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KER-3 OPERATING REPORT
TEST K-3-18, PT IP-645

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TEST K-3-18
PT IP-645

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KER-3 OPERATING REPORT
TEST K-3-18
PT IP-645

I. INTRODUCTION

The purpose of this test was to demonstrate and characterize the simultaneous generation of plutonium and tritium.

II. SUMMARY

- A. Date Charged - February 10, 1964 at 12:00 noon
- B. Fuel Elements - Thirteen 26.1" co-product test assemblies
- C. Exposure - The fuel was exposed for a total of 2,828 hours and at run conditions for 2,288 hours.
- D. Date Discharged - June 7, 1964
- E. Reason for Discharge - Goal exposure

III. TEST DETAILS

A. Tube Charge Order

<u>Position</u>	<u>Description</u>
1-7	16" tubular perfs
8-20	13 26.1" co-product test assemblies
21	16" tubular spacer

B. Fuel Elements

The co-producer element is a nested tube-and-rod assembly. The outer tube contains enriched uranium co-extruded with a Zircaloy-2 cladding and is similar in size to a NOEL. The inner rod is composed of lithium-aluminum alloy initially clad in aluminum and then re-jacketed with a Zircaloy-2 cladding. The fuel assembly is shown in Figure 1 of HW-80175.

C. Operating Conditions

Effluent pressure	1,275 psig
Effluent temperature	270 C
Influent flow	80,000 lbs/hr
pH	10.0 ± 0.2

D. Water Quality

The loop was always filled with demineralized, deoxygenated water which was recirculated through a neutral resin column (XE-150 resin) until

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the water resistivity was greater than one megohm/cm. The pH was then adjusted to 10.0 ± 0.2 by a feed and bleed system. Ammoniated water was injected into the loop make-up feed system which added water to offset a one gpm bleed rate. The pH was controlled by varying the bleed rate and holding the ammoniated water feed constant. In this manner the concentration of ammonia in the loop feed water was raised or lowered by decreasing or increasing, respectively, the bleed rate.

Routine water samples were taken and wet chemical analyses were made for silica, chlorides, sulfate, hydrogen peroxide, total solids, turbidity and specific resistance. Metallic ion concentrations were determined by emission analyses. Oxygen analyses were determined by the Winkler method. Included in the appendix are graphs showing inlet and outlet temperatures, pH, total solids and oxygen.

E. Secondary Testing

The mock-up tube was charged on July 10, 1962 with 12-inch and 24-inch rod holders consisting of stainless steel and carbon steel. The charge order is as follows from downstream end:

<u>Position</u>	<u>Piece</u>	<u>Material</u>
1	Triangular perf	Stainless Steel
2	24-inch rod holder No. 44	Stainless Steel
3	24-inch rod holder No. 46	Stainless Steel
4	24-inch rod holder No. 56	Carbon Steel
5	12-inch rod holder No. 50	Stainless Steel
6	12-inch rod holder No. 12	Carbon Steel
7	12-inch rod holder No. 52	Inconel-X

IV. OPERATING HISTORY

<u>Operating Conditions</u>	<u>Hours Run</u>	<u>Per Cent</u>
Reactor operating - run condition	2,288.51	80.9
Reactor operating - below run condition	234.18	8.3
Reactor down - single-pass	305.45	10.8
Charge in reactor	2,828.34	100.0

See graph in appendix for inlet and outlet temperatures.

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Technician, Coolant Testing

HT Quinn:smc

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KER 3
TEST #19
INLET & OUTLET
TEMP.

RL-REA-329
Page 4

INLET ———
OUTLET - - -

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KER - 3
TEST #18
PH.

RL-REA-329
Page 5

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KEL-3
TEST #18
OXYGEN

HL-REA-329
Page 6

.20
.10
.02
.01
.005

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KSR-3
TEST - 18
TOTAL SOLIDS

RL-REA-329
Page 7

25
20
15
10
5
0

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