UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

AUG 31 1983

MEMORANDUM FOR: Thomas E. Murley, Regional Administrator
Region I

FROM: Darrell G. Eisenhut, Director
Division of Licensing
Office of Nuclear Reactor Regulation

SUBJECT: REVIEW OF SUPPLEMENT NO. 4 TO NUREG-0680, "TMI-1 RESTART"

Enclosed for your review is a copy of the final draft of Supplement No. 4 to NUREG-0680, "TMI-1 Restart."

This Supplement presents the results of the staff evaluation of the impact of the RHR and BETA reports on matters related to TMI-1 restart. It was prepared by an evaluation team composed of personnel from our Division of Human Factors Safety and from the Region I staff in response to a Staff Requirement Memorandum dated June 2, 1983.

Your comments and/or concurrence to release the Supplement for publication are requested by COB on September 7, 1983. Any questions should be directed to L. Crocker, 492-4891.

Darrell G. Eisenhut, Director
Division of Licensing
Office of Nuclear Reactor Regulation

Enclosure:
As stated



83-457

7.1.1.4 Staff Conclusion

Based on the above evaluation the Staff Concludes:

(1) GPUN has taken the required actions to insure that the Vendor manuals are Carefully reviewed and properly controlled

(2) GPUN's Schedule for the completion of the required action is appropriate and timely

(3) When completed, these GPUN actions should provide a means for prompt review and processing of Vendor information as it applies to Safety Related equipment.

• ← NRC's Follow up actions in This area

Future NRC inspections will assure that:

1. The licensee's program is completed and
2. The program implementation is adequate to accomplish its Stated intent.

TABLE OF CONTENTS

Page

Page

## LIST OF FIGURES

## APPENDICES

Appendix A - Inspection Report 50-289/83-10

Appendix B - RHR Report Findings

Appendix C - BETA Report Findings

Appendix D - NRC Staff Evaluation of TMI-1 Operator Attitudes

## 1.0 Introduction

NRC Inspection Report 50-289/83-10, issued on May 17, 1983, reported the results of a special, announced inspection of Three Mile Island, Unit 1 (TMI-1). A copy of that report is enclosed as Appendix A. The purpose and background for the inspection are described in Section 2 of that document. Briefly, the inspection team was charged with reviewing applicable portions of the TMI-1 organization, management, training programs, and operational practices to determine whether the NRC staff could continue to support the positions it had previously taken relative to TMI-1 management integrity supporting TMI-1 restart in light of the ongoing investigation of the Hartman allegations concerning falsification of leak rate data at Three Mile Island, Unit 2 (TMI-2). The team found no reasons for us to alter our previously stated position supporting restart. These results were reported orally to the Commission on May 23, 1983. (The conclusions of the inspection team are found in Section 16 of Appendix A.)

During the inspection, the licensee offered the team for review two consultant reports (by Rohrer, Hibler & Replogle, Inc. (RHR) and by Basic Energy Technology Associates, Inc. (BETA)), which contained information potentially of safety or regulatory significance. (The results are reported in Section 15 of the team's inspection report, Appendix A). After examining each report to determine whether this information might lead the team to alter its conclusions, the team concluded that the reports did not change its findings regarding management integrity and procedural adherence. However, prior to the completion of the inspection, the team did not have an opportunity to examine the contents of the two consultant reports relative to the possible impact upon other matters related to TMI-1 restart. A Staff Requirement Memorandum from the Commission's Secretary to the Executive Director of Operations, dated June 2, 1983, directed us to complete the review of the RHR and BETA reports and to provide any resultant findings to the Appeal Board and to the Commission. As a result of that directive, an evaluation team was formed, consisting of six members from the team

that prepared Inspection Report 50-289/83-10, plus five new members who had not previously been involved. Results of that detailed review of the RHR and BETA reports are reported in this Safety Evaluation Report Supplement.

For the purpose of this review, the comments, findings and recommendations of the RHR and BETA reports were grouped by the evaluation team into the areas of management, training, and operational support. In each of these areas, the team stated its perception of the regulatory or safety issues raised by the RHR and BETA material. Evaluations of the report contents as they affect these issues, and as they are affected by the team's observations and findings, are presented in Sections 3 through 5 of this Supplement.

It is important to emphasize here that the regulatory or safety issues identified in this evaluation are those which the evaluation team perceived could be raised by a disinterested observer after a review of the reports. No implication should be drawn that the issues identified are, in fact, regulatory or safety issues within the purview of NRC even though they are so evaluated in this report. The issues identified have been evaluated from a regulatory perspective because they could be potentially perceived in that context. It should be clear also that the issues identified are those that the evaluation team perceived as possibly being raised based on their experience and knowledge.

The General Public Utilities Nuclear Corporation (GPUN) officially came into being on January 1, 1982, although it had been preceded by a GPU Nuclear Group, as described in Supplement 1 to NUREG-0680, "TMI-1 Restart." The RHR and BETA studies were commissioned by the licensee to help take stock of the new organization and to point out areas where improvements could be made. Both studies were conducted during the early months of the new corporation's existence and neither study was designed to address areas of safety concern. As noted below, the RHR study was to look into the attitudes and perceptions of licensed nuclear operators and the BETA study was to identify areas in the GPUN operation where efficiencies might be improved and where enhanced cost and expenditure control might be achieved.

RHR Report

The RHR study was performed during the latter half of 1982 and the report was issued on March 15, 1983. The RHR report presents the results of an opinion survey of licensed operators and trainees for licenses at the TMI-1 and Oyster Creek nuclear plants of GPUN. The report includes the observations of the interviewer after small group discussions with many of the operators and trainees. The purpose of the project (RHR letter of May 13, 1983) was (1) to see to what extent operator attitudes corresponded to management policies and expectations, and to explore the reasons for any discrepancies; (2) to determine operator reaction to programs where changes were in progress; and (3) to explore the range of operator concerns. The report also documents the collective, subjective perceptions of operators as understood by the interviewer. It does not report objective performance data. It was not designed to, nor does it, address areas of regulatory or safety interest, except as these could be perceived from the subjective description of operator attitudes and concerns. The report presents only the results of the initial exploratory stage of a consulting activity (estimated by RHR to represent about 10% of the total effort envisioned). The report is a working paper for internal use with GPUN management and RHR has not validated its contents. Appendix B lists the questions from the survey form used by RHR, together with the comments and conclusions reached by RHR as a result of the survey and the small group discussions. Each of these items has been evaluated by the NRC staff and a determination has been made as to whether or not the item could potentially raise a safety or regulatory concern. If it does, the section in this report where the matter is discussed is indicated; if not, it is so marked and the matter is not discussed further.

BETA Report

The BETA study was performed during the first half of 1982 and updated during the second half of 1982. The report was issued on February 28, 1983. The BETA report presents the results of a review, requested by GPUN, to identify areas where efficiencies in the GPUN operation might be improved and where enhanced cost and expenditure control might be achieved. While BETA did review some

aspects of regulatory or safety interest, it did so only from the standpoint of evaluating the efficiency of operation. Appendix C lists the findings contained in the BETA report and categorizes each finding as to whether or not the NRC staff considers that it could potentially raise a regulatory or safety concern. If it does, the section in this report where the issue is discussed is indicated; if not, it is so marked and the matter is not discussed further.

In addition, the evaluation team reviewed the RHR and BETA reports to determine whether they contain any new information which is germane to the resolution of matters litigated during the TMI-1 restart proceeding, i.e., (1) questions raised by the Commission in its August 9, 1979, order commencing the restart proceeding; (2) additional questions raised by the Commission in its subsequent order of March 6, 1980; (3) the specific contentions relating to these issues raised by the parties in the restart proceeding; and (4) the issues raised by the Licensing Board in the reopened proceeding on the question of cheating. Findings of the evaluation team relative to each of these issues are presented in Section 6 of this Supplement.

During the course of the evaluation team's detailed review of the impact of the RHR and BETA reports, the licensee furnished to the team (and subsequently to the Appeal Board and the parties to the TMI-1 Restart Proceeding) copies of the first draft of an Institute of Nuclear Power Operations (INPO) Evaluation of TMI-1. The draft evaluation report dated June 10, 1983, had been received by the licensee only a day or so prior to the June 13, 1983 start of the evaluation team's activities at the TMI-1 site. Normally, draft INPO plant evaluations are discussed with licensees prior to being issued in final form to assure that the proposed INPO findings are valid and that the INPO inspectors had not misunderstood or misinterpreted some of the information they obtained during their evaluation. There had not been an opportunity for such an interaction between INPO and GPUN at the time the draft report was furnished to the NRC evaluation team. Nevertheless, in the interests of having a complete report, the NRC team expanded its evaluation efforts to include consideration of the impact of the draft INPO findings. The results are reported in Section 7 of this Supplement.

## 2.0 SUMMARY AND CONCLUSIONS

This Supplement presents the results of a special evaluation of the General Public Utilities Nuclear Corporation (GPUN) and the TMI-1 plant in light of comments, findings, and recommendations made in the reports of two consultants to GPUN. The consultants (Basic Energy Technology Associates, Inc. (BETA) and Rohrer, Hibler, Replogle, Inc. (RHR)) had been retained by GPUN to help assess the efficiency of operations of GPUN, the TMI-1 and Oyster Creek plants, and to determine areas of concern to the licensed operators at these plants about where the licensee might make improvements, repsectively.

GPUN officially came into being on January 1, 1982, and the studies conducted by the consultants took place during the early months of the new corporation's existence. Neither study was designed to uncover or to address areas of safety concern at the TMI-1 plant. Nonetheless, a cursory review of the consultants' reports indicated that they contained information that could be perceived as having safety or regulatory significance and which could have some impact upon previous staff conclusions regarding restart of TMI-1. As a result, we, the NRC staff, were directed by the Commission to review the two consultant reports to determine their effect on TMI-1 restart matters.

In response to the Commission's directive, a staff team composed of members from the Office of Nuclear Reactor Regulation and the NRC's Region I office conducted a special evaluation of the impact of the consultant reports. The team efforts included an onsite evaluation made June 13-17, 1983. In addition to evaluating the contents of the two reports to determine their safety or regulatory significance, the team also examined the effect of the reports' contents upon the findings of the Atomic Safety and Licensing Board's Partial Initial Decisions of August 27, 1981 and July 27, 1982 relative to TMI-1 restart. During the course of its June 13-17 site evaluation, the team also examined the possible impact of proposed findings contained in a draft evaluation report issued on June 10, 1983, by the Institute of Nuclear Power Operations (INPO).

The results of the team evaluation of the RHR and BETA reports are presented in Sections 3, 4, and 5 of this Supplement. The team's evaluation of the impact of the RHR and BETA reports on the Partial Initial Decisions of the Licensing Board is presented in Section 6. An evaluation of the effect of the INPO draft findings is included in Section 7.

The evaluation team took a very broad view of the RHR and BETA reports to determine whether they contained information of safety or regulatory interest. The possible safety or regulatory issues identified by the team are those which the team perceived could be raised by a disinterested person after a review of the reports. In spite of this broad view, which considered issues not within the purview of NRC, the team could identify no information which raised significant safety or regulatory concern. In those instances where some concern appeared warranted, the team's independent evaluation of the issue resulted in a finding that there were no significant problems which would be a bar to TMI-1 restart. Similarly, the team found no instance where the contents of the RHR and BETA reports, when evaluated in light of their goals, would adversely affect the findings of the Licensing Board in its Partial Initial Decisions regarding TMI-1 restart. Finally, the team's review of the draft INPO findings resulted in confirmation of the noted deficiencies as measured against the "standard of excellence" used by INPO. However, in no case did the team conclude that the INPO findings raised issues of regulatory or safety concern that would be a bar to TMI-1 restart.

The team concludes that the RHR and BETA reports do not contain information of significant safety or regulatory interest, nor do they contain information which adversely affects the staff's position upon which the Partial Initial Decisions of the Licensing Board relied upon. Further, the team concludes that the draft INPO report does not contain adverse information that indicates non-conformance with NRC safety or regulatory requirements. Thus, the team concludes that nothing in these reports raises issues which would be a bar to TMI-1 restart.

# 3.0 MANAGEMENT

## 3.1 Organization and Structure

In Section C (Short-Term Actions), part C.6 of NUREG-0680, June 1980, "TMI-1 Restart," the organization and structure responsible for the operation and management of TMI-1 was discussed and shown in Figures 6-1 and 6-2. Subsequently, in Supplement 1 to NUREG-0680, November 1980, an updated description of the organization and structure for the operation and management of TMI-1 was described. In Supplement 1 to NUREG-0680, it was stated that:

> Amendment Number 20 to the TMI-1 Restart Report submitted by the licensee on August 8, 1980, describes plans to establish a GPU Nuclear Corporation that would have responsibility for management and operation of TMI-1, TMI-2, and the Oyster Creek Nuclear Station. The GPU Nuclear Corporation would replace the existing GPU Nuclear Group described in this supplement. The licensee has stated that such a change would have little or no effect upon the organizational structure and assignment of personnel as described above, and that the proposed plan would entail title changes only. Adoption of such a change, however, would require prior approval of the involved state public service commissions and changes in the licensing of the nuclear plants involved. While we will review any new organization, we foresee no problems with the proposed plan.

GPU Nuclear Corporation became functional on January 1, 1982, and is responsible for the management and operation of TMI-1, TMI-2, and the Oyster Creek Nuclear Station. Figure 3-1 shows the current organization of GPU Nuclear Corporation; Figure 3-2 shows the overall organization responsible for TMI-1 under the Vice President and Director TMI-1; Figure 3-3 shows the organization under the Vice President and Director TMI-1 responsible for the operation and maintenance of TMI-1.

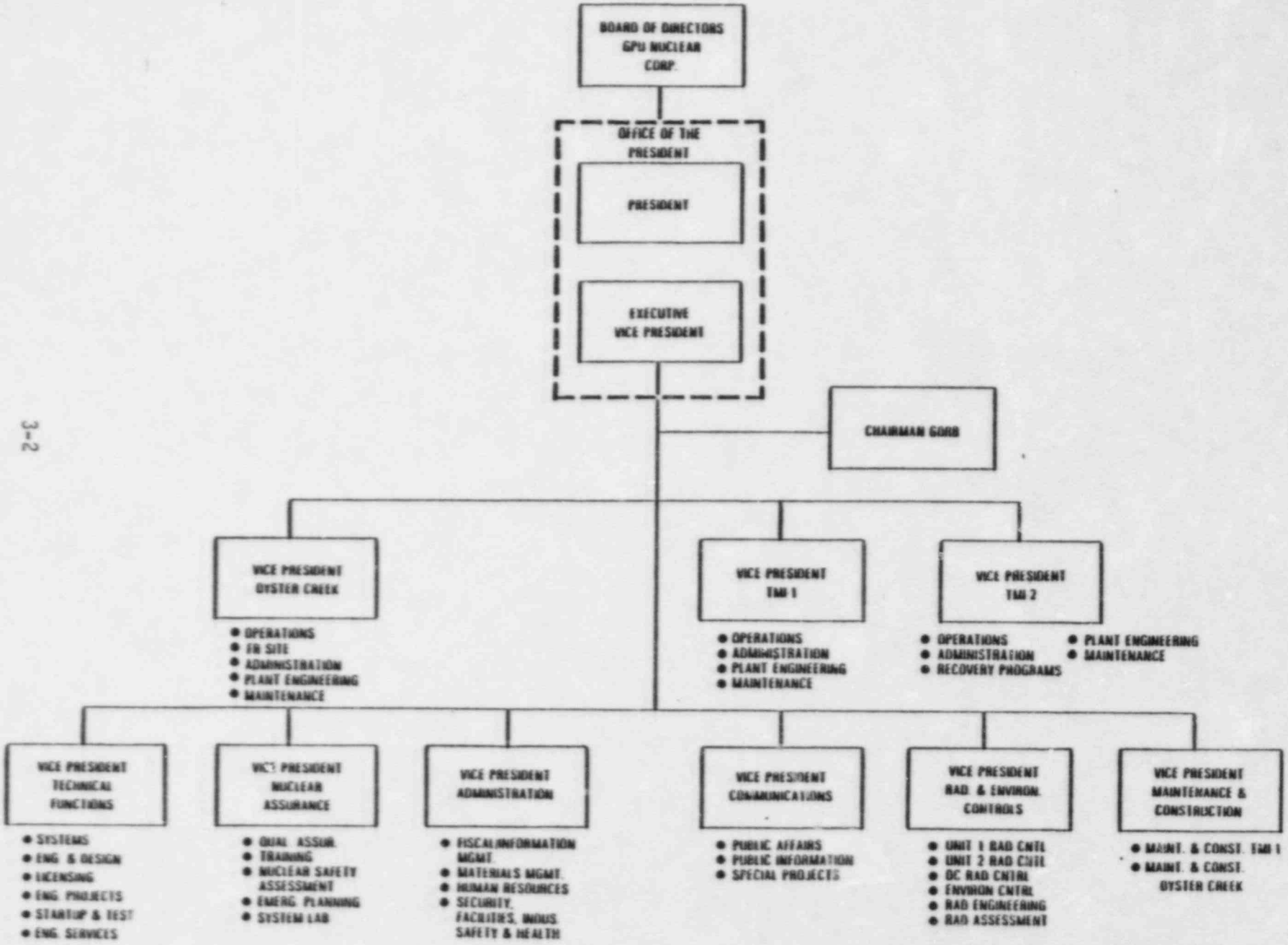


Figure 3-1 GPU Nuclear Corporation

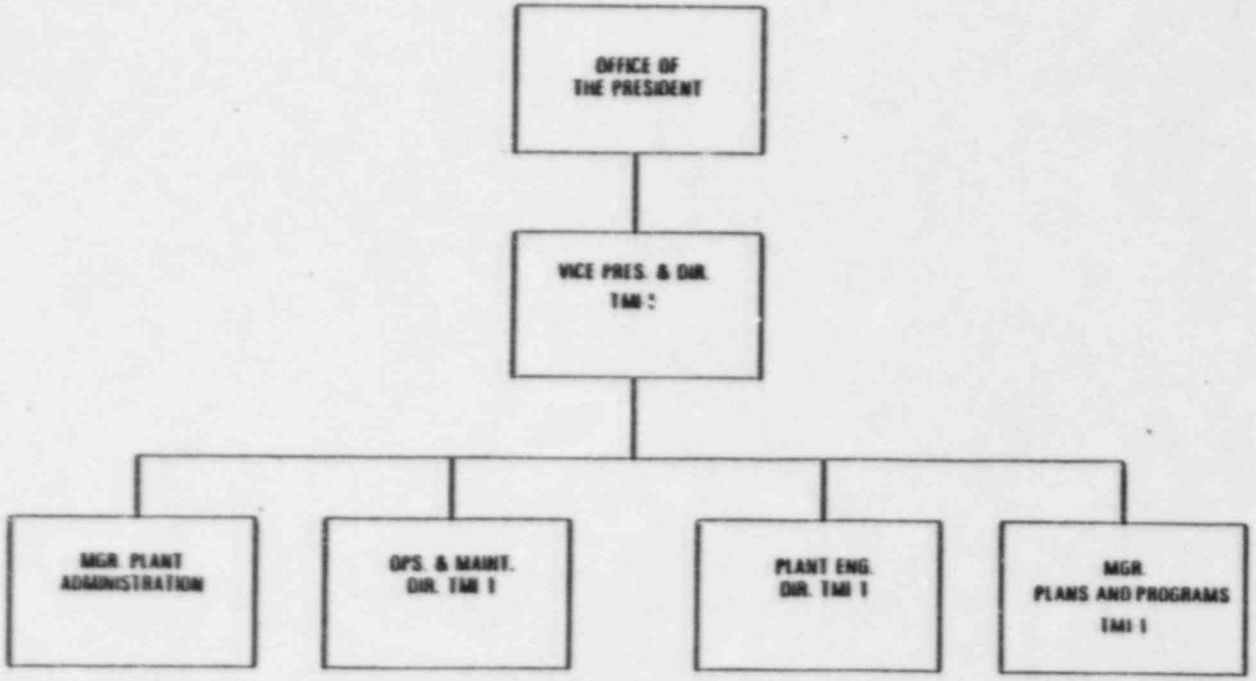


Figure 3-2 TMI-1 Division

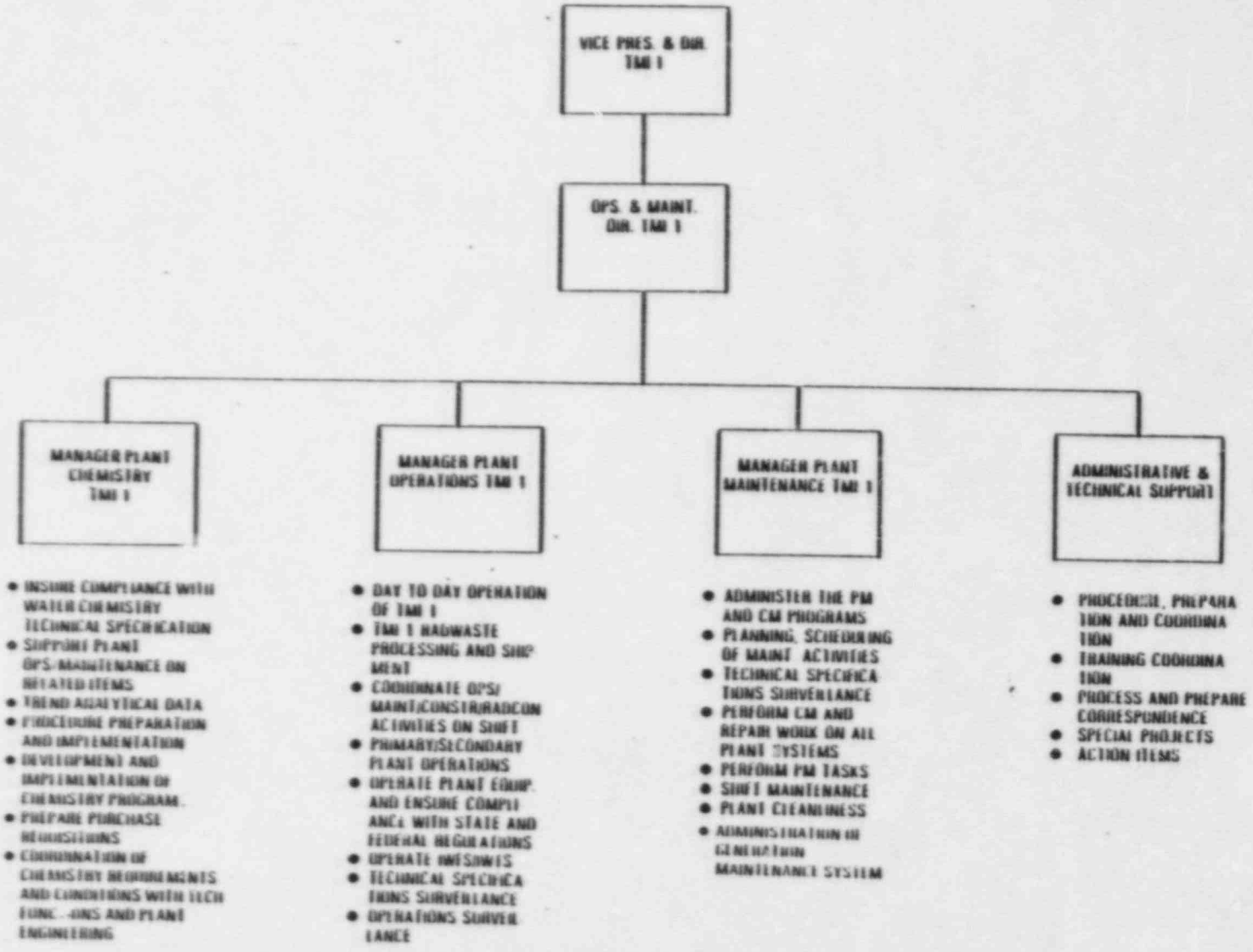


**Figure 3-3 Organization responsible for operation and maintenance**

### 3.1.1 RHR Report

#### 3.1.1.1 Findings

About 20% of the RHR survey effort was devoted to exploring operator attitudes and perceptions regarding organizational issues (see Appendix B, questions 68-96). Overall, among all individuals surveyed, RHR determined that cooperation between departments was the third highest priority issue, although this issue appeared to be more of a concern among Oyster Creek operators than at TMI-1, and it was limited principally to a concern of the senior reactor operators at the two plants.

Based upon the survey results, the TMI-1 operators agreed that the concept of a functional organization made sense and that the new organization was designed to promote safer operation. However, they were concerned about how well the new organization was working in practice and they felt strongly that the various departments needed to find better ways to work together. They felt that the other departments needed more knowledge of plant operations so as to better understand the effects of their actions on operations and they considered that problems would be lessened if there were better coordination among the supervisors. In the perception of the operators, the support departments did not have the same sense of urgency as the operations department, and personnel in the other departments did not have the good of the whole organization in mind when they went about their daily work. To the extent there is a lack of cooperation between departments, the operators blamed themselves as much as they did others, which they attributed in part to their lack of knowledge of the roles of the other departments. They felt that they got good cooperation from the other departments when they knew the individuals with whom they were dealing, and they expressed a desire to know their counterparts in the other departments better. They felt that better management would alleviate problems of cooperation. They did not perceive any difficulty with having the necessary authority onsite to handle both routine and emergency actions.

RHR concluded that the reorganization to GPUN has changed the structure so that operators no longer have the control they had under the previous organization. The new people and new departments and the lack of familiarity with the new roles all contribute to the coordination problem.

3.1.1.2 Issue

We perceive the issue to be whether the departments are organized and adequately functioning together to support safe operation.

3.1.1.3 Safety/Regulatory Concern

The safety or regulatory concern is whether a lack of cooperation between departments is resulting or could result in inadequate support to plant operations such that a safety problem could result.

3.1.1.4 GPUN Response

GPUN has responded to this specific issue by conducting interdepartmental meetings of different levels of management, and departmental meetings at which the functions of the organization and the need for cooperation between units are discussed. Section 3.1.2.4 below describes the various planning and coordination meetings that are held at the working level to assure proper coordination among the various departments and working groups.

3.1.1.5 Staff Evaluation and Conclusion

Under GPUN, support for TMI-1 is now furnished primarily on a functional basis by the various GPUN support departments. Previously, support for the plant was furnished primarily from within the Metropolitan Edison line organization. The new organization, the new individuals that have been brought into the organization and a lack of familiarity with roles and missions all have contributed to a perception on the part of the operators that the new organization has not worked as well as it might. Some of the perceived problems no doubt are endemic to the operation. For example, operators will

probably always view quality assurance and rad/con personnel as being non-cooperative, since the functions of quality assurance and rad/con are not necessarily compatible with productivity.

