



Nuclear Power Plants Use Robust Filters to Reduce Operating and Disposal Costs

Overview

As nuclear plant management continues to work diligently to reduce personnel exposure to radiation and to reduce contamination levels, radioactive waste continues to be produced, and must be disposed of. Today, available radioactive disposal sites and disposal space are limited, and disposal costs continue to rise. Hence, it is imperative that the plant operate and manage waste as efficiently as possible.

Pall Corporation's 140 Series filters can help reduce disposal costs at nuclear power plants. They have superior dirt holding capacity, which means that fewer filters are needed to achieve the desired results. When fewer filters are used, plants save on radiation exposure, labor, and radwaste volume.

Disposal costs can be further reduced when radwaste is "volume reduced", since fees are partially based on volume. For this reason, Pall specifically designed its 140 Series filters to be easily crushed, sheared, and compacted after use.

The Challenge

The South Texas Project (STP) Nuclear Power Plant is situated on 12,200 acres along the

Colorado River, about 90 miles southwest of Houston. It has two of the largest pressurized water reactors (PWR) in the US, each with a capacity of approximately 1,280 MWe, and often generates more electricity than any other nuclear plant in the country.

To keep the fuel pool radiologically clean and free of suspended solids, frequent filter change-outs had to be performed. Frequent change-outs resulted in high radwaste disposal costs, and an increase in the duration of personnel exposure to radiation.

The Diablo Canyon Nuclear Power Plant is located on a 750-acre site in San Luis Obispo County, California. The plant has two Westinghouse 4-loop PWRs, each with a capacity of 1,000 Mwe. To keep disposal costs down, an effort was made to reduce radwaste volume by shearing filters. The filters the plant had been using were designed with an outer screen, which could not be completely cut preventing volume reduction of the filters. This resulted in disposal of the filters whole, which resulted in poor loading of the waste container.



Pall 140 Series filters have superior dirt-holding capacity because they are constructed of advanced proprietary glass fiber media, and a strong spiral wound outer cage.

The Solution

To keep costs, and radiation exposure, to a minimum, the number of underwater filters used at STP Nuclear Plant needed to be reduced. This necessitated finding a replacement filter with robust filtration characteristics. The replacement filter would also need to retrofit the plant's existing Tri-Nuclear underwater filter housings. The decision was made to switch to Pall 140 Series filters. The superior dirt-holding capacity of these filter cartridges enabled the number of filters used at the plant to be reduced from 92 during the 6th refueling of Unit 1 to 39 during the 7th refueling, a difference of almost 60%. As a result, the cost of disposing of filters decreased.

Diablo Canyon Nuclear Power Plant management decided to replace the existing under water vacuum and spent resin transfer filters with Pall 140 Series filters. These Pall filters easily fit in the plant's Tri-Nuclear underwater vacuum and spent resin transfer filter vessels. Instead of an outer screen, the Pall filters are constructed with a strong spiral wound outer cage. This cage is designed to crush and shear easily.

The Pall 140 Series filters have been instrumental in reducing radwaste at the Diablo Canyon plant. The shearing machine shears the filters efficiently, without jamming. Since sheared filters reduce radwaste volume about 4:1, filter disposal costs at the Diablo Canyon plant have been reduced along with the number of container handling operations and cask shipments.

The Benefits

Switching to Pall's 140 Series filters has provided STP and Diablo Canyon with exceptional benefits. Constructed of advanced proprietary glass fiber media, with high efficiency and exceptional dirt-holding capacity, fewer 140 Series filters are needed to perform the job. The design of Pall's 140 Series filters allows for simple and less expensive radwaste disposal. Easily crushed and placed in high integrity containers, the filters contribute significantly to the reduction of radwaste volumes and disposal costs. These exceptional features translate into cost-saving benefits for Pall customers.

- Fewer filters needed
- Fewer filters to change out-lower labor costs, less radiation exposure
- Lower radwaste volume



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