START

1706-KE WASTE TREATMENT SYSTEM

1.0 INTRODUCTION

1.1 Purpose

The purpose of this synopsis is to support the request for withdrawal by the U.S. Department of Energy-Richland Operations Office (DOE-RL) and Westinghouse Hanford Company (WHC) of the Washington State Hazardous Waste Management Act (Chapter 70.105 RCW) Part A and Part B Permit Applications for the 1706-KE Waste Treatment System. Information presented below will demonstrate the 1706-KE Waste Treatment System did not treat, store, or dispose dangerous or mixed waste and there are no plans to conduct these activities.

1.2 Previous Application Submittals

Part A and Part B permit applications were previously submitted (Part A Rev. 2 on November 11, 1987, and Part B on April 24, 1987) by DOE-RL and WHC to the Washington State Department of Ecology for the 1706-KE Waste Treatment System. These documents were submitted in anticipation of using the 1706-KE Waste Treatment System to solidify dangerous and mixed waste. Plans to operate the 1706-KE Waste Treatment System as a dangerous and mixed waste treatment system were later cancelled. The system was used from May 1984 to August 1986 to treat nondangerous radioactive waste water generated from sample analyses and test activities conducted in the 1706-KE Laboratory. Use of the 1706-KE Waste Treatment System's volume reduction and solidification capability was discontinued after August 1986. Current plans indicate no future use, except the accumulation tank and ion exchange column.

2.0 FACILITY DESCRIPTION

The 1706-KE Facility is a laboratory used to conduct water quality, filtration, and corrosion studies in support of N Reactor systems. The original waste treatment system consisted of an accumulation tank to store waste, an evaporation unit, a condensate tank to collect the treatment effluent, and a container storage area. An ion exchange column was added to the accumulation tank in August 1986 and the rest of the system was abandoned. This system, including the added ion exchange column, is illustrated in Figure B-1.

3.0 PROCESS INFORMATION

3.1 Operations History

The 1706-KE Waste Treatment System was purchased and operated to reduce the volume and solidify the radioactive waste water generated from sample analyses and test activities conducted in the 1706-KE Laboratory. During the original operation, a small stream of waste water was fed into a drum of hot epoxy at a constant rate. The water flashed to steam and traveled to a condenser

