June 4, 1984

Docket No.: 50-220

Mr. B. G. Hooten Executive Director, Nuclear Operations Niagara Mohawk Power Corporation 300 Erie Boulevard West Syracuse, New York 13202

Dear Mr. Hooten:

SUBJECT: TRIP REPORT - DISCUSSION OF NUREG-0737, SUPPLEMENT 1, ITEMS I.D.1 AND I.D.2

Re: Nine Mile Point Nuclear Station, Unit No. 1

Enclosed is a trip report summarizing the discussion of our meeting held with members of your staff on February 27-29, 1984, regarding the "Detailed Control Room Design Review (DCRDR) and Safety Parameter Display System (SPDS). Please feel free to contact us regarding any questions you might have.

Sincerely,

Original signed by/

Robert A. Hermann, Sr. Project Manager Operating Reactors Branch #2 Division of Licensing

Enclosure: As stated

cc w/enclosun See next page <u>DISTRIBUTION</u> Docket NRC PDR Local PDR ORB#2 Rdg. D. Vassallo R. Hermann OELD E. Jordan J. Taylor ACRS (10) NSIC ORB#2:DL SNorris:dk	ORB#2:DL RHermann	ORB#2:DL DVassallo
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Mr. B. G. Hooten<sup>.</sup> Niagara Mohawk Power Corporation Nine Mile Point Nuclear Station, Unit No. 1

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Niagara Mohawk Power Corporation . ATTN: Mr. Thomas Perkins Plant Superintendent Nine Mile Point Nuclear Station Post Office Box 32 Lycoming, New York 13093

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Enclosure

## TRIP REPORT

## NINE MILE POINT, UNIT KO. 1

## DISCUSSION OF NUREG-0737, SUPPLEMENT 1

ITEMS I.D.1 AND I.D.2

A meeting was held with Niagara Mohawk Power Corporation (NMPC) on February 27, 23, and 29, 1984 at the Nine Mile Point, Unit 1 site. The purpose of the meeting was to discuss the NMPC approaches for Task Action Plan Items I.D.1, "Detailed Control Room Design Review (DCRDR)", and I.D.2, "Safety Parameter Display System (SPDS)." Participants included R. Pasternak, B. Wolken, and J. Spadafore of NMPC, and L. Beltracchi, R. Hermann and G. Lapinsky of the NRC. At the time of the meeting NMPC had submitted planning documents for both the DCRDR and SPDS (Ref. 1 and 2), and discussion was focused on those documents. In addition, NMPC had a prototype SPDS in operation which was also a primary object of discussion.

The first two days were spent discussing the Nine Mile Point 1 SPDS submittal and informally reviewing the SPDS prototype. Since an NRC staff person representing the Procedures and Systems Review Branch (PSRB) was not able to attend, the acceptability of the SPDS parameters chosen by NMPC was <u>not</u> discussed. Mr. Beltracchi did mention to the NMPC staff that PSRB had some questions concerning the relationship of the Nine Mile Point 1 Emergency Operating Procedures (EOPs) to the SPDS parameters.

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Most of the first two days' discussion centered on the NMPC concept that the SPDS function is served in the NMP-2 control room by displaying 16 "fundamental safety parameters" by means of both hard-wired instrumentation and several levels of CRT-based displays in the control room. Initially, this was an area of concern because the hard-wired displays are somewhat scattered through the control roor, and the CRT is located behind the operators when they are at their normal work stations. Eventually, however, it became clear to the NRC reviewers that the NMPC staff had not properly defined the bounds of their SPDS. As described in the NNPC submittal, the licensee identified 16 "fundamental safety parameters." These were not differentiated as primary or secondary in the text of the submittal, but were implicitly differentiated in the actual displays; that is, a hierarchical cisplay concept is used, consisting of an "overview display" and several "secondary displays." Since the overview consists of a display of actual parameters (reactor pressure, for example) rather than function status distiant (coolant integrity alarm), there is a physical and psychological implication that the overview parameters alone are acequately representative

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of the critical safety function to allow the accurate asses into or plant safety. Ehen questioned on this point, the NMPC staff stat. That the implied differentiation of parameter importance/representativeness is intentional and was just inaccurately described in the submittal. In order to clear up this misunderstanding, NMPC plans to send a revised Safety Analysis Report (SAR) that fully defines the role/function/priority of the 16 "fundamental safety parameters." The staff's understanding at the time of the meeting was that the "overview display" is the primary SPDS display, i.e., the display from which the operator is able to assess plant safety status. The "secondary displays" support a diagnostic rather than monitoring function; so, in terms of the SPDS function, the parameters on secondary displays are, in some sense, less "fundamental." As stated above, NMPC plans to fully define the distinction between parameters in a revised SAR.

