and piping surfaces by the leaking steam and water from the damaged AOG hydrogen recombiner steam trap drain lines. The Health Department has asked Vermont Yankee to sample and analyze the debris in the AOG pipe tunnel to see if it contains Cs-137, and to provide samples to the Health Department for independent confirmation.

Regardless of the questions raised by the Cs-137 findings, these soil samples confirm that this was an area of significant leakage of contaminated water into the environment. The samples also provide important information about the extent of contamination in the soil. In particular, they show that radioactive metals Mn-54, Co-60, Zn-65 and Cs-137 appear to have migrated at least four feet from the leakage pathway in the soil. These soils may be remediated by Vermont Yankee by excavation and disposal as radioactive waste. Water sample results, for example from groundwater monitoring wells GZ-10 and GZ-15, indicate the metals have not migrated 10 to 20 feet from the leakage pathway point of entry into the soil. The Department of Health will continue to analyze all samples for these radioactive metals and hard-to-detect radioactive materials like

strontium-90, another fission product.

Groundwater Extraction

Extraction of contaminated groundwater from GZ-EW1 continues, and a sample from the "frac" tanks was measured at 1.05 million pCi/l by Vermont Yankee. Several thousand gallons of tritium-contaminated water have been extracted so far. This indicates the remediation by extraction appears to be effective – and may improve with the siting of GZ-EW2 in the vicinity of GZ-EW1, near GZ-7 (see well map).

Monitoring Well Test Results

Monitoring Well Test Results Testing by the Vermont Department of Health and Vermont Yankee of on-site and off-site drinking water well samples, as well as water taken from the Connecticut River, continue to show no tritium in excess of the lower limit of detection (<LLD). No on-site or off-site wells show any other radioactive materials related to nuclear power plant operations.

All results are expressed in terms of picocuries per liter (pCi/l), or below the lower level of detection (<LLD).

GZ-1:	<LLD
GZ-2:	<LLD
GZ-3:	45,000
GZ-4:	7,900
GZ-5:	<LLD
GZ-6:	<LLD
GZ-7:	974,000
GZ-8:	No sample; dry well
GZ-9:	<LLD
GZ-10:	9,500
GZ-11:	<LLD
GZ-12:	104,000
GZ-13S:	<LLD
GZ-13D:	1,060
GZ-14S:	231,000
GZ-14D:	<LLD
GZ-15:	687 ,000
GZ-16:	<LLD
GZ-17:	<LLD
GZ-18:	no well yet
GZ-19S:	<LLD
GZ-19D:	<LLD
GZ-20:	107,000
GZ-21:	1.22 million

March 29, 2010

Investigation/Remediation

The 'B" train of the hydrogen recombiner steam trap drain line is back in service. This is one of two pipes found to be badly corroded and leaking in the Advanced Off-Gas (AOG) pipe tunnel. The other pipe, the 'A' train has also been re-routed but is not yet working. Plant operators are investigating the situation.
The new extraction well GZ-EW1 has started pumping tritium-contaminated groundwater into a "frac" tank. From there the water will be filtered and stored for eventual re-use at the station. A second extraction well GZ-EW2 will be drilled within about five feet of GZ-EW1 in the next few days.

Materials have started to arrive on-site for the permanent re-routing of failed and vulnerable piping systems during the April and May 2010 refueling outage. This will include the A and B hydrogen recombiner steam trap drain lines and the AOG moisture separator drain lines that run below the AOG building.

Monitoring Well Test Results

Monitoring Well Test Results Testing by the Vermont Department of Health and Vermont Yankee of on-site and off-site drinking water well samples, as well as water taken from the Connecticut River, continue to show no tritium in excess of the lower limit of detection (<LLD). No on-site or off-site wells show any other radioactive materials related to nuclear power plant operations.

Vermont Yankee's test result for well GZ-13D is slightly positive for tritium at 1,060 pCi/l. Previously, GZ-13D has tested below the lower limit of detection (<LLD). This new result from Vermont Yankee's analysis is unexpected, because GZ-13D is adjacent to its companion shallow well GZ-13S, which continues to test negative for tritium and remains uncontaminated. Test samples are split with the Health Department, and as of today, our sample analysis results for this well are pending.

All results are expressed in terms of picocuries per liter (pCi/l), or below the lower level of detection (<LLD).

GZ-1:	<LLD
GZ-2:	<LLD
GZ-3:	45,000
GZ-4:	7,900
GZ-5:	<LLD
GZ-6:	<LLD
GZ-7:	943,000
GZ-8:	No sample; dry well
GZ-9:	<LLD
GZ-10:	19 ,000
GZ-11:	<LLD
GZ-12:	104,000
GZ-13S:	<LLD
GZ-13D:	1,060
GZ-14S:	221,000

GZ-14D:	<LLD
GZ-15:	687 ,000
GZ-16:	<LLD
GZ-17:	<LLD
GZ-18:	no well yet
GZ-19S:	<LLD
GZ-19D:	<LLD
GZ-20:	107,000
GZ-21:	535,000

March 25, 2010

Vermont Yankee Press Conference

Vermont Yankee officials held a press conference today that included Entergy's Executive Vice President for Operations Mark Savoff. Entergy announceed that it has "identified and stopped the source of tritium leakage" at the plant, and it "has begun initial work to support the remediation of soil and groundwater at the plant site." For more information, including Mr. Savoff's presentation, see the company's news release: VY Tritium Investigation Determines Source of Tritium in Groundwater.

Monitoring Well Test Results

Monitoring Well Test Results Testing by the Vermont Department of Health and Vermont Yankee of on-site and off-site drinking water well samples, as well as water taken from the Connecticut River, continue to show no tritium in excess of the lower limit of detection (<LLD). No on-site or off-site wells show any other radioactive materials related to nuclear power plant operations.

All results are expressed in terms of picocuries per liter (pCi/l), or below the lower level of detection (<LLD).

GZ-1:	<LLD
GZ-2:	<LLD
GZ-3:	52,000
GZ-4:	2,800
GZ-5:	<LLD
GZ-6:	<LLD
GZ-7:	856,000
GZ-8:	No sample; dry well
GZ-9:	<LLD
GZ-10:	32,000
GZ-11:	<LLD
GZ-12:	116 ,000
GZ-13S:	<LLD
GZ-13D:	<LLD
GZ-14S:	223,000

GZ-14D:	<LLD
GZ-15:	703,000
GZ-16:	<LLD
GZ-17:	<LLD
GZ-18:	no well yet
GZ-19S:	<LLD
GZ-19D:	<LLD
GZ-20:	179 ,000
GZ-21:	1.7 million

March 24, 2010

Progress is being reported on the temporary modification to re-route the 'A' train of the Advanced Off-Gas (AOG) hydrogen recombiner steam trap drain line.The B train has already been re-routed and is back in service. Once both the A and B trains are re-routed, this leak pathway to the AOG pipe tunnel and out into the environment will be eliminated. Vermont Yankee officials report that a remotely operated vehicle with a camera was used on March 23 to verify that there are no other leaks in the AOG pipe tunnel at this time. Continuous surveillance by camera is planned from now until the scheduled outage in April.

Permanent modifications of the steam trap drain lines are scheduled for the April 24, 2010 refueling outage. In addition, the drain lines from the A and B trains of the AOG hydrogen recombiner condenser moisture separators will also be permanently re-routed. These two drain lines run under the foundation of the AOG building. Although there is no direct evidence that they are leaking at this time, Vermont Yankee has decided to eliminate this vulnerability.

Vermont Yankee has begun to investigate other structures, systems and components for similar vulnerabilities as part of its Tritium Action Plan and root cause analysis. In the coming weeks, the Department of Health expects to review a copy of the root cause analysis and extent of condition report that examines these vulnerabilities.

Monitoring Well Test Results

Monitoring Well Test Results Testing by the Vermont Department of Health and Vermont Yankee of on-site and off-site drinking water well samples, as well as water taken from the Connecticut River, continue to show no tritium in excess of the lower limit of detection (<LLD). No on-site or off-site wells show any other radioactive materials related to nuclear power plant operations.

All results are expressed in terms of picocuries per liter (pCi/l), or below the lower level of detection (<LLD).

GZ-1:	<LLD
GZ-2:	<LLD
GZ-3:	52,000
GZ-4:	2,800
GZ-5:	<LLD

GZ-6:	<LLD
GZ-7:	856,000
GZ-8:	No sample; dry well
GZ-9:	<LLD
GZ-10:	32,000
GZ-11:	<LLD
GZ-12:	116 ,000
GZ-13S:	<LLD
GZ-13D:	<LLD
GZ-14S:	222,000
GZ-14D:	<LLD
GZ-15:	703,000
GZ-16:	<LLD
GZ-17:	<LLD
GZ-18:	no well yet
GZ-19S:	<LLD
GZ-19D:	<LLD
GZ-20:	179 ,000
GZ-21:	Pending

March 23, 2010

Steam Trap Drain Lines Re-routed

The 'B' train of the Advanced Off-Gas (AOG) hydrogen recombiner steam trap drain line has been temporarily re-routed to take it out of the AOG pipe tunnel. The B train is now back in service, allowing shut down of the A train last night. Workers will now modify and re-route the A train in the same manner.

Once both the A and B trains are re-routed, this leak pathway to the AOG pipe tunnel and out into the environment will be eliminated. A camera will be installed in the AOG pipe tunnel to monitor conditions there, and another remotely operated vehicle (ROV) inspection of the pipe tunnel will be completed to make sure all leaks have been elimated by these temporary modifications. Both A and B trains will be permanently re-routed during the April/May 2010 refueling outage.

Extraction Well Drilled

Drilling of the groundwater remediation extraction well was completed today, March 23. This well, GZ-EW1 and water filtration equipment should be ready sometime this week to begin pumping out significant quantities of tritium-contaminated water from the ground. This extracted water will be treated and stored on-site to be re-used by Vermont Yankee.

Monitoring Well Test Results

Monitoring Well Test Results Testing by the Vermont Department of Health and Vermont Yankee of on-site and off-site drinking water well samples, as well as water taken from the Connecticut River, continue to show no tritium in excess of the lower limit of detection (<LLD). No on-site or off-site wells show any other radioactive materials related to nuclear power plant operations.

All results are expressed in terms of picocuries per liter (pCi/l), or below the lower level of detection (<LLD).

GZ-1:	<LLD
GZ-2:	<LLD
GZ-3:	52,000
GZ-4:	2,800
GZ-5:	<LLD
GZ-6:	<LLD
GZ-7:	888,000
GZ-8:	No sample; dry well
GZ-9:	<LLD
GZ-10:	39 ,000
GZ-11:	<LLD
GZ-12:	116 ,000
GZ-13S:	<LLD
GZ-13D:	<LLD
GZ-14S:	204 ,000
GZ-14D:	<LLD
GZ-15:	703 ,000
GZ-16:	<LLD
GZ-17:	<LLD
GZ-18:	no well yet
GZ-19S:	<LLD
GZ-19D:	<LLD
GZ-20:	258 ,000
GZ-21:	1.7 million

March 22, 2010

'B' Pipe Re-routed

The 'B' train of the Advanced Off-Gas (AOG) hydrogen recombiner steam trap drain line has been temporarily re-routed to take it out of the AOG pipe tunnel. After this modification proves to be working correctly, the A train will be taken out of service for similar modifications. Once both the A and B trains are re-routed, this leak pathway to the AOG pipe tunnel and out into the environment will be eliminated. A camera will be installed in the AOG pipe tunnel to monitor conditions there, and another remotely operated vehicle inspection of the pipe tunnel is planned for March 23 to assure all leaks have been eliminated by these temporary modifications. Permanent modifications to both A and B pipes are planned for the April and May 2010 refueling outage. Other pipes may also be re-routed and other remediation work completed during the outage.

Groundwater Extraction Well Started

Drilling of groundwater extraction well GZ-EW1 is scheduled to start today, March 22. This well will be used to pump out about 300,000 gallons of the tritium-contaminated groundwater for treatment and re-use at the plant. The treated water will be stored in structures inside and outside Vermont Yankee buildings. Vermont

Yankee has indicated that outside storage will provide weather protection and containment berms will be constructed to collect spills.

Soil remediation planning is still underway, awaiting final results from a soil radioactivity analysis conducted the week of March 15. The Vermont Department of Health Laboratory will conduct independent analysis of the soil in the AOG pipe tunnel leakage pathway.

Monitoring Well Test Results

Testing by the Vermont Department of Health and Vermont Yankee of on-site and off-site drinking water well samples, as well as water taken from the Connecticut River, continue to show no tritium in excess of the lower limit of detection (<LLD). No on-site or off-site wells show any other radioactive materials related to nuclear power plant operations.

All results are expressed in terms of picocuries per liter (pCi/l), or below the lower level of detection (<LLD).

GZ-1:	<LLD
GZ-2:	<LLD
GZ-3:	51,000
GZ-4:	2,400
GZ-5:	<LLD
GZ-6:	<LLD
GZ-7:	980,000
GZ-8:	No sample; dry well
GZ-9:	<LLD
GZ-10:	87,000
GZ-11:	<LLD
GZ-12:	78,000
GZ-13S:	<LLD
GZ-13D:	<LLD
GZ-14S:	204 ,000
GZ-14D:	<LLD
GZ-15:	573,000
GZ-16:	<LLD
GZ-17:	<LLD
GZ-18:	no well yet
GZ-19S:	<LLD
GZ-19D:	<LLD
GZ-20:	309,000
GZ-21:	1.543 million

March 19, 2010

Recombiner Steam Trap Drain Lines Re-Routed

The 'B train' of the Advanced Off-Gas (AOG) hydrogen recombiner steam trap drain line has now been temporarily re-routed to take it out of the AOG pipe tunnel. After this modification proves to be working correctly, the A train will be taken out of service for similar modifications. Once both the A and B trains are re-routed, this leak pathway to the AOG pipe tunnel and out into the environment will have been eliminated. A camera will be installed in the AOG pipe tunnel to monitor conditions there.
Permanent modifications to both the A and B steam trap drain lines are planned for the April and May 2010 refueling outage. Other pipes may also be re-routed and other remediation work completed during the outage.

Soil Contamination Study

Results from a second analysis of soil samples taken on March 17 are still pending. These results will be important for understanding impacts on the soil near the leak at the AOG pipe tunnel, and potentially the groundwater contaminated by the leak. Split samples will be provided to the Vermont Department of Health Laboratory for independent analysis.

