

**GPU Nuclear**

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February 27, 1985
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Mr. J. F. Stolz, Chief
Operating Reactors Branch No. 4
Division of Licensing
U.S. Nuclear Regulatory Commission
631 Park Avenue
King of Prussia, PA 19406

Dear Mr. Stolz:

THREE MILE ISLAND NUCLEAR STATION, UNIT 1 (TMI-1)
OPERATING LICENSE NO. DPR 50
DOCKET NO. 50-289
Basic Principles Training Simulator

In response to your October 19, 1984, request for information describing the TMI Basic Principles Trainer capabilities in the areas of reactivity manipulations, plant evolutions, abnormal and emergency evolutions, and industrial operating experience training applications the following descriptions are offered.

I. REACTIVITY MANIPULATIONS

The reactor core is a 12 node model, 3 axial layers of 4, and it provides spatial effects necessary for power distribution training. Six delay groups and one energy group of neutrons are simulated, and a neutron source is provided to make the transition from Cold Shutdown to Hot Zero Power Critical.

Reactivities considered include control rods, fuel temperature (doppler), moderator temperature, boron concentration, Xenon poison concentration, and excess fuel (3 times in core life).

The core thermal - hydraulics include fission product decay and typical simulation channel calculations.

Nodal Rod Worth is considered with safety, re-tilting and power shaping rods being simulated. Dropped rod and misalignment effects are simulated with dropped rod retrieval capabilities.

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Iodine 135 and Xenon 135 are simulated nodally for proper spatial distribution effects and for fast time (up to 40 times real time) Xenon oscillations and power redistribution displays.

II. NORMAL PLANT EVOLUTIONS

Operational evolutions which can be performed by trainees include:

- o Natural circulation/steam dump valve cooling
- o Remove decay heat using LPSI/RHR
- o Heat RCS with reactor coolant pump heat
- o Control RCS pressure (with a pressurizer bubble) using pressurizer heaters and spray
- o Cool RCS with steam dump valves
- o Control steam generator level with FWRV bypass valve manual control
- o Perform reactor criticality (source strength, subcritical multiplication, criticality)
- o Escalate nuclear power through the source and intermediate ranges to the heating range (observing NIS channel overlap, interlock operation, startup rate)
- o Roll turbine to synchronous speed
- o Synchronize generator to grid
- o Load generator and reactor
- o Operate feedwater control system in automatic operation
- o Borate/dilute RCS to desired control rod position
- o Identification, analysis and reaction to abnormal situations through instructor initiated malfunctions
- o Manual ICS system operations

III. ABNORMAL/EMERGENCY EVOLUTIONS

The Instructor can initiate malfunctions from a list of 250 which are categorized as follows:

- o Electrical System
- o Control Rods
- o Nuclear Instrumentation
- o Primary and Support Systems
- o Primary System Instrumentation
- o Secondary Systems
- o Secondary Systems Instrumentation

Since the BPT has a small operating console and limited instrumentation and controls malfunctions are announced and discussed prior to implementation and demonstration.

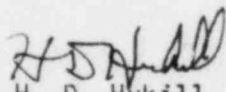
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IV. INDUSTRY OPERATING EXPERIENCE TRAINING APPLICATION

The BPT can be used to present or demonstrate selected IER's based on individual evaluations considering simulator capabilities.

While we believe that the Basic Principles Training Simulator could be used to meet some of the requirements of 10CFR Part 55 and NUREG 0737 for manipulations that are to be performed at the nuclear plant or on an applicable nuclear plant simulator, we do not currently utilize it as the method for certifying the performance of these requirements. We do use it as a precursor to plant or full scope simulator performance of these requirements and are investigating its potential to be used as a device to meet the requirements for some of the manipulations. If you desire any additional information on our Basic Principles Training Simulator, please feel free to contact our Manager, Plant Training, Mr. S. L. Newton.

Sincerely,



H. D. Hukill
Director, TMI-1

HDH/SLN/kvr