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This document consists of 10 pages,

March 7, 1966

INTERLABORATORY NEUTRON FLUX SPECTRAL MEASUREMENT PROGRAM

A. E. DeMers

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An interlaboratory cooperative study¹ has been undertaken on neutron flux spectral measurements, calculations, and data correlation for reactor irradiation and physics study by various sites.

The Testing portion of this study was the irradiation of a wide variety of flux monitors in a special snout capsule holder. The attached sketch shows the capsule holder design, facility design, and the capsule position in relation to adjacent process tubes.

The following is a summary of the irradiations performed:

Test #1 (Battelle Northwest)

Date Irradiated--2-22-66

Time at edge of graphite reflector--0918

Time at position--0919

Time started out--0951

Time at edge of reflector--0952

Adjacent tube data

<u>Tube</u>	<u>Temp</u>	<u>Δ T</u>	<u>Flow</u>	<u>Loading</u>
2287	90.1	85.5	75.3	E ²
2387	90.2	85.6	74.4	E ²
2288	78.3	73.7	72.5	NAT
2388	78.2	73.6	73.5	NAT
2289	77.6	73.0	79.4	E ²
2389	76.1	71.5	77.4	E ²

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Test #2 (Battelle Northwest)

Date Irradiated--3-4-66

Time at edge of reflector--0908

Time in position--0909

Time started out--0930

Time out of reflector--0940

¹NAA-SR-MEMO 11816, Status Report Interlaboratory Cooperative Study on Neutron Flux Spectral Measurements.

Adjacent Tube Data

<u>Tube</u>	<u>Temp</u>	<u>ΔT</u>	<u>Flow</u>	<u>Loading</u>
2287	90.6	86.6	75.3	E ²
2387	91.5	87.5	74.4	E ²
2288	79.5	75.5	72.5	NAT
2388	78.2	74.2	73.5	NAT
2289	78.3	74.3	79.4	E ²
2389	77.1	73.1	77.4	E ²

Test #3 (Atomics International)

Date Irradiated--2-23-66

Time at edge of graphite reflector--1015

Time at position--1016

Time started out--1115

Time at edge of reflector--1116

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Adjacent Tube Data

<u>Tube</u>	<u>Temp</u>	<u>ΔT</u>	<u>Flow</u>	<u>Loading</u>
2287	94	89.5	75.3	E ²
2387	89	84.5	74.4	E ²
2288	76	71.5	72.5	NAT
2388	74	69.5	73.5	NAT
2289	76	71.5	79.4	E ²
2389	74	69.5	77.4	E ²

Test #4 (Battelle Northwest)

Date Irradiated--2-28-66

Time at edge of graphite reflector--1446

Time at position--1447

Time started out--1547

Time at edge of reflector--1548

Adjacent Tube Data

<u>Tube</u>	<u>Temp</u>	<u>Δ T</u>	<u>Flow</u>	<u>Loading</u>
2287	94.6	90.1	75.3	E ²
2387	89.1	84.6	74.4	E ²
2288	89.0	84.5	72.5	NAT
2388	75.3	70.8	73.5	NAT
2289	77.5	73.0	79.4	E ²
2389	75.0	70.5	77.4	E ²

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Test #5 (Sandia Corp.)

Date Irradiated--3-1-66

Time at edge of graphite reflector--1308

Time at position--1309

Time started out--1408

Time at edge of reflector--1409

Adjacent Tube Data

<u>Tube</u>	<u>Temp</u>	<u>Δ T</u>	<u>Flow</u>	<u>Loading</u>
2287	89.4	84.9	75.3	E ²
2288	90.0	85.5	74.4	E ²
2288	78.0	73.5	72.5	NAT
2388	74.0	69.5	73.5	NAT
2289	77.1	72.6	79.4	E ²
2388	75.6	71.1	77.4	E ²

Test #6 (Atomics International)

Date Irradiated--2-23-66

Time at edge of graphite reflector--1449

Time at position--1450

Time started out--1549

Time at edge of reflector--1550

Adjacent Tube Data

<u>Tube</u>	<u>Temp</u>	<u>T</u>	<u>Flow</u>	<u>Loading</u>
2287	94.0	89.5	75.3	E ²
2387	89.0	84.5	74.4	E ²
2288	76.0	71.5	72.5	NAT
2388	74.0	69.5	73.5	NAT
2289	76.0	71.5	79.4	E ²
2389	74.0	69.5	77.4	E ²

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Test #7 (Atomics International)