Soil and Water Remediation Plans

Decisions about further soil remediation will be partly based on results of the soil study. Planning for a contaminated groundwater extraction well near monitoring well GZ-7 continues. This 6-inch diameter well is scheduled for drilling on March 22. Over time, this well may pump out as much as 300,000 gallons of tritium contaminated groundwater. The extracted water will be treated and stored as radioactive water to be re-used by Vermont Yankee.

Monitoring Well Test Results

Testing by the Vermont Department of Health and Vermont Yankee of on-site and off-site drinking water well samples, as well as water taken from the Connecticut River, continue to show no tritium in excess of the lower limit of detection (<LLD). No on-site or off-site wells show any other radioactive materials related to nuclear power plant operations.

All results are expressed in terms of picocuries per liter (pCi/l), or below the lower level of detection (<LLD).

GZ-1:	<LLD
GZ-2:	<LLD
GZ-3:	51,000
GZ-4:	2,400
GZ-5:	<LLD
GZ-6:	<LLD
GZ-7:	987,000
GZ-8:	No sample; dry well
GZ-9:	<LLD
GZ-10:	97,000
GZ-11:	<LLD
GZ-12:	78,000

GZ-13S:	<LLD
GZ-13D:	<LLD
GZ-14S:	193,000
GZ-14D:	<LLD
GZ-15:	573,000
GZ-16:	<LLD
GZ-17:	<LLD
GZ-18:	no well yet
GZ-19S:	<LLD
GZ-19D:	<LLD
GZ-20:	353,000
GZ-21:	1.48 million

March 18, 2010

Recombiner Steam Trap Drain Lines Re-Routed

Temporary modifications to the two failed Advanced Off-Gas (AOG) hydrogen recombiner steam trap drain lines were well underway on March 17. The 'B train' has now been temporarily re-routed from its path through the Advanced Off-Gas (AOG) pipe tunnel to the AOG building floor drain system, which empties into the AOG drain tank. Vermont Yankee operators will now prepare the B train to go back into service, and take the A train out of service to make similar modifications. Once both the A and B trains are re-routed, the leak pathway to the AOG pipe tunnel and out into the environment will have been eliminated. A camera will be installed in the AOG pipe tunnel to monitor conditions there.

Second Soil Contamination Study

A second study began March 17 of the soil at the AOG pipe tunnel excavation where a major leak of tritiated water into the environment was identified. This study will evaluate radioactive contaminants in the soil for the length and width of the excavation, measuring concentrations of these contaminants in soil taken from different depths. To start, "core bore" samples of soil will be taken at the surface of the excavation, and at 2 feet and 4 feet below the surface of the excavation. Soils will be analyzed for materials including cobalt-60, manganese-54, zinc-65 and cesium-137. These radioactive metals were identified in the first soil study that was conducted when the excavation first uncovered the leakage pathway on Feb. 26. Split samples will be provided to the Vermont Department of Health Laboratory for independent analysis.

Extraction Well Planned

Planning for a contaminated groundwater extraction well near monitoring well GZ-7 continues. This 6-inch diameter well is scheduled for drilling on March 22. Over time, this well may pump out as much as 300,000 gallons of tritium contaminated groundwater. The extracted water will be treated and stored as radioactive water to be re-used by Vermont Yankee.

Monitoring Well Test Results

Testing by the Vermont Department of Health and Vermont Yankee of on-site and off-site drinking water well samples, as well as water taken from the Connecticut River, continue to show no tritium in excess of the lower limit of detection (<LLD). No on-site or off-site wells show any other radioactive materials related to nuclear power plant operations.

All results are expressed in terms of picocuries per liter (pCi/l), or below the lower level of detection (<LLD).

GZ-1:	<LLD
GZ-2:	<LLD
GZ-3:	51,000
GZ-4:	2,200
GZ-5:	<LLD
GZ-6:	<LLD
GZ-7:	1.2 million
GZ-8:	No sample; dry well
GZ-9:	<LLD
GZ-10:	135,000
GZ-11:	<LLD
GZ-12:	78,000
GZ-13S:	<LLD
GZ-13D:	<LLD
GZ-14S:	180,000
GZ-14D:	<LLD
GZ-15:	573,000
GZ-16:	<LLD
GZ-17:	<LLD
GZ-18:	no well yet
GZ-19S:	<LLD
GZ-19D:	<LLD
GZ-20:	530,000
GZ-21:	1.15 million

March 17, 2010

Vermont Yankee's Summary of Investigation To Date

Vermont Yankee held an on-site meeting of technical experts from Vermont, New Hampshire and Massachusetts on March 16 to report on the investigation into the tritium leak that was first identified on Jan. 7. Participants were provided a detailed overview of Vermont Yankee's findings, including hydrogeological findings for the site, environmental monitoring test results, a review of the mechanical failures that led to a major leak, and remediation plans for this source of the leak. Most of this information has been described in daily updates by the Vermont Department of Health over the past 10 weeks.

The major source of tritium contamination of groundwater - if not the only source - was identified at the Advanced Off-Gas (AOG) pipe tunnel, and the leak stopped on the weekend of Feb. 14, 2010. (The leak to the environment is depicted by blue water drops in the AOG Building schematic.)

Since that time, water samples taken from the nearest groundwater monitoring well, GZ-10, have shown decreasing tritium concentrations, and water samples taken from wells further east have shown increasing tritium concentrations. Wells GZ-7, GZ-15 and GZ-21 have shown tritium concentrations rising most quickly since the leak was stopped.

Tritium concentrations measured at wells further from the AOG pipe tunnel are expected to rise more gradually, because the soils close to the the AOG Building are more permeable than those between the AOG Building and the Connecticut River. It is expected that tritium concentrations at each of the contaminated well sites will gradually increase as the plume of tritium contamination moves slowly from west to east, peak, and then decline over the coming months.

Well test results show tritium-contaminated groundwater is moving from west to east into the Connecticut River, where it is diluted to below the lower level of detection. Hydrogeology studies of the site also show that groundwater flows toward the river. Vermont Yankee officials also described plans to continue inspecting plant systems and components, as well as steps to repair, re-route or otherwise remediate other potential leak sources.

Vermont Yankee engineers described plans for groundwater remediation. An extraction well may be drilled near well GZ-7 to extract contaminated groundwater from the immediate vicinity of the well. Up to 300,000 gallons of groundwater could be extracted over time, and this water would be treated for future re-use in the plant systems. Provisions for storing this water on-site are being evaluated. Engineers described the specific temporary modifications being planned for the two failed hydrogen recombiner steam trap drain lines in the AOG pipe tunnel. Also discussed by the engineers were plans for a second soil study near the original point of leakage at the AOG pipe tunnel where main steam condensate water escaped the tunnel, contaminated the local soil with various radioactive materials, and contaminated groundwater with tritium.

Monitoring Well Test Results

Testing by the Vermont Department of Health and Vermont Yankee of on-site and off-site drinking water well samples, as well as water taken from the Connecticut River, continue to show no tritium in excess of the lower limit of detection (<LLD). No on-site or off-site wells show any other radioactive materials related to nuclear power plant operations.

All results are expressed in terms of picocuries per liter (pCi/l), or below the lower level of detection (<LLD):

GZ-1:	<LLD
GZ-2:	<LLD
GZ-3:	51,000
GZ-4:	2,200
GZ-5:	<LLD
GZ-6:	<LLD
GZ-7:	1.095 million
GZ-8:	No sample; dry well
GZ-9:	<LLD

GZ-10:	168,000
GZ-11:	<LLD
GZ-12:	78,000
GZ-13S:	<LLD
GZ-13D:	<LLD
GZ-14S:	199,000
GZ-14D:	<LLD
GZ-15:	573,000
GZ-16:	<LLD
GZ-17:	<LLD
GZ-18:	no well yet
GZ-19S:	<LLD
GZ-19D:	<LLD
GZ-20:	438,000
GZ-21:	1.705 million

March 16, 2010

Leaking Pipes to be Re-Routed

Temporary modifications for the two hydrogen recombiner steam trap drain lines are in progress. The modification will eliminate the failed piping in the Advanced Off-Gas (AOG) pipe tunnel that has been draining directly into the tunnel and to the AOG pit sump through the floor drain, and will provide a direct path from the steam trap drain lines to the AOG drain tank. A more substantial enclosure over the AOG pipe tunnel excavation is also being constructed. This is necessary because the excavation will be open until the scheduled April and May 2010 refueling outage. During the outage, workers will more thoroughly clean out the AOG pipe tunnel to prevent the tunnel's floor drain from getting clogged with debris still left in the pipe tunnel. Vermont Yankee may then install a camera in the pipe tunnel for continuous surveillance until the outage, when more permanent fixes are planned.

Tritium Event Investigation Analysis

Vermont Yankee engineers are returning to conducting a “root cause analysis” of the tritium leaks.This process is a formal means of evaluating the event to identify the possible causes, how the event compares to other nuclear power plant operating experiences, and whether the extent of conditions that led to the contamination of groundwater at the pipe tunnel are possible at other locations on site. There may be other pipes subject to the same type of corrosion that caused the two hydrogen recombiner steam trap drain lines to fail. There may be other floor drains that could get clogged with debris and cause contaminated water to collect in building or tunnel spaces. There may be more flaws in concrete joints that would allow contaminated water to leak into the groundwater. This root cause analysis should lead to actions that prevent such failures from recurring.

Remediation Plans for Contaminated Soil and Groundwater

Vermont Yankee is now evaluating plans for remediation of contaminated soil and groundwater. Results from a detailed soil study in the excavation area should inform decisions about remediation.The soil study will for a second time use measurements of radioactivity in the soil near the leakage pathway to identify the extent and magnitude of soil contamination. The ability to shore up the walls of excavation deeper than it is already shored

will also be a consideration in remediation plans. An extraction well may be drilled in the vicinity of well GZ-7 to pump out contaminated ground water. Vermont Yankee has to act quickly on this decision as the groundwater is moving, and there is a limited time frame for contaminated water to be available for extraction at a given location.

Geophysical Testing of Drinking Water Wells

Vermont Yankee has completed geophysical testing of the last of six drinking water wells on site. This testing is done to characterize the condition of the bedrock through which these deep wells are drilled, to better determine if the bedrock will prevent the shallower groundwater from contaminating the deeper water drawn by the drinking water wells. Preliminary geophysical testing results from the first well tested, the Construction Office Building (COB) well, are expected on March 16. Vermont Department of Health and Agency of Natural Resources technical staff will be on site at Vermont Yankee, along with their counterparts from New Hampshire and Massachusetts, for that report.

Monitoring Well Test Results

Testing by the Vermont Department of Health and Vermont Yankee of on-site and off-site drinking water well samples, as well as water taken from the Connecticut River, continue to show no tritium in excess of the lower limit of detection (<LLD). No on-site or off-site wells show any other radioactive materials related to nuclear power plant operations.

The Tritium Concentration Graphs show test rsults from Vermont Yankee over time. These graphs show generally decreasing tritium concentrations at well GZ-10, where a source of groundwater contamination was found and terminated on Feb. 14. The graphs of other tritium contaminated wells, especially GZ-7 and GZ-15 show a generally increasing trend. Taken together, the graphs show the plume of contaminated groundwater gradually moving from west to east, from GZ-10 to the Connecticut River.

With well GZ-21 now in service, there are now a total of nine contaminated wells. GZ-21 is very close to the presumed center line of the plume of tritium contamination, and between the Containment Access Building and the Advanced Off-Gas (AOG) building west of well GZ-15. In contrast, well GZ-10, which at one time resulted in tritium concentrations of more than 2.5 million picocuries per liter (pCi/l) now is down to 202,000 pCi/l. This well next to the original leakage pathway continues to shed its groundwater to the east.

All results are expressed in terms of picocuries per liter (pCi/l), or below the lower level of detection (<LLD):

GZ-1:	<LLD
GZ-2:	<LLD
GZ-3:	51,000
GZ-4:	2,200
GZ-5:	<LLD
GZ-6:	<LLD
GZ-7:	1.11 million
GZ-8:	No sample; dry well
GZ-9:	<LLD

GZ-10:	202,000
GZ-11:	<LLD
GZ-12:	57,000
GZ-13S:	<LLD
GZ-13D:	<LLD
GZ-14S:	166,000
GZ-14D:	<LLD
GZ-15:	572,000
GZ-16:	<LLD
GZ-17:	<LLD
GZ-18:	no well yet
GZ-19S:	<LLD
GZ-19D:	<LLD
GZ-20:	514,000
GZ-21:	1.705 million

March 12, 2010

New Connecticut River Test Results from New Hampshire

A new round of testing by the New Hampshire Department of Health & Human Services laboratory again showed no detectable levels of tritium in the Connecticut River on the New Hampshire side. The lower limit of detection is less than 500 picocuries per liter (<500 pCi/L).

New Well GZ-21

New groundwater monitoring well GZ-21 is expected to be completed on March 12. This well is located at the centerline of the plume of tritium contamination and on a line that could be drawn between well GZ-7 and GZ-15 (see map of well locations). Water test results from this well will help rule out other possible sources of tritium contamination such as the condensate storage tank. This is likely to be the last monitoring well to be drilled. One or more extraction wells to pump out contaminated water from the ground may be sited next week if Vermont Yankee chooses to clean up the tritium plume in this way.

Soil Characterization Study

Vermont Yankee staff are planning another soil study in the Advanced Off-Gas (AOG) Building excavation, possibly starting the week of March 14. Like the first study conducted on February 26, 2010, soil samples will be taken using a "core bore" to get soil from varying depths in the excavation to quantify the travel of radioactive materials into the soil from the AOG pipe tunnel pathway. From the original study, soil samples were found to have concentrations of manganese-54, cobalt-60 and zinc-65 similar to what might be found in plant condensate water. There were also amounts of cesium-137 measured in this soil.

Groundwater Monitoring Well Testing

Testing by the Vermont Department of Health and Vermont Yankee of on-site and off-site drinking water well samples, as well as water taken from the Connecticut River, continue to show no tritium in excess of the lower limit of detection. No on-site or off-site wells show any other radioactive materials related to nuclear power plant operations.

The Tritium Concentration Graphs (see below) show test results from Vermont Yankee over time. These graphs show generally deceasing tritium concentrations at well GZ-10, where a source of groundwater contamination was found and terminated on February 14, 2010. The graphs of other tritium contaminated wells, especially GZ-7 and GZ-15 show a generally increasing trend. Taken together, the graphs show the plume of contaminated groundwater gradually moving from west to east from GZ-10 to the Connecticut River.
To date, tritium has been detected in eight groundwater monitoring wells, all on-site.

