

**From:** Anne Boland *AB*  
**To:** John House  
**Date:** Tue, Dec 27, 2005 12:56 PM  
**Subject:** Fwd: Re: Braidwood Tritium

*OEDO*

Here is the info that OEDO has asked us to review and fill in.

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*L-52*

release . PH

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## RESPONSE

The liquid effluent concentration release limit to the environment for tritium (Part 20, Appendix B) is 1,000,000 Picocuries/Liter. This is the NRC effluent release concentration limit. In addition to the release concentration limit, there are ALARA dose control values contained in the licensee's Technical Specifications that hold the effluent discharges to Appendix I of Part 50 values. Appendix I states that a licensee is to control radioactive effluents ALARA; for liquid effluents (total) this means they have to keep the annual dose to any member of the public within 3 millirem to the total body or 10 millirem to any organ.

The EPA drinking water limit is 20,000 picocuries/Liter. The EPA has determined that this correlates to a radiological exposure of 4 millirem per year.

In addition, the licensee's technical specifications specifies that calendar quarter dose limits for liquid effluents are 1.5 millirem total body and 5 millirem to any organ.

The highest tritium concentration seen in a property-owner's well was approximately 1500 picocuries per liter. This is much less than the EPA drinking water standard and the dose to an individual consuming this water would be negligible, about 0.3 millirem using the EPA dose-concentration relationship.

There have been no health or safety issues identified at this point as a result of the tritium spill.

### Braidwood 1998/2000 spills

**1998 Spill:** Problem Identification Form written. No evidence of radiological follow up by licensee at that time. During April 2001 soil samples were taken in the vicinity of the failed vacuum breaker. Cobalt-60 and Antimony-125 were identified. No NRC action was taken, the spill was treated as 50.75g documentation for decommissioning purposes. The licensee's response to this spill will be part of the upcoming NRC inspection.

**2000 Spill:** Licensee sampled water from vacuum breaker vault. Results were negative for tritium and gamma emitting isotopes. The licensee performed a 50.75g characterization of the area. Soil samples from the spill area showed very low levels of a few gamma emitting isotopes in the 1E-6 to 1E-8 microcuries/gram range. A root cause analysis was performed. This was also treated as a 50.75g issue and the NRC took no additional action. This will be reviewed during the upcoming inspection.

**Well Sampling:** The Radiological Environmental Monitoring Program (REMP) program samples 4 wells which are adjacent to the Kankakee river, east of the plant. Three additional sampling points on the river are the discharge point, and upstream and downstream of the discharge point. There are no sampling wells around the pond (until now). Two of the wells along the Kankakee have shown very small increases of tritium above background (< 500 Picocuries/liter). These wells are downstream from the station discharge point, so one could expect to see some small amounts of tritium in these wells, and this is allowable under the NRC effluent discharge plan.

It would have been reasonable for the licensee to install monitoring wells in the vicinity of the 1998 and 2000 spills and monitor for tritium and other isotopes. However, these were on-site spills so there was no requirement to perform any additional REMP monitoring. Any elevated

tritium in water could be attributed to the approved effluent release program.

The NRC is aware that the State of Illinois issued a NOV to Braidwood concerning the tritium. The licensee is developing remediation plans that will be submitted to the Illinois EPA in response to the NOV. The NRC will review the remediation plans during an upcoming inspection.