At the time of the RHR survey, the newness of the organization had precluded the development of one-on-one relationships among workers that normally promote improved cooperation. Correction of this deficiency is largely a function of time, but it can be accelerated by proper management attention. The actions GPUN has taken to conduct interdepartmental meetings, briefings on departmental roles and missions, and working level meetings to plan activities all should help accelerate the development of a better understanding among all employees of their own roles and how they fit into the overall operation. With this understanding should come improved cooperation. We consider that the actions taken by GPUN are appropriate and adequate.

Our reviews and inspections of TMI-1 have not uncovered problems of a safety or regulatory nature that could be attributed to a lack of cooperation between departments. We conclude that such problems with cooperation as may exist are being worked on by the licensee and that they do not pose a present regulatory or safety concern.

### 3.1.2 BETA Report

#### 3.1.2.1 Findings

The basic thrust of the BETA report is that GPUN is a new organization and that people need to forget the way they worked in the past and concentrate their efforts on making the new organization work. There were no specific comments that reflected on the structure of the organization. The report does, however, have two findings related to the TMI-1 organization and structure:

" III-A
The role of the Director, TMI-1 needs to be clarified and strengthened with respect to his over-all site responsibilities.

- III-B
  The positions for five "engineers" presently reporting to the TMI-1 Manager, Plant Operations should be better defined.

As regards finding III-A, BETA made a number of recommendations, including:

- The Office of the President needs a continuing effort to reinforce the understanding of both the division Directors and the lower levels in the organization of how a functional organization is supposed to work.

- All divisions other than the plant divisions need to understand the importance of their support role.

- All Directors need to impress upon their people that nothing is to be gained by worrying about jurisdictional issues.

- The Director, TMI-1 needs to impress upon his senior people the need to use, not fight, the new organization.

- All Directors need to find a way to stimulate a freer flow of discussion between divisions.

As regards recommendation III-B, BETA observed that the five "engineers" really were not performing engineering duties and that their jobs either should be redefined, if they were still needed in their positions, or they should be absorbed into Plant Engineering.

3.1.2.2 Issue

Our perception of the issue that could be raised by the BETA comments is whether the various GPUN departments are functioning together to support safe operations.

3.1.2.3 Safety/Regulatory Concern

The safety or regulatory concern is whether a lack of cooperation or misunderstanding of roles and missions could result in a lack of adequate support to the plant such that a safety hazard could result.

3.1.2.4 GPUN Response

In its efforts to respond to the BETA report on organizational issues, GPUN has undertaken several actions. These include meetings at the Vice President/ Director level to emphasize the need for freer discussion among divisions and meetings where the Director and Managers of a division make presentations to personnel from other divisions to improve cross-divisional understanding of duties and responsibilities.

To deal with specific issues, TMI-1 has daily meetings with Operations/Maintenance, Rad-Con, QA, and others as necessary to plan and coordinate daily work schedules. Monday-Wednesday-Friday meetings are held with Operations/Maintenance, Rad-Con, QA, and others to plan and discuss longer-range activities. Every other week there are interdivisional meetings (project status meetings) to discuss larger scale project work; and there is a bi-weekly meeting of Managers from several divisions to discuss relationships between these divisions and resolve broad-based problems.

The initial Vice President/Director interdivisional meetings are scheduled for completion in 1983, and some have been conducted already. The daily and other working level meetings have been and will be a part of the TMI-1 routine.

Our discussions with the Director, TMI-1 confirmed a continuing need for the activities of the five "engineers" assigned to the Manager, Plant Operations. Consideration is being given to revising their job titles.

3.1.2.5 Staff Evaluation and Conclusion

We conclude that the licensee is taking appropriate action to promote inter-and

intra-divisional understanding as a means for helping to solve routine operational problems. See also the discussion in Section 3.1.1.5. Our reviews and inspections have not uncovered problems of a safety or regulatory nature attributable to a lack of coordination or a misunderstanding of roles and missions. We conclude that such problems as may exist are being worked on by the licensee and do not presently pose a safety or regulatory concern.

## 3.2 Staffing

### 3.2.1 RHR Report

#### 3.2.1.1 Findings

The RHR report addressed the morale and attitude of the licensed operators at TMI-1 in a broad manner, concluding that overall, the morale of the licensed operators was good. However, various operator concerns about their job conditions, not directly related to nuclear safety, did emerge during the course of the RHR survey.

Specifically, the operators were concerned about pay, rotating shift schedules, disciplinary actions, career options, job security, etc. The RHR report made specific recommendations to address the areas of career, pay, and rotating shifts.

#### 3.2.1.2 Issue

We perceive the issue to be whether the dissatisfactions expressed by the operator could result in inadequate performance by the operators.

#### 3.2.1.3 Safety/Regulatory Concern

The safety concern is whether the existing operators' job conditions could adversely affect the safety of plant operations, primarily as a result of

increased operator turnover and the resulting lack of qualified operator. No regulatory issues were identified in any of the areas reviewed.

3.2.1.4 GPUN Response

GPUN has issued an action plan (May 25, 1983) to follow-up on the recommended RHR actions, which we reviewed. The GPUN action plan addressed all the RHR recommendations applicable to operator morale and attitude agreeing to a majority of the recommended actions, further evaluating the remainder, and rejecting none. The planned actions include providing additional career path opportunities, upgrading the pay differential for licensed status, and disseminating information on free personal problem services. Although there is no regulatory basis for evaluating the GPUN response, we reviewed the GPUN planned actions and concluded that they are reasonable and appropriate.

3.2.1.5 Staff Evaluation and Conclusion

We examined the operator turnover rate in order to gain an insight into any staffing problem; examined the existing operator staff level against regulatory requirements; observed shift operations and interviewed operators in order to develop a perception of operator morale and attitudes; and observed actual work conditions to gain a preception of whether or not operators took pride in the performance of their work. No regulatory issues were identified in any of the areas reviewed.

To determine whether or not operator job attitudes, although seemingly reflecting good morale, could have affected operator turnover, we reviewed the turnover rate and number of licensed operators at TMI-1. The TMI-1 shift assignment sheet dated June 3, 1983 showed 12 Senior Reactor Operators (SROs) and 20 Reactor Operators (ROs) to be on a six-shift rotation. The TMI-1 Technical Specifications require, at most (depending on plant conditions), two SROs and two ROs per shift. Accordingly, TMI-1 has sufficient numbers of licensed operators for all conditions. Review of the licensed operators who have left the company showed that between January 1982 and May 1983, only one RO left GPUN. In addition, during this period one SRO transferred to TMI-2 and one RO

transferred to the Quality Assurance Department. We consider that this turnover rate does not indicate an organization with poor morale or with a staffing problem. Further, we compared licensed operator pay with the operator pay of utilities in the Northeast. The comparison showed that the operator pay during the period of the report was slightly below average. We consider that pay alone would not have caused operators to remain at TMI-1 (as they have done) who otherwise might have wanted to leave the company due to job conditions.

We consider that operator job conditions have not adversely affected the performance of the operators and are unlikely to do so. Further, we consider the GPUN response to be acceptable.

3.2.2 BETA Report

3.2.2.1 Finding

BETA identified many issues with regard to manpower utilization within GPUN. Three BETA staffing findings (V-C-1, -2, and -3) did not involve issues of organizational structure (previously discussed). These three BETA findings involve the Quality Assurance (QA) Department. Specifically, BETA recommended that GPUN consider reducing the size of the QA Engineering, Operations QA, and Manufacturing Assurance sections as their areas of responsibility decrease or stabilize in the future.

3.2.2.2 Issue

We perceive the issue to be whether the QA staffing is sufficient.

3.2.2.3 Safety/Regulatory Concern

The safety and regulatory concern on this issue is whether GPUN has sufficient, qualified manpower to implement the NRC-approved Operations Quality Assurance Plan for TMI-1.

3.2.2.4 GPUN Response

GPUN has agreed to review the manpower in the affected sections as the future workload in these areas becomes more definite and to reduce manpower, if appropriate.

3.2.2.5 Staff Evaluation and Conclusion

A review of NRC inspections and reviews concerning QA coverage during the last two years showed that no significant problems with the QA coverage or the QA staffing were found. Further, the QA staffing reviewed by the Atomic Safety and Licensing Board (ASLB) in the TMI-1 Restart Hearings was compared to QA staff levels of May 31, 1983. In paragraph 113 of the Partial Initial Decision (PID) on management issues, the ASLB found that "[a]s of February, 1981, approximately 65 to 70 QA personnel were assigned to TMI, 30 of whom were actively engaged in TMI-1 work." As of May 31, 1983, 71 QA personnel were assigned at the TMI site, 49 of whom were assigned to TMI-1 work. This compares favorably with the situation as it existed at the time of the Licensing Board's finding.

We consider that GPUN has sufficient, qualified manpower to continue to implement the Operations Quality Assurance Plan. We consider the GPUN response to be acceptable.

3.3 Procedures and Adherence

3.3.1 RHR Report

3.3.1.1 Findings

The RHR report contained several statements concerning the views of GPUN operators about the quality of procedures and management policies related to procedures.

3.3.1.2 Issue

We view the issue of operator concerns for their procedures and management policies related to procedures as a potential safety issue.

3.3.1.3 Safety/Regulatory Concern

If operators question the quality of procedures and management policy on use of procedures, they will have little confidence in the ability of the procedures to prescribe plant operations. Hence, operators may not follow the procedural guidance as management intended. Operators could take independent action based on their analysis rather than actions based on the planned and prescribed actions in authorized procedures.

3.3.1.4 GPUN Response

The GPUN response to issues raised in the RHR report about operators' attitudes toward procedures and related management policies was issued May 25, 1983. All five items identified as "Safety Action Steps" in the RHR report were addressed, all were agreed to, and all were listed as having action underway with a 1983 goal. With the exception of the first item titled "Simplification of emergency operating procedures," we consider the responses to be satisfactory. The response to the first item indicates that GPUN expects to resolve operator concerns about Emergency Procedures which are too detailed and/or complex by: (a) instituting Abonormal Transient Operating Guidelines (ATOG); and (b) providing guidance for the use of 25 degree subcooling margin. In the case of the former, ATOG procedures are not due to be implemented at TMI-1 until after the first refueling following restart and those operators who have been exposed to these procedures have expressed concern that the degree to which ATOG will simplify EPs depends upon the specific method by which it is implemented. In the case of the latter, while it is recognized that such guidance is helpful for the simplification of procedures, this change does not eliminate the concerns expressed by operators during our focused interviews, and discussed in detail in Sections 3.3.1.5 and Appendix D of this SER.

3.3.1.5 Staff Evaluation and Conclusion

The RHR report drew its conclusions from group interviews as well as from written operator responses to a questionnaire. Further, the report combined the views of Oyster Creek and TMI-1 operators, as well as impressions formed by the RHR interviewers. Thus, we could not separate the views of TMI-1 operators from those of Oyster Creek operators. Consequently, we concluded that procedural issues identified in the RHR report needed to be independently examined with TMI-1 operators to determine the significance of their concerns.

We developed a standardized set of questions, including certain "probe" questions to be asked only as follow-ups to specific responses to a prior question. The questions (as written for use by the interviewer) are provided in Appendix D. Two staff members conducted focused, individual interviews with a sample of operators from TMI-1.

Interviews were conducted by having one staff member ask the questions while the other recorded the responses given. Care was taken to ensure the anonymity of those being interviewed, and each respondent was assured of this precaution. The only personal data recorded concerned the individual's role in the shift complement and his NRC license status, i.e., licensed operator (RO), licensed senior operator (SRO), or shift technical advisor (STA).

TMI-1 has six rotating shift crews each consisting of a shift supervisor (SRO), a shift foreman (SRO), three or four ROs, a shift technical advisor (STA), and six or seven auxiliary operators. Those interviewed by the staff included: 11 ROs, 8 SROs (3 STAs), 1 unlicensed (STA). Auxiliary operators (AOs) were not interviewed because of their non-licensed status, their lower level of familiarity with control room procedures, and the fact that they were not included in the RHR survey. Four persons were interviewed from each shift, except "A" shift. "A" shift personnel were offsite and unavailable.

The detailed results of these focused interviews with the TMI-1 operators are presented in Appendix D.

Our interviews with a sample of 20 TMI-1 operators led to findings different from those of the RHR report in several key areas. There are several possible explanations for these differences, as described below:

(1) Although the RHR report was dated March 15, 1983, the actual surveys and group discussions were held as much as eight months earlier. In that period of time there had been numerous changes made in many of the areas addressed in the RHR report, specifically: plant procedures, management policies, staffing and personnel, operator license status, and operator training. Thus, we were in all likelihood discussing issues with and talking with personnel who represented a very different behavioral "sample" than the ones addressed by RHR.

(2) The data presented in the RHR report were obtained primarily from written, anonymous questionnaires completed by operating personnel. We have identified in this SER several examples of questions which contained multiple meanings or were ambiguous in their intent. Without an interviewer present to clarify any such ambiguities for the respondents, it is difficult to interpret the responses to such questions. The focused interviews conducted by us were designed to permit a relaxed, open exchange of information between the respondent and the interviewers. Thorough answers were encouraged (as opposed to checking a box on a form), and clarification of any word or phrase that was unclear was provided. While we recognize that one operator in a room with two NRC staff members may not be conducive to a frank exchange, we did everything possible to reassure the respondents of our sincerety, concern, and promise of anonymity. Care was taken to make questions free of bias, and uni-dimensional of meaning to aid later interpretation. Follow-up questions (probes) were asked when necessary. For these reasons, we believe that the results of our interviews provide an accurate and comprehensive picture of TMI-1 operator opinions and attitudes about procedures and issues related to them.

(3) RHR personnel stated, in their letter of clarification of May 13, 1983, that during their contact with TMI-1 personnel, no distinction was made

between classes of procedures (e.g., administrative, engineering, maintenance, operational, emergency) because RHR was unaware of such distinctions or their importance. During our interviews, it became clear that operators held substantially different opinions about different types of procedures. The extent of these differences is addressed in Appendix D. The staff believes that any attempt to summarize and categorize TMI-1 operator opinions about procedures without recognizing and accounting for the substantial and critical differences between such procedures may result in conclusions that are misleading.

(4) The RHR letter of May 13, 1983, states: ". . .the report combines both operator attitudes and consultant impressions. It is not exclusively the former." Unfortunately, the report does not indicate when a particular statement or conclusion represents operator attitude or consultant opinion. Further, because of the consultants' expressed lack of familiarity with the technical nature of the subject matter (as evidenced by their lack of awareness that there were distinctions between different types of procedures), the technical basis for the consultants' opinions is questionable.

The following items were discussed in the Executive Report provided by RHR. Since there were no direct questions in RHR's questionnaire that addressed these issues, it is assumed that they either were based on comments made during the small group discussions, or represent the opinions of the consultants.

- RHR stated that two procedural issues affected "operator capability to provide safe performance" (page 6). These two issues are: the growth in procedural complexity; and the requirement for verbatim compliance.

As discussed under RHR Question 98, we found that, while 75% of the respondents surveyed felt that procedural complexity and/or detail could theoretically result in a hazard to safety, 70% (14 of 20) believed that none of the procedures in use at TMI-1 were of safety concern due to complexity. RHR's statement

that verbatim compliance degrades the operator's capability to provide safe performance (because it "fosters reliance on procedures, diminishes ability to think," and "leads to covert noncompliance") is refuted by the staff interview findings. Fully 85% (17 of 20) of the TMI-1 personnel who participated believe that management policy on procedural compliance is reasonable, and 100% of the operators interviewed stated that they were unaware of incidents of noncompliance. Further, operators told us that management policy required compliance with the intent of the procedures, rather than "verbatim" or literal compliance, as the RHR report concluded.

- RHR stated: "a slight majority (agree) that the constructive benefits made since the accident are more than offset by the cumbersome procedures and organizational structure" (page 21).

During our interviews, we read this statement to each respondent and then asked what it meant to him, and whether or not he agreed with it. Most respondents agreed that some of the gains made had been offset by cumbersome procedures and organization, but every respondent disagreed with the RHR conclusion that such gains had been "more than offset." Further, there was no consensus among respondents about the RHR statement's meaning.

Based upon our evaluation, we find that, in general, TMI-1 operators believe that:

- Their procedures are up-to-date and accurate.

- Management's policies on procedural compliance are reasonable, and are clearly communicated to the operators.

- Management's policy on procedural compliance is not knowingly disregarded, although unintentional violations could occur.

- A procedure that is too complex or too detailed could lead to safety problems, but none of the procedures in use at TMI-1 have this problem.

- Some Emergency and Abnormal Operating Procedures suffer from too many immediate manual actions and steps, notes, and cautions within this section of the procedure. Since everything within Immediate Manual Actions must be memorized, an undue burden is placed on operators. This burden would be significantly lessened if these steps could be shortened, and if much of the detail could be moved to the subsequent actions section of these procedures.

- "Information overload" of operators may occur due to the length and number of immediate manual actions of some Emergency and Abnormal Procedures.

- Although operators feel that there are too many Emergency Procedures, and that several could be combined or reassigned to another category, they do not feel that the number of Emergency Procedures interferes with their ability to do a good job.

- Although some operators are concerned about inadvertently breaking a regulation or violating a Technical Specification, most agreed that this possibility was a "way of life" on the job, that little could be done about it, and that it did not interfere with their performance.

- Operators are evenly divided in their assessment of the amount of training received on procedures. About half feel that their training is adequate, and half would prefer additional procedural training.

- Most operators find the amount of training on the analysis of plant conditions to be adequate; some would like more such training.

- Operators tend to believe that some of the improvements in safety made since the TMI-2 accident have been partially offset by cumbersome procedures and organizational structure. None believe that such gains have been lost.

Based upon our anonymous, focused interviews with 20 TMI-1 operators representing five of the six shifts, and our analysis of responses to our questions and follow-ups, we conclude that TMI-1 procedures, in general, and Emergency and Abnormal Procedures, in particular, are acceptable for restart, with the following exceptions:

1. We require the licensee to examine the Immediate Actions in Emergency Procedures 1202-6B, "Loss of Reactor Coolant/Reactor Coolant Pressure Injection" and 1202-2A, "Station Blackout," and revise them as necessary to assure that only those essential immediate manual action steps are contained in this section of the procedures. Other essential steps should be relocated to other sections of the procedure, as appropriate. The licensee shall also examine these procedures and eliminate from the "Immediate Actions" sections any excessive or unnecessary wording that appears in steps, notes, or cautions. If any steps, notes, or cautions could be moved from the "Immediate Actions" to the "Follow-up Actions," the licensee shall endeavor to do so.

2. We require the licensee to review for clarity, legibility, and ease of use, all "Special Temporary Procedures" (STPs) placed in the control room for use by operators or other plant personnel. Any STPs of questionable quality should be replaced, and a system should be implemented to ensure the future quality of all STPs consistent with the requirement to issue such procedures on short notice.

The basis for these two exceptions may be found in the detailed responses to individual questions contained in Appendix D.

### 3.3.2 BETA Report

The BETA report contained no comments, findings or recommendations regarding procedures and procedure adherence other than its finding VI-B-1 regarding the length of time and the difficulty involved in getting Technical Functions Division procedures changed. Thus, the BETA report has no impact on the issue discussed in this section.

## 3.4 Attitude Toward Safety

### 3.4.1 RHR Report

#### 3.4.1.1 Findings

Some of the RHR findings concern the area of the operators' attitude toward safety and the operators' perception of management's attitude toward safety.

Concerning the operators at TMI-1, 93% disagreed that "[s]afety gets too high a priority here" and 79% agreed that "[t]he objectives* of GPU Nuclear are valid". However, "[a] majority [56%] ... would not put efficiency second to safety."

Concerning the operators' perceptions of management, "only a slight relative majority [64%] agreed that top management is more concerned about public safety than it is about generating electricity."

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*The GPUN objectives are:

"Manage and direct the nuclear activities of the GPU system to provide the required high level of protection for the health and safety of the public and the employees.

Consistent with the above, generate electricity from the GPU Nuclear stations in a reliable and efficient manner in conformance with all applicable laws, regulations, licenses and other requirements in the directions and interests of the owners."

3.4.1.2 Issue

We perceive the issue to be whether operators have a positive attitude toward safety and whether operators perceive that top management also has a positive safety attitude.

3.4.1.3 Safety/Regulatory Concern

The safety concern is that if the operators did not have a positive attitude toward safety, they might develop a lackadaisical approach toward proper performance of their jobs. The operators' perception of top managements' safety attitude is important insofar as it fosters a positive operator attitude.

3.4.1.4 GPUN Response

RHR made no recommendations concerning operators and their attitude toward safety. Accordingly, GPUN has no new action planned that is directed toward operator safety attitudes.

3.4.1.5 Staff Evaluation and Conclusion

When evaluating operator attitudes, we disregarded the survey question which stated "Efficiency of operations should not take a second place to public safety" based on the convoluted wording of the statement. The 56% agreement approximates the result one would expect if people were forced to agree or disagree with a confusing question.

The remaining survey statements show that the operators generally agree upon the importance of safety. However, we can find no regulatory basis on which to judge the acceptability of the percentage of the agreement.

Operator lack of general agreement concerning top management's attitude about the top priority of safety seems to reflect the operator's general perception of corporate management ("54% agreed that they had "confidence in our corporate

management," while 93% agreed that they had "confidence in our plant management"). Further, based upon the existence of a positive safety attitude by the operators, their perception of top managements' safety attitude is of much less significance. The safety attitude of top GPUN management and their willingness to commit resources to safe operation was previously covered by the Licensing Board and found to be acceptable (see the August 27, 1981, Partial Initial Decision, §§ 400-401).

We conclude that operator attitudes toward safety are positive and, therefore, are unlikely to adversely affect the proper performance of their jobs. Further, although it would be desirable for the operators to have a better perception of top management's attitude toward safety, we conclude that their perception is unlikely to affect their job performance. The safety attitude of top management previously was found by the Licensing Board to be acceptable.

### 3.4.2 BETA Report

The BETA report contained no comments, findings or recommendations regarding operator attitudes toward safety. Thus, the BETA report has no impact on the issue discussed in this section.

## 3.5 Supervision and Productivity

### 3.5.1 RHR Report

#### 3.5.1.1 Findings

The RHR report addressed operator perceptions with regard to supervision and productivity. The TMI-1 operators were generally supportive of the supervision they have received; 77% agreed that they were happy with the quality of their supervision and only 12% agreed that supervision of operators was too lax.

With regard to productivity, the TMI-1 operators were less positive: 65% felt they were required to do too many nonproductive tasks and 58% felt the organization had too many policies and procedures that interfered with doing a good job.

3.5.1.2 Issue

We perceive the issue to be whether supervisory performance and operator productivity are adequate.

3.5.1.3 Safety/Regulatory Concern

The safety concern is that safety-related work might not be done or might be improperly done due to poor supervision. There are no regulatory requirements which apply directly to supervision and productivity.

3.5.1.4 GPUN Response

RHR made no recommendations with regard to operator perceptions of supervision and productivity.

3.5.1.5 Staff Evaluation and Conclusion

We interviewed operators and observed shift operations in order to assess operator perceptions of supervision and productivity. The operators indicated that productivity was not as high as they thought it could be, primarily because of other tasks interjected by supervisors into the operators' routine. Those interviewed agreed that defining "productive work" was subjective, and that what was considered productive by one person might be considered nonproductive by another person. Our interviews and observations gave no indication that performance of nonproductive tasks had adversely affected the proper completion of safety-related work. Regarding the RHR statement regarding "too many policies and procedures," see Section 3.3.1.5 for our independent evaluation.

We conclude that the quality of supervision and operator productivity are not adversely affecting completion of safety-related work, since there was no clear nexus in the RHR report between the questions asked, relative to supervision

and productivity, and safety. Moreover, based on our interviews and observations, none was found.

### 3.5.2 BETA Report

#### 3.5.2.1 Findings

The BETA report findings relative to supervision and productivity centered on poor productivity, with insufficient or poor supervision cited as a contributing factor. Two of the findings for this section, V-B-1 and IX-B, were not examined by the staff because of their lack of relevance to any safety or regulatory concern (See Appendix C). A third finding, VIII-3, cited current bargaining unit agreements as having a marked impact on work efficiency; the staff identified notning in the details of this finding that indicated a safety or regulatory issue. Two findings, XII-A and XII-D, raised possible safety concerns with regard to supervision and productivity. XII-D is discussed in inspection report 50-289/83-10 (Appendix A) but was examined further during this review.

#### 3.5.2.2 Issue

We perceive the issue to be whether supervisory performance and operator productivity are adversely affecting the safety of the plant.

#### 3.5.2.3 Safety/Regulatory Concern

The safety concern relative to this issue is that supervisory performance be effective and adequate so as to properly complete safety-related work. We do not consider productivity, per se, a regulatory issue; however, productivity was reviewed to the extent it could impact upon plant safety.

#### 3.5.2.4 GPUN Response

GPUN has issued an action plan to address the BETA recommendations concerning supervision and productivity. We reviewed the preliminary responses contained

in a May 2, 1983, report. The responses address all the subject BETA recommendations, and GPUN has agreed to all except one, which is undergoing evaluation.

The planned GPUN actions involve no regulatory issues but were reviewed by the staff and found reasonable and adequate.

3.5.2.5 Conclusion

We interviewed operations personnel regarding supervisory adequacy and performance. Training for new supervisors was reviewed, along with the operations performance appraisal system and actual appraisals for Shift Supervisors and Shift Foremen. Disciplinary measures were not examined during this review, as they were examined during special inspection 50-289/83-10 and found to be working in a manner sufficient to enforce compliance with the licensee's policies and procedures. Finally, we observed shift operations at various times. During these reviews and observations, we identified no issues of regulatory significance.

We conclude that supervisory performance is not adversely affecting the completion of safety-related work. Although improvement in employee productivity may be desirable from an economic perspective, based upon our interviews and observations we conclude that it is not an area of safety or regulatory concern.

# 4.0 TRAINING

## 4.1 RHR Report

RHR's letter of May 13, 1983 to Robert Arnold (GPUN) states, "To date, the interviews and the survey have focused on the operators. Consequently, the input up to this point has been one-sided. The purpose of the original effort did not include validating operator perceptions by interviewing management and those in other departments." Validation of the operator perceptions is important, because sound methodology dictates that one attempt to validate opinions. This is especially important in view of the quality of the RHR survey instrument (see Appendix B).

