

**Title:** Authorized Release of Sewage Sludge to a Subtitle D landfill – Robert J. Lee, William L. Chaloupka, Anna Bou, Peter D. Pohlot, Benny Hooda

**Nomination Description:**

BNL maintains a sewage treatment facility for treating sanitary and process wastewater generated on-site. Due to past wastewater disposal practices, radiological contaminants were routinely detected in the biosolids resulting from the treatment process. The biosolids had to be dried then packaged for off-site disposal as low-level radiological wastes. Through the 1990's BNL implemented more stringent waste water disposal requirements. These stricter requirements combined with the Environmental Restoration program's clean-up of sand filter media located at the sewage treatment plant that contained elevated concentrations of radiological contaminants, resulted in slowly but steadily declining concentrations of radioactivity in the sewage treatment effluent and biosolids. In addition to the low-level radiological components, the sludge also contained elevated levels of heavy metals. These metals, especially zinc, were found to impact the effluent quality of the sewage treatment plant effluent. Due to the slow rate of drying and restrictions placed on the discharge of biosolids decant back to the head of the sewage process, the biosolids accumulated rapidly. By the end of 2005, approximately 400,000 gallons of biosolids were in storage at the sewage facility.

In 2005, Plant Engineering and Environmental Protection staff began a process of studying the biosolids and alternate biosolids management options. Numerous samples of biosolids and sandfilter media were collected and characterized for chemical (e.g., hazardous waste) and radiological content. Analytical data proved the waste was non-hazardous and contained only trace level of radioactivity; level indistinguishable from background. Based upon the extreme low-levels of radiological contaminants in the waste, BNL petitioned both the Department of Energy and the New York State Department of Environmental Conservation for release of these waste materials to a subtitle D landfill. Through subtitle D disposal, the cost of waste disposal dropped by approximately \$4 million, not including the significant labor required to dry and handle the solids. The "Authorized Release" was eventually approved by the NYSDEC on

March 8, 2008. The approval requires confirmatory sampling and comparison to release limits. Landfill approval was received on June 24, 2008.

In October 2007 BNL contracted with Mineral Processing Services for the treatment and processing of the waste biosolids using Geotubes; large filter bags designed to retain the solids fraction of the biosolids and allowing the water to pass through (see Figure 1). Processing was successful and approximately 400 cubic yards of processed biosolids (e.g., sludge) was collected from the 400,000(+) gallons of waste and is contained in two 44' circumference by 100' long Geotube filter bags. The filtered material continues to dry and compress as time passes. Disposal of the material awaits funding. The sludge and sand filter media will be combined then staged for final characterization to ensure the waste complies with the release limits established in the NYSDEC approval. Once cleared, shipment will be via railcar, which was the most economical means of transportation and disposal.

This project resulted in many benefits.

Economical disposal of many years of accumulated sludge. Cost savings are estimated at or above \$4.0 million.

Increased efficiency of sewage treatment plant operations. Due to elevated levels of inorganics in the waste solids, discharge of supernatant to the head of the sewage treatment plant was curtailed.

With the disposal of all "old" biosolids, the treatment facility was cleaned out, and surveyed to be "radiologically clean". Newly generated biosolids have been characterized to be free of radionuclides and is being disposed via a local municipal treatment facility at significant savings. This eliminates the need to dry and package the waste solids which saves on significant labor hours.



Figure1. Water being extracted from the biosolids