RADIOACTIVE WASTE PROCESSING AT HOPE CREEK NUCLEAR GENERATING STATION BY THE RAPID DEWATERING METHOD

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ABSTRACT

An evaluation of Hope Creek Nuclear Generating Station waste processing, packaging and handling capabilities with portable process equipment was conducted. Due to the decision to defer their in-plant solid waste processing system, the evaluation concluded that the truck bay was too small to accommodate a standard transport vehicle such as a flatbed or cask lowboy and the overhead crane capacity was insufficient to handle large, efficient waste packages.

Chem-Nuclear was contracted to process waste with the RDS-1000 portable process equipment. The RDS-1000 is a high capacity dewatering system that significantly reduces the time required to produce an acceptable waste form and is providing high waste loadings obtained through compaction of the waste. The Rapid Dewater System (RDS-1000), with its space-saving design, was easily installed on the narrow platform that covers the drum conveyor located at one side of the truck bay.

A cart and rail system was also installed which greatly enhances the ability to move large, heavy loads in and out of the truck bay. This system has enabled Hope Creek to process and package in a 300 cubic foot container, the largest process/disposal container available. It also allows for safe movement of these containers and any associated cask or shield in and out of the process area.

In summary, a truck bay with very limited space was turned into a reliable and efficient waste processing, packaging and handling operation. This was accomplished without the costly and time consuming modifications that have been typically required at other facilities. Hope Creek's waste processing, transportation and disposal cost has been significantly reduced due to the improved loading efficiencies, larger containers, fewer shipments and reduced disposal volumes.

INTRODUCTION

Hope Creek Nuclear Generating Station, a 1100 mw boiling water reactor located in Southern New Jersey, features segregated streams for liquid radwaste processing. High conductivity liquids are evaporated while low conductivity liquids are filtered and demineralized. The Solid Radwaste System features the Werner Pfleiderer Extruder/Evaporator and an HPD Crystallizer with a vapor compression system.

Fuel Loading Schedule-Problems and Solutions

In order to meet the scheduled fuel and load date and to satisfy FSAR requirements, a decision had to be made as to whether to implement an aggressive 30,000 man-hour pre-operational test program on the solid radwaste system or to defer use of that system. In early November, 1985 the decision was made to defer start-up of the solid radwaste system and to contract for solid waste processing services.

Having elected this option, it was then necessary to (1) by-pass existing in-plant process equipment and (2) adapt an area in which processing using the vendor-supplied equipment could be accomplished. To meet this, as well as other critical path objectives, ten people, including the writer, were named Milestone Managers and given the authority to direct craft manpower, expend funds and schedule and complete respective tasks.

Fortunately, by-passing the existing equipment was not a major problem as the components of the solid radwaste system to be by-passed were all located on grade level and were segregated from other systems. This configuration allowed complete by-pass of the process system with resins and filter media by tying into a single existing solid radwaste transfer line upstream of the process equipment.

More complicated, however, was the configuration of a suitable area in which to process. The only available area was the North Truck Bay (Figure 1). This area, which was to be used as a loading platform for asphalt drums enroute to the on-site storage facility, had a number of limitations.

First of all, the system would have to be replumbed to route the necessary interface connections and utilities to the truck bay. This represented 648 linear feet of piping which would have to be installed, pre-operationally tested and accepted prior to fuel load (approximately 25 weeks). Other modifications included painting the wall with deconnable paint and construction of a dike for spill control.

The goal now became to identify the most cost efficient, expedient means possible of processing the mixed bed ion-exchange resins and filter media expected to be produced at Hope Creek in order to prevent a backlog of solid waste and to be prepared to deal with any in-plant water problems.

Initially, a shortened flatbed trailer was purchased. Two (2) 170 cubic feet liners would be staged on the trailer and the trailer spotted in the bay. Several drawbacks existed with this scenario. First, only small, less efficient liners could be used, and secondly, with a shield only one small liner could be staged at one time.

At this point, Hope Creek contracted with Chem-Nuclear Systems, Inc. to provide solid waste processing services using their Rapid Dewatering System (RDS-1000). Working closely with Hope Creek, Chem-Nuclear supplied a small (8' x 8') railroad style cart which could be moved in and out of the bay on two sets of rails. The first set of rails were cut to the length of the bay and grouted into place. A second removable set of rails were mounted on wide flanges. This set abutted the first and extended through the bay door to allow entry or removal of the cart.

The low profile cart, which was load tested to 110,000 pounds, would allow the use of larger, more efficient 300 cubic feet liners and would accommodate the weight of a process shield or cask when required.

Even with the smaller cart, space for processing equipment was limited. Therefore, a steel platform was constructed along the west wall over the solid radwaste conveyor. This worked well as a platform for the space-saving design of the RDS-1000 and as a work platform for the operator.

With the RDS-1000 and the cart and rail system in-place, 300 cubic feet liners could now be set-up, filled with bead resin, dewatered and verified acceptable by plant Quality Assurance personnel within a normal eight (8) hour working day. Similarly, the same size container filled with a filter sludge mixture of Ecodex and Ecosorb could be completed in approximately sixteen to twenty (16 to 20) hours. While little volume reduction was achieved when dewatering bead resin, volume reduction of up to 1.4:1 were realized when processing filter sludges (based on wet-settled sludge volume). This volume reduction is the result of compaction which occurs as a result of the specialized, media specific filters and filter configuration within the process container and the use of the RDS-1000 system.

In summary, the cart and rail system used in conjunction with the RDS-1000 allowed a truck bay with limited space to be converted into a reliable and efficient waste processing packaging and handling area. The use of larger liners and the volume reduction achieved with filter media has allowed Hope Creek to reduce waste processing time, to reduce the number of transportation trips required and to reduce disposal cost.