In addition, RHR states in its May 13, 1983 letter, that "Expectations of operators for training are extraordinarily high at TMI because of the relation of training to license reception and maintenance and as a result, job security. Complaints about training should be evaluated in the light of their extraordinarily high set of expectations. Operators at TMI strongly concur that GPU Nuclear has a major commitment to training..." It is important to view the findings and comments in the RHR report in the context of RHR's comments in their May 13 letter.

### 4.1.1 Findings

- There is a need for increased hands-on experience.
- The repetitive parts of requalification training should be made more attractive.
- Former nuclear Navy personnel need more training on plant systems.

- The training approach in theory mastery needs to be different for former nuclear Navy personnel than it is for personnel coming up through the plant.

- Standards and evaluation of trainees need to be tightened up.

- There needs to be more convergence between training, testing, and ability to run the plant.

- Trainers should be evaluated on their teaching skills and trained according to their needs.

- There is antagonism between requalification trainers and licensed operators.

- Training department needs to be more responsive to trainees.

4.1.2 Issues

We see the training issues as follows:

- Is the training program for licensed operators adequate to meet regulatory requirements?

- Is the TMI-1 plant staff adequately trained to perform their safety-related responsibilities?

4.1.3 Safety/Regulatory Concern

These issues are both a safety and a regulatory concern in that they relate to the training of those personnel who are charged with responsibility for the safe operation of the plant.

To address these issues, we requested copies of the training programs now in place at TMI-1. We also interviewed seven members of the training staff, including the Director of Training and Education (GPUN), the Manager of Plant

Training for TMI-1, and the Supervisor of Licensed Training for TMI-1. The issue was also addressed in additional interviews with 13 licensed personnel from four different operating shifts. We also examined GPUN's formal response to the issues and findings in the RHR report.

4.1.4 GPUN Response

GPUN's response to the issue of more hands-on experience is adequate. Both a Basic Principles Trainer and a replicate simulator are on order for TMI-1. In addition, the newly established Operator Training Review Committee has hands-on experience as an agenda item. Shift supervisors now go through the training program with the trainees to teach the systems that are specific to TMI-1. Instructors participate in Licensed Requalification Training and have required reading assignments so that their knowledge of the plant is current.

To address the issue of former Nuclear Navy personnel needs for more training on plant systems, GPUN is incorporating these personnel into the systems portion of nonlicensed operator training. Additional training for individuals and crews is prescribed by the Restart Requalification Card. Annual simulator training for all personnel is conducted at the B&W simulator in Lynchburg, Virginia.

Another issue is the need for a different training approach in theory mastery for former Nuclear Navy personnel than for those coming up through the plant. GPUN has responded by increasing theory instruction for nonlicensed operators while permitting ex-Navy trainees to take validation exams ("test out") in theory.

GPUN has addressed the issue of tighter standards and evaluation of trainees through the use of qualification check-offs, the Licensed Operator Certification and Control of Exam procedures.

The GPUN response to the need for more convergence between training, testing, and ability to run the plant has taken several forms:

(a) The Operator Training Review Committee, which has members from both the Operations (4) and the Training (3) Departments addresses this issue.

(b) Weekly training review discussions between operations and training personnel have been held for more than a year.

(c) Training and Education (T&E) has provided questions to the NRC test bank in order to assist the effort to make the exam content more valid.

(d) T&E is currently studying the various task analysis procedures to determine which one will best suit the needs of TMI-1.

The quality of the training staff is being addressed by GPUN with the instructor evaluation program and the Instructor Training Program, both presently in place.

The issue of antagonism between requalification trainers and licensed operators, as well as that of need for responsiveness to operators' needs by the training department, are also being addressed by the formation of the Operator Training Review Committee. The T&E Department also has a goal to establish a Training Advisory Committee that may also address these areas.

With the exception of those action steps that involve use of the new BPT and TMI-1 replicate simulator, the GPUN steps for improving training have been implemented or are about to be implemented shortly (starting with the next training cycle).

4.1.5 Staff Evaluation and Conclusion

The GPUN responses to the issue concerning the quality of the training staff, i.e., an instructor training program and an instructor evaluation program, are considered to be appropriate and adequate because these types of programs are the desired practice in any systems approach to training.

The establishment of an Operator Training Review Committee with members from both the Operations (4) and Training (3) Departments provides a good balance of reviewers from the two departments and should serve to alleviate problems between the departments while assuring responsiveness to the operator's needs. We consider the GPUN response to be appropriate and adequate.

During the evaluation team's visit to the TMI-1 site, the Manager, Plant Training, TMI-1 furnished the following updated training material for our review:

1. TMI-1 Replacement Operator Training Program Description

2. TMI-1 Senior Reactor Operator Replacement Training Program

3. TMI-1 Direct Senior Reactor Operator Training Program

4. Licensed Operator Requalification Training Program Description

5. Auxiliary Operator Training Program, Unit I

6. Memo RPC-83-012 dated May 2, 1983 - Meeting of 4/22/83 - Operator Training Concerns

7. Memo 6211-83-0432 dated May 20, 1983 - Operator Training Review Team

8. Memo 6211-83-0450 dated May 24, 1983 - Minutes of Training Review Team Meeting, May 23, 1983

9. Nuclear Personnel Training After TMI-2: The GPUN Response

10. Highlighted excerpts from pages 19, 20, 21, 26, 27, and 37 of ASLB prefiled testimony of Dr. Long, Dr. Knief, Mr. Ross, and Mr. Newton

11. Memo 3200-83-0197 dated April 13, 1983 - TMI-I Restart Qualification Card

12. Memo 6211-83-0516 dated June 13, 1983 - OTSG Tube Rupture Training

13. Drill Guides from OTSG Tube Rupture Training

We have examined the above materials in view of the requirements contained in 10 CFR 50 and 10 CFR 55 as well as the guidelines of Regulatory Guide 1.8 and ANSI Standard 3.1. We find these materials to be acceptable.

The training findings in the RHR report have been adequately addressed by GPUN. Many of these findings had already been identified by the licensee and action steps begun by the time RHR issued their report. It became apparent through interviews with trainers and licensed personnel that not only have the action steps been taken, but that additional steps have been taken by the utility to address issues raised by RHR's operator survey. For example, an effort is being made to allow trainers to spend more time on shift in the control room, thereby enabling training to be more job-relevant. The training staff at the B&W simulator tries to allow time for more than the legally required manipulations. A Pressure-Temperature Plot Trainer is not only in place in the training department but a duplicate of this trainer has been installed in the TMI-1 control room for use of off-shift operations personnel.

In order to further clarify the issues of concern to operators regarding training, we addressed the operator's responses to the RHR survey instrument during our interviews with operators and trainers. (See Section 3.3 and Appendix D of this Supplement.) These personnel, most of whom had responded to the survey, felt that true convergence between training, testing, and ability to run the plant would not be achieved without an operational plant. They also felt that with the present efforts to improve and update training, mentioned above, the programs are adequate.

Our review of the content of the training programs, coupled with personnel interviews, indicates that none of the training issues raised in the RHR report should affect TMI-1 restart. Further, the status of all corrective actions addressing issues raised in the RHR report is such that restart should not be affected.

## 4.2 BETA Report

BETA's letter of May 13, 1983 to Robert Arnold (GPUN) states, "As in other cases, BETA did not review the quality of training, i.e., whether or not the students received the proper training. Our review concentrated on the efficiency of the training program. For the reasons stated in the report, we found areas where improvements needed to be made and these are reflected in the specific recommendations given on pages 58 and 59."

Comments and findings in the BETA report should be viewed in the context of this statement. Predictably, these findings and recommendations are aimed at correcting inefficiencies in scheduling and program coordination. The recommendation that the Director of Training and Education should direct efforts of TMI's training department "to concentrate on producing the best product they know how and less on trying to prove it," stems from BETA's opinion that the TMI training staff has spent a great deal of its time "looking over its shoulder." BETA feels that the training staff needs to get back to what "they know their job is."

### 4.2.1 Findings

V-B-2 The headquarters training group is not concentrating enough on coordinating plant training efforts.

BETA questions the "apparent lack of headquarter's coordination of site training." There appeared to be no group at headquarters that kept track of what was going on at the sites in order to prevent duplication of efforts or, on the other hand, two sites going in different directions. Part of the cause was felt to be GPUN's inability to fill the Director of Training and Education position for 1982. This resulted in the Vice President - Nuclear Assurance and the Manager of Corporate Training dividing responsibility of the position. The Vice President - Nuclear Assurance was assigned other duties in 1982 which further reduced the amount of time he was able to devote to training.

Nevertheless, BETA felt there were people who could carry out the coordinating function and were not being assigned to do so.

V-B-3 There are inefficiencies in the TMI training effort due to lack of meaningful scheduling. The Training Department has difficulty in obtaining data to schedule its training.

BETA felt that more consultation was needed between TMI-1 and the Training Department in order to make the most efficient use of the training staff. Training schedules don't appear to have start dates that are realistic in terms of when personnel are available to be trained.

V-B-4 There is an overly "understanding" attitude which prevails in the TMI Training Department, especially with regard to operator training.

BETA felt that the Training Department lacked the degree of "toughness, accountability, and insistence on performance needed in the nuclear profession." BETA found the situation "improved but not entirely corrected" during a follow-up review conducted in November, 1982. BETA stated, however, that it "... did not attempt to make a first-hand determination of the quality of the training effort. For example, we did not attempt to find out if licensed operators were being taught the correct material in quality or quantity." BETA stated that they made their judgment on the efficiency of the operation based on interviews with the training staff, the students and the "product users." On this basis BETA concluded that "too much emphasis is being placed on proving to the world that the training program is good and not enough on doing what should be done to produce a competent operator." BETA's recommendations were (1) that GPUN management should resist bringing in more outside groups to review the training program; (2) that the TMI Training Department should concentrate on producing the best product

they know how, and less on trying to prove it; and (3) that greater effort should be spent making the students more responsible for their own performance.

V-B-5 There exists a lack of supervision of instructors in the TMI Training Department.

BETA observed that "in some cases," supervisors did not react to situations where instructors were not performing their assigned tasks. In other cases, absence of supervision was noted by BETA. BETA stated that they were alerted to the presence of this condition by comments from GPUN people outside the Training Department. However, the comments were directed at lack of supervision over instructors in the classroom. BETA stated that they did not observe instructor performance in the classroom and concluded that doing so would not have provided the "necessary atmosphere to make a meaningful judgment." Based on their other observations in the Training Department, BETA concluded that "there should be concern over classroom performance." BETA's recommendations were that (1) the TMI Training Manager should review the basic principles of supervisor responsibility with his supervisors; (2) when both the TMI Training Manager and the Operator Training Manager are not in the Training Building, someone should be in charge and assume responsbility; and (3) the TMI Training Manager should have an office in an area where he can see his staff and can be seen by them, rather then his present office, which "creates the impression that he is inaccessible to his staff."

4.2.2 Issue

We perceive the issue to be whether the training staff is performing adequately and obtaining credible training results.

### 4.2.3 Safety/Regulatory Concern

The comments and findings as stated by BETA are a regulatory or safety concern insofar as they affect the training of operations personnel and their ability to run the plant.

### 4.2.4 GPUN Response

GPUN agrees with BETA's findings. As with the RHR report, the utility had already identified and addressed many of these issues. The position of Director, Training and Education has been filled. BETA felt that this was an essential step toward the development of better scheduling and coordination in the training department. All the BETA recommendations with regard to training are presently being implemented or are goals for 1983. BETA's recommendation concerning the staff getting back to "what they know their job is," is being implemented as well. Our review of various training programs now in place, as well as interviews with trainers and operations personnel, indicate that the training staff is doing a credible job in this respect while still meeting NRC's requirements and trying to respond to various intervenors' contentions and allegations.

### 4.2.5 Staff Evaluation and Conclusion

BETA stated that they made no effort to make a first-hand determination of the quality of the training effort, but rather attempted to make a judgment on the efficiency of the operation through interviews, as previously mentioned in the discussion of their findings (Section 4.2.1). The training staff, in conjunction with operations personnel, are working toward ironing out inefficiencies in scheduling and coordination. Training programs are, of necessity, dynamic. Materials must constantly be reviewed for timeliness and accuracy. To accomplish this, GPUN is reviewing its own product, as recommended by BETA. This effort has recently been stepped up with the formation of the Operator Training Review Committee, which has the support of management. The results of the NRC licensing exam are the only measure of credible training now available. Ten licensed operator trainees took exams earlier this year and all but one passed.

The one who failed had difficulty with the simulator portion and is now preparing to retake that part of the exam. The only other valid measure of credible training results is job performance. Use of this measure is very limited at this point because of the nonoperational status of the plant. However, interviews with supervisory operations personnel and licensed operators indicate that job performance of TMI-1 operations personnel is adequate to the extent that they can satisfactorily operate plant systems now in use.

The status of all corrective actions addressing training issues raised in BETA's report is such that restart should not be affected.

# 5.0 OPERATIONAL SUPPORT

## 5.1 Maintenance

### 5.1.1 RHR Report

The RHR report contained no comments or recommendations relative to plant maintenance activities, nor did the operator survey form ask questions related to plant maintenance.

### 5.1.2 BETA Report

#### 5.1.2.1 Findings

The BETA report Finding III-C concluded that "Maintenance at TMI-1 can improve its support of the plant." This finding was further amplified into the following three areas:

- Most maintenance work appears to be accomplished on night shift and not on the day shift, although most plant support personnel are available on day shift.

- Repairs often do not solve the root cause of the problem; BETA concluded that the cause was that Plant Engineering was not routinely involved in the solution of the problem.

- TMI-1 personnel were concerned that the transfer of maintenance activities to the Maintenance and Construction (M&C) Division, which had already been accomplished at Oyster Creek Nuclear Generating Station, would be very disruptive of current maintenance activities if accomplished at TMI-1 prior to restart. BETA concluded that there would be some disruption and that such a transfer would be accommodated more easily after TMI-1 restart

is completed. Also BETA concluded that although there may be some shortcomings, the current maintenance program is adequate to support the plant prior to restart.

Based on the above, BETA recommended the following:

- Schedule more maintenance work on day shift with increased supervisory, planning and scheduling support.

- Establish the concept of cognizant engineer, ensure plant engineering review and concurrence prior to the start of each maintenance activity, and when necessary, have Plant Engineering direct maintenance actions planned and in progress.

- Do not assign cognizance of maintenance activities to M&C Division until afte the restart of TMI-1.

5.1.2.2 Issue

We consider the issue to be whether the maintenance of safety-related equipment is being properly completed.

5.1.2.3 Safety/Regulatory Concerns

The safety concern is whether the safety-related equipment is being maintained in such a manner that safety problems are avoided.

5.1.2.4 GPUN Response

In its response to BETA, GPUN concurred with the BETA recommendations, with one exception: the recommendation to provide cognizant engineers. They consider this to be too manpower intensive and an issue that would affect other higher priority engineering activities. GPUN has placed this recommendation under evaluation for possible long term action.

Based on a review of documents and on discussions with various TMI-1 personnel, we determined that GPUN has taken the following actions to implement the BETA recommendations:

- Daily maintenance scheduling meetings are now being conducted. Key personnel have been rotated to the day shift and the number of day shift maintenance personnel and supervisors has been increased. To improve efficiency of major maintenance activities, such maintenance is performed on the day shift only rather than being rotated from shift to shift.

- A formal trending program has been established to identify repeat maintenance items. The plant engineering staff is consulted more frequently concerning corrective maintenance problems. Also, a verbal policy has been established to have maintenance personnel present during testing of completed maintenance, so that problems can be immediately detected and corrected by the personnel who performed the maintenance.

- The assignment of the maintenance responsibility to M&C Division will not be considered until after TMI-1 restart.

5.1.2.5 Staff Evaluation and Conclusion

The staff assessed the issues that BETA raised and determined these to be related to the efficiency of operation and "a better way to do business" rather than any non-adherence to regulatory requirements. However, the portion of the BETA finding which stated that "the root causes of problems are not determined" could be perceived as having an impact on safety, although the BETA report did not identify the extent of or the relationship to plant safety of this finding. After onsite review of this issue, the staff notes the following:

- No specific safety-related maintenance or equipment is identified in the BETA report.

- We conducted interviews with BETA consultants on May 9, 1983 (reference: Region I Inspection Report 50-289/83-10). No safety issues were identified by BETA representatives during the course of these interviews.

- In a letter to GPUN dated, May 13, 1983, BETA clarified that their review addressed efficiency rather than safety issues.

Redundancy exists in safety-related systems and equipment in the TMI-1 design to the take into account the repetitive need for maintenance, i.e., at least two systems are provided so that one system is operational while the other system is being maintained. The license requirements (Technical Specifications) specify the needed operability of redundant equipment when safety-related equipment is out of service. The operability of redundant equipment is tested prior to removing from service a piece of equipment needing maintenance. Also, limits are placed on plant operations when redundant equipment is out of service.

- From October 1981 to March 1983 the staff has conducted seven onsite inspections which included various aspects of maintenance activities (including specific inspections of steam generator tube leak repairs). No major safety issues were identified by these inspections.

Based on the above, we conclude that the BETA maintenance findings do not indicate that the maintenance of safety-related equipment is adversely affecting plant safety.

## 5.2 Engineering

### 5.2.1 RHR Report

The RHR Report contained no comments or recommendations relative to engineering activities, nor did the operator survey form ask questions related to engineering support.

### 5.2.2 BETA Report

#### 5.2.2.1 Findings

During June of 1982, BETA performed an efficiency and manpower utilization study of the GPUN Technical Functions (TF) Division, which provides the technical and

engineering support to the GPU nuclear plants (TMI-1, TMI-2 and Oyster Creek.)

In general, BETA found: (1) "an organization struggling to get its work done with a lot of new people still trying to figure out what their jobs were"; (2) "top management within TF having to spend an inordinate amount of time solving day-to-day problems that a mature organization would be handling in a routine manner"; and (3) "the management still attempting to put in place methods of operation suitable for running a large 250-man engineering force." BETA also stated, "Anomalies...are being worked out and progress is being made ....It will take more time for TF to mature into an effective, smooth-running organization."

Given below are the specific potentially safety-significant BETA findings:

- VI-A - "The overall effectiveness of T/F in support of TMI-1 and Oyster Creek is lacking."

- VI-B-1 - "It is too hard and takes too long to get a Technical Functions procedure changed."

- VI-B-3 - "Drawings have not been revised to show completion of modification work."

- VI-B-4 - "Rework, as measured by the number of Field Change Notices is excessive."

- VI-D - "There is a lack of intimate, day-to-day knowledge of the problems being found at the plants that require engineering support or involvement."

- VI-E-1 - "The Shift Technical Advisor (STA) program at both sites, but particularly at Oyster Creek, needs to be reviewed and strengthened."

- VI-E-3 - "There is lack of involvement by Technical Functions in the conduct of the Training Program, particularly operator training."

- VI-F-1 - "Engineering Projects personnel are performing tasks that could be done better elsewhere in the Division, thus decreasing their capacity for the management of the engineering projects."

- VI-F-2 - "The training of project engineers is weak."

- VI-H - "Neither the chemistry group in Technical Functions nor the System Laboratory has assumed a leadership role in the TMI-1....chemistry improvement program."

5.2.2.2 Issue

The issue is whether engineering support to TMI-1 is adequate.

5.2.2.3 Safety/Regulatory Concern

The safety concern is whether, taken as a group, the BETA findings indicate inadequate engineering support to TMI-1. Such an inadequacy could result in the plant being operated in an unsafe condition or with unsafe equipment.

5.2.2.4 GPUN Response

Given below is a summary of the licensee's response to each of the safety-significant findings by BETA:

- Findings VI-A and VI-D

  At the time of the staff's review, the TF Division had 427 people on board, of whom 356 were professional. The authorized level is 433. The present staffing level reflects more than a 70% increase since the time of BETA's initial visit. The TF organization is now structured to provide a maximum span of control of seven for the technical working groups to improve supervisory control and technical effectiveness. The TF procedures are all established and the personnel are being trained on a continuing basis.

The organization recognizes the need for an intimate day-to-day knowledge of the problems at the operating units. In order to focus more attention on the day-to-da, problems, the licensee has decided to contract with outside groups for major engineering tasks, while maintaining primary responsibilities for developing design specifications and performing independent engineering review and safety review. In addition, the cognizant engineering section and responsible section engineers have been identified for each of the plant systems. The responsible engineers are required to provide a bimonthly status report to TF management on their respective systems. TF engineering projects are controlled and managed by a computerized work-in-process report.

- Finding VI-B-1

The licensee has acknowledged the problems with procedure revision and is currently working towards a realistic goal of three months for procedure revision.

- Finding VI-B-3

The licensee acknowledged this finding and has incorporated the following policies for revising drawings: (1) an interim composite drawing to reflect the modification will be provided to the control room upon system turnover; (2) all operations and maintenance drawings (as defined in Appendix B to Procedure EP-025) will be revised within 90 days; and (3) all the other drawings, such as isometrics and structural detail drawings, will be revised on an as-needed basis.

- Finding VI-B-4

The licensee acknowledged this finding. Procedure EMP-15 has been revised to require (1) a detailed preliminary engineering design review by multi-discipline personnel and (2) an on-site-constructibility review of the design at about 80% completion. The licensee believes that these changes will substantially reduce the need for Field Change Notices.

- Finding VI-E-1

The licensee acknowledged the recommendations for improvement in the STA training program, in STA's involvement in day-to-day operations and management commitment for the 'rotation' of the STAs. Management has already taken necessary steps to incorporate the above recommendations in the STA program. The licensee does not agree with the BETA recommendation that the licensee "consider changing the practice that STAs obtain an SRO license." The licensee feels that the SRO license will increase credibility of STAs among the operating staff. Therefore, the licensee does not intend to change this practice.

- Finding VI-E-3

Technical Functions acknowledged this finding. The TF staff now provides technical data for the lesson plans and operating procedures. In addition, the TF staff performs technical review of the plant procedures and training material as part of its normal responsibility. There is increased communication at both the manager's level and the working level between TF and the training group.

- Findings VI-F-1 and VI-F-2

The licensee acknowledged these findings. The administrative and scheduling responsibilities have already been transferred from the Engineering Projects Department to the Engineering Services Department. In addition, Engineering Projects is currently being staffed with experienced engineers of appropriate disciplines.

The training of project engineers has been enhanced by monthly training meetings conducted by the Director of Engineering Projects Department. In addition, the Executive Vice President redefined the position of the project engineers and required the project engineers to be cognizant of the engineering aspects of the project instead of just being coordinators.

The licensee believes that these steps will be adequate to improve the performance of the Engineering Projects Department.

- Finding VI-H

The licensee acknowledged this finding. The corporate chemistry activities are now consolidated and organized under the Director of Engineering and Design. The functional areas and the responsible individuals are now clearly defined. The licensee feels that these changes will improve the situation and enhance leadership in chemistry areas.

5.2.2.5 Staff Evaluation and Conclusions

To address the BETA findings and GPUN's responses, we visited both the site and corporate offices. Regulatory requirements, including those for quality assurance/controls, were used as bases for the evaluation of the BETA findings.

In addition, we reviewed the following design documents at various stages of completion to determine the effectiveness of the changes instituted after the BETA visit:

- BA 412244 TMI-1 Remote Shutdown System
- BA 412021 Reactor Coolant System Vents
- BA 412398 Emergency Feedwater Flow Transmitter Change Out

From the above discussions and design document reviews, we noted the following:

- TF was formally organized on December 29, 1981. Prior to this date TF was a part of the TMI Generation group.

- BETA visited the licensee about six months after the formation of the present TF organization while TF was in a phase of rapid growth through acquisition of personnel from within the GPU member companies and from outside the GPU organization.

- Prior to the BETA visit the TF Management was aware of its weaknesses and corrective actions were being implemented to improve the situation.

- The TF management readily accepted all BETA findings that are relevant to safety and sound engineering.

- At the time of our review, TF management had completed a draft response to the BETA findings. This draft was being reviewed by the licensee's management and the Board of Directors. The draft response acknowledged most of the BETA findings and provided valid bases for not accepting those BETA findings with which TF disagreed.

We observed that the BETA findings have had a positive impact upon the quality of safety-related engineering activities to support the TMI-1 restart. The licensee has incorporated significant changes to preclude adverse impacts to TMI-1 operation from the conditions that led to BETA's findings. We conclude that the changes outlined above and incorporated by the licensee in response to the BETA findings are adequate to provide assurance that TF can provide adequate engineering support for TMI-1 operations.

## 5.3 Radiological Controls

### 5.3.1 RHR Report

The RHR Report contained no comments or recommendations relative to radiological controls, nor did the operator survey form ask questions related to radiological controls.

5.3.2 BETA Report

5.3.2.1 Findings

The BETA report, Finding III-F, states "There are too many instances where radiological controls are not as good as they should be. The work force has not accepted enough of the responsibility for high quality radiological work performance. Excessive generation of radioactive waste is part of these problems." Finding IX - A states "Little radiological engineering is performed at Parsippany."

5.3.2.2 Issue

The issue as perceived by us is whether the Radiological Control Program being implemented at TMI-1 has weaknesses which should be of concern to NRC.

5.3.2.3 Safety/Regulatory Concern

The safety concern raised by this issue is that lack of an adequate radiological control program could pose a hazard to plant personnel and to the health and safety of the public.

5.3.2.4 GPUN Response

As a result of BETA's continuing consultation to GPUN in this area, the licensee has implemented several initiatives, such as a radiological assessor to independently review implementation of the radiological control program, radiological engineers to assess day-to-day performance, a management off-shift tour program to observe plant activities on other than the day shift, a method by which anyone can report deviations from good radiological practices (Radiological Deficiency Reports), and a formal method of investigating radiological incidents (Radiological Investigation Reports). Additionally, the licensee has implemented a computer-based radiation exposure management program for radiation exposure management in real time, and a new state-of-the-art TLD personnel radiation dosimetry program.

5.3.2.5 Staff Evaluation and Conclusion

The BETA discussion of this finding is essentially an extension of BETA's prior consulting work for GPUN in this area in that it is a prescriptive overview to strengthen the existing program in an effort to increase efficiency and decrease the time and cost currently involved with radioactive work at TMI-1. The thrust of the discussion is that, while implementation of the existing program is sufficient to meet NRC regulatory requirements, with improvement in the performance of the radiological control personnel and by instilling in the work force an attitude to perform their work utilizing good radiological practices, a higher quality radiological control program will result. This will improve efficiency and reduce time and cost. No specifics regarding Finding III-F are included in the BETA discussion. Finding IX-A is essentially a recommendation to include radiological engineering considerations in the early stages of planning and design rather than, as now done, when the completed design packages arrive on site. It is felt that this would increase efficiency and productivity and reduce cost.