All results are expressed in terms of picocuries per liter (pCi/l), or below the lower level of detection (<LLD).

GZ-1:	<LLD
GZ-2:	<LLD
GZ-3:	34,000
GZ-4:	2,200
GZ-5:	<LLD
GZ-6:	<LLD
GZ-7:	1.168 million
GZ-8:	No sample; dry well
GZ-9:	<LLD
GZ-10:	342,000
GZ-11:	<LLD
GZ-12:	57,000
GZ-13S:	<LLD
GZ-13D:	<LLD
GZ-14S:	160,000
GZ-14D:	<LLD
GZ-15:	572,000
GZ-16:	<LLD
GZ-17:	<LLD
GZ-18:	no well yet
GZ-19S:	<LLD
GZ-19D:	<LLD
GZ-20:	539,000

March 11, 2010

AOG Pipe Tunnel Inspection Completed, Two Pipes to be Re-Routed

Vermont Yankee report that inspection of the inside of the AOG pipe tunnel has been completed, and the equipment used in that inspection, including the remotely operated vehicle, is being removed. Vermont Yankee has concluded that both the A and B hydrogen recombiner steam trap drain lines are the only leaking components inside the tunnel, and the leak that was found at the point where the AOG drain line connects to the tunnel is the only leakage pathway to the environment. (This point is represented by blue water drops on the AOG Building schematic.)

The A pipe was isolated and the leak stopped on Feb. 14. The B pipe is in a place where it cannot be isolated, and must be kept in service. Plans for a temporary modification are being made to provide both the A and B lines a complete, leak-free path to the AOG drain tank. Permanent modification of both lines is planned for the scheduled April to May 2010 refueling outage. Some kind of leak monitoring method is being considered for the AOG pipe tunnel.

Meanwhile, none of the leakage from the B pipe still in service is leaking into the environment. Any leakage is being routed by the AOG pipe tunel floor drain to the AOG pit sump. From there it is pumped through underground pipes to the rad waste building for re-use. Vermont Yankee reports that this piping does not leak.

More Testing Planned

Two other underground pipes located beneath the foundation of the AOG Building may soon be tested for their structural integrity. These pipes may also be re-routed during the refueling outage. Vermont Yankee may also test the condensate storage tank (CST) a third time. Vermont Yankee engineers are evaluating whether some ultrasonic or visual testing of the CST floor is needed. The floor of this 500,000 gallon tank of radioactive reactor water was last inspected and repaired in 1993.

Inventory and Status of Other Pipe Systems

Vermont Yankee is also making an inventory of other inaccessible pipe tunnels like the AOG pipe tunnel, as well as other floor drains that must be checked for clogging. The Department of Health has also asked Vermont Yankee for a list of the inspection and remediation status of the 41 underground pipe systems that carry radioactive reactor water.

New Well GZ-21

Hydroexcavation and drilling of well GZ-21 is scheduled for March 11. This is the last groundwater monitoring well to be drilled, other than GZ-18 near the river's edge and in the centerline of the plume. An extraction well, to pump out contaminated water from the ground may also be drilled if Entergy chooses to clean up the tritium plume in this way.

Groundwater Monitoring Well Testing

Testing by the Vermont Department of Health and Vermont Yankee of on-site and off-site drinking water well samples, as well as water taken from the Connecticut River, continue to show no tritium in excess of the lower limit of detection. No on-site or off-site wells show any other radioactive materials related to nuclear power plant operations.

To date, tritium has been detected in seven groundwater monitoring wells, all on-site.

All results are expressed in terms of picocuries per liter (pCi/l), or below the lower level of detection (<LLD).

GZ-1:	<LLD
GZ-2:	<LLD
GZ-3:	46,000
GZ-4:	3,100
GZ-5:	<LLD
GZ-6:	<LLD

GZ-7:	1.076 million
GZ-8:	No sample; dry well
GZ-9:	<LLD
GZ-10:	456,000
GZ-11:	<LLD
GZ-12:	35,600
GZ-13S:	<LLD
GZ-13D:	<LLD
GZ-14S:	157,000
GZ-14D:	<LLD
GZ-15:	590,000
GZ-16:	<LLD
GZ-17:	<LLD
GZ-18:	no well yet
GZ-19S:	<LLD
GZ-19D:	<LLD
GZ-20:	645,000

March 10, 2010

Remotely Operated Vehicle (ROV) Inspection

The remote operated vehicle (ROV) inspection of the AOG pipe tunnel is nearing completion. Inspection of the inside of the AOG pipe tunnel has revealed two specific pipe failures. Both the A and B hydrogen recombiner steam trap drain lines inside the pipe tunnel are corroded and leaking. The A pipe was isolated and the leak stopped on Feb. 14. The B pipe is in a place where it cannot be isolated, and must be kept in service. Plans for a temporary modification are being made to provide both the A and B pipes a complete, leak-free path to the AOG drain tank. Complete modification of both lines is planned for the scheduled April to May 2010 refueling outage. Meanwhile, none of the leakage from the B pipe still in service is leaking into the environment. Any leakage is being routed by the AOG pipe tunnel floor drain to the AOG pit sump.

Groundwater Monitoring Well Testing

Well GZ-10, which had previously showed tritium contamination at 2.5 million picocuries per liter (pCi/l), tested at 525,000 pCi/l on March 9, 2010. Vermont Yankee technicians sampled it on March 8, and results at about 600,000 pCi/l were so much lower than previous days that it could have been an error. With two days of significantly lower concentrations and re-checking testing protocol, Vermont Yankee is now confident of these results.

A new well is also providing new data. This is well GZ-20 located between well GZ-10 and GZ-7, near the condensate storage tank. A sample from this well came in at 624,000 pCi/l. Another new well, GZ-21, on the southern edge of the tritium plume between well GZ-10 and GZ-16, may be providing valid samples by Friday. Testing by the Vermont Department of Health and Vermont Yankee of on-site and off-site drinking water well samples, as well as water taken from the Connecticut River, continue to show no tritium in excess of the lower limit of detection. No on-site or off-site wells show any other radioactive materials related to nuclear power plant operations.

To date, tritium has been detected in seven groundwater monitoring wells, all on-site.

All results are expressed in terms of picocuries per liter (pCi/l) or below the lower level of detection.

GZ-1	<LLD
GZ-2	<LLD
GZ-3	46,000
GZ-4	3,100
GZ-5	<LLD
GZ-6	<LLD
GZ-7	1.115 million
GZ-8	No sample; dry well
GZ-9	<LLD
GZ-10	456,000
GZ-11	<LLD
GZ-12	36,000
GZ-13S	<LLD
GZ-13D	not commissioned yet
GZ-14S	147,000
GZ-14D	<LLD
GZ-15	590,000
GZ-16	<LLD
GZ-17	<LLD
GZ-18	no well yet
GZ-19S	<LLD
GZ-19D	<LLD
GZ-20	624,000

*Results are expressed in picocuries per liter (pCi/l). All of the wells that have shown no contamination have results expressed as "<LLD" (below the lower limit of detection).

March 9, 2010

Remotely Operated Vehicle (ROV) Inspection

Remote inspection of the inside of the AOG pipe tunnel continues, though the ROV was stuck in "mud" made by the combination of concrete dust and condensate water from leaking pipes. It is this mud that clogged the floor drain of the pipe tunnel, allowing more water to collect and rise to a level where it leaked from the tunnel into the groundwater. The ROV is being used to inspect the inside of the tunnel to try to identify the leak source(s) and check on the overall structural integrity.

Second Leaking Steam Trap Drain Line Identified

On March 5, engineers at Vermont Yankee located another leaking pipe in the AOG pipe tunnel that is identified as the 'B hydrogen recombiner steam trap drain line.' A dime-size hole was found on one side of the pipe, with

more corrosion on the other side. This is likely responsible for the 100 gallons per day leak rate into the pipe tunnel.

This 'B' pipe is back-up to the 'A' hydrogen recombiner steam trap drain line, which was also verified to be leaking. The 'A' pipe was isolated and the leak stopped on Feb. 14. The 'B' pipe is in a place where it cannot be isolated, so engineers are determining if the drain line can be temporarily relocated until a longer term fix can be accomplished during the refueling and maintenance outage scheduled for April and May. Other pipes that could be corroded - especially those buried in soil under the AOG Building - would also be relocated during the outage, when radiation levels in the spaces where the piping runs will be significantly reduced at that time.

New Wells Tracking Contamination

Vermont Yankee reports that new groundwater monitoring well GZ-20 is nearly ready for service. This well is located between well GZ-10 and GZ-7, near the condensate storage tank. Samples from this well may help identify leak sources near the tank or elsewhere away from the AOG pipe tunnel that has been verified as a source of leaks. Excavation for GZ-21 is planned for March 10, to be located between GZ-10 and GZ-16, just east of the AOG building. Testing of well GZ-16 is reported at less than the lower limit of detection (<LLD), further substantiating the southern edge of tritium contamination.

- Monitoring Well Location Map (pdf)

For the first time, well GZ-10 is not showing the highest levels of tritium contamination, while wells GZ-7, 15, 12, 3, 14 and 4 are all showing increasing levels of tritium contamination. This is more evidence that tritiated ground water has been moving away from the source(s) along the presumed centerline of the leak and down toward the Connecticut River.

Groundwater Monitoring Well Testing

Testing by the Vermont Department of Health and Vermont Yankee of on-site and off-site drinking water well samples, as well as water taken from the Connecticut River, continue to show no tritium in excess of the lower limit of detection. No on-site or off-site wells show any other radioactive materials related to nuclear power plant operations.

To date, tritium has been detected in seven groundwater monitoring wells, all on-site.

All results are expressed in picocuries per liter (pCi/l). All of the wells that have shown no contamination have results expressed as "<LLD" (below the lower limit of detection).

Well	Test Result*
GZ-1	<LLD
GZ-2	<LLD
GZ-3	52,000
GZ-4	2,800
GZ-5	<LLD
GZ-6	<LLD
GZ-7	1.121 million
GZ-8	No sample; dry well
GZ-9	<LLD
GZ-10	1.025 million

GZ-11	<LLD
GZ-12	22,000
GZ-13S	<LLD
GZ-13D	not commissioned yet
GZ-14S	164,000
GZ-14D	<LLD
GZ-15	593,000
GZ-16	<LLD
GZ-17	<LLD
GZ-18	no well yet
GZ-19S	<LLD
GZ-19D	<LLD

March 5, 2010

ROV Inspection AOG Pipe Tunnel

Workers at Vermont Yankee removed concrete blocks and placed a remotely operated vehicle (ROV) inside the Advanced Off-Gas (AOG) pipe tunnel. The ROV is being used to inspect the inside of the tunnel to try to identify a source of liquid that is leaking there, and to check the overall structural integrity of the tunnel.

ROV inspection located a hole in the side wall of a pipe in the tunnel. The hole is leaking enough steam and water that it is likely to be responsible for the 100 gallons per day leak rate into the pipe tunnel.

Ultrasonic testing of the condensate storage tank (CST) is due to begin the week of March 8. This inspection of the bottom of the tank will take several days. Other piping of interest will be also be tested ultrasonically, using technology that tests the inside and outside of piping runs using sound waves. This is especially useful when a length of piping runs underground. Two such lines run under the AOG Building.

New Monitoring Well

New well GZ-14D came fully on-line today. This well is immediately adjacent to GZ-14S (what had been called GZ-14) at what is assumed to be the centerline of the underground plume of tritium contaminated groundwater. While GZ-14 S is at a depth of about 30 feet below ground level, GZ-14D is at about 70 feet below ground level. The paired wells give some measure of the transport of contaminants from the groundwater in soil nearer the surface compared to those closer to bedrock.

The GZ-14D sample was reported by VY today at 2,300 picocuries per liter (pCi/l). While this is still early in this well's history, it is clear that there are differences in tritium concentrations nearer and farther from the ground level as evidenced by GZ-14S testing most recently at 144,000 pCi/l.

Testing for "Hard to Detect" Radionuclides

The first results of analyses performed for radioactive materials that are hard to detect were reported by Vermont Yankee today. These include strontium-90, iron-55 and nickel-63. Water samples from wells GZ-3, GZ-4 and GZ-14 were analyzed by the plant's contract laboratory, Teledyne Brown of Tennessee.

No evidence of any of these hard to detects was found. Other well samples, including from GZ-10 near the leakage path are being tested now for hard to detects. The Vermont Department of Health will have these analyses conducted independently by a private commercial laboratory.

Groundwater Monitoring Well Test Results

All Vermont Department of Health and Vermont Yankee on-site and off-site drinking water well samples continue to show no tritium in excess of the lower limit of detection. No on-site or off-site wells show any other radioactive materials related to nuclear power plant operations.

Well results reported by Vermont Yankee today are listed below. All of the wells that have shown NO contamination have results expressed as "<LLD" (below the lower limit of detection).

All measurements are expressed in picocuries per liter (pCi/l) of tritium:

GZ-1:	<LLD
GZ-2:	<LLD
GZ-3:	52,000
GZ-4:	2,800
GZ-5:	<LLD
GZ-6:	<LLD
GZ-7:	1.085 million
GZ-8:	No sample; dry well
GZ-9:	<LLD
GZ-10:	1.118 million
GZ-11:	<LLD
GZ-12:	22,000
GZ-13S:	<LLD
GZ-13D:	not commissioned yet
GZ-14S:	156,000
GZ-14D:	2,300
GZ-15:	593,000
GZ-16:	not commissioned yet
GZ-17:	<LLD
GZ-18:	no well yet
GZ-19S:	<LLD
GZ-19D:	<LLD

March 4, 2010

AOG Pipe Tunnel Excavation

Vermont Yankee workers removed concrete blocks from the AOG pipe tunnel today to provide access for a robot – a "remotely operated vehicle" called a ROV. The ROV will be used to visually inspect the tunnel for leakage pathways out of the tunnel into the environment. The ROV will also allow inspection for the source of a liquid leak of about 100 gallons of water per day into the tunnel from pipes in the tunnel. This liquid is being

processed through the pipe tunnel floor drain to the AOG pit sump, but the source needs to be identified for repair.

The ROV may also be used to inspect the floor of the Condensate Storage Tank (CST). This inspection may begin Saturday February 6, and will take several days to complete. The CST contains more than 500,000 gallons of highly tritiated water, and has been subjected to multiple inspections.

