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MEMORANDUM FOR: Thomas M. Novak, Director
Division of Safety Programs
Office for Analysis and Evaluation
of Operational Data

FROM: Mark H. Williams, Chief
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Office for Analysis and Evaluation
of Operational Data

SUBJECT: SUMMARY OF JANUARY 17-18, 1990 MEETING WITH ROCHESTER GAS & ELECTRIC CORPORATION REGARDING MAINTENANCE INDICATOR DEVELOPMENT

On January 17-18, 1990, members of the NRC staff met with representatives of Rochester Gas and Electric Corporation (RG&E), their consultant, ATESI, and the Nuclear Management Resources Council (NUMARC) at the Ginna site to discuss maintenance indicator development. A list of meeting attendees is contained in Enclosure 1. Enclosure 2 contains the overall meeting agenda. Enclosure 3 is the agenda for RG&E presentations that discussed specific portions of the agenda items from Enclosure 2.

This meeting was a followup to the October 13, 1989 meeting of the NRC/Industry Maintenance Indicator Demonstration Project. The composition of the demonstration project represents a broad spectrum of utility organizations and sizes, as well as plant sizes and nuclear steam supply system designs and ages. RG&E was included in the demonstration project to gain insights regarding the monitoring of maintenance from the perspective of a relatively small utility operating a single, older plant - RG&E's Ginna plant. Ginna began commercial operation in 1970 with a two-loop Westinghouse-designed PWR having an electrical output of 470 MWe, and represents roughly one-half of the utility's electric generating capacity.

The NRC staff presented the detail and logic which were followed during the development of the staff's proposed Maintenance Indicator (MI). The purpose of this presentation was to familiarize RG&E personnel with all of the detail necessary for understanding the proposed indicator.

RG&E presented results of their assessment of the NRC's proposed indicator, which involved an RG&E staff effort of approximately 1000 manhours. This assessment, which included mathematical verification of the indicator algorithm and results of their analysis of individual NPRDS component failure narratives, focused on an example system (chemical and volume control system) that, according to the indicator, had equipment problems, and a discussion of the reliability-centered maintenance (RCM) program being implemented at the Ginna plant.

RG&E presented the background behind their RCM project, its system selection criteria, the RCM analysis and task methodology, and the RCM Living Program. The results of the RCM analysis determine which components will receive PM tasks designed to maintain component function.

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The following major issues were discussed during the meeting:

(1) RG&E expressed concern that the staff's proposed indicator did not distinguish critical failures from failures which were not significant. They were concerned that use of this indicator could result in a plant's maintenance program focusing on relatively unimportant individual failures. RG&E stated that significant events which occurred at Ginna over the time span of interest were not tracked by the indicator. The staff explained that, as a programmatic indicator, the proposed indicator was not intended to track significant events. Rather, it was intended to track component failures across a broad spectrum of equipment over time to establish a trend on the premise that no single failure would be used to reach a conclusion about the effectiveness of the maintenance program.

(2) Definition of Maintenance - comparison of the results of independent reviews of example NPRDS failure narratives performed by RG&E and the NRC staff led to the issue whether failures which involved wearout or were first of a kind were maintenance-related.

RG&E reevaluated all of the NPRDS failures using a jury expertise approach, and, in their view, a low percentage could be attributed directly to "maintenance" (11%), as their organizational structure defines maintenance.

According to RG&E, intrinsic design reliability results in random failures for some components [e.g., components that rely on materials that degrade over time (capacitors, relays, seals)] which are expected and are not a result of ineffective maintenance.

A case in point was a group of failures involving the charging pumps. In these failures, the pump packing was found to be leaking, the packing was replaced, and the events were reported to the NPRDS as degraded failures. After several pump packing failures of this type, RG&E determined that the leaking packing was a wearout problem. The corrective action taken was to prepare a PM procedure to replace the pump packing periodically. Under current NPRDS reporting guidance, RG&E considers the packing replacement a wearout condition, and not a maintenance-related failure. The NRC staff commented that for this case, regardless of the cause of the first failure of the pump packing (wearout or maintenance-related), since the indicator would be tracking the failure history, it would show a valid improvement in the RG&E maintenance program when the new PM procedure for the pump was implemented. Therefore, the indicator in this case would measure a maintenance program improvement, and the question of whether the initial failures were due to wearout or lack of maintenance was moot.

RG&E pointed out that, independent of incipient or degraded reporting, the economic decisions exercised during the selection of the preventive maintenance activities or decisions not to maintain but replace when appropriate are treated negatively by the staff's proposed indicator. The indicator does not consider economic and ALARA considerations. This is related to the concern expressed in other meetings with project participants that there is some acceptable level of component failure rate associated with an effective maintenance program. However, the proposed indicator counts all failures in establishing trends, which implies that

any failure is a result of maintenance ineffectiveness. To this concern, the staff has responded that the indicator uses failures across a broad spectrum of equipment over time to establish a trend, and in that framework, no single failure is used to reach a conclusion about the effectiveness of the program. The staff believes that these concerns could be resolved by putting a band around the indicator which would identify the region of acceptability.

(3) Reliability-Centered Maintenance - Since the analysis is done on a component basis, this methodology may allow components to run to failure, or to a condition where corrective maintenance is required due to a loss of function, if a redundant component (i.e., another train or path) is available. The analysis used to identify this equipment considers the local impact, system impact, and plant impact of the component failure. There will be no system impact if all of its constituent trains are not taken down by the failure of the component.

