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For: W. Luchowski
S. Levy
E. Zobniowski

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TMI-2 REACTOR CORE STATUS

INSTRUMENTATION DATA PACKAGE

Prepared By:

Robert J. Ackerman, Jr.
Special Instrumentation Group Supervisor

April 11, 1979
Numerous measurements have been made during the past 15 days that can help in inferring the status of the TMI-2 reactor core. The purpose of this document is to report all of these measurements to provide as complete and accurate as possible the pertinent information. This data will be reported by instrument class.

1. **Incore Thermocouples**

52 Cr/Al thermocouples are located in incore instrument thimbles positioned approximately 6' above the active core. Diagnostic measurements (loop resistance, time trace studies, trend analysis and spectral analysis) indicate that 49 of these are functioning and appear to be healthy, 2 (4F and 2C) are suspect, and one (9A) and 1 is failed (15A).

2. **Incore Self-Powered Neutron Detectors**

There are 52 instrument thimbles in the core that contain 7 self-powered neutron detectors (SPNDs) in each thimble at levels in inches from the core bottom as follows:

<table>
<thead>
<tr>
<th>Level</th>
<th>Inches From Core Bottom</th>
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<tbody>
<tr>
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<td>0</td>
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<td>10</td>
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<td>50</td>
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<td>60</td>
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</table>

Diagnostic measurements (loop resistance and current) on these SPNDs indicate that 37 of these are not failed (high resistances and measurable currents) with 6 of 52 at level 1 and 15 of 52 at level 2, 1 at level 3, and 1 at level 5 (see attachment 1 for detailed location information). The failed SPNDs show low loop resistances indicating possibly failed sheaths and moisture in the cable.

3. **Excore - Uncompensated Ion Chambers**

Eight uncompensated ion chambers (4 upper and 4 lower) are positioned about 6' outside the reactor vessel. Ion measurements have been made on these chambers as follows:

<table>
<thead>
<tr>
<th>Quadrant</th>
<th>(relative pump)</th>
<th>Upper</th>
<th>Lower</th>
</tr>
</thead>
<tbody>
<tr>
<td>WX (24)</td>
<td>1.8</td>
<td>0.1</td>
<td></td>
</tr>
<tr>
<td>ZY (14)</td>
<td>2.6</td>
<td>2.4</td>
<td></td>
</tr>
<tr>
<td>WY (28)</td>
<td>1.2</td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td>ZY (16)</td>
<td>1.88</td>
<td>1.8</td>
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</table>

Exceeds standard 5.8 P/hr/m²
4. Startup Range Detector (EE, Core, AD)

There are two startup range detectors located about 6" outside the reactor vessel. These detectors have been verified to be responding to neutrons (integral bias curve, discriminator setting). The neutron source from the core at this time is a combination from the startup sources (Antimony, Beryllium and Americium) and 3n reactions in Deuterium and then from multiplication in the core. The detectors were reading 40 cps on 4/9/79 and were showing slight decay daily.

5. Movable Incore Detector

Each instrument thimble has a hollow tube for insertion of a movable incore SPND. E1 were backed off and the 1-81 had the moveable SPND pulled.

The SPND was inserted on 4/9/79 and moved to about 3 ft. (92-9 in.) up into the core before it was blocked for any further insertion. The probe was backed off and reinserted to this same point several times indicating a firm blockage at this point.