Tritium Testing in Wells

Vermont Yankee reports that well GZ-10, sited within 15 feet of the AOG pipe tunnel leakage pathway, was sampled at its lowest tritium concentration yet. All Vermont Department of Health and Vermont Yankee on-site and off-site drinking water well samples continue to show no tritium in excess of the lower limit of detection. No on-site or off-site wells show any other radioactive materials related to nuclear power plant operations.

Well results reported by Vermont Yankee today are listed below. All of the wells that have shown NO contamination have results expressed as "<LLD" (below the lower limit of detection).

All measurements are expressed in picocuries per liter (pCi/l) of tritium:

GZ-1:	<LLD
GZ-2:	<LLD
GZ-3:	52,000
GZ-4:	2,800
GZ-5:	<LLD
GZ-6:	<LLD
GZ-7:	983,000
GZ-8:	No sample; dry well
GZ-9:	<LLD
GZ-10:	1.25 million
GZ-11:	<LLD
GZ-12:	22,000
GZ-13S:	<LLD
GZ-13D:	not commissioned yet
GZ-14S:	144,000
GZ-14D:	not commissioned yet
GZ-15:	593,000
GZ-16:	not commissioned yet
GZ-17:	<LLD
GZ-18:	no well yet
GZ-19S:	<LLD

GZ-19D:	<LLD

March 3, 2010

AOG Pipe Tunnel Excavation

Vermont Yankee technicians have completed a thorough visual inspection of the concrete pipe that surrounds the AOG drain line (labeledOGE-100-G1 Drain Line on the AOG Building schematic). The purpose of this inspection was to look for any other possible cracks, gaps or pathways that would allow contaminated water to escape the pipe into the environment. This visual inspection was documented by video camera. No obvious pathways were observed, but a full report on this inspection is expected.

Workers are also completing the above-ground enclosure that will help protect the excavation area from the weather while more inspections and tests are done.

Further inspection of the AOG pipe tunnel is planned for March 4 or 5, using a robot – a "remotely operated vehicle" called a ROV. The ROV will be placed into the tunnel through an opening in the tunnel wall made by removing some of the concrete blocks around the point where the AOG drain line enters the pipe tunnel. This is the location of the leak that was verified by testing on Feb. 27, and depicted on the AOG building schematic (see maps) as blue water drops coming from the AOG pipe tunnel.

Ultrasonic and visual inspection of the inside of the condensate storage tank is also planned. The condensate storage tank has been implicated in tritium leaks at a number of other nuclear power plants. Although this tank has been inspected twice already during this investigation, these will be the first inspections from within the tank. A submersible ROV will be used in this investigation because the condensate storage tank will still contain water when these tests are conducted.

Groundwater Monitoring Wells

Sampling from GZ-10, the groundwater monitoring well that has consistently had the highest measurements for tritium, continues to show declining contamination. Test results reported by Vermont Yankee on March 3 were the lowest yet, at 1.41 million picocuries per liter (pCi/l). This is still a very high concentration of radioactivity.

A new groundwater monitoring well, GZ-17, has provided evidence that tritium contamination appears to be moving from the plant structures directly to the river, and not out in other directions. GZ-17is situated in the Maintenance Building to the west of the AOG pipe tunnel leak, and to the west of GZ-10. Test results by Vermont Yankee so far have been reported at less than the lower limit of detection (LLD). Hydrogeologists consider it unlikely that contamination would move against the observed groundwater flow, and test results from GZ-17 are so far confirming this. New groundwater monitoring well, GZ-19S, is also testing below the lower limit of detection, further evidence that tritium contamination does not extend more to the south of GZ-4.

Well GZ-20, planned for just southeast of the condensate storage tank, is at an early stage of planning. Sited between GZ-10 and GZ-7, it may help clarify whether there are other sources contributing to the high tritium concentrations at GZ-7. Well GZ-21 is planned between the Containment Access Building and the AOG Building.

Current Groundwater Monitoring Well Test Results

No drinking water wells, either on-site at Vermont Yankee or off-site, have been found to be contaminated with tritium, according to analyses by both Vermont Yankee and the Vermont Department of Health. No radioactive materials other than tritium have been found in any water samples analyzed by either laboratory.

All of the wells that have shown NO contamination have results expressed as "<LLD" (below the lower limit of detection). Tritium contamination remains fairly stable at the contaminated wells.

Not all wells are sampled every day. Following are the most current test results. All results showing contamination with tritium are expressed in picocuries per liter (pCi/l).

	March 2, 2010	March 3, 2010
GZ-1	<LLD	
GZ-2	<LLD	
GZ-3	49,000	
GZ-4	1,900	
GZ-5	<LLD	
GZ-6	<LLD	
GZ-7	959,000	
GZ-8	dry well (not being sampled)	981,000
GZ-9	<LLD	
GZ-10	1.54 million	
GZ-11	<LLD	1.41 million
GZ-12	45,000	
GZ-13S	<LLD	
GZ-13D	In development	
GZ-14S	142,000	
GZ-14D	In development	135,000
GZ-15	449,000	<LLD
GZ-16	In development	
GZ-17	<LLD	
GZ-19S	In development	
GZ-19D	In development	<LLD

March 1, 2010

AOG Pipe Tunnel Tests

Boroscopic examination of the inside of the Advanced Off-Gas (AOG) pipe tunnel conducted on February 28 revealed no observable defects in the AOG drain line itself. The 2-inch carbon steel pipe appears to be intact from where it connects to the 12-inch diameter AOG pipe tunnel to the concrete duct that surrounds the drain line until the drain line reaches the AOG drain pit (see the AOG building schematic). An inch-by-inch inspection of the entire length of the concrete duct that surrounds the drain line is in progress. The boroscopic inspection allowed further observation of the point where the concrete duct and the pipe tunnel connect. This inside view shows there is enough space between the concrete duct and the PVC sleeve around the drain line to allow water to leave the pipe tunnel and enter the soil and groundwater outside the tunnel.

Excavation also revealed that, at the point where the drain line reaches the pipe tunnel, the concrete wall of the tunnel had been cut away, and concrete blocks were mortared into place. Vermont Yankee reports this dates back to 1978, when the drain line was added on to the AOG pipe tunnel. Vermont Yankee workers are planning

to remove some of these concrete blocks to place a robot in the tunnel. The robot will carry a video camera to allow better observation of the tunnel interior than is possible by boroscope. This is important because there is some source of contaminated water still leaking into the tunnel. This water runs through the floor drain into the AOG drain pit sump, where it is pumped to the Rad Waste Building for reprocessing. So far, the path for this water into the environment is not evident.
Other integrity tests of the pipe tunnel and the rest of the AOG drain line will have to be made to confirm that there are no other paths to the environment. In addition, other system components will have to be examined for their integrity. Ultrasonic testing of two pipes that run beneath the AOG Building from moisture separator drains to the AOG drain tank may begin the week of March 8, 2010. Ultrasonic testing of the condensate storage tank, which holds about 500,000 gallons of radioactive process water is scheduled for March 5.

Remediation Planning
Radioactive waste specialists from Entergy are at Vermont Yankee to evaluate possible remediation techniques. These include pumping contaminated water from the ground for reprocessing or radioactive waste disposal. Soil remediation efforts are also to be discussed.

Drinking Water Well Geophysical Tests
Over the weekend, geophysical testing of Vermont Yankee-owned drinking water wells began. The Construction Office Building was tested first, and this was followed by the southwest well. Three additional wells along Governor Hunt Road, at the western site boundary, are to be tested this week. The Plant Support Building well should be tested on March 12. These tests are being done to better characterize the bedrock through which the drinking water wells are drilled, as well as the integrity of the well itself. They help substantiate the protective separation of the groundwater and drinking water.

Well Drilling
New wells will be ready to begin sampling soon. These include GZ-13D, GZ-14D, and GZ-19D. These will complete three pairs of coupled wells that provide information about the vertical characteristics of groundwater by sampling at different depths at the same location. New result from GZ-19S is less than the lower limit of detection. GZ-17 may also provide a valid sample soon. This well is to the west of the AOG pipe tunnel leakage source. This will help define the extent of contamination away from the general flow of groundwater from the AOG pipe tunnel and well GZ-10. This general flow is east to the Connecticut River. A site for GZ-16 has been identified, and drilling for it may begin soon. This, along with GZ-19S and GZ-19D, may help better define the southern edge of the tritium plume. Plans in the near term include landing a new well between GZ-10 and GZ-7, and near the condensate storage tank (CST) in an effort to detect other leaks near the CST.

Tritium Testing in Wells
All Vermont Department of Health and Vermont Yankee on-site and off-site drinking water well samples continue to show no tritium in excess of the lower limit of detection. No on-site or off-site wells of any kind show other radioactive materials related to nuclear power plant operations.
Contaminated well results reported by Vermont Yankee today are listed below. All measurements are expressed in picocuries per liter (pCi/l) of tritium:

GZ-3:	45,000
GZ-4:	4,400
GZ-7:	893,000

GZ-10:	1.62 million
GZ-12:	16,000
GZ-14:	142,000
GZ-15:	449,000

FEBRUARY:

February 28, 2010

Testing Verifies Leak

On Saturday, Feb. 27, Vermont Yankee personnel conducted the leak test on the Advanced Off-Gas (AOG) pipe tunnel, and verified a leak at the point where the AOG pipe tunnel meets the 2-inch drain line. (The crack is depicted on the AOG Building schematic as blue water drops coming from the AOG pipe tunnel.) See below for description of leak test.

Taken together with other findings, results of the leak test and soil tests (see below) is good evidence that the crack revealed by excavation at the AOG pipe tunnel on Feb. 26 represents a significant pathway for radioactive water from the AOG pipe tunnel into the environment in the recent past.

This pathway likely allowed nuclear steam that condensed into standing water on the floor of the pipe tunnel, while the floor drain was clogged, to leak into the environment. The radioactive water then likely contaminated the soil nearby with radioactive solids, and the groundwater nearby and for several hundred feet east to the Connecticut River with tritium.

The nuclear steam leak was isolated on Feb. 14. That same day, the AOG pipe tunnel floor drain was also unclogged and the standing water in the pipe tunnel was drained from the tunnel. Knowing this, it is likely that the source of contaminated water that likely flowed through the AOG pipe tunnel and out to the environment has been stopped for two weeks. Tritium concentrations measured at well GZ-10, the well nearest the leaking AOG pipe tunnel, have generally been decreasing since then.

NOTE: This may not be the only leak, and the investigation will continue to search for other possible leaks.

AOG Pipe Tunnel Leak Test

The test started by plugging the AOG pipe tunnel floor drain. The tunnel was then flooded with about 500 gallons of de-mineralized pure water. When the water was high enough to reach the 2-inch concrete AOG drain line (OGE-100-G1 on the AOG Building schematic), the water flowed from inside the tunnel to outside the tunnel through the crack in the concrete and PVC piping that was discovered during excavation early morning on Feb. 26. (The crack is depicted on the schematic as blue water drops coming from the AOG pipe tunnel.) The water that leaked out from the AOG pipe tunnel was captured in the catch containment at the bottom of the excavation.

Soil Testing near the Leak

Vermont Yankee has analyzed soil samples taken from the AOG excavation on Feb. 26. From these, “split samples” have been sent to the Vermont Department of Health Laboratory for independent analysis.

There are two things different about soil measurements compared to water measurements:

Water sample results are reported in picocuries per liter (pCi/l) because the analysis is by volume. Soil sample results, as reported below, are in picocuries per gram (pCi/g) because the analysis is by mass (or weight).

All of the results presented below are for radioactive materials other than tritium. Soil analyses for tritium have not yet been made. The radioactive materials that make up the total activity reported below include cobalt-60,

manganese-54, zinc-65, cesium-137 and barium-140. These radioactive materials are metals and, as expected, they have only been found near the source of this leak. They have not been found in any groundwater or drinking water samples. These metals are common contaminants found in nuclear process waters like the condensed nuclear steam discovered on Feb. 12 in the AOG pipe tunnel.

Soil Test Results

Samples were taken using a "core bore" to get soil from varying depths in the excavation directly beneath the point of the leak.
Vermont Yankee reports that their testing shows the overall solids activity concentration for soil at varying depths to be approximately:
2.4 pCi/g soil layer closest to the leak
2.2 pCi/g 2 feet deeper
1.1 pCi/g 4 feet deeper
0.85 pCi/g 6 feet deeper

These results clearly show radioactivity levels decreasing for samples taken further from the source of the leak. No radioactive solids like cobalt-60, manganese-54, zinc-65, cesium-137 and barium-140 are detectable at a distance of 12 feet from the point of the leak.
NOTE that these are some of the earliest measurements and analyses. Vermont Department of Health measurements will be conducted as soon as possible after samples arrive at the public health laboratory.

Well Testing and Drilling

Geophysical testing of the Construction Office Building (COB) well has started. Test results are too preliminary to draw any conclusions.
Drilling of well GZ-17 inside the Maintenance Building and just west of the AOG pipe tunnel leakage source has reached a depth of 22 feet below ground level.

Well test results for GZ-10 reported by Vermont Yankee for Feb. 27 were at about 1.71 million pCi/l. The highest measurement for GZ-10 was about two weeks ago at about 2.5 million pCi/l). GZ-7 tested at 946,000 pCi/l, well GZ-15 tested at 449,000 pCi/l and well GZ-14 pCi/l.
These are all groundwater monitoring wells. There are no reports of drinking water contaminated with tritium, on-site or off-site, either by Vermont Yankee or the Vermont Department of Health Laboratory. The only radioactive contaminant detected in any wells to date is tritium. No other radioactive materials related to nuclear power plant operations have been found in any on-site or off-site drinking or groundwater monitoring samples.

Continuing Work

On Sunday, Feb. 28, the AOG pipe tunnel wall exposed by excavation will be bored with holes to allow examination with boroscope camera of the interior of the pipe tunnel. This may provide further evidence of this as the radioactive water pathway from plant systems and structures into the environment.
Vermont Yankee will also conduct geophysical tests of its on-site drinking water wells. These include the West Well and the South Well that supply commingled water for the plant's main drinking water supply, as well as the PSB Well that serves the Plant Support Building. Geophysical testing is being done to better characterize the

structure and fractures of the bedrock between the shallow groundwater and the deeper drinking water, and the possibility for groundwater to contaminate drinking water.

February 26, 2010

As of 4:30 p.m. on Friday, Feb. 26, there are no new significant developments. State agency personnel will be on site at Vermont Yankee and on call over the weekend to monitor activities and to collect and receive samples as needed. Installation of the catch containment should be completed tonight. Leak testing of the tunnel is scheduled for Saturday, Feb. 27. New wells will continue to be drilled and developed for service, and well sampling will continue over the weekend.