Once the scope of the SPDS was defined by NMPC as the "overview display," the discussion concerning the use of spatially separated hard-wired instrumentation and multilevel CRT-based displays became less an issue because the hard-wired displays and lower-level CRT displays will be used: (1) to provide backup to the SPDS function, and (2) for follow-on and diagnostics rather than safety status monitoring.

An abbreviated review of the NMP-1 prototype was done to provide NMPC with some immediate feedback on the human factors aspects of the proposed displays, as well as to allow the NRC staff to judge the usefulness of review guidance developed by the NRC Office of Research for evaluation of CRT displays. Areas of concern are reported below.

One of the most serious problems identified by the staff concerned the issue of data validation. Currently, the approach proposed by NMPC is to have the SPDS operator check data validity. This is done by comparing the displayed value of a parameter on the overview with a redundant display (different channel) of the same parameter on a secondary display. Allocating this function to the operator adds an increment of mental load, adds clutter to the displays because of the need for redundant data, and reduces the number of cross-checks possible and their credibility, i.e., a comparison of <u>two</u> independent values provides no information if the values differ significantly - the operator must guess which one is correct. This could be very misleading, especially if there was a situation when the overview value failed on-scale while the redundant secondary display was correctly portraying an abnormal trend. The NMPC staff said that they would address this data validation concern in the revised SAR.

In the original SAR submittal there was no direct discussion of the requirement for a continuous display. During the meeting several alternatives were discussed, e.g., dedicated overview CRT, visual cuing to return to top level. NMPC will address this issue in the revised SAR.

. . . . × An <u>informal</u> human factors evaluation of the top level, overview display page of the SPDS was conducted. The display page was titled, "Emergency Response Display Overview." The display contained process variable magnitude and trend data on the five process/safety functions defined in NUREG-0737, Supplement 1. The human factors evaluation was limited only to this portion of the display. The evaluation was conducted by using a checklist defined in NUREG/CR-3557, "CRT Display Evaluation: The Checklist Evaluation of CRT Generated Displays," December 1983. The display met many of the items defined by the checklist. For example, time data is updated at specific intervals, and the display of a constant time indicates a failure of the display system. Several items in the checklist were not applicable to the display; also the staff identified several items which should be added to the checklist. However, with the use of the checklist, the staff did find a few features of the display system which could be improved upon. These were:

- The display was void of visual cues which would serve as decision aids to operators, e.g., process variable limits, sequence cue to another display page.
- The color codes used for data in the display elements did not conform to accepted human factors practices, e.g., a red parameter bar for normal operation.

These findings were discussed with the licensee.

Formal review of the SPDS will begin when the revised SAR is submitted to the NRC. NMP-1 has decided that a preimplementation audit is no longer necessary. Therefore, the staff will cancel its tentative plans for a preimplementation audit and proceed in the normal fashion subsequent to receipt of the revised SAR.

On February 29, discussions were held concerning TAP Item I.D.1, "Detailed Control Room Design Review (DCRDR)." Both Brian Wolken (Program Coordinator) and Ray Pasternak (Licensing) of the NMPC staff seemed to have a good understanding of the DCRDR requirements as well as the magnitude of effort needed on the part of NMPC to satisfy those requirements. Contrary to the implications of the schedule provided in the NMP-1 Program Plan (complete review in one 10-14 day span), the NMPC staff seems to understand the time and personnel resources needed to carry out the "follow up" work, including the systems function and task analysis. Discussions concerning the DCRDR concluded with staff comments regarding documentation requirements. NMPC suggested that after a consultant is hired another informal meeting be held at some future date in Bethesda, Maryland to further clarify details of the LCRDR Program. The staff agreed that such a meeting would be useful for both the licensee and the staff.

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