Results of Region I inspections of the TMI-1 Radiological Control Program implementation over the past two years* have confirmed, generally, BETA's overall findings, i.e., while significant improvements have been made to upgrade the program and its implementation, some deficiencies still exist in program implementation largely as a result of worker attitude toward radiological controls. The GPUN initiatives and programs, as confirmed by the results of NRC Region I inspections of radiological controls at TMI-1, demonstrate management attention to the program and a resolve to improve implementation of the program by all concerned.

We conclude that while improvements in the radiological control program at TMI-1 still can be achieved, as indicated by BETA, based upon current inspection findings the program is in compliance with NRC requirements and the NRC approved TMI-1 radiological control program and is carried out in an acceptable manner, as evidenced by the results of continuing NRC inspections.

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*NRC Region I Inspection Reports 50-289/81-06; 81-07; 81-11; 81-29; 81-30; 81-34; 82-01; 82-05; 82-08; 82-10; 82-14; 82-22; 83-04; 83-08; 83-17.

## 5.4 Plant Services

A number of findings in the BETA report addressed various areas of plant service/support, such as security, administrative support, materials management, communications, and operations analysis. Each of these findings was reviewed by the staff to determine whether plant safety was being adversely affected by any of these support groups. The findings reviewed for this section are contained in Appendix C.

One finding, VII-E-5, involved an excessive number of alarms occurring in the protected area perimeter alarm system. The Security Department is currently in the process of upgrading the alarm system to a more reliable system. Different types of units have been tested at the site, and selection and installation are expected to occur in the near future. In the event a perimeter alarm malfunctions, security procedures require compensatory actions to be taken by the security force.

The staff concluded there are no safety issues with regard to these findings.

# 6.0 EFFECT OF MATTERS RAISED IN RHR AND BETA REPORTS ON SAFETY ISSUES LITIGATED DURING RESTART HEARING

The staff evaluation team compared the comments, findings, and recommendations of the RHR and BETA reports with findings of the Atomic Safety and Licensing Board (ASLB) in its Partial Initial Decisions (PID) of August 27, 1981 and July 27, 1982, to determine the impact of the reports on matters that were litigated before the board. These include (1) questions raised by the Commission in its August 9, 1979, order commencing the TMI-1 restart proceeding; (2) additional questions raised by the Commission in its subsequent order of March 6, 1980; (3) the specific contentions relating to these issues raised by the parties to the restart proceeding; and (4) the issues raised by the Licensing Board in the reopened proceeding on the question of cheating. The results of the staff evaluation of the impact of the RHR and BETA reports on these hearing issues are presented in this section.

All information in this section from the RHR and BETA reports, from GPUN's responses to those reports, and from the ASLB's Partial Initial Decision are quoted verbatim. The GPUN responses discussed in this section are draft responses that were available at the time of the evaluation team's visit to TMI-1.

## 6.1 Commission Order of August 9, 1979

### 6.1.1 Order Item 1e - Operator Training

#### 6.1.1.1 Order

Item 1e of the Commission's August 9, 1979, order required the licensee to:

> Augment the retraining of all reactor operators and senior reactor operators assigned to the control room including training in the areas of natural circulation and small break loss of coolant accidents including

revised procedures and the TMI-2 accident. All operators will also receive training at the B&W simulator on the TMI-2 accident and the licensee will conduct a 100 percent re-examination of all operators in these areas. NRC will administer complete examinations to all licensed personnel in accordance with 10 CFR 55.20-23.

6.1.1.2 Board Finding

In its August 27, 1981, Partial Initial Decision on the TMI-1 Restart Hearings the Licensing Board concluded (§ 276):

> On the basis of the extensive record developed on training, the Board finds that Licensee has in place at TMI-1 a comprehensive and acceptable training program. Since the accident, Licensee has substantially augmented its training department and headed it with professional educators who have backgrounds in nuclear training. Licensee's programs have been reviewed by NRC and by highly qualified independent consultants. The TMI-1 licensed operators have been trained, retrained, audited and reaudited by Licensee's training personnel and independent consultants. The operators have been exposed to training in the areas they should master before operating the plant. Nevertheless, prior to obtaining NRC licenses to operate the plant, these individuals all must pass NRC-administered examinations, both oral and written, with NRC's present grading criteria (70%/80%) and four individuals must pass as well the special Category T (TMI-2) lessons learned) examination with a 90% grade. The Board generally finds Licensee's training adequate and specifically finds Licensee has complied with the Commission's August 9, 1979 and March 6, 1980 Orders insofar as they relate to training. Operator training and procedures will also be the subject of our partial initial decision on plant design issues.

Further, in the August 27, 1981, PID at § 584.c the Board concluded:

> That Licensee has augmented the retraining of all Reactor Operators and Senior Reactor Operators assigned to the control room including training in the areas of natural circulation and small break loss of coolant

accidents including revised procedures and the TMI-2 accident. All operators also have received training at the B&W simulator on the TMI-2 accident and Licensee will conduct a 100 percent re-examination of all operators in these areas."

However, the Board added a footnote to § 584.c stating, "Because of the pendency of the inquiry into the matter of cheating on the NRC operator license examinations, the Board omits for now any conclusion respecting operator testing and licensing."

In its PID of December 14, 1981, the Board reached no conclusions regarding the "cheating episodes". (§ 2014). In the Partial Initial Decision of July 27, 1982 on the Reopened Proceeding, the ASLB imposed the following conditions on restart of TMI-1 (§ 2347):

(1) There shall be a two-year probationary period during which the Licensee's qualification and requalification testing and training program shall be subjected to an in-depth audit by independent auditors, approved by the Director of NRR, such auditors to have had no role in the TMI-1 restart proceedings.

(2) Licensee shall establish criteria for qualifications of training instructors to ensure a high level of competence in instruction, including knowledge of subjects taught, skill in presentation of knowledge, and preparation, administration, and evaluation of examinations.

(3) Licensee shall develop and implement an internal auditing procedure, based on unscheduled ("surprise") direct observation of the training and testing program at the point of delivery, such audits to be conducted by the Manager of Training and the Supervisor of Operator Training and not delegated.

(4) Licensee shall develop and implement a procedure for routine sampling and review of examination answers for evidence of cheating, using a review process approved by the NRC Staff.

6.1.1.3 Effect of RHR and BETA Reports

In its August 27, 1981, PID, the Board noted at § 272 (and implied its agreement with the statement) that "... successful completion of such examinations (NRC license examinations) coupled with training sufficient to allow success on those examinations was indicative of a capable licensed operator ...". However, in its July 27, 1982, PID on the reopened proceeding, the Board stated (§ 2337) that "... we no longer have the assurance that there was sufficient quality control over the training and testing process ...". In addition, in § 2343, the Board questioned, "... is the instruction adequate to prepare the operators to operate the plant safely?" The Board then imposed its remedies, as noted in the preceeding section, "... to be satisified within the first two years after any restart authorization ...".

We reviewed the contents of the RHR and BETA reports in light of the Board's question from § 2343 to determine the affect of the reports on the Partial Initial Decisions.

RHR Report

Our review indicates that the RHR report raises two principal issues related to operator training: (1) the concern of the operators regarding the lack of hands-on experience; and (2) the lack of convergence between training, testing, and the ability to operate the plant.

- Lack of Hands-On Experience

We consider the concern of the operators regarding a lack of hands-on experience to be both real and understandable. None of the operators have operated the plant at power during the more than four years it has been shutdown, and a significant number of newer operators have never operated the plant at power.

Limited experience in dynamic plant response has been provided to trainees for initial licensing, and for all licensed personnel during requalification training, at the B&W simulator in Lynchburg.

Recognizing the limitations on actual operating experience, the TMI-1 Operations Department has developed a TMI-1 Restart Qualification Card. The Restart Card requires each shift, under the direction of the shift supervisor, to perform individual and crew training during a number of exercises and maneuvers. Crew training includes both licensed and auxiliary operators. Additional simulator training involving revised emergency procedures was conducted during June 1983. In addition, the recently formed Operator Training Review Committee will explore additional methods to obtain hands-on experience.

The licensee also plans to obtain a Basic Principles Trainer, scheduled for delivery in 1983, and a replica plant simulator, scheduled for delivery in 1985. Use of these machines should provide additional practical experience to the operators.

We find that the licensee has taken and is taking action to provide practical hands-on type of experience to the operators. Short of actually operating the plant, which requires Commission approval, there is a little more that can be done to provide hands-on experience. We conclude that this issue raised by the RHR report does not affect the Licensing Board's findings and conclusions related to training.

- Lack of Convergence Between Training, Testing, and Ability to Operate the Plant

The licensee has now incorporated the remedies prescribed by the Licensing Board (see Section 6.1.1.2) into its training program. Nonetheless, several of the RHR comments may be construed to indicate that training has degraded since the Board's Partial Initial Decision of July 27, 1982. Comments in the area include:

- What is taught in training is different from what they experience in the plant.

- Three out of four denied that training prepared them for what they actually do.

- Operators complained of a lack of convergence between training, testing, and ability to operate the plant.

The operators' responses to some of the statements in the RHR survey instrument, however, do not totally support the RHR comments. For example:

- (RHR #5) The content of the last licensing exams was job relevant. (69% agreed).

- (RHR #17) The content of the last requalification exam was job relevant. (79% agreed).

- (RHR #18) The training and testing programs have helped me be a more effective operator (97% agreed).

- (RHR #36) I feel confident my training has prepared me to handle a genuine emergency. (76% agreed).

- (RHR #128) On balance, we are better prepared for an emergency as a result of changes since the TMI-2 accident. (91% agreed).

Our interviews with licensed personnel did not result in a finding of support for the first two RHR comments noted above. Most operators indicated that "training" includes not only the formal classroom portion, but also on-the-job and simulator training, that is, the entire training program. Our evaluation of the RHR report is that the consultants either were not aware of or failed to include in their survey, questions related to these other aspects of the training program. With regard to convergence of training and testing, we reported

in Section 4 of this Supplement that nine of ten TMI-1 operator license applicants passed the last NRC examinations. The tenth individual had a failing grade only in one area. Based upon these results, we conclude that there is convergence between training and testing, that the GPUN training program remains acceptable and that this issue raised by the RHR report would not affect the Partial Initial Decisions of the Licensing Board. Regarding the Board's question raised in § 2343, "... is the instruction adequate to prepare the operators to operate the plant safely?", a firm answer is not available. For now, we can only monitor the TMI-1 personnel discharging their licensed duties on a shut-down plant. To date, the licensed staff performance remains acceptable.

BETA Report

The BETA report contains three findings related to training at TMI-1

- V-B-3 There are inefficiencies in the TMI-1 training effort due to a lack of meaningful scheduling. The Training Department has difficulty in obtaining data to schedule its training.

- V-B-4 There is an overly "understanding" attitude which prevails in the TMI-1 Training Department, especially with respect to operator training.

- V-B-5 There exists a lack of supervision of instructors in the TMI-1 Training Department.

Regarding V-B-3, BETA recommended that better efficiencies in department planning and instructor utilization could be obtained by long range planning. No safety issues, and no issues related to quality of instruction or performance of the training staff are raised by this finding. We do, however, note that the TMI-1 operations staff is on a six-shift schedule which provides for regularly scheduled periods of requalification training (one week out of six). This schedule is the same as that considered by the Licensing Board.

BETA's finding V-B-4 regarding the "understanding" attitude was based upon observations made during March and April of 1982 and which included interviews with the Training Department staff, students and product users. BETA indicated that, "... the Training Department had become very 'understanding' of all the problems the students may have and, as a result, lacked the degree of toughness, accountability, and insistence on performance needed in the nuclear profession." In a follow-up review conducted in November 1982, BETA found that this situation had improved, although the problem had not been entirely corrected. In its review, BETA "... did not attempt to make a first-hand determination of the quality of the training effort ... we did not attempt to find out if licensed operators were being taught the correct material in quality or quantity."

We agree that both students and licensed personnel should be held responsible and that there should be insistence on performance. However, the BETA findings did not include evaluation of written examinations, on-the-job training or simulator exercises for students and for licensed personnel in the requalification program. Our review of the licensee's training program indicates that there are adequate criteria to assure that the program is effective.

BETA's finding V-B-5 regarding lack of supervision in the Training Department apparently was based upon two observations. First, "In some cases, it was because supervisors, who were present, did not react to situations where instructors were not performing their assigned tasks." BETA notes that it "... was alerted to the possibility of this condition by a number of comments made by GPUN people outside the Training Department. The main thrust of these comments applied to the lack of supervision over the instructors in the classroom." BETA adds that it "... was not able, or in a position to observe instructor performance in the classroom, ...".

In response to the BETA recommendations, GPUN intends to (1) review supervisory responsibilities with those assigned as supervisors of training instructors, and (2) assign responsibility for monitoring activities in the training building during periods when both the Manager, TMI Training and the Operator Training

Manager are absent. In addition, GPUN has developed instructor evaluations in response to the second Board remedy specified in § 2347.

We consider instructor control of classroom presentation and conduct of students as essential elements in the administraion of training programs. During our limited period at the training center we did not observe any matter that would support the BETA finding, nor are we aware of any results of the NRC's continuing inspection program that would support the finding. We are, however, satisfied that GPUN has a program to monitor activities in the training building and to provide for periodic evaluation of instructor performance. We conclude that since the licensee has initiated steps to detect and correct any problems of the type identified by this finding, the finding would have no affect on the Partial Initial Decision of the Licensing Board.

6.1.1.4 Staff Conclusion

The RHR report produced two principal comments: operators desire an increase in hands-on experience; and operators are concerned about a lack of convergence between training, testing, and the ability to operate the plant. The solution to increased hands-on experience is to have an operating plant, which also would provide a partial solution to the second comment. TMI-1 has developed and is using a Restart Qualification Card to require and track additional individual and team training. Also, the recently formed Operator Training Review Committee will seek additional methods to obtain hands-on experience. The plant also will be receiving a Basic Principles Trainer in 1983. We conclude that these measures and the TMI-1 Requalification Program will provide adquate hands-on experience during the period that TMI-1 remains shutdown.

Regarding convergence of training, testing, and the ability to operate the plant, our review indicates that operators at TMI-1 have opinions different from those contained in the RHR report. In addition, the results of the last licensing examination indicates convergence between training and testing. Proof of the quality of training and the performance of licensed personnel will have to await restart of Unit 1. To date, performance of licensed personnel has been acceptable.

The BETA report contained two principal findings: V-B-4 which indicated an overly "understanding" attitude by the training department toward operator training, and V-B-5 which indicated a lack of supervision of instructors. As indicated in the report, no direct evaluation was made of the criteria used in operator training nor was there any direct observation of instructor performance. Our evaluation of the training program is that there are adequate evaluation criteria to negate "understanding" attitudes toward operators. In addition, the licensee has a program which requires periodic evaluation of instructors.

We conclude, therefore, that the contents of the RHR and BETA reports do not adversely affect the findings and conclusions of the Licensing Board regarding operator training.

6.1.2 Order Item 6 - Managerial Capability

6.1.2.1 Order

Item 6 of the August 9, 1979, Commission Order stated that:

> The licensee shall demonstrate his managerial capability and resources to operate Unit 1 while maintaining Unit 2 in a safe configuration and carrying out planned decontamination and/or restoration activities. Issues to be addressed include the adequacy of groups providing safety review and operational advice, the management and technical capability and training of operations staff, the adequacy of the operational Quality Assurance program and the facility procedures, and the capability of important support organizations such as Health Physics and Plant Maintenance.

6.1.2.2 Board Finding

In its August 27, 1981, PID at §584.d, the ASLB concluded:

> That Licensee has demonstrated its managerial capability and technical resources to operate Unit 1 while maintaining Unit 2 in a safe configuration and carrying out planned decontamination and/or restoration activities. In reaching this conclusion, we have addressed the Licensee's command and administrative structure at the corporate and plant levels, the adequacy of groups providing safety review and operational advice, the management and technical capability and training of operations staff, the adequacy of the operational Quality Assurance program and the facility procedures, the relationship between the financial and technical organizations, and the capability of important support organizations such as Health Physics, Radwaste, and Plant Maintenance. We have specifically addressed issues (1) through (11) and (13) of CLI-85-5;

(CLI-80-5 is the Commission Order of March 6, 1980.)

The capability of licensee's management was further called into question during the reopened proceeding on cheating during the licensing examinations. In its July 27, 1982, Partial Initial Decision on the Reopened Proceeding, the Licensing Board at §§ 2395-2422 discusses its conclusions, recommendations and remedies. The Board concluded at § 2433 of the PID:

> The Board concludes that in consideration of the findings, recommendations, and conditions set out above, the issues in the proceeding reopened by the Board's Order of September 14, 1981 have been resolved in favor of restarting Three Mile Island Unit 1 and that the conclusions of the Partial Initial Decisions of August 27, 1981, 14 NRC 381, and December 14, 1981, 14 NRC 1211, remain in effect.

6.1.2.3 Effect of RHR and BETA Reports

The effect of the RHR and BETA reports on the Board findings relative to managerial capability is necessarily a compilation of the effects of these reports on the various issues mandated by the Commission order and considered by the Board in reaching its conclusions. These issues, together with references to the Sections of this Supplement where they are discussed in detail, are:

- Licensee's command and administrative structure - see Section 6.2.1.

- Adequacy of groups providing safety review and operational advice - see Section 6.2.7.

- Management and technical capability and training of operations staff - see Section 4.0 and Section 6.1.1.

- Adequacy of the operational Quality Assurance program - see Sections 6, 7, and 8 of Appendix A.

- Facility procedures - see Section 3.3, Appendix A generally, and Appendix D.

- Relationship between the financial and technical organizations - see Section 6.2.6.

- Capability of important support organizatons such as:

  Health Physics - see Sections 6.2.4 and 5.3
  Radwaste - see Sections 6.2.5 and 5.3
  Plant Maintenance - see Section 5.1

And other support organizations not specifically mentioned in the Commission Order:

  Engineering - see Section 5.2
  Training - see Sections 4.0 and 6.1.1

6.1.2.4 Staff Conclusion

As discussed in the various sections referenced in 6.1.2.3 above, we have found no instance where the contents of the RHR and BETA reports would adversely affect the findings and conclusions of the Licensing Board on the individual issues. That is to say, none of the RHR or BETA findings is such that it would

require a change to staff testimony presented during the hearing or to the Licensing Board finding that there presently exists the managerial capability and technical resources to operate Unit 1 safely while maintaining Unit 2 in a safe configuration and carrying out planned decontamination and/or restoration activities. We conclude, therefore, that the two reports have no adverse impact upon the findings and conclusions of the Board on the overall issue of managerial capability.

6.1.3 Category B Recommendations

6.1.3.1 Order

In the Commission order of August 9, 1979, it was ordered that the licensee shall

> comply with the Category B recommendations as specified in Table B-1 of NUREG-0578...

These recommendations included consideration of the Shift Supervisor Responsibilities (Item 2.2.1.a), the Shift Safety Engineer (Item 2.2.1.b), and Shift Turnover Procedures (Item 2.2.1.c).

6.1.3.2 Board Finding

In its August 27, 1981, PID at §584.e, the ASLB concluded:

> That Licensee complies with the Category A (short-term) recommendations related to management competence (Items 2.2.1.a., 2.2.1.b, 2.2.1.c and ...) in Table B-1 of NUREG-0578 and has made reasonable progress toward completion of the Category B (long-term) recommendation related to management competence (Item 2.2.1.b) in Table B-1 of NUREG-0578.

6.1.3.3 Effect of RHR and BETA Reports

The RHR and BETA reports do not take issue with the subjects of 2.2.1.a - Shift Supervisor Responsibility or 2.2.1.c - Shift Turnover Procedures. However,

BETA finding VI-E-1 states that, "The Shift Technical Advisor (STA) program at both sites, but particularly at Oyster Creek, needs to be reviewed and strengthened." BETA noted that problems associated with the STAs had to do with attrition, the STA training program, and their proper utilization.

We previously examined the role and the qualifications of the STAs at TMI-1 during the inspection effort leading to Inspection Report 50-289/83-10, which is included as Appendix A to this Supplement. Our evaluation is contained in Section 11 of that document. We found there that the STA program at TMI-1 is established and is operating in accordance with regulatory requirements and licensee commitments. The STAs were fully qualified and trained and candidates for replacement STAs were in training. The NRC has no requirement regarding STA utilization other than that they must be available to provide advice to the Shift Supervisor in the event of an off-normal situation. The STAs at TMI-1 meets this requirement. Their utilization at other times is a matter to be determined by the licensee. The licensee does not agree, nor do we, with the BETA recommendation that the STAs not obtain SRO licenses. We feel that obtaining an SRO license enhances both the status and the capability of an STA.

In summary, our review of the BETA findings, in conjunction with our own evaluation of the STA program, reveals nothing that would cause a change to the Board findings and conclusions regarding the STA.

6.1.3.4 Staff Conclusion

We conclude that the RHR and BETA reports do not affect the findings of the Partial Initial Decision on these subjects.

## 6.2 Commission Order of March 6, 1980

### 6.2.1 Organization of Command and Administrative Structure

#### 6.2.1.1 Order

In the Commission Order of March 6, 1980, (Item (1)), it was stated that the Licensing Board should examine

whether Metropolitan Edison's command and administrative structure at both the plant and corporate levels, is appropriately organized to assure safe operation of Unit 1;

6.2.1.2 Board Finding

The Licensing Board extensively reviewed the details of the licensee's command and administrative structure. A description of the structure and the testimony relied upon by the Board is presented in the August 27, 1981, PID (§§ 46-66). At § 67 of the PID, the Board stated:

> ... The Board concludes that the Licensee's command and administrative structure at the corporate level is appropriately organized to provide reasonable assurance of safe operation of TMI-1.

The Licensing Board also reviewed the details of the TMI-1 on-site organization and technical resources. A description of the organization is presented in the PID at §§ 68-104. At § 105 of the PID, the Board stated:

> ... we conclude that the Licensee's command and administrative structure at the level of the TMI-1 plant is appropriately organized to provide reasonable assurance that TMI-1 can be operated safely. CLI-80-5 issue (1).

In summary, in the August 27, 1981, PID at §584.d, the ASLB concluded:

> That Licensee has demonstrated its managerial capability and technical resources to operate Unit 1 ... In reaching this conclusion, we have addressed the Licensee's command and administrative structure at the corporate and plant levels . . .

6.2.1.3 Effect of RHR and BETA Reports

About 20% of the RHR survey effort was devoted to exploring operator attitudes and perceptions regarding organizational issues. The results of this survey effort, the GPUN response to the RHR findings and recommendations, and our evaluation of the impact of the RHR report on issues related to the licensee's organization and structure are discussed in Section 3.1.1 of this Supplement.

BETA had no specific comments or recommendations concerning the structure of the licensee's organization, although the BETA report does contain two findings on related issues. These matters, together with the licensee's response and our evaluation of the impact of the BETA report on issues related to the organization of the licensee, are presented in Section 3.1.2 of this Supplement.

A question has been raised regarding the overall impact of the BETA report on the Board findings in view of the earlier connection of BETA with the TMI-1 restart proceeding. Mr. Wegner of BETA was one of the licensee's chief witnesses at the hearing on organization and management issues. The Licensing Board relied heavily on the testimony of Mr. Wegner in reaching its decision. His testimony is summarized in the August 27, 1981, PID at §§ 57-58. Mr. Wegner was also one of the principal contributors to the BETA report. Cursory comparison of the findings of the BETA report with Mr. Wegner's testimony at the hearing might indicate that Mr. Wegner has now changed his mind regarding the command and administrative structure of the licensee, which in turn might impact the findings of the Licensing Board.

Upon closer examination, however, we do not feel that there is a conflict between Mr. Wegner's testimony at the hearing and the contents of the BETA report. As can be seen from an examination of § 58 of the PID, Mr. Wegner concluded that the GPUN organization was probably the most effective organization the licensee could structure to handle nuclear utility affairs. He pointed out, as detailed in § 58 of the PID, the reasons why he felt it would be effective. His testimony about the effectiveness of the new organization necessarily was prospective in nature, since the new organization was only then going into operation.

In his letter of May 13, 1983, regarding the BETA report, Mr. Wegner stated that,

> This review was undertaken at the request of GPUN corporate management for the purposes of identifying areas where efficiencies in all phases of the operation of GPUN might be improved and where methods of cost and expenditure control might be enhanced. While the BETA review addressed issues such as nuclear safety, training of operators or adherence to regulatory requirements, it did so only to the extent of evaluating efficiency.

The findings of the BETA report point out areas where improvements in the operation of the organization can be made. The findings do not take issue with the basic organizational structure, they do not identify areas of safety concern that must be corrected to meet regulatory requirements, and they do not identify problems of individual ineptitude or non-performance that require correction in order to have a safely-run plant. To the contrary, as stated, they identify areas where improvements can be made to obtain a more efficient, more smoothly-running operation. In this respect, the findings contained in the BETA report are the type of findings we would expect to see in the report of any competent consultant after a thorough evaluation of any nuclear utility. In any organization, there always are some shortcomings and some improvements that can be made. In our view, the fact that a utility management is interested in identifying possible weaknesses in its organization so that they can be corrected is one of the measures of an acceptable command and administrative structure.

In view of the above, we do not consider that the contents of the BETA report would have affected the Board's findings regarding the GPUN command, and administrative structure.

6.2.1.4 Staff Conclusion

We conclude that neither the specifics of the RHR and BETA reports nor the overall thrust of the BETA report as compared with Mr. Wegner's testimony during the restart hearing would affect the conclusions of the Licensing Board regarding the GPUN command and administrative structure.

6.2.2 Qualifications of Staff

6.2.2.1 Order

In the Commission Order of March 6, 1980, (Item (2)) it was stated that the Licensing Board should examine

> whether the operations and technical staff of Unit 1 is qualified to operate Unit 1 safely (the adequacy of the facility's maintenance program should be among the matters considered by the Board);

6.2.2.2 Board Finding

The Licensing Board examined in considerable detail the qualifications of the operations and technical staff for TMI-1. A description of the Board's findings in this regard is contained in the August 21, 1981, PID at §§ 68-104. In the PID, at § 106, the Board stated:

> ... the Board concludes that the operations and technical staff of TMI-1 is qualified to operate the unit safely. We also conclude that, considering Licensee's off-site technical support divisions, the TMI-1 maintenance program is appropriately organized and staffed to provide reasonable assurance that TMI-1 can be operated safely.