AOG Excavation Reveals Crack in Pipe Tunnel

At about 5:00 a.m. on Feb. 26, Vermont Yankee unearthed the concrete AOG pipe tunnel that carries the 2-inch drain line (labeled OGE-100-G1 Drain Line on the AOG Building schematic) at the point where the drain line connects to the AOG pipe tunnel. This revealed a substantial crack in the concrete and the PVC pipe that surrounds and carries the drain line into the tunnel. (This is depicted on the schematic as blue water drops). The crack runs from the outside of the concrete duct into the pipe tunnel.

This finding is good visual evidence of a possible pathway from the AOG pipe tunnel into the earth and groundwater.

Soil samples collected by a "core bore" taken from varying depths below the AOG pipe tunnel are being analyzed now by Vermont Yankee, with the expectation that analysis will show contamination with radioactive materials. Preliminary word from Vermont Yankee is that other radioactive materials have been detected in the soil, including isotopes of manganese, zinc and cesium. A split sample will be delivered to the Vermont Department of Health Laboratory for independent analysis.

Results may substantiate this crack as at least one pathway of contaminated water from the plant structures and systems into the groundwater.

Health Department staff are on site to monitor the continuing work. The Vermont Department of Health has requested that all findings and actions taken be documented by video and other means.

Although this is a significant finding that is consistent with previous findings (nuclear steam, standing water in the tunnel, and a clogged floor drain) more definitive evidence is still needed. "Leak testing" with pure demineralized water is scheduled for this weekend, Feb. 27 and Feb. 28, to help identify the actual mechanism and pathway more definitively.

This may not be the only pathway, and the investigation continues.

February 25, 2010

COB Well Disconnected

The Construction Office Building (COB) drinking water well was disconnected today. An alternative water supply has been routed from the Environmental Laboratory Facility, and connection to the COB is planned for today.

Geophysical testing of the COB well is scheduled to begin today, Feb. 25, to evaluate the approximately 350 feet of bedrock, through which well passes

This will be followed by geophysical testing of five other drinking water wells over the next week. Health Department staff will monitor this work over the weekend. The purpose of the geophysical testing is to better understand the bedrock and isolation of the groundwater from drinking water. Reports from the geophysical testing of a well are expected to be available seven to 10 days after the test is complete.

Excavation at the Advanced Off-Gas (AOG) pipe tunnel has unearthed the concrete duct around the 2-inch AOG drain line at its southern end. A crack in the duct can be seen, but radioactivity indicative of a leak has not been measured from soil samples at that part of the excavation. Excavation at the north end, where the concrete duct seats against the pipe tunnel, is proceeding today, and visual inspection may be possible later today of this part of the drain line concrete duct for leakage. This excavation is time-consuming, as much of this work is by hand. Leak testing of the tunnel will take place after a catch basin is laid into the base of the excavation. Leak testing will be performed with demineralized water. Boroscopic inspection through holes to be drilled through the pipe tunnel wall should be done over the weekend, Feb. 27 and 28. This may help identify the source of what appear to be fluids draining from the pipe tunnel to the AOG pit. These fluids appear to be generating about 100 gallons per day.

New Wells

New wells in the final stages of development are GZ-13D, GZ-14D, GZ-19S and GZ-19D. Well GZ-16 is being restarted after dealing with an obstruction. GZ-17 is in the initial stages of excavation. GZ-17 will help establish contamination levels west of the AOG excavation, while the other five are set to help better characterize the groundwater horizontally as well as, and for the first time, vertically.

Well Test Results

Daily monitoring of tritium concentration in groundwater wells on site continues. Results of today's tests by Vermont Yankee for tritium concentrations are below, all in picocuries per liter (pCi/L):

GZ-3:	42,000
GZ-4:	2,400
GZ-7:	892,000
GZ-10:	1.79 million
GZ-12:	32,000
GZ-14:	122,000
GZ-15:	552,000

February 24, 2010

Due to weather conditions, Vermont Yankee has suspended all but essential operations, and most workers who are not required for safe operation of the plant have been sent home. Continuing the excavation is considered an essential operation and will continue – see below.

Excavation

Excavation of the area around the Advance Off-Gas (AOG) pipe tunnel is approaching the 15 foot depth needed for visual inspection, and Vermont Yankee expects to complete the entire excavation by 6:00 a.m. Thursday, Feb. 25.

Vermont Yankee reports they have found an indication of a crack in the concrete duct around the 2-inch AOG drain line. This is the original point of interest as a potential source of the tritium leak. Although there is no absolute evidence of leakage, this is an important finding, as the crack may represent a possible pathway to groundwater. Further excavation will allow better characterization of the extent and depth of the crack.

If the excavation is successfully completed, Vermont Yankee expects to install the catch containment by noon on Feb. 26. The catch containment is a flexible structure designed to capture potentially contaminated soil and water. Leak checks on the pipe tunnel and the interface with the concrete duct would then likely begin during the day on Feb. 27.

There are plans to bore holes through the concrete pipe tunnel and to inspect the pipe tunnel with a boroscope over the weekend, Feb. 27 and 28. Vermont Yankee continues to test soil in the excavation. Test results to date show levels of contamination consistent with other soils on site, and at this time do not positively indicate any leakage.

Advanced Off-Gas (AOG) Pit Sump

The AOG pit sump continues to pump out about 100 gallons of water per day. This may indicate some leakage in the pipe tunnel.

Monitoring Wells

Well GZ-17, near the AOG excavation, is marked and drilling may begin Friday, Feb. 24. Well GZ-14(D) is being developed for sampling but is not yet ready. Well GZ-19(S) is complete and will be in service soon, while GZ-19(D) is being drilled and may be in service by Feb. 26. Wells identified with the "D" designation are deeper than those without, and those with the "S" designation. Both the shallow and deep wells are paired to better characterize layering of the groundwater in the ground above bedrock.

Well Test Results

Daily monitoring of tritium concentration in groundwater wells on site continues. Results of today's tests by Vermont Yankee for tritium concentrations are below, all in picocuries per liter (pCi/L):

GZ-7: 982,000

February 23, 2010

Advanced Off-Gas (AOG) Pipe Tunnel

According to Vermont Yankee, final preparations for full excavation of the AOG pipe tunnel are underway. This is the area that has emerged over the past weeks as a point of great interest for finding the source or sources of the tritium leak.

Excavation to a depth that allows visual observation of possible leakage pathways may be completed within the next 48 hours. Final preparations include installation of braces and shoring to prevent a cave-in, excavating to a depth of about 15 feet below the ground, installing a "catch containment" to capture potentially contaminated soils and water, and erecting an external enclosure above and over the excavation and the radiologically controlled area inside the excavation. Once this is accomplished, an "integrity test" of the pipe tunnel is planned to help locate specific leakage pathways from the tunnel to the environment.

Soil samples are being taken as the excavation proceeds. So far, all soil tests have only shown concentrations of plant-related radioactive materials similar to those concentrations recorded in the 1993 soil characterization.

New Well Drilling

New groundwater monitoring wells GZ-13D and GZ-14D have been drilled to their final depth and will be in service soon. Samples may be available from each in the next day or two. New groundwater monitoring wells GZ-19 and GZ-19D were being drilled, but an obstacle was encountered at GZ-19. Wells identified with the "D"

designation are deeper than those without. Both the shallow and deep ("D") wells are paired to better characterize layering of the groundwater in the ground above bedrock.

None of these groundwater monitoring wells passes through bedrock. Vermont Yankee officials have put a moratorium on drilling wells through the bedrock at this time as a precaution against the possibility of contaminating deep water sources that supply drinking water wells through fractures in the bedrock.

New groundwater monitoring well GZ-17 may be started this week. This is an important well as it is west of the AOG excavation area, and it may better identify the extent of the contamination plume in the area west of well GZ-10. Well GZ-16 also encountered an obstacle and it is being re-sited. Well GZ-18, at the shore of the Connecticut River and near the projected centerline of the plume is on hold. Technicians are taking river water samples from as near to this point as they can, given the ice-over on the river, by pumping directly from the water's surface.

Geophysical Testing of Wells

Geophysical testing of wells on site is set to begin later this week. Vermont Yankee reports that at least six wells will be tested in this way. Geophysical testing uses instruments that are physically inserted into the well, and they are used to help identify fractures in the bedrock.

'Dose Assessment' Report

A report on potential doses from the groundwater tritium is expected Wednesday. This report was reviewed by Vermont Department of Health scientists in a draft form on Feb. 18. The report calculates the possible dose to humans from this event. The Health Department is independently evaluating potential doses using its own dose models, and will evaluate the findings of the Entergy dose report after reviewing all of the calculations and assumptions in detail.

One potential source of dose, from eating fish, was reported on today by Vermont Yankee. Their tritium analysis of fish samples found no activity above the minimum detectable activity. Analyses for other radionuclides is pending. Department of Health analyses of fish for tritium and other radioactive materials are also pending.

Well Test Results

Daily monitoring of tritium concentration in groundwater wells on site continues.

Results of today's tests by Vermont Yankee for tritium concentrations are below, all in picocuries per liter (pCi/L):

GZ-3:	42,000
GZ-4:	2,100
GZ-7:	941,000
GZ-10:	1.687 million
GZ-12:	32,000
GZ-14:	119,000
GZ-15:	552,000

All other groundwater monitoring wells and drinking water wells, both on-site and off-site were reported to be less than the lower limit of detection. Vermont Department of Health Laboratory analytical results are reported in the tables found in the surveillance page at this site.

February 22, 2010

Advanced Off Gas (AOG) Pipe Tunnel

According to Vermont Yankee, excavation near the Advanced Off Gas (AOG) Pipe Tunnel started up again over the weekend, progressing to a depth of 11 feet below ground level. This area, and the pipes contained within the tunnel, has emerged over the past weeks as a point of great interest for finding the source(s) of the tritium leak. The current goal is to reach a depth of at least 15 feet to uncover and inspect the concrete pipe tunnel for potential pathways for leakage from the pipe to the ground. Ground water is present at about 23 feet below the surface of the ground near this excavation.

As the excavation progresses, bracing and shoring must be installed to hold back the dirt wall and prevent a cave-in. When excavation is completed, a "catch containment" will be set up to capture as much leaking water from potential sources as possible. Also, an above-ground enclosure will be erected. This building-like structure will provide weather protection for the excavation area, and will be used to control access to what will be a radiologically-controlled area (RCA). An RCA is an area of the facility controlled to protect personnel from exposure to radiation and radioactive materials. To enter, personnel must meet special requirements – such as wearing dosimeters that record worker radiation exposures, and to work under the specific instructions and permissions of a radiation work permit.

Once the catch containment and above-ground enclosure is complete, leak testing of the pipe tunnel can begin. This leak testing could begin as early as Wednesday. It will be conducted with demineralized water, which may be dyed to allow spotting by its fluorescence. If dyes are used, it would be done in accordance with Agency of Natural Resources requirements.

During the excavation, samples of water and soil will be taken. So far, down to this 11 foot depth, there is no evidence of tritium nor of other nuclear plant-related radioactive materials beyond what is expected in soils at most areas of the plant.

Following integrity testing of the AOG pipe tunnel, new efforts will be made to inspect the A and B hydrogen recombiner moisture separator drains. This piping runs under the AOG building to the AOG pit, which is at the west side of the AOG excavation. The piping is not actually visible from the excavation. Imaging technology, excavation under the AOG, or additional wells may be needed to test whether this piping leaks.

Construction Office Building (COB) Drinking Water Well

Geophysical testing is now planned for the Construction Office Building (COB) drinking water well. This testing will help hydrogeologists better understand the on-site drinking water wells and fractures in the bedrock through which the wells are drilled. Geophysical testing should also provide a better assessment of the risk of contaminating the COB well at a depth of about 350 feet below ground, with tritium contamination that is present in the groundwater at a depth of about 30 feet underground.

To date, no contamination of this sort has occurred – all COB well samples have been free of tritium and any other nuclear plant-related radioactive materials.

Vermont Yankee plans to disconnect the COB well from the water system it currently serves, and redirect water from other plumbing on site to take its place. Vermont Yankee is working with the Agency of Natural Resources on this alternate water supply.

Unless geophysical testing reveals that daily sampling might lead to contamination of the water sources that supply the COB well, Vermont Yankee officials state they plan to continue taking samples from the COB well, after the geophysical testing. This is important because these samples can provide drinking water monitoring within the plume area.

Well Test Results

Daily monitoring of tritium concentration in groundwater wells on-site continues.

Results for today are listed below, all in picocuries per liter (pCi/l):

GZ-4:	2,700
GZ-12:	19,000
GZ-3:	32,000
GZ-14:	118,000
GZ-15:	342,000
GZ-7:	966,000
GZ-10:	1,810,000

February 19, 2010

AOG Excavation

Preparations for the new approach to the excavation near the Advanced Off Gas (AOG) system area continued today. The new approach is needed to make sure the excavation area is safely shored up before work proceeds.

AOG Pipe Tunnel

Water appears to be still leaking from a source within the AOG Pipe Tunnel. There is visible movement of water within the tunnel, which can only be seen using a boroscope inserted through the concrete wall of the tunnel. The AOG pit sump to which the pipe tunnel drains is collecting about 100 gallons each day before being pumped from the sump to the Rad Waste Building.

Well Test Results

Vermont Yankee reports the following water sampling tests results for today: (All measurements are in picocuries per liter.)

GZ-3:	30,233
GZ-4:	2,709
GZ-7:	973,094
GZ-10:	1.993 million
GZ-12:	13,547
GZ-14:	119,206
GZ-15:	355,155

Note about Cobalt-60 and other Radioisotopes

There are often reports that cobalt-60 or other radioactive materials have been found in samples. These reports so far are of water within plant buildings or systems. It is expected that most nuclear plant process water will have cobalt-60 and other radioactive materials in it. It would NOT be expected to find these other radionuclides

in the environment outside of plant systems, structures or buildings except near the source of a leak. However, to monitor this, water and soils are being tested for all these other radionuclides.
To date, tritium is the only radionuclide that has been detected. Tritium contamination has been detected in seven specific groundwater monitoring wells on-site at Vermont Yankee. There has been no tritium or any other nuclear plant-related radionuclide detected in drinking water wells on or off-site.