Date Irradiated--2-23-66

Time at edge of graphite reflector--0835

Time at position--0836

Time started out--0936

Time at edge of reflector--0937

Adjacent Tube Data

<u>Tube</u>	<u>Temp</u>	<u>T</u>	<u>Flow</u>	<u>Loading</u>
2287	94.0	89.5	75.3	E ²
2387	89.0	84.5	74.4	E ²
2288	76.0	71.5	72.5	NAT
2388	74.0	69.5	73.5	NAT

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Test #7 Adjacent Tube Data Continued

<u>Tube</u>	<u>Temp</u>	<u>Δ T</u>	<u>Flow</u>	<u>Loading</u>
2289	76.0	71.5	79.4	E ²
2389	74.0	69.5	77.4	E ²

Test #8 (Atomics International)

Date Irradiated--2-24-66

Time at edge of graphite reflector--0909

Time at position--0910

Time started out--1009

Time at edge of reflector--1010

Adjacent Tube Data

<u>Tube</u>	<u>Temp</u>	<u>Δ T</u>	<u>Flow</u>	<u>Loading</u>
2287	97	92.5	75.3	E ²
2387	89	84.5	74.4	E ²
2288	77	72.5	72.5	NAT
2388	77	72.5	73.5	NAT
2289	76	71.5	79.4	E ²
2389	73	68.5	77.4	E ²

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Test #9 (Atomics International)

Date Irradiated--2-25-66

Time at edge of graphite reflector--1054

Time at position--1055

Time started out--1155

Time at edge of reflector--1156

Adjacent Tube Data

<u>Tube</u>	<u>Temp</u>	<u>ΔT</u>	<u>Flow</u>	<u>Loading</u>
2287	97	92.6	75.3	E ²
2387	92	87.6	74.4	E ²
2288	77	72.6	72.5	NAT
2388	76	71.6	73.5	NAT
2289	77	72.6	79.4	E ²
2389	73	68.6	77.4	E ²

Test #10 (Atomics International)

Date Irradiated--2-24-66

Time at edge of graphite reflector--1051

Time at position--1052

Time started out--1151

Time at edge of reflector--1152

Adjacent Tube Data

<u>Tube</u>	<u>Temp</u>	<u>ΔT</u>	<u>Flow</u>	<u>Loading</u>
2287	97	92.5	75.3	E ²
2387	89	84.5	74.4	E ²
2288	77	72.5	72.5	NAT
2388	77	72.5	73.5	NAT
2289	76	71.5	79.4	E ²
2389	73	68.5	77.4	E ²

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Test #11 (Argonne National Laboratories)

Date Irradiated--3-2-66

Time at edge of graphite reflector--1704

Time at position--1705

Time started out--1735

Time at edge of reflector--1736

Adjacent Tube Data

<u>Tube</u>	<u>Temp</u>	<u>ΔT</u>	<u>Flow</u>	<u>Loading</u>
2287	84	79.5	75.3	E ²
2387	90	85.5	74.4	E ²
2288	81	76.5	72.5	NAT
2388	78	73.5	73.5	NAT
2289	75	70.5	79.4	E ²
2389	76	71.5	77.4	E ²

Test #12 (Argonne National Laboratories)

Date Irradiated--3-3-66

Time at edge of graphite reflector--0904

Time at position--0905

Time started out--0935

Time at edge of reflector--0936

Adjacent Tube Data

<u>Tube</u>	<u>Temp</u>	<u>ΔT</u>	<u>Flow</u>	<u>Loading</u>
2287	90.5	86.4	75.3	E ²
2387	91.5	87.4	74.4	E ²
2288	79.2	75.1	72.5	NAT
2388	78.0	73.9	73.5	NAT
2289	78.3	74.2	79.4	E ²
2389	77.0	72.9	77.4	E ²

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Test #13 (Battelle Northwest)

Date Irradiated--3-4-66

Time at edge of graphite reflector--1411

Time in position--1412

Time started out--1442

Time out of reflector--1443

Adjacent Tube Data

<u>Tube</u>	<u>Temp</u>	<u>Δ T</u>	<u>Flow</u>	<u>Loading</u>
2287	91.2	87.0	75.3	E ²
2387	92.2	88.0	74.4	E ²
2288	79.9	75.7	72.5	NAT
2388	80.5	76.3	73.5	NAT
2289	78.8	74.6	79.4	E ²
2389	77.5	73.3	77.4	E ²

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2390

2389

2388

2387

2290

2289

2288

2287

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DEPRESSOR TUBE
2.700 O.D. SLEEVE

CADMIUM SLEEVE
3 7/8 SQ CHANNEL
3 1/2 O.D. X 1/8 W.T. TUBE
3 8 O.D. X 1/8 W.T. TUBE

CHARGING TUBE

SPECIMAN CARRIER