Further, in the PID at §584.d, the ASLB also concluded:

> That Licensee has demonstrated its managerial capability and technical resources to operate Unit 1 while maintaining Unit 2 in a safe configuration and carrying out planned decontamination and/or restoration activities. In reaching this conclusion, we have addressed . . . the management and technical capability . . .of operations staff, . . . and the capability of important support organizations such as . . . Plant Maintenance.

6.2.2.3 Effect of RHR and BETA Reports

The RHR report does not discuss or imply the existence of problems or issues dealing with managerial capability and technical resources, or with the plant maintenance function at TMI-1.

Finding III-C of the BETA report states that, "Maintenance at TMI-1 can improve its support of the plant." In the discussion accompanying the finding, BETA observed that, "The performance of maintenance at TMI-1 has improved significantly during the last two years. However, weaknesses still exist which tend to degrade the quality, quantity, and efficiency of maintenance work." As the reasons for its finding, BETA stated that (1) there was too much interference with maintenance work on the day shift, (2) Engineering was not brought into

the process where they could help resolve the root causes of maintenance problems, and (3) there was a concern about the timing of a change in the corrective maintenance responsibility from the plant to the GPUN M&C Division. Our evaluation of the impact of this BETA finding is presented in Section 5.1 of this Supplement. We concluded there that the BETA maintenance findings do not adversely affect plant safety. Based upon our evaluation of the significance of these findings, as presented in Section 5.1, we consider that the findings also would not adversely impact the findings and conclusions of the Licensing Board.

6.2.2.4 Staff Conclusion

We conclude that the RHR and BETA reports do not affect the findings and conclusions of the Licensing Board relative to this order item.

6.2.3 Views of NRC Inspectors

6.2.3.1 Order

Item 3 of the Commission Order of March 6, 1980, stated that the Licensing Board should examine:

> what are the views of the NRC inspectors regarding the quality of the management of TMI Unit 1 and the corporate management, staffing, organization and resources of Metropolitan Edison;

6.2.3.2 Board Finding

In the August 27, 1981, PID at §359, the ASLB concluded:

> NRC Staff (PF¶83) urges us to find, and we do find that the NRC inspectors believe the Licensee to be capable of properly managing and safely operating TMI Unit 1. CLI-80-5 issue (3).

6.2.3.3 Effect of RHR and BETA Reports

The views of NRC inspectors was not a specific topic of either report. Thus, the reports have no impact on the ASLB finding on this issue. However, after evaluation of the RHR and BETA reports, the views of the NRC inspectors remain unchanged from those stated in NUREG-0680 and its Supplments 1 and 2. Following is an update with respect to the status of issues discussed in the NUREG-0680 Supplements 1 and 2 within the context of NRC inspector views on quality of management, staffing, organization and resources. Summary results of the latest Systematic Assessment of Licensee Performance (SALP) are also presented as an update on NRC inspector views based on more recent inspections subsequent to the issuance of Supplement 2.

- Inspection Findings Discussed in NUREG-0680, Supplements 1 and 2

  The management and technical issues raised in Supplements 1 and 2 were noted primarily from four intensive investigations and/or special appraisals and evaluations. They are (Table III.B.1 of Supplement 1):

  -- Investigation 50-320/79-10 (March 28 - July 31, 1979) Investigation into the March 28, 1979 TMI Accident (NUREG-0600)

  -- Inspection 50-289/80-19 (July 23-25, 1980) Special Inspection ("NTOL" Review) of Utility Management and Technical Competence

  -- Inspection 50-289/80-21 (July 7-11, 14-18, 27-31, and August 1, 1980) Special Management Appraisal Inspection of Management Control Systems for Selected Functional Areas of Licensed Activities

  -- Inspection 50-289/80-22 (July 28 - August 8, 1980) Special Evaluation Inspection of the Health Physics Program.

  Other inspection report summaries were noted along with a few associated violations (Supplement 1, Appendix C previously referenced to

as noncompliances). The conclusion of Supplement 2 was "...corrective measures proposed by the licensee, when fully implemented, are sufficient to resolve the management concerns identified during past...inspections. Region I will verify satisfactory implementation of the various corrective measures, including effectiveness of management improvement prior to TMI-1 restart."

On a sampling basis, Region I has verified the satisfactory implementation of licensee corrective action for the violations addressed in Appendix C of Supplement 1. The management and technical issues addressed in Appendices A and B of Supplement 1 from the intensive investigations and/or special appraisals and evaluations totalled 163 items. The management isrues associated with these vio`ations and significant weaknesses we.e corrected by the licensee and reviewed for satisfactory implementation by Region I. The majority of these items were reviewed during the last SALP period October 1, 1981 to September 30, 1982.

Some technical issues remain open but these are being followed by the licensee for completion prior to restart or are waiting special plant conditions to be adequately tested to resolve these issues. Remaining technical issues are: TMI-1 Ventilation System Flow and Balancing Test, Data collection for the Leakage Reduction Program, Implementation of the new Effluent Monitoring System. These items are being followed by Region I.

Systematic Assessment of Licensee Performance (SALP)

The last complete SALP period was October 1, 1981 to September 30, 1982, with a report issued January 20, 1983, including the licensee's response of December 14, 1982 to the SALP Board conclusions. Ten areas were reviewed by the SALP Board based principally on the inputs from inspectors who conducted inspections during the subject period. These areas were: Plant Operations (Shutdown Mode); Radiological Controls, including Radiation Protection; Radioactive Waste Management; Transportation Effluent Control and Monitoring; Maintenance;

Surveillance, including Inservice and Preoperational Testing; Fire Protection; Emergency Preparedness; Security and Safeguards; Licensing Activities; Quality Assurance/Control; and, Design, Engineering and Modification.

Overall it was found that the licensee's "performance of licensed activities indicates a high degree of management attention and involvement and that it is aggressive and oriented toward nuclear safety with adequate application of resources." It was noted that "in the areas of Radiological Control, Maintenance and Design, Engineering, and Modifications ...better coordination and communications among management, interfacing technical function groups and plant supervisory and worker personnel would enhance performance."

6.2.3.4 Staff Conclusion

Based on the above, previous NRC inspector views of the quality of Licensee management, staffing, organization and resources remain unchanged and are substantiated by the verification of licensee implementation of corrective actions and commitments stated in NUREG-0680, Supplements 1 and 2. The effective implementation of these measures will continue to be reviewed by Region I during the routine inspection program, especially during power operation (if operation is permitted).

6.2.4 Health Physics Program

6.2.4.1 Order

Item (4) of the Commission Order of March 6, 1980, stated that the Licensing Board should examine:

> whether the Unit 1 Health Physics program is appropriately organized and staffed with qualified individuals to ensure the safe operation of the facility;

6.2.4.2 Board Finding

In the August 27, 1981, PID at §584.d, the ASLB concluded:

> That Licensee has demonstrated its managerial capability and technical resources to operate Unit 1 . . . . In reaching this conclusion, we have addressed . . . . the capability of important support organizations such as Health Physics . . . . We have specifically addressed issues (1) through (11) and (13) of CLI-80-5.

6.2.4.3 Effect of RHR and BETA Reports

The RHR report contained no comments or recommendations relative to the adequacy of the GPUN health physics programs. The BETA consultant report addressed the area of the health physics program in Findings III-F and IX-A. Our discussion and evaluation of those findings is presented in Section 5.3, Radiological Controls, of this Supplement.

By the use of a more stringent standard than that imposed by NRC regulations, BETA concluded that the program at TMI-1 is average, even though there is strong management support for a higher quality program. BETA prescribed additional steps to be taken to achieve that objective and to reduce costs involved with radiological work while increasing efficiency and effectiveness.

6.2.4.4 Staff Conclusion

Implementation of the radiological control program (health physics program) at TMI-1 is under continual review by on-site NRC Radiation Specialists to determine compliance with NRC regulations. (Refer to Section 5.3.2.4, Footnote 1 for a list of recent NRC Region I Inspection Reports.) While deviations from good radiological control practices and violations of NRC regulations are identified at times, the licensee's corrective actions are usually prompt and effective, thereby maintaining a program which meets NRC requirements, including the NRC approved TMI-1 radiological control program. This, together with the licensee's initiatives to correct deficiencies in the radiological controls program, as discussed in Section 5.3.2.4, is indicative of a strong resolve to improve this program.

6.2.5 Staffing for Radwaste

6.2.5.1 Order

Item (5) of the Commission Order of March 6, 1980, stated that the Licensing Board should examine:

> whether the Unit 1 Radiation Waste system is appropriately staffed with qualified individuals to ensure the safe operation of the facility;

6.2.5.2 Board Finding

In the August 27, 1981, PID at §386, the ASLB found that:

> Based on the findings of the Staff and on BETA assessment, the Board is satisfied with Licensee's radioactive waste program and organization.

Further, at §584.d, the ASLB concluded:

> That Licensee has demonstrated its managerial capability and technical resources to operate Unit 1 . . . . In reaching this conclusion, we have addressed . . . . the capability of important support organizations such as . . . . Radwaste .... We have specifically addressed issues (1) through (11) and (13) of CLI-80-5;

6.2.5.3 Effect of RHR and BETA Reports

The RHR report contained no comments or recommendations relative to the adequacy of staffing of the TMI-1 radwaste program.

The BETA consultant report touched upon the area of radioactive waste in Finding III-F where it addresses radiological controls. It states, "Excessive generation of radioactive waste is part of these problems" (i.e. instances where radiological controls are not as good as they should be and the work force is not accepting enough responsibility for high quality radio-logical work performance). No specifics regarding this finding are included in the BETA discussion since BETA presents a prescriptive overview to strengthen the

existing radiological control program at TMI-1. It is assumed, therefore, that the excessive generation of radwaste mentioned was a result of the repair work on the steam generators, since this was a major ongoing activity during the period of BETA's review, and since it resulted in considerable quantities of radwaste. A similar finding is addressed in NRC Region I Inspection Report 50-289/82-22 and in monthly reports prepared during that period by the TMI-1 Radiological Assessor. These monthly reports are routinely reviewed by onsite NRC radiation specialists to identify items or trends which could result in violations of NRC requirements. The problem associated with the generation of radwaste, from a health and safety view, is primarily unnecessary radiation exposure to workers, especially if frequent radiation surveys are not performed to identify and isolate the radwaste from workers. While one such instance was cited by NRC during the steam generator repair work (see IR 50-289/82-22), in light of the scope of the work being performed it did not represent a major breakdown in the licensee's program and corrective actions were implemented.

Regarding the qualifications of the TMI-1 radwaste organization, a special review was conducted by onsite NRC radiation specialists on July 11, 1983 to determine if the qualifications of the incumbent personnel met industry standards as had been reported previously to the Atomic Safety and Licensing Board during the TMI-1 Restart Hearing (NUREG 0680, Supplement I). The TMI-1 Radwaste organization is staffed with 24 GPUN employees. The Radwaste Manager, with assistance from one Senior Radwaste Engineer and two Level 1 Engineers, directs three shift foremen, and 15 radwaste laborers. The Radwaste Manager reports to the Manager, Plant Operations TMI-1. Based on NRC review, it was determined that the Radwaste staff's qualifications exceed the requirements of ANSI/ANS 3.1-1978 (N18.1-1971). Such experience should enable and ensure safe operation of all TMI-1 Radwaste Systems and facilities.

6.2.5.4 Staff Conclusion

The radiological waste management program at TMI-1 is under continual review by onsite NRC Radiation Specialists and Resident Inspectors to ensure compliance with NRC regulations. While violations of these regulations are identified at times, the licensee's corrective actions are usually prompt and effective, thereby maintaining a program which meets NRC requirements. (See Sec-

tion 5.3.2.4.) Therefore, the BETA comment has no impact on the Licensing Board finding.

6.2.6 Relationship Between Corporate Finance and Technical Departments

6.2.6.1 Order

Item (6) of the Commission Order questioned

> whether the relationship between Metropolitan Edison's corporate finance and technical departments is such as to prevent financial considerations from having an improper impact upon technical decisions;

6.2.6.2 Board Finding

In the August 27, 1981, PID at §401, the ASLB concluded

> We conclude that Licensee's organizational framework and its practice of committing substantial resources to its nuclear business provides reasonable assurance that the relationship between its corporate finance and technical departments is such as to prevent financial considerations from having an improper impact on technical decisions.

6.2.6.3 Effect of RHR and BETA Reports

Neither the RHR report nor the BETA report raises any issue in this area.

6.2.6.4 Staff Conclusion

We conclude that the RHR and BETA reports do not affect the findings of the Licensing Board's Partial Initial Decision.

6.2.7 Safety Review

6.2.7.1 Order

In Item (7), the Commission order of March 6, 1980, stated that the Licensing Board should examine:

> whether Metropolitan Edison has made adequate provision for groups of qualified individuals to provide safety review of and operational advice regarding Unit 1;

6.2.7.2 Board Finding

The Licensing Board extensively examined the issue of safety review and operational advice. In the August 27, 1981, PID (§§ 402-428) the Board describes the groups and mechanisms to be used by the licensee to assure adequate safety review and operational advice. At § 429 of the PID, the Board stated:

> The Board concludes that the Licensee has made adequate provisions for groups of qualified individuals to provide safety review of and operational advice regarding TMI-1.

Further, in the PID at §584.d, the ASLB also concluded:

> That Licensee has demonstrated its managerial capability and technical resources to operate Unit 1 ... In reaching this conclusion, we have addressed . . . the adequacy of groups providing safety review and operational advice . . .

6.2.7.3 Effect of RHR and BETA Reports

The RHR and BETA reports do not discuss the groups providing safety review and operational advice. Thus, the comments and findings of these reports have no impact on the Board conclusions relative to the issue of groups providing safety review and operational advice.

6.2.7.4 Staff Conclusion

The results of the most recent staff review of this area are presented in Section 9 of Appendix A to this Supplement. There were no adverse findings relative to regulatory requirements. We conclude that the RHR and BETA reports do not affect the conclusions of the Partial Initial Decision.

6.2.8 Comparison of Unit 1 Infractions with Industry-Wide Infractions

6.2.8.1 Order

Item (8) of the Commission Order of March 6, 1980, stated that the Licensing Board should determine:

> what, if any, conclusions regarding Metropolitan Edison's ability to operate Unit 1 safely can be drawn from a comparison of the number and type of past infractions of NRC regulations attributable to the Three Mile Island Units with industry-wide infraction statistics;

6.2.8.2 Board Finding

In the August 27, 1381, PID at §442, the Licensing Board concluded:

> In summary, while both the Staff and Licensee compiled statistical information on infraction histories of plants which could reasonably be compared with TMI, both parties derived little meaning from these statistical comparisons. To the extent a conclusion might be drawn at all, Licensee appeared to be an average performer. Probably, the more accurate view, however, is that there is no statistically reliable conclusion that can be drawn concerning Licensee's ability to operate TMI-1 from a comparison of the number and type of past infractions of NRC regulations attributable to the Three Mile Island Units with industry-wide infraction statistics.

6.2.8.3 Effect of RHR and BETA Reports

Neither the RHR nor the BETA report identified any examples which we would judge to be infractions of NRC requirements. Accordingly, the reports do not affect prior conclusions in this area. The noncompliance history for the past few years is discussed briefly in NRC Region I Inspection Report 50-289/83-10, Section 12, and in Systematic Assessment of Licensee Performance reports for 1981 and 1982.

6.2.8.4 Staff Conclusion

We conclude that the RHR and BETA do not affect the findings of the Partial Initial Decision regarding this order item.

6.2.9 Comparison of LER Statistics with Industry

6.2.9.1 Order

Item (9) of the Commission Order of March 6, 1980, stated that the Licensing Board should determine:

> what, if any, conclusions regarding Metropolitan Edison's ability to operate Unit 1 safely can be drawn from a comparison of the number and type of past Licensee Event Reports ("LER") and the Licensee's operating experience at the Three Mile Island Units with industry-wide statistics on LERs and operating experience;

6.2.9.2 Board Finding

In the August 27, 1981, PID at §455, the Licensing Board concluded:

> We are however satisfied, as Licensee urges us to be (PF § 265), that Mr. Koppe's analyses provided no basis to suspect that there are any serious shortcomings in TMI-1 LER history which would cause us concern about Licensee's management capability."

6.2.9.3 Effect of RHR and BETA Reports

Neither the RHR nor the BETA reports identified any examples which we consider should have resulted in an LER. Accordingly, the reports do not affect prior conclusions in this area. LERs for the past few years are discussed briefly in NRC Region I Inspection Report 50-289/83-10, Section 12 and in Systematic Assessment of Licensee Performance reports for 1981 and 1982.

6.2.9.4 Staff Conclusion

We conclude that the RHR and BETA reports do not affect the findings of the Licensing Board relative to this order item.

6.2.10 Actions That May Reveal Deficiencies in Corporate or Plant Management

6.2.10.1 Item (10) of the Commission Order questioned

> whether the actions of Metropolitan Edison's corporate or plant management (or any part or individual member thereof) in connection with the accident at Unit 2 reveal deficiencies in the corporate or plant management that must be corrected before Unit 1 can be operated safely;

This Order Item is discussed in Supplement No. 1 to NUREG-0680, "TMI-1 Restart," issued in November 1980. In Supplement No. 1 (pages 36-37), the staff identified two issues which were still under investigation. One of these pertained to the transfer of information, which indicated plant conditions, to the NRC during the day of the accident. The other involved a then on-going Department of Justice (DOJ) investigation of concerns relating to alleged falsification of leak rate test data (the Hartman allegations). The staff stated in Supplement No. 1 that pending the completion of these two investigations it could draw no conclusions regarding this Order Item.

Supplement No. 2 to NUREG-0680, issued in March 1981, also discussed the Commission's Order Item 10. On pages 9-10 of Supplement No. 2 the staff reported that its "Investigation into Information Flow During the Accident at Three Mile Island," issued as NUREG-0760 in January 1981, had concluded that information pertinent to the accident had not been intentionally withheld, but

that neither had such information been adequately transmitted either to the NRC or to the Pennsylvania Bureau of Radiological Protection. The staff further stated that NUREG-0746, "Emergency Preparedness Evaluation for TMI-1," had assessed the licensee's communications facilities and plans for communications flow during an accident in accordance with the requirements of 10 CFR 50.47 and the guidance of NUREG-0654, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants." It was reported that the corrective actions taken by the licensee would be reviewed as part of the NRC's evaluation of the licensee's emergency preparedness and that the adequacy of the corrective actions would be verified during an emergency preparedness exercise. The staff also noted that NUREG-0760 had not identified any issues regarding licensee management, organization or staffing which required additional licensee action.

Supplement No. 2 to NUREG-0680 contains additional information regarding the alleged falsification of leak rate data. While the DOJ investigation of this issue still had not been completed, the staff stated that there appeared to be no direct connection between this issue and the TMI-2 accident and that it had found no indication of practices at TMI-1 similar to those alleged at TMI-2. The staff further stated that in light of the licensee's clear management policy regarding strict adherence to procedures, the establishment of management policy for disciplinary measures to be taken for failure to adhere to procedures, and the establishment by the licensee of an operations inspection program to verify procedure adherence, the staff believed that the issue of alleged leak rate data falsification was only of historical significance. However, in a filing to the Commission on April 18, 1983 (NRC Staff Comments on the Analysis of GPUN v. B&W Transcript), the staff noted that it had not carefully chosen its words regarding applicability of the Hartman allegations. In a footnote to April 18 filing, the staff stated, "In restrospect the wording of this last conclusion in Supplment No. 2 should have been more precisely stated to be that the actions taken by the Licensee in light of the Hartman allegations were adequate to address the concerns identified."

The staff stated in Supplement No. 2 that it would resume its investigation regarding the alleged leak rate data falsification after the DOJ had completed its investigation. Notwithstanding this open matter, the staff concluded that

deficiencies in the licensee's corporate or plant management had been corrected or had been identified for correction and the staff considered that this issue (Order Item 10) had been resolved.

6.2.10.2 Board Finding

This issue was litigated during the restart proceeding. In reaching its conclusion, the Licensing Board extensively examined the response to the TMI-2 accident by various involved individuals (PID §§ 461-503) and discussed its limited knowledge of the Department of Justice investigation of the Hartman allegations (PID §§ 504-505). The Board found no reasons for concern that deficiencies in corporate or plant management evidenced following the accident were still present within the licensee's organization that would be a bar to restart. Thus, the Licensing Board, in its Partial Initial Decision on management issues, concluded (§506) that, "In overall summary of CLI-80-5 issue (10), we have noted our lack of knowledge about the Department of Justice investigation. Subject to this matter, ...we find no deficiencies in the corporate or plant management, arising from our inquiry into management's response to the accident, that have not been corrected and which must be corrected before there is reasonable assurance that Unit 1 can be operated safely."

At the time Supplement No. 2 to NUREG-0680 was issued, the staff assumed that the DOJ investigation of the allegations regarding falsification of leak rate data at TMI-2 would have been completed and the remaining NRC investigation would have been completed prior to need for a decision on TMI-1 restart. However, in April 1983, the DOJ investigation was still underway and the need for a decision on TMI-1 restart appeared to be imminent. The staff decided that it should look once again into the matter of management, procedures, and procedure adherence at TMI-1 to provide continuing assurance that practices such as are alleged to have occurred at TMI-2 would not occur at TMI-1. The results of this re-evaluation of the licensee's policies regarding procedure adherence and the organizational and procedural means for assuring procedure adherence are contained in Inspection Report 50-289/83-10, attached as Appendix A to this Supplement.

6.2.10.3 Effect of RHR and BETA Reports

During the course of the re-evaluation reported in Inspection Report 50-289/83-10, the evaluation team specifically reviewed the RHR and BETA reports to determine whether the contents of these reports adversely affected the team findings regarding this management issue. The review efforts are discussed in Section 15 of the Inspection Report. The team concluded that the contents of the RHR and BETA reports did not change the team's findings regarding management integrity and procedure adherence.

6.2.10.4 Staff Conclusion

The conclusions of the Inspection Report, presented in Section 16 of Appendix A, are that the licensee's policies and practices related to procedure adherence and license conditions, as reflected in its management organization, procedures, training, reviews and commitment to safety and quality, are acceptable and do support restart of TMI-1. The report also concluded that the numerous changes and improvements in organization, procedural adherence and personnel at TMI-1 that have occurred since the Hartman allegations provide assurance that these allegations do not now present health and safety concerns that require resolution prior to restart of TMI-1.

The Commission now has directed the Office of Investigations to reopen the investigation into the Hartman allegations and the Executive Director of Operations has directed Region I to investigate the possible applicability of these allegations to TMI-1. During the preparation of this Supplement, these investigations were still in progress.

Further review of the comments, findings, and recommendations of the RHR and BETA reports reported in this Supplement has not revealed information which warrants a change to the staff conclusions regarding this issue as presented in Inspection Report 50-289/83-10. Accordingly, we consider that the contents of these reports do not affect the Partial Initial Decision of the Licensing Board as regards Order Item 10, and that no further actions by the licensee as regards this issue are required prior to TMI-1 restart.

6.2.11 Adequacy of In-House Technical Support

6.2.11.1 Order

Item (11) of the Commission Order of March 6, 1980, stated that the Licensing Board should examine:

> whether Metropolitan Edison possesses sufficient in-house technical capability to ensure the simultaneous safe operation of Unit 1 and clean-up of Unit 2. If Metropolitan Edison possesses insufficient technical resources, the Board should examine arrangements, if any, which Metropolitan Edison has made with its vendor and architect-engineer to supply the necessary technical expertise;

6.2.11.2 Board Finding

In the August 27, 1981, PID at §584.d, the ASLB concluded:

> That Licensee has demonstrated his managerial capability and technical resources to operate Unit 1 while maintaining Unit 2 in a safe configuration and carrying out planned decontamination and/or restoration activities. In reaching this conclusion, we have addressed the Licensee's command and administrative structure at the corporate and plant levels, the adequacy of groups providing safety review and operational advice, the management and technical capability and training of operations staff, the adequacy of the operational Quality Assurance program and the facility procedures, the relationship between the financial and technical organizations, and the capability of important support organizations such as Health Physics, Radwaste, and Plant Maintenance. We have specifically addressed issues (1) through (11) and (13) of CLI-80-5...

6.2.11.3 Effect of RHR and BETA Reports

The RHR report does not discuss or imply problems dealing with the technical capability of the Licensee. The BETA report states that "technical support, while improving is still slow, unresponsive to plant needs and too often tech-

nically incomplete" (page 3). In further amplification of this statement, BETA stated on page 2 of its letter of May 13, 1983, to Mr. Robert C. Arnold, that:

> The third point addresses the lack of timely response of engineering support to the plant. As pointed out in the report, this situation is improving. The issue here is the timeliness and completeness of the engineering support. Work at the plant which requires engineering does not proceed without it. If it takes weeks to get the necessary engineering input instead of days, that is an inefficient delay. If, when the plant receives the engineering input and checks it out in the plant as it is required to do and finds it incomplete, then further delays are encountered. BETA found no examples where improper engineering had been performed to the point where the work in the plant had been accepted.

In response to this item, the GPUN is reviewing methods to improve the management of the large engineering group with Technical Function and is investigating the means for having plant information and problems flow into the Engineering and Design organization on a routine basis, not just when Technical Functions support is required. This action is targeted for completion in 1983. We find this action by the licensee an acceptable response to the BETA finding. (See also the discussion in Section 5.2 above.)

6.2.11.4 Staff Conclusion

Since neither BETA nor the staff has found that the timeliness of engineering support for the plant has affected plant safety, and since RHR had no findings relative to engineering support, we conclude that the RHR and BETA reports do not affect the findings of the Partial Initial Decision on this subject.

6.2.12 Adequacy of Financial Resources

6.2.12.1 Order

Order Item (12) questioned

whether Metropolitan Edison possesses the financial resources necessary to safely operate Unit 1 in addition to cleaning up Unit 2;

6.2.12.2 Board Finding

In Supplement No. 2 to NUREG-0680, "TMI-1 Restart," the staff stated that this Order Item would be considered as part of Item 7 of the Commission's Order of August 9, 1979. However, a subsequent Commission Order of March 23, 1981, (CLI-81-3), deleted the issue of the licensee's financial qualifications as a matter to be litigated in the hearing. In that Order, the Commission accepted the views of the Commonwealth of Pennsylvania that while it was important for the licensee to demonstrate its financial ability to operate TMI-1 simultaneously with the cleanup of Unit 2, the return of TMI-1 to commercial operation would improve, rather than impair, the licensee's financial health. Accordingly, the substance of this Order Item became moot and no further action was taken by the staff to respond to this issue. In its Partial Initial Decision of August 27, 1981, the Licensing Board noted (§29) that contentions dealing with the licensee's financial qualifications were eliminated from the hearing as a result of the Commission's March 23, 1981 Order.