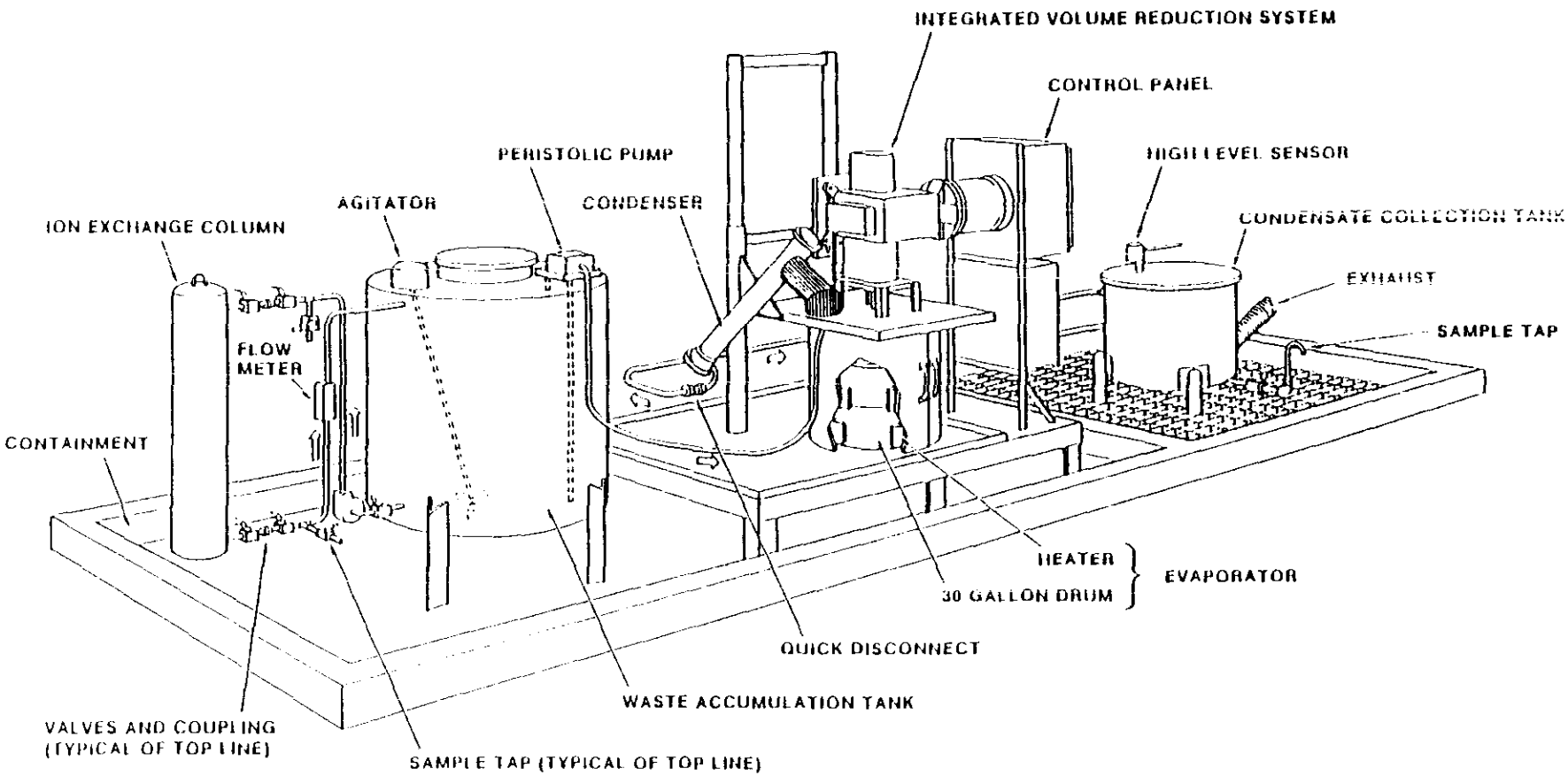

Figure B-1. 1706-KE Waste Treatment System Design

where it was cooled to a liquid and collected in the condensate collection tank. At this point, the liquid was sampled to determine if the radionuclide content was below releasable limits. Solids were collected in the epoxy. When a sufficient volume was accumulated, a catalyst was added to set up the epoxy. The drum of solid epoxy was removed, sealed, and sent to the radioactive burial grounds. This operation was discontinued in August 1986 when the ion exchange column was attached to the accumulation tank. In present operations, the nondangerous radioactive waste water in the accumulation tank is circulated through the column until the radionuclide content is below releasable limits. Nondangerous waste water in the accumulation tank will continue to be treated in this manner.

3.2 Waste Designation

Knowledge of the waste water treated during the operations described above is based on process knowledge of the parent facilities that provided the water for testing and specific activities conducted at the 1706-KE Laboratory. The waste water consisted of: samples of water from the KE and KW fuel storage basins; rinse solutions from the Low Oxidation State Metal Ions (LOMI) process test loop containing a small amount of LOMI solution; samples of the N Reactor primary loop water; and samples of decontamination water from the N Reactor primary loop (3% to 4% phosphoric acid).

The fuel storage basin water is radioactive demineralized water. The water is demineralized using ion exchange columns. The KE and KW basin conductivity is currently operated at approximately 2 umhos/cm. In the past the KE basin has been operated as high as 150 umhos/cm (river water levels). The pH of the basin waters range from 6.0 to 7.0 and contain up to 4.0 x 10^6 pCi/l of radionuclides.

The LOMI test loop was rinsed with demineralized water. The resulting solutions were calculated to contain approximately 0.02 weight percent vanadic picolinate, 0.02 weight percent ferric picolinate, 0.01 weight percent ammonium formate, and 0.01 weight percent formic acid. A waste designation was performed on the precursor material and determined to be nonregulated according to Washington Administrative Code (WAC) 173-303. The concentrations in the precursor material were:

0.37 weight percent of vanadic picolinate.
0.34 weight percent of ferric picolinate.
0.24 weight percent of ammonium formate.
0.24 weight percent of formic acid.
98.81 weight percent of water.

This waste solution has a pH of 4.0 to 4.5 and contains the radionuclides removed from the reactor.

N Reactor primary loop water is demineralized radioactive water. The average conductivity is 80 umhos/cm. The conductivity is caused by the addition of ammonium hydroxide, and hydrazine. Ammonium hydroxide and hydrazine are added to increase the pH to 10.6, as a corrosion inhibitor, and to scavenge oxygen. This addition also results in an ammonium content of approximately 100 ppm. Hydrazine is present in the primary loop at up to 1000 ppb, but

decomposes on contact with air. Therefore, no hydrazine is present in the waste accumulation tank, since the accumulation tank is open to the air.

The N Reactor primary loop decontamination water contains 3% to 4% phosphoric acid based on maximum capacity of makeup and storage tanks. This water is neutralized before entering the waste accumulation tank. There is approximately 1.0×10^8 pCi/l of radionuclides present in the decontamination water.

4.0 SUMMARY

The request by DOE-RL and WHC to withdraw the Part A and Part B permit applications for the 1706-KE Waste Treatment System is supported by the information provided above. The permit applications were originally submitted as a contingency because the 1706-KE Waste Treatment System was being considered for future use to treat dangerous and mixed waste. The waste treated in the 1706-KE Waste Treatment System was determined nonregulated according to the Dangerous Waste Regulations, WAC 173-303. This was determined by waste designation and knowledge of the laboratory activities during the time the waste treatment system was operated. The 1706 Waste Treatment System was not used for treatment of dangerous or mixed waste. There are no plans to use the system to treat dangerous or mixed waste.

5.0 CERTIFICATION

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

John E. Nolan — 5/26/89

Co-operator
John E. Nolan, President
Westinghouse Hanford Company

Date

Michael J. Lawrence — 6-22-89

Owner/Operator
Michael J. Lawrence, Manager
U.S. Department of Energy
Richland Operations Office

Date