New Groundwater Monitoring Wells
Well drilling continues, with new coupled wells GZ-13D and GZ-14D the furthest along. Wells GZ-16 and GZ-19 are planned to be next in line.

February 18, 2010
Excavation Work
The new approach for excavating the area around the Advanced Off-Gas (AOG) Building is in its initial stages. Successful excavation of this area is important because it may positively identify the source or sources of leaks responsible for contaminating groundwater with tritium.

AOG Sump Pit
AOG pit sump appears to have pumped 100 gallons of water to the rad waste building over the last 24 hours. This is a possible indicator of leakage within the pipe tunnel which drains to this sump. This is the drain that was recently unclogged, and may have collected water from nuclear steam leaking into the tunnel.

On-Site Water Testing
Vermont Yankee's test results for today of on-site groundwater monitoring wells are provided below for seven wells that have shown contamination with tritium so far. There are seven other wells on site that have shown no contamination. None of the wells have shown any other radioisotopes associated with a nuclear power plant. The location of the wells can be seen on the Investigation Site Map. Wells GZ-3, GZ-4 and GZ-14 are about 100 feet from the river. GZ-10 is near the excavation area, about 400 feet from the river. GZ-7 is closer to the excavation site, about 350 feet from the river. GZ-15 is about 250 feet from the river. GZ-12 is about 200 feet from the river. None of the river water samples tested so far have shown contamination with tritium or any other reactor-related materials.
Feb. 18 ground water monitoring well test results (all in picocuries per liter):

GZ-3:	31,000
GZ-4:	2,700
GZ-7:	990,000
GZ-10:	1.99 million
GZ-12:	18,000
GZ-14:	113,000
GZ-15:	305,000

New Wells and Related Testing
Additional wells are also being drilled or in development. Well GZ-13D is nearing completion, and drilling of GZ-14D is underway. These will be used to better characterize the hydrogeological conditions underground at the site. Wells GZ-16, GZ-17 and GZ-19 will be prepared next week.

Planning is underway for geophysical testing of numerous drinking water wells on the site, looking for fractures in the bedrock. The locations of these fractures in the drinking water wells allows for characterization of the bedrock and the separation of drinking water and ground water.

Independent Water Testing

Independent testing by the Vermont Department of Health Laboratory has generally verified test results by Vermont Yankee's contractor. The Health Department continues testing a number of off-site drinking water wells. To date, no drinking water wells have shown contamination with tritium or any other radioisotopes associated with a nuclear reactor.

February 17, 2010

Excavation Work

According to Vermont Yankee, the original plan for excavating the area around the Advanced Off-Gas (AOG) Building is not working, and a new approach is set to begin as soon as materials and safety preparations are in order. This new approach may begin Thursday, February 18. Successful excavation of this area is important because it may positively identify the source or sources of leaks responsible for contaminating groundwater with tritium.

On-Site Water Testing

Vermont Yankee's test results for today of on-site groundwater monitoring wells are provided below for seven wells that have shown contamination with tritium so far. In addition, there are seven other wells on site that have shown no contamination. None of the wells have shown any other radioisotopes associated with a nuclear power plant. You can see the location of the wells on the Map of Investigation Site (see below). In general terms, GZ-3, GZ-4 and GZ-14 are about 100 feet from the river. GZ-10 is near the excavation area, about 400 feet from the river. GZ-7 is closer to the excavation site, about 350 feet from the river. GZ-15 is about 250 feet from the river. GZ-12 is about 200 feet from the river. None of the river water samples tested so far have shown contamination with tritium or any other reactor-related materials.

Feb. 17 ground water monitoring well test results (all in picocuries per liter):

GZ-3	32,000 pCi/l
GZ-4	2,400 pCi/l
GZ-7	991,000 pCi/l
GZ-10	1.99 million pCi/l
GZ-12	18,800 pCi/l
GZ-14	113,800 pCi/l
GZ-15	305,00 pCi/l

Of note is the decrease in tritium concentrations at GZ-10 compared to the last few measurements. Although this may be a coincidence, it follows after fixing the steam leak that was identified within the AOG pipe tunnel, and removal of standing water from the pipe tunnel floor. However, concentrations in wells east of GZ-10 have not varied much, or appear to be slowly increasing. It is still too early to determine a trend. Well GZ-8 was set, but it is a dry well at this time.

Independent Water Testing

To date, independent testing by the Vermont Department of Health Laboratory has generally verified test results by Vermont Yankee's contractor. In addition, the Health Department is testing a number of drinking water wells off-site. To date, no drinking water wells have shown contamination with tritium or any other radioisotopes associated with a nuclear reactor.

New Wells Planned

Other wells are also being drilled, planned or considered. GZ-13D and GZ-14D are underway, and they will be used to better characterize the hydrogeological conditions underground at the site. Plans are being made for wells GZ-16, GZ-17 and GZ-19. GZ-16 and GZ-19 may provide some better definition of the southern flank of the plume, positioned between GZ-10 and GZ-9 near the excavation area and GZ-4 and GZ-5 near the river. GZ-17 may reveal the extent of contamination just west of the AOG excavation area. GZ-18 will eventually go in by the river just east of GZ-14, but plans are on hold for personnel safety issues related to the weather and the terrain near the shore.

February 16, 2010

New Well GZ-15

Over the weekend, Vermont Yankee reported that groundwater monitoring well GZ-15 was completed and put into service. GZ-15 is located in the Containment Access Building that is east of the Advanced Off-Gas (AOG) Building. This new well is approximately on the line formed by connecting well GZ-10 near the southwest corner of the AOG Building and GZ-14 near the Connecticut River.

GZ-15 tested in the range of 238,000 picocuries per liter (pCi/l) for tritium, according to Vermont Yankee. This result somewhat substantiates the location of GZ-15 as mid-point of the groundwater contamination plume that runs from the AOG pipe tunnel, pit, and drain line as well as some buried piping, on its way down to the Connecticut River.

Using the most recent groundwater monitoring well data, the plume of tritium contamination starts with a concentration of 2,112,000 pCi/l at GZ-10, believed to be near the source(s) of the leak, past the area of well GZ-7 where the concentration of tritium is about 949,000 pCi/l, past the new well GZ-15 at about 238,000 pCi/l and on to well GZ-14 near the river at about 90,300 pCi/l.

Excavation Work

Excavation near the AOG building and well GZ-10 is ongoing. This excavation is now about 13 feet long and 7 feet wide, and will eventually be about 15 feet deep. The area of excavation is roughly bounded on the north by the AOG pipe tunnel, by the AOG building on the east, and by the turbine building on the west. The purpose of the excavation is to uncover the AOG pipe tunnel, pit, drain and piping associated with the AOG system to be examined as the source(s) of groundwater contamination.

This work will take some time because the area contains safety-related fuel oil piping and electrical conduit that service the emergency diesel generators, and a solid structure to support the excavation and the exposed piping and services is being constructed. In addition, a rugged enclosure is being built over the excavation area to provide weather protection, negative pressure ventilation, radiologically-controlled area access restrictions and other services such as lighting, electricity and heat.

Soil and Water Testing

As the excavation progresses over the next several days, soil and water samples will be taken for testing. These

samples will be split with the Department of Health, as well as any other evidence that may help substantiate that a particular component failure is related to the groundwater tritium contamination. Soil and water samples will be analyzed for tritium and other radioisotopes related to nuclear plant operations. Vermont Yankee has some mitigation plans for piping and other components that are found to be leaking, and other plans are being evaluated. Planning for long-term repairs (for example re-routing underground pipes that carry radioactive materials so they are no longer buried) is beginning.

AOG Pipe Tunnel

The steam and standing water observed in the AOG pipe tunnel last week was also addressed over the weekend. Operators identified the steam source, the B recombiner steam trap drain piping, and isolated it. They also dislodged a blockage in the drain line from the pipe tunnel to the AOG Pit accessing the blockage from the sump side of the drain. This released much of the standing water from the floor of the pipe tunnel into the sump. The sump was then pumped down to the rad waste building for processing. The water in the pipe tunnel was heavily tritiated, as was the nuclear steam. This means each had tritium concentrations in excess of about 2 million pCi/l. Once the standing water and nuclear steam were removed, an inspection of the pipe tunnel was undertaken. No obvious source of leakage from the pipe tunnel into the ground was identified. The excavation will likely be needed to complete this investigation.

More Monitoring Wells Planned

Drilling has begun for well GZ-13D, to be followed by GZ-14D. These wells, along with GZ-16, GZ-19 and GZ-19D, will continue to improve our understanding of the underground flow of groundwater and the protection of drinking water.

GZ-16 will be sited west of the AOG excavation to more precisely map the western edge of the tritium plume. Its siting and drilling is complicated by the construction of the maintenance shop floor where the well is to be drilled.

GZ-18 is planned to be drilled very close to the river, following the line from the potential plant sources at GZ-10 through GZ-14. Until GZ-18 is drilled, samples of river water at this interface between the river to the east and the land to the west, may be obtained by boat in the river (as long as the river is not frozen over at that site).

February 12, 2010

Vermont Yankee reported today that they were able to enter the Advanced Off-Gas (AOG) Pipe Tunnel with a boroscope. A boroscope is a small camera on a line that may be inserted into otherwise inaccessible areas. Through boroscopic inspection, Vermont Yankee staff identified what appears to be a steam leak, and what appears to be water pooling in part of the floor of the pipe tunnel. While this pipe tunnel is an area of significant interest as workers seek to find a source of ground water tritium contamination, a specific pathway to the environment from this pipe tunnel has NOT been located.

Excavation of the area next to this pipe tunnel and the AOG drain line may reveal a pathway. Excavation is just beginning again after stopping at a depth of 4 feet on Feb. 11. It may be some time before the excavation reaches a depth where evaluation is possible.

Test results reported today from ground water samples are showing similar concentrations of tritium as described previously: GZ-3 is at 28,600 picocuries per liter (pCi/l); GZ-4 is at 2,500 pCi/l; GZ-7 is at 948,000 pCi/l; GZ-10 is at 2.23 million pCi/l; GZ-12 is at 19,800 pCi/l; and GZ-14 is at 86,400 pCi/l.

All of the drinking water wells and the remaining seven active ground water monitoring well samples resulted in tritium levels below the limits of detection. All wells still show no evidence of other reactor-related radioactive materials.

Well GZ-15, in the Containment Access Building (CAB) has been completed. This new well is east of the AOG and in about what is considered the probable centerline of the tritium plume. Reliable test results may be available tomorrow, and these samples may substantiate the centerline of the plume at that distance between the AOG drain line excavation area and the Connecticut River.

Other wells are still being sited, with drilling scheduled to take place over the weekend.

February 11, 2010

Today, GZA Environmental, a consultant hired by Vermont Yankee, presented preliminary information from an ongoing hydrogeology assessment of the site. Up to eight new wells may be drilled to better complete the hydrogeological assessment.

According to Vermont Yankee, current tritium results for today are wells: GZ-1, 2, 5, 6, 9, 11, and 13 are all at less than the limits of detection; GZ-3 is at 28,600 picocuries per liter (pCi/l); GZ-4 is at 2,500 pCi/l; GZ-7 is at 948,000 pCi/l; GZ-10 is at 2,230,000 pCi/l; GZ-12 is at 19,800 pCi/l; and GZ-14 is at 86,000 pCi/l.

To date, none of the drinking water samples, on- or off-site, and none of the river water samples tested by either Vermont Yankee or the Health Department laboratory have detected tritium contamination.

Excavation work at the Advanced Off-Gas (AOG) Building near well GZ-10 and some buried underground lines and the concrete duct bank that holds the AOG drain line may continue Friday, and proceed slowly over the weekend. Reaching a depth where visual assessment is possible may take until Monday.

February 10, 2010

Vermont Yankee reported ground water monitoring well sample results for today. GZ-10 continues to have the highest concentration of tritium, at 2.28 million picocuries per liter (pCi/L). Test results from this well have fluctuated up and down around 2.2 to 2.6 million pCi/L since the well went into service February 6.

Tritium concentrations in two other wells appear to be trending upward. GZ-7 is now reporting at 937,000 pCi/l, and GZ-14 is at 93,000 pCi/l. GZ-4 tested at 2,792 pCi/l, GZ-3 tested at 38,427 pCi/l, and GZ-12 tested at 22,636 pCi/l. These also appear to be trending higher as compared with previous days.

However, these are still relatively small numbers of samples from each well, and trends will only be reliable once many more samples are tested from each well.

All other wells - GZ-1, GZ-2, GZ-5, GZ-6, GZ-9, GZ-11, GZ-13, the COB, PSB and Main drinking water wells, and the Connecticut River have tested negative for tritium. Well GZ-8 is drilled but dry, and therefore not being sampled.

No nuclear plant-related radionuclides were identified in the gamma spectroscopy of all of the above samples.

According to Vermont Yankee, excavation near the Advanced Off-Gas (AOG) drain line and other piping of interest has been completed to 4 feet in depth. Further excavation is now on hold while comprehensive safety analyses are being made. Some limited work may begin again tomorrow, with possible excavation down to 10 to 15 feet beneath the surface on Friday and Saturday.

Inspection of the AOG pipe tunnel by boroscope and robotics continued today. Results are still inconclusive. The AOG pit sump continues to be evaluated for evidence of leaks in to the pit.

Three new wells, GZ-15, GZ-16 and GZ-17, are planned to be drilled around the AOG Building. These are intended to better understand the nature of the tritium plume and the nature of groundwater flow on site.

February 9, 2010

Vermont Yankee staff continue with the extensive planning required to excavate near well GZ-10. This is an area between the Advanced Off-Gas (AOG) building, the turbine building and the condensate storage tank.
Samples from well GZ-10 continue to test at high concentrations of tritium, in the range of 2.4 million picocuries per liter (pCi/l).
There are several piping runs of interest in this area. Because safety considerations are complex and extensive, planning for the excavation and actual excavation to a depth of 10 to 15 feet may not be completed for many days. Today, workers excavated to about a depth of 4 feet, where they will hold until risk analyses are complete.
Meanwhile, Vermont Yankee reports that tritium results from other groundwater monitoring wells remain in the range where they have previously been measured, with GZ-3 near 39,000 pCi/l, GZ-4 near 2,500 pCi/l, GZ-7 near 890,000 pCi/l, and GZ-14 near 81,000 pCi/l.
One exception is GZ-12. This well had previously tested at about 6,900 pCi/l. Today, it tested at 23,000 pCi/l.
Tests of other wells are showing results below the limits of detection. These are GZ-1, GZ-2, GZ-5, GZ-6, GZ-9, GZ-11 and GZ-13. GZ-8, west of the plant buildings, came up dry.
All wells, both groundwater monitoring and drinking water wells, are testing negative for other reactor-related radioactive materials by gamma spectroscopy. Soil samples at or near wells and excavations remain similar to the 1993 soil characterization study results.
Vermont Yankee is continuing with other inspections of the AOG pipe trench, the service water ball joint trench, and the AOG pit sump. To date, no leaks have been found that can be linked conclusively to the groundwater tritium contamination.