6.2.12.3 Effect of RHR and BETA Reports

There were no comments, findings or recommendations in either the RHR or the BETA report that would adversely affect the Commission Order of March 23, 1981. To the contrary, the staff notes that the intent of the BETA study was to improve the efficiency of the operation, which would tend to decrease the costs associated with TMI-1 operations and thus improve the licensee's financial ability to operate TMI-1 while cleaning up Unit 2.

6.2.12.4 Staff Conclusion

We conclude that the BETA and RHR reports do not affect the findings of the Licensing Board's Partial Initial Decision.

6.2.13 Other Specific Issues Identified by the Board

6.2.13.1 Order

Item (13) of the Commission Order stated that the Licensing Board should examine:

> such other specific issues as the Board deems relevant to the resolution of the issues set forth in this order.

6.2.13.2 Board Finding

In the August 27, 1981, PID at §584.d, the ASLB concluded:

> That Licensee has demonstrated its managerial capability and technical resources to operate Unit 1 . . . . In reaching this conclusion, we have addressed the Licensee's command and administrative structure at the corporate and plant levels, the adequacy of groups providing safety review and operational advice, the management and technical capability and training of operations staff, the adequacy of the operational Quality Assurance program and the facility procedures, the relationship between the financial and technical organizations, and the capability of important support organizations such as Health Physics, Radwaste, and Plant Maintenance. We have specifically addressed issues (1) through (11) and (13) of CLI-80-5;

6.2.13.3 Effect of RHR and BETA Reports

The Licensing Board did not identify any specific issues it addressed in accordance with this Order Item (13) that were not otherwise covered during the proceeding. Thus, there can be no impact by the RHR and BETA reports on this Order Item.

6.2.13.4 Staff Conclusion

We conclude that the RHR and BETA reports do not affect the finding of the Licensing Board regarding this Order Item (13).

6.3.1.1 Contention

CEA contends that there is specific need for the establishment of training for operators that addresses the problem of "mindset" that denies information indicative of serious reactor problems.

6.3 Contentions Raised by Parties

6.3.1 CEA Contention 13:

6.3.1.1 Contention

CEA contends that there is specific need for the establishment of training for operators that addresses the problem of "mindset" that denies information indicative of serious reactor problems.

6.3.1.2 Board Finding

In the ASLB proceeding for Restart of TMI-1, the issue of 'mindset' was considered as part of the litigation of training issues (§166). In its conclusion (§276) the Board found that the licensee has in place at TMI-1 a comprehensive and acceptable training program.

6.3.1.3 Effect of RHR and BETA Reports

The staff's review of the BETA and RHR reports indicates that the issue of 'mindset' which denies information of serious reactor problems was not included in the reports.

6.3.1.4 Staff Conclusion

We conclude that the BETA and RHR reports do not affect the findings of the ASLB's Partial Initial Decision.

6.3.2 Aamodt Contention 2:

6.3.2.1 Contention

It is contended that TMI-1 should not open until the performance of licensee technicians and management can be demonstrated to be up-

graded as certified by an independent engineering firm. This upgrading should include 100% test performance of job description with provision for retraining and retest, or discharge of those who cannot consistently and confidently master all necessary information for safe conduct of their job description under all anticipated critical situations as well as routine situations.

6.3.2.2 Board Finding

The ASLB in its August 27, 1981 findings and conclusions (§§ 264-265) stated that "the OARP does adequately serve as an independent training and testing function and that it satisfies the requirements of Commission Order item 1(e) regarding the retraining of all ROs and SROs...." The Board agreed "... that it must be the Staff, rather than an independent engineering firm "... which must determine the competency of licensed operator candidates." In addition, "... the Board finds that adequate provisions exist for the retaining of operators and for requalification examinations, as well as for retesting of individuals who do not initially pass the NRC examinations."

6.3.2.3 Effect of RHR and BETA Reports

The issues raised by the Aamodts are training and testing. The BETA report does not address these areas; however, RHR appears to question the validity of training and evaluations in the following comments.

- Operators complained about the lack of convergence between training, testing and the ability to run the plant.

- In their perception, training prepared individuals to pass examinations and is successful at this, but does not prepare them sufficiently to operate.

6.3.2.4 Staff Evaluation and Conclusion

Extensive discussions of the licensee's training and testing programs are provided in Section 4.0 and 6.1.1 of this Supplement. We concluded in those sec-

tions that the licensee's training and testing programs are adequate and that nothing in the RHR or BETA reports would have an adverse impact upon previous Licensing Board findings regarding these issues. For the same reasons we conclude that the RHR and BETA reports do not affect the Licensing Board findings relative to this contention.

### 6.3.3 TMIA Contention 5

#### 6.3.3.1 Contention

TMIA Contention 5, as finally revised by "Memorandum and Order of Prehearing Conference of August 12-13, 1980 (August 20, 1980)", states:

> It is contended that Licensee has pursued a course of conduct that is in violation of 10 CFR 50.57, 10 CFR 50.40, 10 CFR 50.36, 10 CFR 50.71 and 10 CFR 50 Appendix B, thereby demonstrating that Licensee is not "technically ... qualified to" operate TMI Unit 1 "without endangering the health and safety of the public." This course of conduct includes:
>
> a. deferring safety-related maintenance and repair beyond the point established by its own procedures (see, e.g. A.P. 1407);
>
> b. disregarding the importance of safety-related maintenance in safely operating a nuclear plant in that it:
>
> 1. (deleted)
>
> 2. proposed a drastic cut in the maintenance budget;
>
> 3. (deleted)
>
> 4. fails to keep accurate and complete maintenance records related to safety items;
>
> 5. has inadequate and understaffed QA/QC programs related to maintenance;

6. extensively uses overtime in performing safety-related maintenance.

6.3.3.2 Board Findings

In the August 27, 1981, PID, the ASLB made the following findings:

- Contention a

  (§300) We find no evidence that the Licensee has improperly deferred safety-related maintenance and repair either beyond a point established by its own procedures or so as to endanger the health and safety of the public.

- Contention b

  2. (§324) The board found that there was no evidence that the TMI-1 budget cuts for maintenance were drastic, that the budget cuts would have affected safe operation of the plant, or that the budget cuts demonstrated an underlying management philosophy of compromising safety in favor of profits as alleged by TMIA.

  4. (§§314-319) This contention was not resolved by the board but returned to the staff for further evaluation. It was ultimately resolved by the staff in Region I Inspection Report 50-289/82-09.

  5. (§330) The board found that this contention had been mooted by the enlargement of the licensee's QA/QC program subsequent to the TMI-2 accident.

  6. (§346) The board found that there was no evidence of any adverse effect from overtime upon safety-related maintenance.

As relates to the overall TMIA Contention 5, the ASLB concluded (§348):

In summary, the Board finds that contrary to TMIA Contention 5, Licensee has not deferred safety-related maintenance and repair either beyond the point established by its own procedures or otherwise improperly. We find further that Licensee has not disregarded the importance of safety-related maintenance in safely operating a nuclear plant by proposing a drastic cut in the maintenance budget of by extensively using overtime in performing safety-related maintenance. Finally, although we have noted some defects in Licensee's record keeping practices above, the extensive changes in Licensee's safety-related record keeping program and in its QA/QC programs related to maintenance has resulted and should continue to result in substantial improvements. Licensee's course of conduct, considering the improvements noted, does not, as alleged by TMIA Contention 5, demonstrate that Licensee is not technically qualified to operate TMI-1 without endangering the health and safety of the public.

6.3.3.3 Effect of RHR and BETA Reports

The RHR Report contained no comments or recommendations relative to inappropriate maintenance activities, nor did the operator survey form ask questions in this area.

BETA finding III-C identified the following:

a. It was difficult to get maintenance work accomplished on day shift.

b. Maintenance sometimes did not solve the root cause of the problem and engineering should become more involved in plant maintenance activities.

c. The transfer of maintenance activities to the Maintenance and Construction Division should wait until after TMI-1 restart.

6.3.3.4 Staff Evaluation and Conclusion

We determined that none of the above BETA report findings or subsequent BETA recommendations to correct the findings regarding improving the efficiency and effectiveness of maintenance have any relationship to the issues raised by TMIA

Contention 5 or the ASLB findings concerning this contention. (See also the discussion in Section 5.1 of this Supplement.)

We conclude that BETA Report Finding III-C on improving the effectiveness and efficiency of maintenance is different from the issues raised by TMIA Contention 5 and does not affect the ASLB partial Initial Decision concerning the TMIA contention.

## 6.4 Issues Considered in the Reopened Hearing

The Licensing Board issued its Partial Initial Decision (PID) on management issues on August 27, 1981. Just prior to issuance, the Board had been notified regarding allegations of cheating on operator examinations. As a result of this cheating issue, the Board, in its PID, retained jurisdiction over issues relating to the quality of the licensee's management and its operating personnel.

On October 2, 1981, the Licensing Board reopened the hearing to inquire into the cheating issue. A Special Master was appointed to preside over the hearing and the Licensing Board, in a Memorandum and Order dated October 14, 1981, directed that the supplementary proceeding would consider a broad issue and 12 specific issues as itemized in Section 6.4.1. Following the supplementary hearing, the Licensing Board issued its Partial Initial Decision on the Reopened Proceeding on July 27, 1982. The effect of the contents of the RHR and BETA reports on the findings of the Licensing Board regarding the issues covered in the reopened proceeding is discussed in the remainder of Section 6.4.

### 6.4.1 Issues for the Reopened Proceeding

#### The Broad Issue

The Broad Issue to be heard in the reopened proceeding is the effect of the information on cheating in the NRC April examination on the management

issues considered or left open in the Partial Initial Decision, recognizing that, depending on the facts, the possible nexus of the cheating incident in the NRC examination goes beyond the cheating by two particular individuals and may involve the issues of Licensee's management integrity, the quality of its operating personnel, its ability to staff the facility adequately, its training and testing program, and the NRC process by which the operators would be tested and licensed.

Particular Issues

1. The extent of cheating by TMI-1 operator license candidates on the NRC license examinations in April 1981, and on any other Licensee- or NRC-administered examinations, including but not limited to the following: the Kelly examinations (including Category T) in April 1980; Category T make-up examinations subsequently administered by the company; the ATTS mock examinations in early April 1981; and such other examinations as the Special Master shall deem relevant. These latter shall include any other Licensee-administered qualification or mock exam or NRC-administered exam since the accident at TMI-2.

2. The adequacy of the Staff's investigation of, and NRC response to, the cheating incident and rumors of cheating in the April 1981 NRC examinations.

3. The adequacy of Licensee's investigation of, and Licensee's response to, cheating or possible cheating in the examinations listed in Issue 1 above.

4. [Proposed Issue 4 was combined with Issue 3.]

5. The extent of Licensee management knowledge of, encouragement of, negligent failure to prevent, and/or involvement in cheating in the above mentioned NRC and Licensee examinations.

6. The existence and extent of Licensee management involvement in cheating as alleged by the Aamodts in paragraph 7 in response to the Board's Order of August 20, 1981.

7. The existence and extent of Licensee management constraints on the NRC investigation of cheating and rumors of cheating in the NRC April 1981 examinations.

8. The adequacy of Licensee management response to the incident in July 1979, referred to in the OIE investigation report and involving one of the two operators terminated as a result of cheating on the NRC April 1981 examinations.

9. The adequacy of Licensee's plans for improving the administration of future Licensee qualification examinations for licensed operators and candidates for operator licenses, including the need for independent administration and grading of such examinations.

10. The adequacy of the administration of NRC licensing examinations for TMI-1 personnel, including proctoring, grading, and safe-guarding the integrity of examination materials; the adequacy of the Staff's review of the administration of Licensee's Category T examinations; and the adequacy of the Staff's plan for retesting operators and monitoring its NRC examinations to assure proper adherence to NRC testing requirements in order to assure that the purposes of the NRC examinations, because of the nature of the questions, cannot be defeated by cheating, the use of crib sheets, undue coaching or other evasive devices.

11. The potential impact of NRC examinations, including retests, and operator terminations on the adequacy of staffing of TMI-1 operations.

12. The sufficiency of management criteria and procedures for certification of operator license candidates to the NRC with respect to the

integrity of such candidates and the sufficiency of the procedures with respect to the competence of such candidates.

6.4.2 Unaffected Issues

Particular issues numbered 1, 2, 3, 4, 5, 6, 7, 8, and 10 are clearly unaffected by any information in the RHR and BETA reports. Issue number 1 pertains to the details of the cheating incidents while Issues 2 and 3 (and 4) pertain to the adequacy of the staff's and the Licensee's investigations of these incidents. The RHR and BETA reports contain no information that addresses cheating on examinations and contain no information on the incidents in question. Thus, these reports have no impact upon these issues.

Issues 5 and 6 pertain to the existence and the extent of Licensee management knowledge of, encouragement of, negligent failure to prevent, and/or involvement in the cheating. Since the RHR and BETA reports do not contain any information regarding cheating, they therefore do not implicate management in such activities. Thus, the RHR and BETA reports do not affect Issues 5 and 6.

Issue 7 pertains to possible licensee management constraints on the NRC investigation of cheating in the NRC April 1981 examinations. Neither the RHR report nor the BETA report has any information regarding the April 1981 examinations. Thus, they do not affect this issue.

Issue 8 pertains to the adequacy of licensee management response to the incident in July 1979. Neither the RHR report nor the BETA report contains any information regarding this issue and, hence, they have no effect on the Licensing Board decision relating to this issue.

Issue 10 pertains to the NRC administration of examinations for TMI-1 personnel. The details of how the NRC administers examinations were not discussed in either the RHR report or the BETA reports. Thus, these reports do not affect Issue 10.

6.4.3 Issues Possibly Affected by RHR and BETA Reports

The Licensing Board findings relative to Particular Issues 9, 11 and 12 and to portions of the Broad Issue could be affected by the contents of the RHR and BETA reports.

6.4.3.1 Particular Issue 9

Issue 9 pertains to the licensee's administration of examinations. The Licensing Board discussion and findings relative to this issue are presented in §2321-§2347 of the July 27, 1982, Partial Initial Decision. The Board was critical of the licensee's pre-accident administration of licensing examinations and of the corrective steps that had been taken at the time of the hearing. Accordingly, the Board imposed two conditions relative to administration of licensing examinations on TMI-1 which were to be satisfied within the first two years after restart authorization (PID, §2347). One of these conditions requires the licensee to develop and implement an internal auditing procedure providing for unscheduled direct observation of the training and testing program by the Manager of Training and the Supervisor of Operator Training. The second condition requires the licensee to develop and implement a procedure for routine sampling and review of examination answers for evidence of cheating.

RHR Report

The RHR report noted that examination security has had an unpleasant history among operators at TMI, although most of the operators agree that examinations need to be closely monitored. However, two-thirds of the operators agreed that the precautions taken in administering examinations made them feel not trusted. This finding tends to indicate that the licensee has imposed stringent controls on the administration of examinations. Thus, it is not in conflict with the expressed desires of the Licensing Board. We have inspected the licensee administration

BETA Report

The BETA report contains no information specifically related to the administration of examinations, although Finding V-B-4 of the report discusses the BETA perception of an attitude problem in the Training Department which results in the students not being adequately challenged. Such an attitude conceivably could carry over into laxness in training and in the administration of examinations. That such is not the case is partially attested to by the RHR finding noted above. Further, staff inspections and reviews of the GPU-administered examinations have not revealed any deficiencies in licensee administration of examinations.

6.4.3.2 Particular Issue 11

Issue 11 pertains to the potential impact of NRC examinations, including retests, and operator terminations on the adequacy of staffing of TMI-1 operations. The Board did not take issue with the adequacy of staffing at TMI-1; and reaffirmed that Condition 9 (August 27, 1981, PID, §583) for the staffing of Unit 1 will and must be met.

RHR Report

The RHR report noted that TMI-1 currently has six shift crews, which they find quite satisfactory. Thus, it is not in conflict with the expressed Condition 9 of the Licensing Board.

BETA Report

The BETA report did not address adequacy of staffing of TMI-1 operations.

6.4.3.3 Particular Issue 12

Issue 12 pertains to management criteria and procedures for certification of operator license candidates. The Board was critical of the pre-TMI-2 accident method used to certify candidates for an operator license. The licensee

stated that a formal certification procedure would be established. The Board noted that, if properly implemented, a formal certification procedure, founded on the trainer's evaluation of candidates by means of properly administered and graded examinations, would enhance the credibility of the licensee's certification process. The Board further stated its belief that, as part of the certification process, the senior management official charged with signing the certification to the NRC is obligated to review the candidate's personnel file and to take into consideration any information reflecting on the candidates integrity and attitude. (July 27, 1982, PID at §2349-2350)

RHR Report

The RHR report does not discuss the provisions for certification of operator candidates. Therefore, there is no conflict between the RHR Report and the PID.

BETA Report

The BETA report does not discuss the provisions for certification of operator candidates. Therefore, the BETA Report has no impact on the PID.

6.4.3.4 The Broad Issue

The general concerns mentioned in the Broad Issue are discussed at length in the July 27, 1982, Partial Initial Decision. At §2423, the ASLB concluded:

> The Board concludes that in consideration of the findings, recommendations, and conditions set out above, the issues in the proceeding reopened by the Board's Order of September 14, 1981, have been resolved in favor of restarting Three Mile Island Unit 1 and that the conclusions of the Partial Initial Decisions of August 27, 1981, 14 NRC 381, and December 14, 1981, 14 NRC 1211, remain in effect.

The questions that could be raised by the RHR and BETA reports as they affect this issue have been discussed earlier. None were found that, in our judgment, would have altered the Board's conclusion.

6.4.4 Staff Conclusion

We conclude that matters raised by the RHR and BETA reports have no impact upon the conclusions reached by the ASLB in its Partial Initial Decision on the reopened hearing.

## 7.0 DRAFT INPO EVALUATION

The Institute of Nuclear Power Operations (INPO) conducted an evaluation of TMI-1 during the weeks of May 9 and 16, 1983, covering the areas of Organization and Administration, Operations, Maintenance, Technical Support, Training and Qualifications, Radiological Protection, and Chemistry. A draft of the INPO evaluation report was published on June 10, 1983. In accordance with the agreement between NRC and INPO, the draft INPO evaluation findings were not discussed with the INPO evaluation team. Rather, in pursuing the INPO findings, the staff examined each finding to determine its potential for raising a safety/regulatory concern.

INPO evaluation reports normally are issued in draft form and are discussed with licensees to assure that the INPO inspectors have not misunderstood or misinterpreted data leading to their proposed findings. Following this iteration, the reports are issued formally to the licensees who then normally furnish copies of the reports to the NRC.

As part of its efforts to evaluate the impact of the RHR and BETA reports, the staff evaluation team visited the TMI-1 site during the period June 13-17, 1983. During the entrance briefing, the licensee furnished to the team a copy of the INPO draft report, even though it had just been received and the licensee had not had an opportunity to review it. Copies of the draft report were also subsequently furnished to the Appeal Board and to the parties to the TMI-1 restart proceeding. (At that time, the INPO findings were still preliminary, i.e., they had not yet been confirmed by the licensee.)

Since the INPO evaluation efforts had covered much the same areas as were being addressed by the staff evaluation team, the team expanded its activities to consider also the possible impact of the draft INPO findings.

This section presents each of the INPO draft findings of possible safety significance, states the possible safety issue that could be construed from the

draft finding, evaluates the safety significance of the draft finding, and provides the staff conclusion regarding the impact of each such finding on a TMI-1 restart decision.

It should be noted that INPO was not evaluating TMI-1 against regulations and regulatory guides promulgated by the NRC. Rather, INPO conducts evaluations to see how well the INPO criteria are being met. INPO criteria generally establish goals that provide broad statements of conditions. In contrast to NRC regulations, INPO criteria are usually subjective in nature and lead to suggestions on how a utility might better conduct its business. INPO findings therefore are based upon the INPO mission which "is to promote the highest levels of safety and reliability in the operation of nuclear electric generating plants."* Accordingly, it should be kept in mind that a negative INPO finding does not necessarily mean that a violation of an NRC requirement has occurred. We reviewed the draft INPO report to determine if any requirement were violated.

## 7.1 Organization and Administration

### 7.1.1 INPO Finding OA.6-1

#### 7.1.1.1 Finding

Vendor technical manual content, distribution, and use are not rigorously controlled. Some manuals marked "Controlled Copy" were noted in the plant without evidence of proper control. Some maintenance procedures refer to portions of technical manuals for detailed work instructions even though the referenced portions have not been reviewed for technical adequacy.

INPO Recommendation

Establish improved control of vendor technical manuals to ensure they are complete and current. Ensure that portions of manuals used to control work are technically adequate.

*Quote from the Institutional Plan for the Institute of Nuclear Power Operations, May 1983.

7.1.1.2 Issue

We consider the issue to be whether vendor information is being adequately reviewed for applicability to safety-related equipment and used where applicable to preclude any adverse impact upon the safety-related equipment.

7.1.1.3 Evaluation

The reviewers interviewed members of management and the Technical Functions Division regarding the finding. GPUN's proposed response to this issue is that the TMI-1 Manager, Operations and Maintenance, has directed and provided the Technical Functions Division with a prioritized list of approximately sixty (60) technical manuals to be reviewed in detail. Also to be developed is a TMI-1 Technical Manual List which will indicate to the user those technical manuals which have received an adequate technical review and are designnated as "controlled copy." This list is to be reviewed and updated quarterly.

7.1.1.4 Staff Conclusions

GPUN action insuring that technical manuals are controlled and had received an adequate technical review is under way. The review of the sixty (60) technical manuals was started in July 1982 and is scheduled for completion by December of 1983. Action taken by GPUN in addressing this issue is adequate. The ongoing NRC inspection program will assure that:

1. The licensee's program is completed as scheduled; and

2. The program implementation is adequate to accomplish its stated intent.

## 7.2 Operations

### 7.2.1 INPO Finding OP.2-1

#### 7.2.1.1 Finding

Shift supervisory personnel need to be more effectively involved in routine operations activities outside the control room. Although supervisory tours are conducted, routine activities of operations personnel are not consistently monitored to ensure conformance with station policies and good operating practices.

INPO Recommendation

Emphasize shift supervisory involvement in routine operations activities outside the control room.

#### 7.2.1.2 Issue

The regulatory concern is whether shift supervision is performing its duties in a manner so as to assure compliance with regulatory requirements.

#### 7.2.1.3 Evaluation

On June 22-23, 1983, a special independent review of operations was made to verify the following:

- Adequacy of shift supervision in the control room and out in the plant
- Procedure adherence, including operator response to alarms
- Adequacy of licensee controls and implementation of valve lineup verification, including second independent checks.

Observations were made on all three shifts for the period and included the following:

- Relay testing of the Emergency Diesel Generators
- Fire system deluge actuation in the main transformer
- Primary Auxiliary Operator (AO) tour on the start of the swing (3:00 - 11:00 PM) shift, including entry into high radiation areas
- Outbuilding AO tour on start of a day shift, including the screenhouse area
- Waste Gas Tank lineup and release to the environment
- Fire drill during the night (11:00 PM - 7:00 AM) shift
- Two shift turnovers and oncoming shift briefings
- Liquid Radwaste Effluent Monitor (RM-L7) interlock check
- Auxiliary Building Missile Protection Door Closure
- Decay Heat River Water Inservice Test procedure implementation
- Chemical addition to the "A" Steam Generator.

Shift Supervision

From observations of shift supervisors and foremen, orders and directions were clear and concise. The shift supervisors stated that they could not conduct plant tours as often as they liked during the day shift (Monday to Friday) due to the need for their attention in and near the control room. This demonstrated that shift supervisors recognize that they must prioritize their various activities during each shift. We also observed that the shift supervisors were

not over-burdened with numerous logs or records and that the overall operations organization and structure allows shift personnel the time to think about shift activities and priorities from a safety viewpoint.

Procedure Adherence and Response to Alarms

The evolutions noted above required the use of operating, surveillance and alarm response procedures and properly approved log sheets. In all cases verified copies of current procedures were used by the operators. During the review of the steam generator chemical addition and waste gas release lineup evolutions, the AOs' approach to procedure implementation was noteworthy. The AOs thought about what they were about to do in implementing a particular procedural lineup by performing checks in addition to specific procedural requirements. These checks involved understanding flow paths, making observations of system piping for unexpected conditions, and checking for expected interface valve positions. The AO taking plant tour readings also made observations beyond the scope of the prescribed log sheets to identify abnormal or deficient conditions. Discrepancies were noted and corrected on-the-spot or documented and/or reported to shift supervision for corrective action. In one instance an AO appropriately initiated a procedure change request to clarify actions needed in the Steam Generator Chemical Addition section of the Wet Layup Recirculation Procedure.

Control Room Operators were knowledgeable about alarms in the control room, and during various evolutions in the plant, such as at the "satellite" panel for the Emergency Diesel Generators during relay testing. Many of the alarms were due to the testing of various restart modification work. The operators expected these alarms, knew why they were received, and knew that no further alarm responses were appropriate, in accordance with Administrative Procedure (AP) 1001G, Procedure Usage.

To assist the operator in understanding plant status via alarms status lights, the operation department initiated an operations surveillance, OPS-35, dated February 13, 1980, Weekly Control Room Annunciator Check, which requires the logging of alarms not normal for plant conditions and of all out-of-service

alarms in the control room. On the first Wednesday of each month, this list is to include all current alarms. We noted that the completed surveillance check was reviewed by operations department management and that therefore OPS-35 is also a good management tool. The current OPS-35 was posted in the control room for operator use. Shift turnover sheets for the CROs also require the logging of new alarms that "stay in" during the previous shift.

A fire protection system deluge actuation occurred at the main transformer during these observations. Alarms/status lights were received, indicating that three fire pumps had started. The appropriate alarm response procedures were used to dispatch personnel to the scene. No fire was found; the actuation appeared to be inadvertent due to a fan injection of hot air. No further action was appropriate beyond resetting the system and restoring the fire pumps to standby status.

