

Groundwater Contamination Investigation at Indian Point Energy Center

Overview

Entergy is the owner of the Indian Point Energy Center (IPEC). The company has instituted an extensive groundwater characterization effort at IPEC, which has provided detailed information on groundwater flow within and through the site. To date it has identified and delineated three separate groundwater plumes. The last step in the characterization process is a dye trace study which is currently under way. Once this is completed Entergy is expected to assess possible remedial actions.

Entergy has installed 36 new well locations, most with multiple sampling levels associated with fracture flow regions. Including the many pre-existing monitoring wells, there are now roughly 100 discrete groundwater sampling locations available.

Both the NRC and State agencies (DEC and DOH) have been and continue to be extensively involved in the site investigative efforts (see description of DEC and DOH involvement, below).

None of the contamination from the three plumes is flowing off-site into the surrounding community. Groundwater contamination does, however, discharge into the Hudson River. The NRC and NYS both confirm Entergy's assessment that there is no threat to public health from these plumes or the leaks from which they emanate.

Unit-2 Plume

The source of this plume is the Unit-2 Spent Fuel Pool (SFP). This is a stainless steel-lined pool that does not have leak monitoring capabilities. (The Unit-3 SFP does have this capability, and it is not leaking at this time.) The primary contaminant is Tritium (H-3), though some fission products have been identified in the wells closest to the SFP. Radionuclides from this plume are known to be reaching the Hudson. There are 16 monitoring wells in place for this plume. There was also a groundwater recovery well put in place in case the investigation shows the need for pumping. (It was installed in advance due to future engineering constraints associated with the dry cask transfer operations in the fuel storage building.) There is an investigation under way to identify and stop the leak in the SFP. This operation has been hindered due to the large quantities of spent fuel currently in the pool. All accessible portions of the pool have been inspected and Entergy is working with contractors to develop inspection techniques for the remaining areas of the pool obstructed by the spent fuel.

Unit-1 Plume

The source of this plume is the Unit-1 SFP (actually a series of interconnected pools). This is an unlined concrete pool, also without leak detection capabilities. The primary contaminants in this leak are H-3 and Strontium-90 (Sr-90), but other fission and

activation products are also present in wells closer to the pool. This leak was originally identified in the mid-1990s by the former site owner and operator, Consolidated Edison. Con Ed consolidated the fuel rods into the central pool (west fuel pool) and drained the water from the surrounding pools. At that time, Con Ed believed that this had controlled the leak. Radionuclide contaminants from this plume are known to be reaching the Hudson. There are approximately 19 monitoring well locations for this plume. Entergy has initiated remedial actions for this plume at and near the source. It is running a continuous water treatment system for the SFP itself and has reduced the radioactive concentration of the water by over 90%. Due to the ongoing leaks from the spent fuel, this treatment must be continued until the spent fuel can be removed from the pool. Entergy is also collecting and treating water from the curtain drain. It is treated for removal of radionuclides and trace amounts of PCB's and tested prior to release. This water must meet the SPDES condition of no allowable PCB discharges. Starting sometime in early 2008 Entergy will remove all of the spent fuel from the Unit-1 SFP, and dewater and decontaminate the pool. This will remove the source of this plume. The need for any groundwater remediation will be evaluated once the hydrology study is complete.

Unit-1 Drain Line Plume

The source of this plume is a storm drain that had historically received water from a groundwater removal sump in the Unit-1 building complex. In 1994 Con Ed disconnected the sump from the drain line when contamination was discovered in the water there. The source was determined to be a leaking Unit-1 SFP (see description of Con Ed actions related to Unit-1 Plume above.) No new contaminants have been introduced into this plume since 1994. The contaminants include Cesium-137 (Cs-137), H-3, Sr-90 and potentially trace levels of other contaminants. There is currently no evidence of contaminants in this plume reaching the Hudson.

NYS DEC Involvement

The Bureau of Hazardous Waste & Radiation Management in DEC's central office has been involved in the investigative process for the IPEC leaks and groundwater contamination since October 18, 2005 when its involvement was requested by representatives of Westchester and Rockland Counties. This Bureau's involvement includes geologists, a radiation specialist, and a Resource Conservation and Recovery Act (RCRA) engineer.

This involvement includes:

- participation in the NRC site inspection visits and activities,
- verification of the reported status of the groundwater and leak investigations,
- participation in technical discussions with the NRC and Entergy hydrologists and health physicists regarding investigation results and future plans,
- participation in bi-weekly stakeholder conference calls and meetings,
- collection of split samples from on-site and off-site wells for radiological contents, and

- acting as the focal point for technical review of these efforts for all interested State agencies, including the Department of Health, New York State Energy Research and Development Authority, State Emergency Management Office, and Public Service Commission.

DEC is currently coordinating a spring split sampling effort for fish in the Hudson River.

NYS DOH Involvement

The DOH –

- has assessed the potential public health impacts of the leak,
- identified local and regional private and public water supply wells and determined that none of them are affected by the site groundwater contaminants,
- analyzes all of the State samples from the ongoing split sampling effort, and
- participates in bi-weekly stakeholder conference calls and meetings.

EPA Region 2 Position

Region 2's Radiation & Indoor Air Branch in the Division of Environmental Planning and Protection (DEPP-RIAB), has and continues to monitor this situation. We agree with the conclusions reached by the State of New York and the U.S. Nuclear Regulatory Commission that no radionuclide migration is occurring toward the surrounding communities adjacent or near the IPEC site. We also have reviewed the actions taken by the site owner/operator and the oversight of the involved Federal and State agencies and agree that the actions being taken are protective of public health and the environment and are appropriately designed to assure adequate protection for the future.

A Brief Glossary of Terms:

Tritium (H-3) is an activation product created when neutrons interact with the Hydrogen isotope Deuterium (H-2). Deuterium occurs naturally in the hydrogen bonded in water; therefore the water in a spent fuel pool contains Tritium because the Deuterium captures neutrons emitted from the spent fuel. It is not cost effective to separate out Tritium from the water media. The half-life for Tritium is 12.32 years.

Strontium 90 (Sr-90) is a fission product and occurs when the uranium fuel in a reactor undergoes fission. Sr-90 can escape through hairline cracks or other imperfections in the spent fuel and become dissolved in the water in a spent fuel pool. The half-life for Sr-90 is 28.78 years. Sr-90 can be cost-effectively removed from water.