February 8, 2010
Vermont Yankee reported today that a sample from well GZ-10, which was reported at about 2.45 million picocuries per liter (pCi/l) on Saturday February 6, 2010, was analyzed today with similar results, about 2.38 million pCi/l. Vermont Yankee staff are preparing to excavate in the area near this well to inspect underground piping and a concrete pipe duct that contains what has been called the 2" off-gas drain line. There are at least two other piping runs of interest in this area, and they are 2" drain lines from the off-gas moisture separators. This will require extensive preparations to implement safety and radiological controls due to the nature of plant service systems in the excavation area.

Other monitoring wells are reporting values similar to what has been common over the past weeks: GZ-7 is reported at 890,713 pCi/l; GZ-14 at 81,547 pCi/l; GZ-3 at 39,199, and GZ-4 at 2,560 pCi/l. A new well, GZ-12, showed tritium results of 6,912 pCi/l. Right now, there are a total of 13 groundwater monitoring wells on site, leaving GZ-1, GZ-2, GZ-5 GZ-6, GZ-9, GZ-11, and GZ-13 at less than the limits of detection. These are all tritium concentrations. No other reactor-related radioisotopes have been identified by gamma spectroscopy.
One additional groundwater monitoring well is in its final stages of readiness. This is well GZ-8 on the west side of the plant, in an area believed to be upstream of the prevailing flow of groundwater from the west and under or around plant structures, and ultimately to the Connecticut River. It is possible that more wells may be sited in the coming days.

The picture that is forming from wells testing positive for tritium is a corridor of contaminated groundwater running from the turbine building to the Connecticut River, with a width at the turbine building end defined somewhat by wells GZ-11 and GZ-9, and by GZ-3 and GZ-14 at the river. This is a very large area that encompasses many potential sources of water at this concentration of tritium, including the condensate storage tank and the systems and components of the Advanced Off-Gas (AOG) system.

Many other systems and components are still being inspected, including the AOG tunnel, the AOG pit sump and the rad waste trench. Vermont Yankee has also indicated that they have prepared "temporary modification packages" to be used to stop a leak once it is identified.

February 6, 2010

Vermont Yankee reported this afternoon that GZ-10, a new ground water monitoring well located near the Advanced Off-Gas (AOG) system, sampled at 2.45 million picocuries per liter (pCi/L) for tritium.
This is about three times the concentration measured yesterday in ground water monitoring well GZ-7, and is approaching that of reactor process water, 2.9 million pCi/L for tritium.
GZ-10 is located near the AOG drain line excavation made to inspect a concrete duct bank that encases a 2" drain pipe. It is also near two buried pipes that carry reactor process water.
All of these must be visually inspected for leaks to identify if one or more are a source of the groundwater contamination.
This inspection will likely require excavation of the earth near these pipes, and will begin as soon as preparations for safe and effective work allow.
The concentrations of tritium measured today and yesterday indicate there are one or more sources that are leaking highly contaminated water into the ground.

February 5, 2010

Vermont Yankee reported today that they succeeded in accessing the Advanced Off-Gas (AOG) pit and took a sample from the AOG pit sump. Vermont Yankee tested the sample and found 2,700,000 pCi/L from a small sample. This is significant in that the sump discharges its contents through underground piping that connects from the AOG pit to the rad waste building for processing. That underground piping could be leaking.
Excavation is planned for this area, and a new well is being considered to further evaluate this site. As a preventive measure, the sump has been turned off and the controls "tagged out" (locked).
New well GZ-7 showed tritium concentration of about 834,000 pCi/L, up from about 775,000 yesterday. GZ-7 is located between the Advanced Off-Gas Building and the Reactor and Turbine Buildings.

In addition, Vermont Yankee succeeded in accessing the heating, ventilation and conditioning (HVAC) duct by boroscope, and has found no water there. The HVAC duct is the 78-inch concrete pipe that carries building exhaust from all of the production buildings to the plant stack. From this inspection, it appears that the HVAC duct is no longer considered a likely source of the tritium leak.

Vermont Yankee is now monitoring drinking water wells on site and river water daily.

February 4, 2010

Vermont Yankee reported today that a new groundwater monitoring well, GZ-7, resulted in a sample with a tritium concentration of about 774,825 picocuries per liter (pCi/l).
GZ-7 is located near the station's condensate water storage tank, between the Advanced Off-Gas Building and the Reactor and Turbine Buildings.

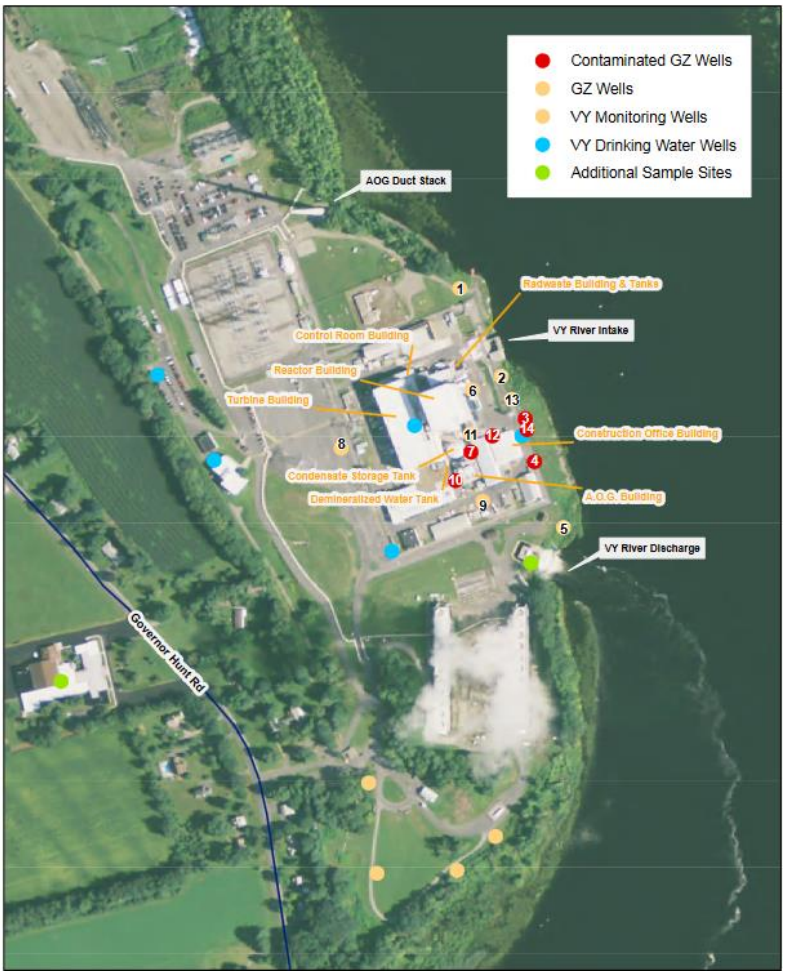
This is the highest concentration of tritium yet reported to date. These new findings may indicate the well is near a source of leakage. It may also narrow down the search area and systems to be searched. Groundwater

contamination to this degree would be more likely to be from a system of high tritium radioactivity. This raises certain potential sources of the leak up in priority interest.

Vermont Yankee reports that, according to their tests, the other wells on site are still at, or near, previously reported levels of contamination. Specifically, GZ-3, the original well found to be contaminated, is at about 36,000 pCi/l, GZ-4 is less than 2,000 pCi/l, and GZ-14 is about 70,000 pCi/l.
Vermont Yankee reports that as of the last verified analysis, all wells are not showing evidence of other radioactivity by gamma spectroscopy.
To date, all drinking water well tests are negative for elevated tritium. Vermont Yankee is now testing the drinking water well nearest the contaminated groundwater monitoring wells, the Construction Office Building well, every day.

February 3, 2010
Results of independent analyses of water samples tested to date by the Vermont Department of Health Laboratory are available.
According to Vermont Yankee officials, groundwater monitoring well GZ-3 sampled today at 36,261 picocuries per liter (pCi/l), the highest concentration there yet. GZ-14 sampled at 69,392 pCi/l. This is down from its highest level yesterday at 80,458 pCi/l. These numbers demonstrate the fact that contamination levels are likely to vary from day to day, but trends may be seen in longer time frames. Samples from wells GZ-2 and GZ-6 tested at less than the lower limit of detection.
With regard to the search for a source or sources, the well nearest the rad waste trench has yet to show evidence of tritium leakage. At the AOG drain line, the excavation has uncovered part of the concrete duct bank that holds the pipes. Still no obvious leakage has been observed. Further inspections and excavation are likely.
Station personnel used a boroscope to inspect what is called the Advanced Off-Gas (AOG) pipe tunnel today. Reports are that the tunnel appeared dry. A similar inspection of the AOG drain pit is planned. The heating ventilation and air conditioning (HVAC) duct may be inspected by boroscope as early as Friday. This is the 78-inch concrete pipe that carries building exhaust from all of the production buildings to the plant stack.

February 2, 2010
There are now six groundwater monitoring wells on site at Vermont Yankee from which samples are being taken for analysis: GZ-1, GZ-3 (the well where tritium contamination was first detected), GZ-4, GZ-5, GZ-6, GZ-14.



Vermont Department of Health Investigation in to Contamination at Vermont Yankee Nuclear Power Station February 9, 2010.

According to Vermont Yankee reports, yesterday GZ-3 showed test results of 24,700 picocuries per liter (pCi/l) for tritium. GZ-14 showed test results of 75,300 pCi/l for tritium, and GZ-4 sampled showed 1,840 pCi/l. Vermont Yankee reported sample results for wells GZ-1, GZ-5, and GZ-6 at less than the lower limit of detection for tritium (approximately 650 pCi/l). Based upon these results, the sites they sample are not considered by Vermont Yankee to be contaminated. No wells have shown radioactive materials other than tritium.

Eight additional wells, GZ-2 and GZ-7 through GZ-13, are expected to be available for sampling in the coming days, with GZ-2, GZ-7, and GZ-9 as early as tomorrow.

Results from the Vermont Department of Health Laboratory analyses will be available online later this week.

Vermont Yankee staff are also inspecting station systems. Openings into the Advanced Off-Gas (AOG) pit and the AOG pipe tunnel in the coming days should allow inspection for water by boroscope or other imaging devices.The AOG pit sample is important because it is the end repository for collections from the building floor drains.

To preclude shutting down plant building ventilation to allow opening of the heating ventilation and air conditioning (HVAC) duct, a one-inch bore hole will be drilled to allow a boroscopic inspection for fluids in that 78-inch concrete pipe.

Repairs to, and leakage evaluation for, the rad waste trench continues. As does excavation near the AOG drain line. Neither of these sites has been definitively ruled in or out as a source of tritium contamination.

February 1, 2010

Vermont Yankee officials informed the Department of Health today that water samples from groundwater monitoring wells GZ-14 and GZ-4 resulted in positive measurements for tritium.

GZ-14 had a tritium concentration of 70,500 picocuries per liter (pCi/l) and GZ-4 had a tritium concentration of 1,840 pCi/l. Both results were from samples taken on Jan. 31. Until now, the highest groundwater result to date had been 32,000 at GZ-3 (the original monitoring well to show tritium) as it was sampled on Jan. 30.

GZ-14 is a new well that was completed and ready for sampling on Jan. 30, and it was drilled about 100 feet south of GZ-3. GZ-4 is about 100 feet south of GZ-14. All three groundwater monitoring wells are along the shore of the Connecticut River to the east of the plant. The total length of the line from GZ-3 south to GZ-4 along the river is about 200 feet. At this time, we have no report on other radioisotopes in the water samples from these new wells.

These results from these wells are expected. A positive result for tritium is one of the pieces of information sought from the new groundwater monitoring wells. These positive results help define the length and breadth of the tritium plume on-site at Vermont Yankee. The wells also help better define underground water flow directions and rates. Results from both shallow and deep wells above the bedrock help us understand the depth of the plume. Analysis of drinking water samples that come from deep wells beneath the bedrock help verify that the water people consume is free of radioactivity from the nuclear plant. Currently, there are no plans to drill new wells through the bedrock.

Excavation at the AOG drain line continues, with no actual sign of leakage at this point. Workers have now reached the top of the concrete duct bank that holds the AOG drain line.

At the rad waste trench, the drop test (a leak test from within the trench) has not yet been completed. Well GZ-6, drilled near the rad waste trench, has not tested positive for tritium above the Lower Limit of Detection.

Work also resumed today on preparations to gain access to the stack HVAC (heating, ventilation and air conditioning) duct. This is the 78-inch diameter duct that connects the exhaust from the reactor, rad waste, turbine and AOG buildings to the stack. It runs along the river just east of these buildings, and is of great interest as a possible source of tritium. These preparations will likely take many days because all of the ventilation systems involved will need to be realigned before the duct can be entered safely for inspection.

JANUARY:

January 29, 2010 - Afternoon Update

Test results from water samples taken from wells GZ-1, GZ-3, GZ-5 and GZ-6 are pending. GZ-6 is the newest monitoring well, and is closest to the rad waste pipe trench. Drilling of another new well, GZ-11, started this morning but work was suspended due to the extreme cold.

The continuing excavation of the AOG drain line was beginning to get underway again this afternoon.

More planning is underway to gain additional access to the stack HVAC (heating, ventilation and air conditioning) duct. This is the 78-inch diameter pipe of interest that carries air from the AOG and most of the other buildings on site.

The drop test (or leak test), which helps to determine if the rad waste pipe trench is leaking water is ongoing.

System flow checks, additional excavations and ground-penetrating radar and other imagery will continue at a number of other sites that could be sources of the leak.

January 29, 2010 - Morning Update

Excavation late yesterday directed toward the AOG drain line resulted in the identification of what observers first thought to be a release of steam that could lead to the origin of tritiated water found in well GZ-3. Excavation was immediately stopped. Further investigation, however, could not confirm this as a steam release or leak.