RG&E stated that the RCM systems selected are predominately standby systems, whereas the systems monitored by the indicator are outage-dominating systems. The staff's proposed indicator does not currently cover most standby safety systems.

The staff pointed out that the proposed indicator can serve as a check on the adequacy of the RCM program and implementation. To ensure that the indicator maintains consistency across plants to the extent possible, the equipment scope of the RCM program should be included in the selection of equipment to be monitored by the indicator. In this vein, the list of equipment monitored by the indicator may be modified, contingent on recommendations received from the industry during the demonstration project.

From their review of the set of NPRDS failures, RG&E concluded that no PM Program activity at Ginna should be modified as a result of the failures aggregated under the indicator algorithm methodology. Other equipment failures have caused PM Program changes at Ginna.

Since the indicator for the Ginna plant remained below the average for PWRs of its type and size, with no adverse trends, over the entire period of interest, the staff would not have expected any PM Program changes to be made based on the indicator.

RG&E indicated there is significant risk in reliance on a single indicator to measure maintenance effectiveness; the staff's proposed indicator could penalize a good performer by lessening the priority for budgets being applied to maintenance if the indicator showed good performance. RG&E utilizes both process indicators (backlog) and industry performance indicators (i.e., availability) as measures of maintenance effectiveness. RG&E did identify the following two sets of indicators, one qualitative, the other quantitative, which they would propose using to monitor maintenance effectiveness:

Qualitative - plant material condition, repetitive component failures.

Quantitative - forced outage frequency, turbine runback frequency, safety system availability.

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RG&E identified the following issues which they consider to be most significant in resolving their concerns about the staff's proposed indicator.

(1) System and component selection.
(2) Effects of failure (Local versus system versus plant).
(3) "Ghost" Ticks-Remove superfluous "Ghost" ticks.
(4) Multifaceted (other indicators, maintenance team inspections, other inspections).
(5) Individual NPRDS plant reporter expertise and report completeness - Can significantly affect the quality of the NPRDS data.

The following items were identified for future action:

(1) RG&E will prepare a list of equipment, based on their RCM experience, that should be monitored with the staff's indicator.

(2) RG&E will provide the staff access to component data for the systems analyzed to date within the Ginna RCM Program.

RG&E agrees with this summary.

Mark H. Williams, Chief
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of Operational Data

Enclosures: As stated.

Distribution:
TPAB RF
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* See previous sheet for concurrences.

OFC	:TPAB	:TPAB	:C:TPAB	:	:	:	:
NAME	:POREILLY:*	gep:RDENNIG*	:MWILLIAMS	:	:	:	:

ENCLOSURE 1

ATTENDANCE LIST

JANUARY 17-18, 1990 MEETING

WITH ROCHESTER GAS & ELECTRIC CORPORATION

NAME	AFFILIATION
John Fischer	RG&E
Mark Flaherty	RG&E
James Huff	RG&E
Tom Marlow	RG&E
Bob Smith	RG&E
Herb Van Houte	RG&E
Gerald Wahl	RG&E
Joe Widay	RG&E
Bill Zornow	RG&E
Walt Smith	NUMARC
Jim Huzdovich	ATESI
John Wilson	ATESI
Victor Benaroya	NRC/AEOD
Bob Dennig	NRC/AEOD
Pat O'Reilly	NRC/AEOD
Mark Williams	NRC/AEOD

ENCLOSURE 2

AGENDA

JANUARY 17-18, 1989 MEETING WITH ROCHESTER GAS & ELECTRIC CORPORATION

REGARDING MAINTENANCE INDICATORS

(1) NRC Presentation - Performance Indicator Development, Analysis Assumptions and Purpose of Meeting.

(2) Discussion of Interim Indicator Results.

(3) NPRDS Reporting of Component Failures Involving Outage-Dominating Equipment.

(4) Root Cause Analysis of Individual Component Failures of Outage-Dominating Equipment.

(5) Discussion of Rochester Gas & Electric's Programs/Approaches for Trending Equipment Failures and Failure Causes as They Relate to Maintenance.

(6) Comparison of Maintenance Trend Information.

  (a) Trends Calculated with the NRC's Indicator.

  (b) Trends Calculated with Rochester Gas & Electric's Indicator(s).

ENCLOSURE 3

RG&E AGENDA FOR MAINTENANCE

INDICATOR DEVELOPMENT MEETING

Introduction (Marlow)

NRC Presentation of Agenda Items 1-4

1) RG&E Assessment of NRC Data

a) RG&E mathematical verification. (Zornow)
b) 57 reports. (Zornow)

2) Analysis of Validity of MEI (Marlow)

a) Concerns with MEI data. (Marlow)
b) Example of a specific Ginna system which had ticks - CVCS. (Wahl)
c) Matrix. (Marlow)
d) Present graphs, charts. (Marlow)

(5) Discussion of RG&E's Programs/Approaches for Trending Equipment Failures and Failure Causes as They Relate to Maintenance

a) RCM system selection vs. MEI system selection. (Wilson)
b) RCM analysis and RCM task evaluation. (Wilson)
c) RCM Living Program - Tells if we did not have the right system, critical component, dominant failure modes, or frequency. (Wilson)

(6) Comparison of Maintenance Trend Information

(a) Trends calculated with the NRC's proposed indicator.
(b) Trends calculated with RG&E's indicator.

RG&E's Recommendation for an MEI (Marlow)

a) Qualitative.
b) Quantitative.

Conclusions (Marlow)