It was noted that administrative procedure AP 1001G states that alarm response procedures "should" be followed to the degree appropriate. This verb could imply only a recommendation to follow alarm response procedures. However, based on discussions with and observation of operators, they do understand their responsibilities to implement alarm response procedures to determine the cause of the alarm, and to take appropriate corrective action, which may involve additional actions by abnormal or emergency procedures. Licensee management representatives indicated that the above statement regarding alarm response procedure use is also intended to address situations when expected alarms are received and no further action is appropriate. The statement is worded so as to avoid unnecessary distractions to other plant evolutions or event response actions. Accordingly, we consider this guidance acceptable.

Two AOs were observed entering high radiation areas. On a sampling basis, Radiation Work Permit (RWP) requirements were verified to be met, including the use of alarming digital dosimeters as appropriate substitutes for a continuous dose rate meter. The licensee management representative has issued an internal memorandum requiring that primary AOs obtain a digital dosimeter for their shift to have readily available for use. The radiological controls department

was also requested to reserve (purchase, if necessary) three digital dosimeters for the exclusive use of the operations department.

Valve Lineup Verification

The implementation of a switching and tagging order to remove red ("danger-do not operate") tags from two valves on the Nitrogen/Vent System for the pressurizer was observed. Although no second verification check was required, the AO did confirm the removal by communication with the control room and the switching order was properly implemented, including a verification by the AO that the valves were in their expected "closed" position.

The administrative controls (AP 1002) for switching and tagging and requirements for independent verification of valve/breaker positions were reviewed. Good controls noted are Enclosures 11 and 13 to this procedure. Enclosure 13 is the training requirement authorizing an individual to request switching and tagging; it includes completion of Enclosure 11, Switching and Tagging Qualification Checklist by an individual. The checklist requires an individual to know the administrative controls for switching and tagging and how drawings, procedures/technical manuals are to be used on a switching and tagging evolution. Practical Factors are also included along with oral and written examinations before an individual is put on an authorization list to request switching and tagging.

The existing controls do not prevent one person from performing an independent verification by observing another person checking a particular valve/breaker position. The licensee management representative acknowledged some confusion on the part of operators regarding exactly what is expected of them when performing "independent" checks. The licensee management representatives indicated that additional guidance will be issued. This additional guidance will be reviewed by NRC's Office of Nuclear Reactor Regulation (NRR) before restart, should it be authorized.

regulatory requirements. No safety concerns or conditions adverse to regulatory requirements were noted during our independent observation.

7.2.3 INPO Finding OP.3-2

7.2.3.1 Finding

Performance of independent verification of valve position needs improvement. The second verification of valve position is sometimes performed by observing the first individual check the valve position rather than performing an independent second check.

INPO Recommendation

Revise current operating practices to ensure that the second valve position verification is accomplished by an independent check.

7.2.3.2 Issue

The regulatory concern is that the licensee's switching and tagging administrative controls might not be fully implemented. A programmatic breakdown in implementing these controls for safety-related equipment might render the equipment inoperable, resulting in a safety concern.

7.2.3.3 Evaluation

See the discussion under 7.2.1.3, above.

7.2.3.4 Staff Conclusion

No safety concerns or conditions adverse to regulatory requirements were identified. However, a review of the current revisions to AP 1002 and AP 1029 revealed that these procedures do not preclude the second checker from "verifying" valve position by observing the first check of a valve position. We acknowledge the INPO finding and recommendation in this area and agree that

additional guidance is needed. We will review any additional guidance to be issued by the licensee regarding independent verifications of valve/breaker positions prior to any restart authorization.

7.2.4 INPO Finding OP.4-1

7.2.4.1 Finding

Operator and supervisor knowledge need improvement in some areas. Some auxiliary operators could not explain proper operation of the diesel engine support systems. Additionally, some control room operators and supervisors had difficulty discussing electrical distribution controls and using electrical drawings to analyze unusual transients.

INPO Recommendation

Improve supervisor and operator knowledge in the areas identified above. Include these areas in the existing pre-startup training program.

7.2.4.2 Issue

These findings indicate a lack of knowledge in diesel generator support systems and lack of understanding in electrical distribution controls and response during transients.

7.2.4.3 Evaluation

The staff did not evaluate individual knowledge in these areas. The staff did evaluate lesson plans and OJT tasks in these areas and concluded that the training programs do contain adequate fundamentals to operate the diesel generator and respond to electrical distribution transients.

Although INPO comments may be in response to isolated cases, they imply that the findings may be generic to all auxiliary operators and licensed personnel. Therefore, further screening by GPUN is necessary to resolve this issue.

We are not aware of any actions that GPUN plans in this area. However, the most logical approach is to review INPO detailed notes and conduct additional interviews. These activities could be performed during scheduled requalification periods.

7.2.4.4 Staff Conclusions

Our review of the training program indicates that adequate training exists in operation of diesel engine support systems and response to electrical distribution transients. Additional information from GPUN evaluation is required.

7.2.5 INPO Finding OP.5-1

7.2.5.1 Finding

Some emergency and operating procedures need improvement to enhance their usability. Some cautions follow the action steps to which they apply, and some notes contain procedural steps. It is recognized that extensive effort has been made to improve emergency and operating procedures.

INPO Recommendation

During normal review and revision of plant procedures, identify and correct the type of problems noted above.

7.2.5.2 Issue

Our concern is that emergency and operating procedures must provide adequate coverage to preclude any adverse impact upon safety.

7.2.5.3 Evaluation

The INPO findings were evaluated relative to the issue stated and were found to have no adverse impact upon safety or regulatory requirements. The procedures were found to be usable and effective. However, the reviewer agreed with

the INPO comments that improvements in several of the procedures would enhance their usability.

7.2.5.4 Conclusion

We found that the INPO finding was a desirable "improvement performance objective." However, the existing emergency and operating procedures were adequate to preclude any adverse impact upon safety or regulatory requirements.

## 7.3 Maintenance

### 7.3.1 INPO Finding MA.1-1

#### 7.3.1.1 Finding

Control of maintenance activities needs improvement. Maintenance activities are not always formally documented to reflect appropriate review and authorization of changes in work scope. QA requirements, use of procedures and vendor manuals, and post-maintenance test requirements need to be established and documented prior to continuing jobs with changes in work scope.

INPO Recommendation

Improve control of maintenance activities. Ensure that proper review and approval by appropriate managers is documented for extended work scope.

#### 7.3.1.2 Issue

We consider the issue to be whether plant safety is being adversely affected by licensee failure to document additional reviews and authorizations when the scope of the maintenance work increases.

7.3.1.3 Evaluation

We have determined, through previous inspections, that TMI-1 is in compliance with the regulatory requirements concerning the control and documentation of maintenance activities. The INPO finding, while not identifying a non-adherence to regulatory requirements, does identify an area in the TMI-1 maintenance program which needs further clarification.

The INPO draft finding identified a weakness in the documentation of reviews when the scope of maintenance work increased beyond that originally identified on the job ticket. We consider this to be a paperwork problem which requires resolution; however, no impact on plant safety is indicated. After additional review, we determined that for safety-related maintenance, personnel are aware of the need for and do use the appropriate additional procedures when the scope of the maintenance activity increases. In addition to specifying the work, these procedures contain appropriate Quality Assurance and test requirements.

7.3.1.4 Staff Conclusions

We consider that the above INPO finding does not affect plant safety.

7.3.2 INPO Finding MA.3-1

7.3.2.1 Finding

The plant needs to improve the identification and processing of deficiencies for corrective maintenance action. Many valve, flange, and pump deficiencies are not included in the work control system. In addition, some caution tags identify deficiencies that are not included in the work control system.

INPO Recommendation

Develop measures to ensure timely identification and processing of plant deficiencies for corrective maintenance.

7.3.2.2 Issue

We consider the issue to be whether the timeliness of the identification of minor items or deficiencies for corrective maintenance is adversely affecting plant safety.

7.3.2.3 Evaluation

Regulations require that a program be in place to ensure that conditions adverse to plant safety are promptly identified and corrected; and that the causes of malfunctions are promptly determined, evaluated and recorded. We determined that such a program does exist at TMI-1. The large number of "Job Tickets" issued at TMI-1 tends to demonstrate compliance with these requirements. The deficiencies noted in the INPO inspection were minor and of the type that might be expected to be observed on a normal plant inspection tour. They did not adversely affect plant safety. The report did not identify any instance of unidentified plant maintenance which would affect plant safety. We performed an independent sampling review of caution tags in place for items requiring maintenance and found no deficiencies identified by caution tags that were not also identified in the work control system.

7.3.2.4 Staff Conclusion

We consider that this INPO finding does not adversely affect plant safety.

7.3.3 INPO Findings MA.9-1 and MA.9-2

7.3.3.1 Findings

- Finding MA.9-1

Improvement is needed in warehousing practices to ensure that the quality of stored items is maintained. Storage requirements, preventive maintenance, and environmental and shelf-life controls are not adequately implemented.

INPO Recommendation

Establish programs that address storage requirements and preventive maintenance for stored equipment and material. Upgrade existing efforts in the area of environmental and shelf-life controls. Ensure these programs include materials in "direct turnover" status.

- Finding MA.9-2

The warehouse spare parts program does not fully support the Maintenance Department. Problem areas include the following:

a. Some items for critical plant equipment are kept in uncontrolled shop and plant storage areas. Items are issued in standard quantities, and current procedues do not provide for returning unused items to inventory.

b. Consumables required for the preventive maintenance program are not always available.

c. Maintenance Department is sometimes not informed when their recommendations for spare parts stocking are revised or disapproved. This sometimes results in inadequate spare parts inventory and causes increased direct purchasing of material and supplies.

d. Maintenance planners spend the majority of their time in parts procurement activities because of inadequate warehouse inventory, direct purchase activities, and tracking of spare parts inventory requests.

INPO Recommendations

Implement appropriate actions, including those listed below, to strengthen warehouse support of the Maintenance Department.

a. Upgrade the spare parts issue and return procedures to accommodate returning unused items to inventory. Provide for traceability and storage of

usable equipment removed from the plant or equipment obtained by direct purchase.

b. Revise the spare parts provisioning program to ensure Maintenance Department input in determining items to be stocked and stocking levels.

c. Improve the timeliness of the review process for spare parts inventory requests.

d. In conjunction with b and c, consider a weekly status report to maintenance planners on outstanding purchase requisitions and spare parts inventory requests.

7.3.3.2 Issue

We perceive the issue to be whether the safety of the plant is being adversely affected by materials management practices.

7.3.3.3 Evaluation

Our reviewers interviewed members of the purchasing, warehouse, maintenance, and quality control departments and toured the warehouse and some plant storage areas.

No regulatory issues were identified.

GPUN is currently upgrading existing practices for maintaining the quality of stored items and improving support of the Maintenance Department. The upgrade effort is in response to QA Audit S-TMI-82-15, conducted October 7-November 2, 1982, and the INPO Audit.

7.3.3.4 Staff Conclusion

We conclude that materials management practices are not adversely affecting plant safety. Improvements in areas such as nomenclature of stock items for

retrieval purposes, and return of unused materials to inventory may be desirable, but such improvements are not regulatory concerns affecting plant safety.

## 7.4 Technical Support

### 7.4.1 INPO Finding TS.3-1

#### 7.4.1.1 Finding

The operating experience review program should be improved. Although some vendor bulletins are currently being addressed, a comprehensive program is not in place to review and process appropriate vendor information.

INPO Recommendations

Modify the program currently being used to process INPO and NRC information, as described in GPU Nuclear procedure No. EP-017, to specifically include vendor information, or develop and implement a separate program to ensure that vendor information is properly reviewed and processed.

#### 7.4.1.2 Issue

We consider the issue to be whether vendor information is being adequately reviewed for applicability to safety-related equipment and used where applicable to preclude any adverse impact on safety-related equipment.

#### 7.4.1.3 Evaluation

The reviewers interviewed members of management and Technical Functions regarding the finding. GPUN's proposed response is to have the Technical Functions Division first review all vendor bulletins, notices, etc., and then place all pertinent information into the operating experience review program. This will assure that all applicable information is reviewed by those supervisors/personnel responsible for the operation and/or maintenance of safety-related equipment.

7.4.1.4 Staff Conclusion

Since the operating experience review program is currently in existence, modifying the existing program to also include vendor information appears to be an acceptable method for handling vendor information. The ongoing NRC inspection program is adequate to determine that the licensee has implemented the program for handling of vendor information. Prior to startup, we will inspect to assure that adequate provisions have been made to handle the vendor information.

7.4.2 INPO Findings TS.4-1 and TS.4-2

7.4.2.1 Finding TS.4-1

Some temporary modifications are installed on operating systems without a technical design review. Procedure AP 1013 for electrical jumpers, lifted leads, and mechanical bypasses requires only a limited safety evaluation. It does not require technical design reviews similar to those performed for permanent modifications.

INPO Recommendation

Conduct technical design reviews of electrical jumpers, lifted leads, and mechanical bypasses currently in place on operating systems. Implement controls to ensure technical design reviews are performed on future temporary modifications prior to placing modified systems in service.

Finding TS.4-2

The review of plant modification designs needs improvement. Plant personnel do not always perform operability and maintainability reviews. Designers sometimes fail to identify physical obstructions and structural restrictions.

INPO Recommendation

Ensure that plant modification designs are reviewed for operability and maintainability. Increase involvement of Operations and Maintenance personnel in the reviews. Ensure that reviews include plant walkdowns by designers prior to construction.

7.4.2.2 Issue

We perceive the issue to be whether adequate technical reviews of plant modifications are conducted to preclude an adverse safety or regulatory problem.

7.4.2.3 Evaluation

The temporary modifications concerning electrical jumpers, lifted leads and mechanical bypasses (TS.4-1) are covered by the regulatory requirements under the facility operating license Appendix A, Technical Specifications. Based upon a detailed review of the licensee's program and implementation, we found the program to be implemented and to comply with regulatory requirements. Our reviewers noted that some "temporary" modifications had been installed for years. Based upon our findings regarding temporary modifications, the Director of TMI-1 directed that the existing plant procedure controlling temporary modifications (AP 1013) be revised to require that the Plant Engineering Department perform an annual review of each temporary modification to independently reestablish the validity of each modification.

The INPO recommendation to "conduct technical design reviews" appears to exceed existing regulatory requirements.

The existing regulatory requirements stipulate a "safety evaluation" which implies that the reviews have a technically correct basis and places the responsibility upon the licensee to assure that each temporary modification is correct and will not adversely affect safety. Based upon our review, this is being accomplished.

We found that INPO draft finding TS.4-2 was already being addressed by the licensee. A draft procedure (EMP-014) was in the licensee's approval process to incorporate constructability and maintainability reviews. Interviews with engineering personnel determined that walkdowns by designers of modifications have now been initiated.

7.4.2.4 Staff Conclusion

We found that technical reviews of plant modifications are being conducted in accordance with regulatory requirements which should preclude any adverse safety or regulatory problem. Improvements being made by the licensee will further improve the program.

7.4.3 INPO Finding TS.5-1

7.4.3.1 Finding

Formal controls need to be established for software development and revision on the computer used by the nuclear engineer. This computer is used for important reactor physics calculations in support of plant operation.

INPO Recommendation

Develop administrative controls for software development and revision.

7.4.3.2 Issue

We perceive the issue to be whether the lack of formal control of computer program development could result in design or operational errors due to inaccurate development or improper usage.

7.4.3.3 Evaluation

The nuclear engineering group of the Plant Engineering Department of the TMI-1 plant staff has developed short, relatively simple computer programs for

repetitive calculations they routinely perform. In the past, the nuclear engineering group has considered these programs to be the same as calculations performed on a hand calculator (i.e., the results have been checked using an alternative method, the design has been verified by an independent person, etc.). However, no formal, procedural controls have been established for computer program development and revision within the Plant Engineering Department. (The more complex computer programs used in design work are controlled by the Technical Functions Division of GPUN.)

We reviewed some of the programs and found their development and usage to be acceptable based on the current nature of the programs, the very limited number of people using the programs, and the effective, informal controls used for the programs thus far. However, the staff considers that formal procedural controls are needed to preclude safety problems due to potential expanded usage of those programs by other groups and to additional future program development.

GPUN has agreed to establish formal, procedural controls for the Plant Engineering Department for computer program development and revision.

7.4.3.3 Staff Conclusion

We conclude that the lack of formal computer program development within the Plant Engineering Department has not resulted in adverse effects on reactor design or operation. We further conclude that formal computer controls must be established. Accordingly, the GPUN response is acceptable and appropriate.

7.4.4 INPO Finding TS.6-1

7.4.4.1 Finding

Improvements are needed in the plant performance monitoring program. Some instrumentation used for data collection is not included in the surveillance or preventive maintenance calibration programs. The responsibility for performing data analysis is not clearly defined. Important system or component

degradation may not be readily detected due to the time delay between data collection and transmittal for analysis.

INPO Recommendation

Include instrumentation used for plant performance monitoring data collection in a routine calibration program. Establish clear responsibilities for data analysis. Consider increasing the frequency of data transmittal for analysis to ensure system or component trends do not go undetected.

7.4.4.2 Issue

The staff considers the issue to be whether plant safety is being adversely affected by the failure to calibrate certain instruments used for plant performance analysis and by the delay between data collection and transmittal for plant performance analysis.

7.4.4.3 Evaluation

We determined that the TMI-1 plant performance monitoring program is being developed to improve overall plant thermal efficiency and to detect long term equipment trends.

This program applies to both safety and nonsafety equipment. For nonsafety-related equipment, plant performance monitoring is an additional program which is not covered by regulatory requirements. The Technical Specification surveillance test program and ASME Code Section XI, Inservice Test Program, are currently in place to meet regulatory requirements for safety-related equipment.

Plant performance monitoring exists to improve plant efficiency and to evaluate long term equipment performance. Most equipment included in this program is not safety related. Safety-related equipment which may be included is also covered by other programs for assuring adequacy of plant safety. Instruments which are used for safety-related equipment are being calibrated.

7.4.4.4. Staff Conclusion

We consider that the above INPO finding does not adversely affect plant safety.

## 7.5 Training and Qualification

### 7.5.1 INPO Finding TQ.3-1

#### 7.5.1.1 Finding

Improvements are needed in the on-the-job training (OJT) program for licensed operators. Although good OJT study guides exist for some major plant evolutions covered by procedures, additional study guides should be developed to identify the actions, knowledge, and skill requirements for each OJT task or checkout.

INPO Recommendation

Develop guidelines for actions, knowledge, and skills required for successful completion of each OJT task or checkout.

#### 7.5.1.2 Issue

We perceive the issue to be the adequacy of OJT study guides contained in current licensed operator training programs.

#### 7.5.1.3 Evaluation

We reviewed the INPO report and the current OJT training for licensed operators and find that the current training program provides adequate guidance to achieve prescribed levels of knowledge. We believe that the INPO recommendation would add guidance to the existing program and is in the interest of upgrading all programs at nuclear power plants.

Our review of on-the-job training described in paragraphs 184 and 186 of the PID on Management and Training (August 27, 1981) indicates that task sheets used during this period required check-outs by three levels of Operations Department personnel, as well as questioning by Training Department licensed instructors. The current program has not been degraded compared to the previously described program. INPO recommendations seek to further improve OJT.

GPUN is considering the INPO recommendation by utilizing a special team of training and operations department personnel.

7.5.1.4 Staff Conclusion

We conclude that the existing OJT program provides adequate guidance to achieve prescribed levels of knowledge to meet regulatory requirements. Additional guidance to the program recommended by INPO is under consideration by the GPUN staff.

7.5.2 INPO Finding TQ.5-1

7.5.2.1 Finding

Mechanical, electrical, instrument, and utility maintenance personnel need initial training in basic maintenance fundamentals or plant systems prior to job assignment in the plant.

INPO Recommendation

Provide systems overview and maintenance fundamentals training to all personnel prior to their assignment to in-plant maintenance duties. Evaluate the existing skills and knowledge of experienced personnel entering the maintenance force, and provide initial training as necessary.

7.5.2.2 Issue

We perceive the issue to be whether maintenance personnel have the needed skills and knowledge to perform safety-related work without adversely affecting the safety of the plant.

7.5.2.3 Evaluation

We reviewed the INPO report and supporting information for any evidence of inadequate or unacceptable maintenance work due to lack of proper skills or knowledge. No examples could be found. We note that the INPO emphasis on "initial training" and training "prior to their assignment to in-plant maintenance" has no regulatory basis. From a safety perspective, the maintenance personnel must have sufficient knowledge, skills, and supervision to adequately perform their assigned tasks. However, it appears that INPO has not found any instances or examples of a lack of such.

We also reviewed the current Maintenance Technician Training Program against the description of this program in Paragraph 209 of the ASLB Partial Initial Decision (PID) on management issues to verify that the program has not been degraded subsequent to the ASLB restart hearings. TMI continues to train maintenance people one week out of seven. The staff also reviewed Inspection Report 50-289/82-19, dated January 12, 1983, which documents an inspection of the nonlicensed technical training program.

GPUN has not agreed to provide the extensive initial maintenance training recommended by INPO. GPUN will continue to provide training for maintenance personnel on a continuing basis of up to one week of training in each seven-week period. In addition, GPUN states that an indoctrination program will be developed for maintenance personnel hired from outside the company into higher than entry level maintenance positions.

7.5.2.4 Staff Conclusion

We conclude that there is no evidence that maintenance personnel are performing safety-related work for which they do not have the needed skills or knowledge. We conclude that the INPO-recommended action of systems and maintenance fundamentals training of maintenance personnel prior to in-plant work assignment, while potentially beneficial, is beyond the required program based on regulations and safety. The staff considers the GPUN response to be reasonable and appropriate.

7.5.3 INPO Finding TQ.5-2

7.5.3.1 Finding

OJT for mechanical, electrical, and utility maintenance personnel needs improvement. OJT tasks and checkouts have not been established to ensure that these personnel are appropriately trained or evaluated in required skills and knowledge.

INPO Recommendation

Develop and implement a more structured OJT program incorporating the following:

a. identification of tasks to be performed, simulated, or discussed

b. identification of individuals or classifications of individuals qualified and responsible for conducting OJT

c. skill and knowledge required for each identified task to be performed, simulated, or discussed

d. identification of individuals or classifications of individuals qualified and responsible for conducting final checkouts

e. assurance that individuals have demonstrated competency in specified tasks prior to job assignment

The existing minor maintenance qualification sheets, which document competency on selected minor maintenance tasks, could be expanded to document completion of OJT.

7.5.3.2 Issue

We perceive the issue to be whether the maintenance personnel working on safety-related work have sufficient knowledge and skills to adequately perform their assigned tasks.

7.5.3.3 Evaluation

The staff could find no evidence of work having been performed by maintenance personnel without sufficient knowledge or skill and could find no such example in the INPO report. As discussed in paragraph 7.5.2, the staff has confirmed that GPUN meets regulatory requirements for maintenance technician training. GPUN has agreed to pursue a more structured OJT program based on the results of the recently implemented minor maintenance qualification program.

7.5.3.4 Staff Conclusion

We conclude that the training of maintenance personnel, including OJT, meets regulatory requirements and that maintenance personnel are not performing tasks for which they do not have sufficient knowledge or skills. We conclude that a "more structured OJT program," while potentially beneficial, is beyond the requirements of existing regulations. The staff considers the GPUN response to be reasonable and appropriate.

7.5.4 INPO Finding TQ.9-1

7.5.4.1 Findings

Improvements are needed in the study and reference material available for use in systems training. Existing system descriptions are out of date. The plant is aware of this situation, and an Operations Plant Manual is being written to provide updated system descriptions.

INPO Recommendation

Complete the development of the Operations Plant Manual. Implement a process to ensure that the newly developed material will be kept updated to reflect system modifications.

7.5.4.2 Issue

We perceive this issue to be whether study and reference material is up to date enough to serve as a basis for conducting systems training such that plant safety is not adversely affected.

7.5.4.3 Evaluation

The licensee has identified existing systems descriptions that require revision and is in the process of developing an Operations Plant Manual. The Operations and Training Departments are updating systems descriptions and expect to complete this effort about January 1, 1984. Plant Administrative Procedure AP 1043, Control of Plant Modifications, will be used to help keep the manual current.

Although the study and reference material may not be current, the RO requalification program described in paragraph 190 of the PID on management issues contains elements which keep operators current about plant changes, as well as license and procedure revisions. Inspection report 50-289/82-19, conducted during October 4-November 19, 1982, reviewed this program and found that no

changes have been made which are in nonconformance with existing regulatory requirements or commitments.

7.5.4.4 Staff Conclusion

Our conclusion is that the requalification program provides elements which keep licensed personnel adequately informed of plant changes to systems. GPUN agrees that study and reference materials require revision and is proceeding with this task.

## 7.6 Radiological Protection

### 7.6.1 INPO Findings

- Finding RP.1-1

The criteria used for extending radiation work permits (RWP) is not sufficiently defined. Most routine RWPs are extended for seven days without a requirement to resurvey areas on a routine basis to ensure that radiological conditions have not changed.

INPO Recommendation

Provide additional guidance in the RWP procedure on extending RWPs. Establish resurvey requirements for extended RWPs.

- Finding RP.4-1

The station ALARA program has not been fully implemented. Additional items needing implementation are as follows:

a. man-rem estimates and exposure goals for specific jobs

b. man-rem action levels requiring post-job reviews

INPO Recommendation

Complete implementation of the station ALARA program by addressing the areas noted above.

- Finding RP.7-1 ( RP 9-1 in INPO 2nd Dft )

The quality control program for the new thermoluminescent dosimeter (TLD) system does not require the analysis of spiked TLDs.

INPO Recommendation

Expand the existing dosimetry quality control program to include spiked TLDs with the monthly personnel TLD analysis. Develop acceptance criteria for the accuracy of these dosimeter results, and evaluate cases where acceptance criteria are not met.

- Finding RP.7-2

Improvements are needed in the self-reading pocket dosimeter (SRPD) program. The following areas need improvement:

a. the identification of faulty SRPDs when there are unfavorable comparisons with TLDs

b. the criteria for investigating the results of comparisons between TLDs and SRPDs

c. the cause of the high percentage of SRPDs that fail the calibration check

INPO Recommendation

Revise the SRPD program to include the following:

a. Issue SRPDs to workers by serial number. Perform calibration checks on SRPDs when unfavorable comparisons with TLDs occur.

b. Lower the threshold and acceptable deviation percentage values for SRPD and TLD comparison.

c. Establish operating histories for SRPDs and remove problem dosimeters.

7.6.2 Issue

We perceive the issue to be whether the licensee's radiological protection program meets NRC requirements.