Water samples extracted from the surrounding area (resulting from the hydroexcavation process and surrounding soil) were tested on site by Vermont Yankee. Results were not indicative of a leak. Tritium levels were found to be less than the Lower Limit of Detection of 600 to 650 picocuries/liter and trace amounts of other radioisotopes consistent with 1993 site soil characterization were also identified. There was not enough water found to allow for a “split” sample to be taken for independent testing by the Vermont Department of Health laboratory.

Because this was not definitively identified to be the source of tritiated water, excavation will resume today to reach the concrete pipe duct that contains the drain line and obtain additional samples for testing. Plant officials, in consultation with the contractors doing the excavation work, are determining the best way to reach the drain line, which lies at a depth of about 12 feet below the ground surface.

The investigation continues. We expect to post an afternoon update.

January 28, 2010

Samples in all wells tested to date, except GZ-3, remain free of nuclear plant-related radioactive materials. GZ-3 is still contaminated with only tritium. Results for the newest well that has been drilled and sampled, GZ-6, are not yet available. Two other new wells, GZ-4 and GZ-14, have been completed but are are not ready for sampling.

Another new well, GZ-11, is of particular interest because it will allow assessment of radiological conditions near the 78-inch diameter plant ventilation duct to the plant stack. There is a low point in this duct that is capable of supporting a large amount of condensed tritiated water vapor from the air that flows from the AOG and most of the other buildings on site. Inspection via a "man way" (small passageway that a person can enter through) is planned, but building ventilation must be stopped during this procedure.

The testing of the rad waste trench or pipe chase is set up and will likely take several days. This "leak test" of the pipe chase may provide only a very imprecise measure of water leakage, until a more quantitative "tracer test" is conducted.

Excavation of the AOG was re-started today, proceeding eventually to the depth of the concrete pipe duct that contains the drain. A concrete bore into the concrete may be needed to positively verify that the drain line does not leak.

January 27, 2010

Vermont Yankee officials today reported that a sample from the GZ-3 well taken on Jan. 26 shows tritium at the concentration of 24,900 picocuries per liter (pCi/l, and a sample taken today shows 28,900 pCi/l. These numbers are within the range of past samples from this well, although today's result is the highest activity so far.

Drilling of well GZ-6, a new groundwater monitoring well sited near the rad waste trench, was completed yesterday. A first sample of the groundwater should be taken today or tomorrow. Useful information about the source of tritium-contaminated groundwater may result from the well water measurements at this new well. In addition, a "drop" test is being performed to see if the rad waste trench might leak water. This test uses a pre-determined amount of water purposely put in the trench to see if the water level drops over time. This is done to evaluate whether radioactive water that was in the trench could have leaked from the trench into the ground.

The plant is also running tests on components in the trench to determine if they leak contaminated water into the trench.
Excavation near the AOG drain line reached a depth of about 6 feet today, and no obvious accumulated moisture was observed. Contrary to what had been hypothesized from ground-penetrating radar images before the excavation began, the soil was not found to be saturated with contaminated water. Excavation to about 12 feet below the ground will allow inspection of the concrete duct that holds the AOG drain line. Soil samples from the excavation have been analyzed by gamma spectroscopy, and Vermont Yankee reports that radioactive materials were found. However, these results do not indicate leakage – they are similar to those values measured in a 1993 site characterization of soil contamination.
Two other new wells, GZ-4 and GZ-14, have been drilled, and they may be available for sampling in about 48 hours. They will provide a means to test water in the area for radioactive material contamination, and help to determine the underground flow characteristics of the groundwater. The purpose of the wells is to find the plume, and help determine its physical extent, and the concentration of radioactive materials in the plume.
The Vermont Department of Health has been collecting and analyzing water samples for tritium and other radionuclides from on- and off-site since this event began on January 7, 2010 with the report of tritium in GZ-3 by Entergy officials. Sampling results to date are very similar to those from Vermont Yankee: GZ-3 is the only well showing tritium contamination and no well, including GZ-3, has tested positive for other radioactive materials.

January 26, 2010
Water sample test results reported by Vermont Yankee today were less than the lower limit of detection for GZ-1 and GZ-5 groundwater monitoring wells, and for the Construction Office Building on-site drinking water well. Well GZ-3 continues to test positive for tritium at about 23,000 picocuries per liter. No other nuclear-plant related radioactive materials were reported in any of these samples, including samples taken from well GZ-3, which remains positive for only tritium.
Digging of well GZ-6, near the rad waste trench was completed today. Samples from this well may be available later this week. Such samples may help in the investigation as to whether radioactive water in that trench could have contributed to groundwater contamination. Preparations for drilling other wells are underway. Eleven new groundwater monitoring wells are planned to help locate the physical underground extent and concentration of the tritium plume.
The rad waste trench is being tested for its structural integrity to see if water in it can move to groundwater. In addition, the trench will be repaired to prevent further leakage if it has been occurring there. About 60 gallons of rain water accumulated in the trench with recent rains. It has been tested for radioactivity (results are pending), and the water has been removed. Excavation of the area near the AOG drain line was planned for today as well.

January 25, 2010
On Friday, January 22, Vermont Yankee officials provided the Vermont Department of Health with a document titled Simplified Bounding Analysis for Tritium in Well GZ-3. This presents a calculation by Vermont Yankee scientists of a hypothetical dose of radiation to a member of the public that could result from tritium-contaminated water from the site. The calculation assumes a certain tritium concentration and the volume of that water discharged from the site, along with ground water flow from the site, Connecticut River water mixing rates and the pathways of the tritiated water to human consumption. The tritium concentration used was the maximum measured in well GZ-3 (28,100 picocuries per liter) and the pathways to people included eating fish

from the river, eating vegetables and leafy vegetation grown in soils watered by the river, and consuming milk and beef from cattle that had consumed local drinking water and feed from river-irrigated land.
The dose resulting from this Vermont Yankee calculation is approximately 1/100th of a millirem or one microrem. The Vermont Department of Health annual dose limit from tritium is five millirem or 5,000 microrem. The Health Department is analyzing this preliminary calculation by Vermont Yankee. A more detailed dose assessment is being performed by an outside contractor for Vermont Yankee. The Health Department will check that final calculation, as well as perform a dose assessment calculation of its own.
Vermont Yankee personnel and contractors started drilling well GZ-6 near the rad waste trench. This is where tritiated water with a concentration of up to 2.1 million picocuries per liter was found on January 13, 2010. This new well may help substantiate if this rad waste trench has leaked tritium and other radioactive materials into the adjacent ground and into the ground water. As of this morning, drilling of the well had not been completed. When completed, the well will need to be flushed for a day or two, and then water samples will be taken.
Soil samples near the well have already been taken for radiochemical analysis by Vermont Yankee. In addition to a large number of drinking and non-drinking water samples being taken and analyzed on- and off-site, samples of fish and sediment from the river are being taken for analysis by both Vermont Yankee and the Health Department.
Excavation near the AOG drain line, another potential source of tritium in the site investigation is planned for Tuesday, January 26.

January 22, 2010
Drilling is scheduled to start this weekend on the first of a number of additional ground water monitoring wells on site at Vermont Yankee. The first well is to be located near the rad waste trench where tritium-contaminated standing water has been found. This is the water that contained high amounts of tritium (between 750,000 and 2,100,000 picocuries per liter). It also contained trace amounts of other radioactive materials, as would be expected for most water at the plant that is related to the nuclear reactor process.
Vermont Yankee engineers are still concerned about possible – but still unverified – leakage beneath the ground where the Advance Off-Gas (AOG) drain line is located.
A number of other possible sources are also being investigated. Several of these possible sources have been found to be water-free. A few have contained water sources that have tested negative for tritium. To date, Vermont Yankee's investigating teams report that they documented that the independent spent fuel storage installation and the spent fuel pool do not appear to be sources of tritium in groundwater.
Maintenance personnel have also constructed a barrier to seal a connection between the rad waste trench and an evaporator tank that may be contributing to the accumulation of tritiated water in the trench. The seal appears to have stopped the condensation of tritiated water vapor on the corrugated roof over the concrete trench. Structural engineers are also examining the trench to determine its structural integrity to try to locate an actual pathway of tritiated water to the ground around the trench. If found, such a pathway may help determine if the tritiated water in the trench is at least partly responsible for the tritiated water in the groundwater monitoring well.
To date, the Vermont Department of Health Laboratory has analyzed many samples of on-site groundwater and off-site drinking water and river water. Other than the original groundwater monitoring well GZ-3, where tritium was first detected, no water samples tested by the Department of Health Laboratory have been positive for tritium. Gamma isotopic analysis for other radionuclides is ongoing. No samples that have been tested since this investigation began – including samples from the GZ-3 well – have been found to contain radioactive materials other than naturally-occurring materials such as radon. By Health Department Laboratory protocol, any samples

that contain radon gas radioactive decay daughter products are recounted in 14 days to eliminate the interference due to these radon daughter products.

January 21, 2010

As part of the investigation to locate the source of tritium detected in monitoring wells on site, Vermont Yankee has inspected a number of trenches that hold electrical cables and piping systems. These trenches are constructed of concrete and are designed to isolate the contents (cables or pipes) from the environment, while allowing access for inspection or maintenance. In addition, many sumps, drains and piping vaults have been inspected. Some have been found not likely to be sources of tritiated water that could be responsible for the groundwater contamination. However, there are two specific sites of particular interest as potential sources of tritium.

The first site is a drain line. The drain line is connected to a steam line that runs from the steam jet air ejectors to the Advance Off-Gas System (AOG). The drain line is located in a trench and surrounded by steel-reinforced concrete. This drain line appears to be constructed of materials that could corrode and leak, and it is in an underground environment that might lead to such corrosion. This AOG drain line is not yet excavated, but ground-penetrating radar imaging indicates saturated soil above the drain line. Soil samples will be tested to determine if the soil saturation is due to tritiated water. This could mean the drain line is leaking, and excavating the trench to expose the drain line will be required to assess whether this drain is the source of the leak.

A second potential source of tritium is called the rad waste pipe trench. On January 13, Vermont Yankee reported to state and federal officials that about 150 gallons of standing water was found, and radioactivity analysis indicated the water had a tritium concentration about 100 times that found in the groundwater monitoring well (well GZ-3). The contaminated water was measured at 2.1 million picocuries per liter (pCi/l). This water was removed from the trench. Four days later, water was again found in the trench. This time about 60 gallons of water measuring about 750 thousand pCi/l was removed. Subsequent tests have shown that condensation of high temperature air that exists in the trench could result in tritiated water in the range of 1.6 million pCi/l. There is still no identified pathway for this trench water to groundwater. Investigation of this pathway continues.

Both the AOG drain line and the rad waste pipe trench are located within a few hundred feet of the contaminated well GZ-3. Although the investigation is now focused on these two potential sources for the leak, it is too early to rule out other possible sources. Eleven new monitoring wells will be drilled on site at Vermont Yankee over the next few weeks to provide additional water samples to help identify the source(s) of the tritium and to identify the boundaries of the tritium plume. In order to identify the boundaries of the plume, it is expected that some of the additional wells will tap into contaminated water. Positive and negative water samples will help define the breadth of the plume beneath the surface. Samples from the monitoring wells may also help identify the highest levels of contamination, which is yet unknown.

Another important development was a false positive test result on a groundwater monitoring well sample from well GZ-1. On January 19, 2010, Vermont Yankee reported a positive test result of 9,540 pCi/l from this well. Later that day, VY officials expressed concern with the accuracy of that measurement. On January 20, 2010, VY confirmed that additional samples and recounting of the original sample showed that well GZ-1 was, in fact, not contaminated. The laboratory analysis inaccuracy is blamed on faulty liquid scintillation cocktail. This cocktail is the medium within which a water sample is mixed for radiochemical analysis. The erroneous counts were conducted with flawed cocktail, while analyses with good cocktail resulted in measurements that were less than the instrument's lower limit of detection. Measurements less than the LLD are taken as negative for tritium.

Vermont Yankee continues to test a number of water sources, including the groundwater monitoring wells twice weekly and drinking water weekly. In addition, the Department of Health continues to test drinking water wells weekly and groundwater monitoring wells monthly. At this time, the only water samples revealing tritium contamination are those from groundwater monitoring well GZ-3. No drinking water on- or off-site has been found to be contaminated with tritium.

January 14, 2010

On January 7, the Vermont Department of Health was notified by Vermont Yankee Nuclear Power Station that samples taken from a groundwater monitoring well on site at the plant contained tritium.

Tritium is a radioactive form of hydrogen. It is a by-product of the nuclear fission process in a nuclear reactor, and it also occurs naturally in the environment as the result of cosmic ray interactions with the earth.

Laboratory tests of samples taken from this monitoring well have shown tritium levels at 700, 14,500 and 17,000 picocuries per liter (pCi/l). The U.S. Environmental Protection Agency (EPA) regulatory standard for tritium in drinking water is 20,000 pCi/l. The Nuclear Regulatory Commission (NRC) applies the EPA standard for drinking water, and has established a standard of 30,000 pCi/l for non-drinking water sources such as the monitoring wells.

The measurements from the samples at Vermont Yankee reported so far have been taken from non-drinking water monitoring wells, and those results are below these regulatory standards at this time. To date, all the samples from drinking water wells at Vermont Yankee do not show any tritium contamination. In response to these sample results, Vermont Yankee officials have started an investigation to identify the source of the tritium, and the magnitude of the tritium contamination of groundwater on the plant site, and to determine whether it is also present in the groundwater in the surrounding area. The Vermont Department of Health and the NRC are participating in the investigating teams.

Tritium emits low energy beta radiation. People can be exposed to this beta radiation by drinking water contaminated with tritium. Vermont's Radiological Health Rule standard for tritium applies only to wells that provide drinking water. The tritium levels reported from the Vermont Yankee samples at this time are below the Vermont Department of Health's regulatory standard of 5 millirem for drinking water. This means that for drinking water found to have an average tritium concentration of 20,000 pCi/l, the total effective dose equivalent from consuming this water for a year would be 4 millirem. An annual dose equivalent of 5 millirem would result from an average concentration of 25,000 pCi/l.

Vermont Yankee has been sampling for tritium at its on-site monitoring wells since 2007. In addition, the Vermont Department of Health samples off-site groundwater, surface water and drinking water, and has done so for more than the 38-year operating life of the plant. None of these samples have had tritium concentrations of more than a few hundred pCi/l.

In the coming days and weeks, the Health Department and the Vermont Yankee investigating teams will be looking closely at this situation. Sampling for tritium will continue on site and off site, and will include sampling of drinking water wells in the area.