

Fermilab and the Environment

Managing Tritium in Surface Water

Fermilab’s program to monitor and manage low levels of tritium in surface water on the Fermilab site.

Tritium, which has a half-life of 12.3 years, is a byproduct of accelerator operations at Fermilab. As part of our environmental monitoring program, we periodically sample the water discharged into the creeks on site and report the results to the Illinois Environmental Protection Agency, as required by state regulations. These samples occasionally show low levels of tritium, far lower than the water standards that Fermilab is required to meet. The low levels of tritium found since 2005 in Indian Creek and in some Fermilab ponds stem from new physics experiments that use more powerful particle beams.

Fermilab is committed to go beyond merely satisfying the regulatory limits. We strive to keep the tritium discharges as low as reasonably achievable, keep the public fully informed, and engage the public in the establishment of goals and formulation of plans. We discuss our plans with the Fermilab Community Advisory Board, and we post the results of the water samples for the three creeks leaving the Fermilab site on the Web: www.fnal.gov/pub/about/community/creekhub.html



What is tritium?

Tritium is a weakly radioactive isotope of the element hydrogen. It emits low-energy particles that cannot penetrate the skin. People could be harmed only by regularly drinking water with high levels of tritium over many years. The surface water at Fermilab is not used as drinking water and poses no threat to drinking water.

Does this tritium constitute a health risk to Fermilab neighbors?

No. The levels found in Indian Creek (photo) are extremely low compared to what is safe for a lifetime of continuous exposure to tritium in surface water. The table below illustrates how tritium concentrations found at Fermilab compare to safe concentrations in surface water. The levels are specified in picocuries (pCi, the amount of radiation produced) per milliliter (ml, metric volume) of water. The regulatory standard for drinking water is also listed, even though the water leaving the Fermilab site poses no threat to drinking water.

For further information

If you have any concerns or questions, please call the Fermilab Office of Communication at 630-840-3351 or go to www.fnal.gov/pub/about/community/

Standards and Fermilab water sample locations

Surface Water Standards for DOE Facilities
(These apply to Indian Creek and Fermilab ponds.)

1,900 pCi/ml
Standard for continuous, safe external exposure to water, established by the U.S. Department of Energy

Federal Drinking Water Standards
(Tritium from Fermilab does not affect drinking water.)

20 pCi/ml
Standard for water safe to use as a drinking water supply, established by the U.S. Environmental Protection Agency (EPA)

Typical tritium concentrations in ponds on Fermilab site.

Less than 3 pCi/ml
Levels found in surface water on site in recent years; many ponds show no detectable levels of tritium

Tritium concentrations in Indian Creek at site boundary

Occasionally 1-3 pCi/ml; usually below detection limit
Typical levels found in samples taken in recent years; low-level discharges from on-site ponds occur occasionally

Detection limit for tritium

1 pCi/ml
Limit achieved by standard tritium detection techniques