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HANFORD ATOMIC PRODUCTS OPERATION - RICHLAND, WASHINGTON

TITLE

PRODUCTION TEST IP-387-D; IRRADIATION SERVICE
REQUEST HAPO 255; IRRADIATION OF COBALT IN
THE KW BOTTOM FRONT-TO-REAR MAGAZINE
FACILITY (0074)

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PRODUCTION TEST IP-387-D:
IRRADIATION SERVICE REQUEST HAP0 255
IRRADIATION OF COBALT IN THE KW BOTTOM
FRONT-TO-REAR MAGAZINE FACILITY (0074)

January 12, 1961

HANFORD ATOMIC PRODUCTS OPERATION
RICHLAND, WASHINGTON

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PRODUCTION TEST IP- 387-D
IRRADIATION SERVICE REQUEST HAP0 255
IRRADIATION OF COBALT IN THE KW BOTTOM
FRONT-TO-REAR MAGAZINE FACILITY (0074)

OBJECTIVE

The purpose of this test is to produce 24,000 curies of cobalt-60 for the Hanford Laboratories Operation's gamma facility.

BASIS AND JUSTIFICATION

A cobalt-60 source is currently being used by the Nonmetallic Materials Development Operation to study the effect of gamma irradiation on gas-graphite reactions. The intense gamma radiation induces reactions between gases and graphite which are not observed in the absence of radiation. An additional 24,000 curies of cobalt-60 are needed to increase the intensity of the source and to replace part of the original source which has been lost through radioactive decay. The investigation of the effects of gamma radiation on gas-graphite reactions is one phase of the Hanford studies in support of the Gas Cooled Reactor Program.

MATERIAL AND TYPE OF CAPSULE

Three-eighth's-inch diameter cobalt rods will be canned in a one and one-quarter-inch OD by one-half-inch ID welded aluminum capsule. (See sketch). 134-2-1-1

Twelve capsules, each containing one cobalt rod three-eighth's-inch in diameter by eight and three-eighth's-inches long will be irradiated. The cobalt will weigh approximately 130 grams.

FACILITY AND AREA

The three-hole Magazine facility (tube 0074) in 105-KW will be used for this test. Six pieces will be centered, front-to-rear, in position 1 and position 3 of the facility.

REACTIVITY EFFECT

10 cmk.

HEAT GENERATION

4 kilowatts.

LENGTH OF IRRADIATION

Approximately eight months will be required to produce the desired activity.

SHUTDOWN TIME

Two hours; one hour for charging and one hour for discharging. Charging and discharging can be accomplished as soon as water pressure is lowered, since Test Holes 0065 and 0074 have an individual crossheader (No. 59) which may be valved down almost immediately after water pressure is lowered.

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FACILITY OPERATION

Position 2 of the facility is presently charged with 34 ORNL (Be_3N_2) pieces, and its instrumentation is not connected into the reactor safety circuit. The charging of an additional twelve cobalt pieces will not constitute a reactor hazard, and the test facility instrumentation will not operate the reactor safety circuit. The standard provisions for an empty test hole apply to the facility.

HAZARDS

The cobalt pieces will be centered in the facility with a dummy charge upstream to prevent the pieces from washing upstream and creating a radiation hazard on the front face of the reactor.

The incremental heat generation, due to the presence of the cobalt pieces, is negligible in comparison with the heat removed from the graphite stack by the test hole cooling water. Failure of one hydraulic connector, front or rear, would not reduce the cooling flow sufficiently to cause boiling. Even with a dry tube no melting of the tube or its contents should occur. However, in this case, or in the case where the cooling water does not completely fill the tube, a high radiation beam will be encountered in the work area. Therefore, the normal procedure for an empty test hole, that is a manual reactor shutdown in the event of loss of cooling water, is specified.

RESPONSIBILITY

IRRADIATION PROCESSING DEPARTMENT - Irradiation Testing.

1. Scheduling the charge-discharge.
2. Fabrication of the capsules.
3. Charging and discharging the samples.
4. Routine data collection.

IRRADIATION PROCESSING DEPARTMENT - KW Processing.

1. Operational safety of the reactor.
2. Production continuity.
3. Special pickup and shipment of the pieces.

A. E. DeMers
Irradiation Testing

A. E. DeMers/rch

HAP0 255 COBALT SOURCE CAN

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