7.6.3 Evaluation

None of the INPO findings appeared to represent violations of NRC requirements. Nevertheless, NRC radiation specialists did followup on the specific findings to ensure their understanding of each finding. No violations were identified. Additionally, we determined that the specific areas in which INPO had findings had been reviewed during routine NRC inspections and, in three of the four cases, NRC had identified similar deficiencies. While correction of these deficiencies by the licensee would result in improvements in the radiological protection program, the deficiencies do not represent violations of NRC requirements.

7.6.4 Staff Conclusion

Implementation of the radiological control program (i.e., the health physics program) at TMI-1 is under continual review by on-site NRC radiation specialists and Resident Inspectors to determine compliance with NRC regulations. (Refer to Section 5.3.2.4, Footnote, for a list of recent NRC Region I Inspection Reports.) While deviations from good radiological control practices and violations of NRC regulations are identified at times, the licensee's corrective actions are usually prompt and effective, thereby maintaining a program which meets NRC requirements.

## 7.7 Chemistry

### 7.7.1 INPO Findings

- Finding CY.1-1

  Supervision of chemistry technicians needs strengthening. The chemistry foreman assigned to supervise chemistry technicians is also performing other responsibilities that require significant amounts of time and limit his attention to laboratory activities. As a result, chemistry technician activities are not always prioritized or monitored for optimum use of technician time.

INPO Recommendation

Initiate appropriate actions to improve supervision of chemistry technicians.

- Finding CY.1-2

  Coordination of activities between on-site and off-site Chemistry Departments needs strengthening. For example, the preparation and approval process for station chemistry procedures is not always timely and sometimes results in procedures that are unnecessarily complex. Also, the installation and calibration of new analytical equipment are not always timely.

INPO Recommendation

Improve the coordination of activities between the on-site and off-site Chemistry Departments including addressing the items noted above.

- Finding CY.2-1

  Chemistry technicians need additional training in fundamental water chemistry and plant systems knowledge.

INPO Recommendation

Assess the knowledge level of individual technicians in the areas noted in the finding, and develop a training program to correct identified deficiencies.

- Finding CY.4-1

  Laboratory work areas are not always maintained in accordance with good housekeeping practices. Work areas were dusty, and countertops were cluttered.

INPO Recommendation

Provide more emphasis on laboratory housekeeping practices. The chemistry laboratories should be kept clean and uncluttered to provide an atmosphere that promotes optimum analytical accuracy.

- Finding CY.5-1

  Safety practices associated with chemistry activities need improvement. Eating, drinking, and smoking was observed in the secondary laboratory where poisonous chemicals are stored and handled. In addition, safety equipment is not always used or accessible.

INPO Recommendation

Place more attention on chemistry and laboratory safety practices. Eating, drinking, and smoking should not be allowed in the secondary laboratory. Keep the areas around safety equipment such as eye wash fountains and emergency showers clear so that emergency access to these facilities will not be affected. Ensure that technicians wear proper eye protection while working in the laboratory.

7.7.2 Issue

We perceive the issue to be a non-safety matter except for the implied danger to licensee personnel (CY.5-1).

7.7.3 Evaluation

None of the findings appeared to represent violations of NRC requirements. Nevertheless, on-site NRC radiation specialists and Regional Inspectors did followup on the specific findings to ensure their understanding of each finding. No violations were identified. Additionally, the technical qualifications and training of chemistry personnel were specifically reviewed during Region I Inspection 50-289/83-04, conducted January 20 to February 25, 1983. That review was conducted to determine the continued and effective implementation implementation of the health physics and chemistry training programs [as stated under Order Item 6 (Short-Term) Management Capability and Resources (NUREG-0650, Supplement 2)] and identified no deficiencies.

INPO Finding CY.2-1 indicates that chemistry technicians need additional training in fundamental water chemistry and plant systems knowledge. NRC inspector followup on this finding determined that this was probably true for a new group of technicians who had completed the initial chemistry training program, but had not yet entered the upgrading portion of the cyclic/retraining program. Work performed by new technicians is under the direction of more experienced personnel and is required to be done by procedure. While some procedures are unnecessarily complex (Finding CY.1-2), they nevertheless are correct and, by GPUN Policy, must be adhered to. INPO also found that the supervision of chemistry technicians needs strengthening (Finding CY.1-1). This finding is pointed toward optimizing the use of technician time since the chemistry foreman's time is taken up with other duties which, in INPO's view, detract from supervisory duties. This fact had been previously recognized by the licensee and active recruitment to fill other positions in the chemistry group has been on-going.

# APPENDIX A

## IE INSPECTION REPORT 50-289/83-10

(Will be added to final SER)

# APPENDIX B
## RHR REPORT FINDINGS

This Appendix shows RHR's survey instrument and response percentages for TMI-1 operators. In addition, where there are additional comments related to survey response categories as revealed through small group discussions, they have been detailed after those response categories. The TMI-1 response percentages were provided by RHR after some confusion as to whether data was gathered from TMI-1 or Oyster Creek. The rest of the findings and priority issues were identified in RHR's report, "Priority Concerns of Licensed Nuclear Operators at TMI-1 and Oyster Creek and Suggested Action Steps," dated March 15, 1983. Report findings that are applicable only to Oyster Creek are not considered.

The survey instrument with response percentages is provided in its original order. Each of the responses, issues, and findings has been evaluated by the NRC staff evaluation team that prepared Supplement 4 to NUREG-0680. For those findings that could potentially raise a safety or regulatory concern, we have indicated the section in Supplement 4 where the finding is discussed. Those findings that do not potentially raise a safety or regulatory concern are noted to be "Not safety-related" and are not discussed in Supplement 4.

The Priority Issues detailed below are more or less of a summary of operator concerns as they surfaced during group discussions.

### Priority Issue #1 - Training of Operators

Training is of exceptional importance to licensed operators. This is not only because of their need to pass licensing exams but also because of the responsibilities a licensed control room operator takes on.

Among the most critical dissatisfactions with training is lack of hands-on experience at TMI-1 for ex-Navy nuclear trainees, largely because the plant is not operational.

While requalification licensing is felt to be a heavy burden, the time devoted to it is perceived as insufficient by operators. Handling of repeat courses is viewed as boring by operators, whose bored attitude is in turn, hard on the trainers.

Staff Comments: See Sections 4.1 and 6.1.1.

Priority Issue #2 - Career Path for Operators

Control room operators feel "locked in" to a windowless rotating shift career because of (a) a history of shortage of trainees; (b) lack of visible career paths; (c) drop in compensation for jobs outside control room; and (d) difficulty in meeting degree requirements for some management positions.

Staff Comments: Not safety-related

Priority Issue #3

Change in the corporate structure of GPUN has removed some degree of control from operators. There are problems of coordination between newly created departments and confusion about the many new people and their roles with respect to the entire organizational structure. Operators believe that this can be improved, however. Concerns over operator pay, rotating shifts, and quality of management are all concerns but these seem to be more of a concern at Oyster Creek than at TMI.

Staff Comments: See Sections 3.1.1, 6.1.2 and 6.2.1.

RHR SURVEY INSTRUMENT

SA = Strongly Agree
A = Agree
D = Disagree
SD = Strongly Disagree
N = Number of Respondents

| A. Licensing | Response Percentages | | | | |
|---|---|---|---|---|---|
| | SA | A | D | SD | N |
| 1. The licensing process is necessary | 37 | 63 | | | 43 |
| Staff Comments: Positive response | | | | | |
| 2. Licensing exams promote safer operation. | 7 | 63 | 28 | 2 | 43 |
| Staff Comments: Positive response | | | | | |
| 3. Licensing and requalification exams need to be monitored closely to insure honesty. | 8 | 67 | 26 | 2 | 43 |
| Staff Comments: See Section 4.1 | | | | | |
| 4. The security precautions surrounding the exams make me feel not trusted. | 28 | 47 | 23 | 2 | 43 |
| Staff Comments: Not safety-related, see Section 4.1 | | | | | |
| 5. The content of the last licensing exams was job relevant. | | 69 | 31 | | 36 |
| Staff Comments: See Sections 4.1 and 6.1.1 | | | | | |

| | Response Percentages | | | | |
|---|---|---|---|---|---|
| | SA | A | D | SD | N |
| 6. The oral portion of the licensing exams tests how you would really act in an emergency. | 5 | 29 | 63 | 3 | 38 |

Staff Comments: See Section 4.1

Licensing - Additional Comments

Small group discussions revealed that some operators felt the precautions during exams were carried to undue lengths and were demeaning.

Staff Comments: See Section 4.1

B. Requalification

| | | | | | |
|---|---|---|---|---|---|
| 7. The requalification process is necessary. | 12 | 81 | 7 | | 41 |

Staff Comments: Postive response

| | | | | | |
|---|---|---|---|---|---|
| 8. Requalification exams for RO's and SRO's promote safer operation. | | 74 | 26 | | 39 |

Staff Comments: See Section 4.1

| | | | | | |
|---|---|---|---|---|---|
| 9. Preparing for the requalification exams is a big burden for me. | 44 | 32 | 21 | 3 | 34 |

Staff Comments: Not safety-realted

| | Response Percentages | | | | |
|---|---|---|---|---|---|
| | SA | A | D | SD | N |
| 10. The requalification exams become less of a burden for me with each passing year. | | 26 | 58 | 16 | 31 |
| Staff Comments: Not safety-related | | | | | |
| 11. Each year I have a fear of failing the requalification exams. | | 67 | 27 | 6 | 33 |
| Staff Comments: Not safety-related | | | | | |
| 12. Requalification preparation takes an unfair amount of my personal time. | 33 | 36 | 27 | 3 | 33 |
| Staff Comments: Not safety-related | | | | | |
| 13. The volume of material for which we are responsible in requalification exams is too broad. | 18 | 67 | 15 | | 33 |
| Staff Comments: Not-safety realted | | | | | |
| 14. I learn useful material while preparing for my requalification exams. | 6 | 89 | 6 | | 33 |
| Staff Comments: Positive response | | | | | |
| 15. Requalification exams should be broken into content sections which are administered one by one over the course of the year (as contrasted with the current single annual comprehensive exam). | 42 | 32 | 18 | 8 | 38 |
| Staff Comments: Not safety-related | | | | | |

| | Response Percentages | | | | |
|---|---|---|---|---|---|
| | SA | A | D | SD | N |
| 16. If it were legally feasible, requalification on an every other year rather than on a yearly basis would be desirable. | 34 | 32 | 34 | | 41 |

Staff Comments: Not safety-related

| | | | | | |
|---|---|---|---|---|---|
| 17. The content of the last requalification exam was job relevant. | | 79 | 21 | | 29 |

Staff Comments: See Sections 4.1 and 6.1.1

| | | | | | |
|---|---|---|---|---|---|
| 18. The training and testing programs have helped me be a more effective operator. | | 78 | 19 | 3 | 36 |

Staff Comments: See Sections 4.1 and 6.1.1

C. Training

| | | | | | |
|---|---|---|---|---|---|
| 19. GPU Nuclear has a major commitment to training. | 9 | 81 | 9 | | 43 |

Staff Comments: Positive response

| | | | | | |
|---|---|---|---|---|---|
| 20. I am satisfied with the training for licensing. | | 14 | 77 | 9 | 43 |

Staff Comments: See Sections 4.1 and 6.1.1

| | | | | | |
|---|---|---|---|---|---|
| 21. I am satisfied with the training for requalification. | | 23 | 71 | 6 | 34 |

Staff Comments: See Sections 4.1 and 6.1.1

| | Response Percentages | | | | |
|---|---|---|---|---|---|
| | SA | A | D | SD | N |
| 22. Our current training prepares us for what we actually do as operators. | | 26 | 59 | 14 | 42 |
| Staff Comments: See Sections 4.1 and 6.1.1 | | | | | |
| 23. The overall quality of the training staff is poor. | 9 | 39 | 47 | 5 | 43 |
| Staff Comments: See sections 4.1 and 6.1.1 | | | | | |
| 24. The training department is not oriented to the needs of the operators. | 14 | 65 | 21 | | 43 |
| Staff Comments: See Sections 4.1 and 6.1.1 | | | | | |
| 25. Reactor theory deserves little or no place in the training program. | 2 | | 70 | 28 | 43 |
| Staff Comments: Positive response | | | | | |
| 26. Thermodynamics, heat transfer and fluid flow theory deserve little or no place in the training program. | | 2 | 67 | 30 | 43 |
| Staff Comments: Positive response | | | | | |
| 27. Thermodynamics, heat transfer and fluid flow theory have a place in the training program but are over stressed. | 14 | 33 | 42 | 12 | 43 |
| Staff Comments: Not safety-related | | | | | |

| | Response Percentages | | | | |
|---|---|---|---|---|---|
| | SA | A | D | SD | N |
| 28. The training program should include material broader than the technical and operational so that operators better understand their role within the industry and community. | 5 | 36 | 55 | 5 | 42 |
| Staff Comments: Not safety-related | | | | | |
| 29. Training has been improving. | 5 | 81 | 12 | 2 | 42 |
| Staff Comments: Positive response. See Sections 4.1 and 6.1.1 | | | | | |
| 30. In training, too much emphasis is placed on emergency and not enough on normal operation. | 6 | 56 | 39 | | 43 |
| Staff Comments: See Section 4.1 | | | | | |
| 31. Sufficient attention is given to requalification training. | | 43 | 54 | 3 | 35 |
| Staff Comments: See Section 4.1 | | | | | |
| 32. Operator training does not have a high enough priority among the range of training needs. | 17 | 44 | 39 | | 41 |
| Staff Comments: See Section 4.1 | | | | | |
| 33. We have too much training in specific procedures. | | 9 | 91 | | 43 |

| | Response Percentages | | | | |
|---|---|---|---|---|---|
| | SA | A | D | SD | N |
| Staff Comments: See Sections 4.1 and 3.3.1 | | | | | |
| 34. We do not have enough training in analyzing plant conditions. | 14 | 61 | 23 | 2 | 43 |
| Staff Comments: See Section 4.1 | | | | | |
| 35. We are required to know more than is practical. | 19 | 48 | 33 | | 42 |
| Staff Comments: See Sections 4.1 and 3.3.1 | | | | | |
| 36. I feel confident my training has prepared me to handle a genuine emergency. | 21 | 55 | 21 | 2 | 42 |
| Staff Comments: See Sections 4.1 and 6.1.1 | | | | | |
| 37. It is important for the training program to cover the political and public relations concerns relating to safe operation. | 5 | 41 | 43 | 12 | 42 |
| Staff Comments: Not safety-related | | | | | |
| 38. The training department is right in not wanting to train us on anything we are not tested on. | 2 | 2 | 67 | 28 | 43 |
| Staff Comments: Not safety related | | | | | |

Training - Additional Comments

° While operators are strongly against being tested on any more material than they are already tested on, they do not agree that they should only be trained on material on which they will be tested.

Staff Comments: Not safety-related

° Some operators feel that training prepares them sufficiently to pass exams but not sufficiently to operate. This is especially true at TMI-1 where many trainees have not seen the plant in full operation.

Staff Comments: See Sections 4.1 and 6.1.1

° Requalification training is often cancelled at the last moment.

Staff Comments: See Sections 4.1 and 6.1.1

° There is antagonism between requalification trainers and licensed operators.

Staff Comments: See Section 4.1

° Non-licensed operators feel they do not get sufficient training in theory because the program is geared to ex-Navy nuclear personnel, who already are familiar with this material; conversely, ex-Navy nuclear people feel they do not get enough hands-on training in the plant.

Staff Comments: See Sections 4.1 and 6.1.1

° Some operators have said (in small group interviews) that while the training department has grown, the staff assigned to operator training has shrunk.

Staff Comments: See Section 4.1

| D. Career | Response Percentages | | | | |
|---|---|---|---|---|---|
| | SA | A | D | SD | N |
| 39. I plan to be a licensed operator for the foreseeable future. | 31 | 55 | 9 | 5 | 42 |
| Staff Comments: Not safety-related | | | | | |
| 40. I feel I have good job security as a licensed operator. | 26 | 50 | 21 | 2 | 42 |
| Staff Comments: Not safety-related | | | | | |
| 41. I need more career options. | 38 | 38 | 24 | | 42 |
| Staff Comments: Not safety-related | | | | | |
| 42. It would be helpful to me to have career alternatives within GPU Nuclear even if I never used them. | 44 | 56 | | | 43 |
| Staff Comments: Not safety-related | | | | | |
| 43. I aspire to advance to management. | 31 | 50 | 19 | | 36 |
| Staff Comments: Not safety-realted | | | | | |
| 44. I would not look forward to being on shift in operations for the rest of my career. | 45 | 45 | 7 | 3 | 40 |
| Staff Comments: Not safety-related | | | | | |
| 45. I am restless to get out of a rotating shift job. | 11 | 16 | 73 | | 37 |
| Staff Comments: Not safety-related | | | | | |

| | Response Percentages | | | | |
|---|---|---|---|---|---|
| | SA | A | D | SD | N |
| 46. I would be willing to move eventually to another job that did not pay so much. | 12 | 36 | 48 | 5 | 42 |

Staff Comments: Not safety-related

| | | | | | |
|---|---|---|---|---|---|
| 47. I feel "locked in" to this job with no career path out. | 12 | 41 | 45 | 2 | 42 |

Staff Comments: Not safety-related

| | | | | | |
|---|---|---|---|---|---|
| 48. Operators who come up through the plants function better than those who transfer in from the Navy Nuclear Program. | 19 | 39 | 37 | 5 | 41 |

Staff Comments: See Section 4.1

| | | | | | |
|---|---|---|---|---|---|
| 49. Those from the Navy should have more training and exposure to plant equipment before working in the control room. | 44 | 49 | 5 | 2 | 43 |

Staff Comments: See Sections 4.1 and 6.1.1

E. Motivation

| | | | | | |
|---|---|---|---|---|---|
| 50. I am/would be proud to be a licensed operator. | 44 | 51 | 5 | | 43 |

Staff Comments: Positive response; not safety-related

| | Response Percentages | | | | |
|---|---|---|---|---|---|
| | SA | A | D | SD | N |
| 51. Being a licensed operator is worth the effort and demands to me. | 33 | 53 | 14 | | 43 |

Staff Comments: Not safety-realted

| | | | | | |
|---|---|---|---|---|---|
| 52. I would like to be an operational foreman but the efforts and demands of the job make it not worth it. | 17 | 37 | 47 | | 30 |

Staff Comments: Not safety-related

| | | | | | |
|---|---|---|---|---|---|
| 53. It bothers me to be told "this is the way we do things at the other nuclear facility." | 11 | 54 | 35 | | 37 |

Staff Comments: Not safety-related

| | | | | | |
|---|---|---|---|---|---|
| 54. I would rather work in a nuclear plant than a fossil plant. | 21 | 55 | 21 | 2 | 42 |

Staff Comments: Not safety-related

| | | | | | |
|---|---|---|---|---|---|
| 55. My morale at the present moment is good. | 7 | 79 | 9 | 5 | 43 |

Staff Comments: Postive response

| | | | | | |
|---|---|---|---|---|---|
| 56. My morale is better than it was this time last year. | 30 | 43 | 27 | | 40 |

Staff Comments: Positive response

| | Response Percentages | | | | |
|---|---|---|---|---|---|
| | SA | A | D | SD | N |
| 57. I am afraid that qualifications for the licensed operator position will change to my disadvantage. | 7 | 50 | 43 | | 42 |

Staff Comments: Not safety-related

| | | | | | |
|---|---|---|---|---|---|
| 58. Operators on the day shift are overworked. | 2 | 27 | 68 | 2 | 41 |

Staff Comments: Not safety-related

| | | | | | |
|---|---|---|---|---|---|
| 59. The operator job on back shifts is boring. | | 21 | 76 | 2 | 42 |

Staff Comments: Not safety-related

| | | | | | |
|---|---|---|---|---|---|
| 60. Operators are well paid for what they do. | 7 | 44 | 28 | 21 | 43 |

Staff Comments: Not safety-related

| | | | | | |
|---|---|---|---|---|---|
| 61. Operators are well paid in relation to other departments. | 2 | 33 | 35 | 30 | 43 |

Staff Comments: Not safety-related

| | | | | | |
|---|---|---|---|---|---|
| 62. I would like to see some changes in the way shifts are scheduled. | | 35 | 60 | 5 | 40 |

Staff Comments: Not safety-related

| | Response Percentages | | | | |
|---|---|---|---|---|---|
| | SA | A | D | SD | N |
| 63. The role of the operator has been evolving over the last few years in a good direction. | | 46 | 43 | 11 | 37 |

Staff Comments: Not safety-related

| | | | | | |
|---|---|---|---|---|---|
| 64. I feel I am required to do too many things on my job that are not really productive. | 17 | 48 | 36 | | 42 |

Staff Comments: Not safety-related, see Section 3.5.1

| | | | | | |
|---|---|---|---|---|---|
| 65. I feel that the direction GPU Nuclear has taken has the operators' interest at heart. | | 30 | 56 | 14 | 43 |

Staff Comments: Not safety-related

| | | | | | |
|---|---|---|---|---|---|
| 66. We operators are committed to quality performance. | 37 | 63 | | | 43 |

Staff Comments: Positive response, see Section 3.2.1

| | | | | | |
|---|---|---|---|---|---|
| 67. My job conditions have improved over the past year. | 15 | 54 | 32 | | 41 |

Staff Comments: Postive response, see Section 3.2.1

| F. Organizational Issues | Response Percentages | | | | |
|---|---|---|---|---|---|
| | SA | A | D | SD | N |
| 68. The support departments of GPU Nuclear are working at cross purposes with operations. | 9 | 55 | 36 | | 42 |
| Staff Comments: See Section 3.1.1 | | | | | |
| 69. The new departments we now work with were installed to promote safer operation. | | 77 | 23 | | 39 |
| Staff Comments: See Section 3.1.1 | | | | | |
| 70. The new organization may lessen the operator's control and authority but it promotes a safer operation. | | 46 | 46 | 7 | 41 |
| Staff Comments: See Section 3.1.1 | | | | | |
| 71. Our facility lacks anyone on site with sufficient authority to handle emergency situations. | 2 | 2 | 74 | 21 | 43 |
| Staff Comments: See Section 3.1.1 | | | | | |
| 72. Our facility lacks anyone on site with sufficient authority to coordinate daily activities. | 5 | 2 | 76 | 17 | 42 |
| Staff Comments: See Section 3.1.1 | | | | | |
| 73. The concept of support departments makes sense in theory. | 14 | 86 | | | 42 |
| Staff Comments: See Section 3.1.1 | | | | | |

| | Response Percentages | | | | |
|---|---|---|---|---|---|
| | SA | A | D | SD | N |
| 74. The support departments are working well in practice. | | 37 | 54 | 10 | 41 |

Staff Comments: See Section 3.1.1

| | | | | | |
|---|---|---|---|---|---|
| 75. I get good cooperation from other departments when I know the individuals with whom I am dealing. | 12 | 83 | 5 | | 42 |

Staff Comments: See Section 3.1.1

| | | | | | |
|---|---|---|---|---|---|
| 76. I may be frustrated by the procedures of other departments but by and large, we are better off for them. | | 67 | 27 | 5 | 40 |

Staff Comments: See Section 3.1.1

| | | | | | |
|---|---|---|---|---|---|
| 77. The various departments need to find better ways to work together. | 21 | 79 | | | 43 |

Staff Comments: See Section 31.1.

| | | | | | |
|---|---|---|---|---|---|
| 78. It would help matters if we knew our counterparts in other departments better. | 7 | 88 | 5 | | 43 |

Staff Comments: See Section 3.1.1

| | | | | | |
|---|---|---|---|---|---|
| 79. Operators have been given sufficient information to understand and appreciate the roles of the other functions. | | 16 | 81 | 2 | 43 |

Staff Comments: See Section 3.1.1

| | Response Percentages | | | | |
|---|---|---|---|---|---|
| | SA | A | D | SD | N |
| 80. The concept of a Shift Technical Advisor is good in theory. | 21 | 72 | 7 | | 43 |

Staff Comments: See Section 3.1.1

| | | | | | |
|---|---|---|---|---|---|
| 81. The STA program is working well in practice. | 3 | 44 | 44 | 9 | 32 |

Staff Comments: See Section 3.1.1 and Section 11 of Appendix A

| | | | | | |
|---|---|---|---|---|---|
| 82. To the extent there is lack of cooperation between departments, it is as much the fault of the operators as of the other disciplines. | | 66 | 24 | 10 | 41 |

Staff Comments: See Section 3.1.1

| | | | | | |
|---|---|---|---|---|---|
| 83. To the extent there is a problem of cooperation, it is because of poor organizational structure. | 5 | 41 | 54 | | 41 |

Staff Comments: See Section 3.1.1

| | | | | | |
|---|---|---|---|---|---|
| 84. To the extent there is a problem of cooperation, it is due to poor management. | 5 | 55 | 41 | | 4 |

Staff Comments: See Section 3.1.1

| | Response Percentages | | | | |
|---|---|---|---|---|---|
| | SA | A | D | SD | N |
| 85. Other departments do not have the good of the whole organization in mind when they go about their daily work. | 7 | 65 | 27 | | 40 |

Staff Comments: See Section 3.1.1

| | | | | | |
|---|---|---|---|---|---|
| 86. If it were not for the support departments, RO's would have too much to do. | 5 | 43 | 50 | 3 | 40 |

Staff Comments: See Section 3.1.1

| | | | | | |
|---|---|---|---|---|---|
| 87. If it were not for the support departments, SRO's would have too much to do. | 5 | 53 | 37 | 5 | 38 |

Staff Comments: See Section 3.1.1

| | | | | | |
|---|---|---|---|---|---|
| 88. Rad-Con should be under the supervisory control of operations. | 17 | 46 | 32 | 5 | 41 |

Staff Comments: See Section 3.1.1

| | | | | | |
|---|---|---|---|---|---|
| 89. Operators use the support departments as an excuse. | | 19 | 68 | 12 | 41 |

Staff Comments: See Section 3.1.1

| | | | | | |
|---|---|---|---|---|---|
| 90. I would like to know more about what other departments in the company do. | 10 | 81 | 10 | | 41 |

Staff Comments: See Section 3.1.1

| | Response Percentages | | | | |
|---|---|---|---|---|---|
| | SA | A | D | SD | N |
| 91. I have all the authority I need to perform my job properly. | 2 | 59 | 33 | 5 | 42 |

Staff Comments: See Section 3.1.1

| | | | | | |
|---|---|---|---|---|---|
| 92. I don't get action fast enough on my problems. | 5 | 47 | 47 | | 40 |

Staff Comments: See Section 3.1.1

| | | | | | |
|---|---|---|---|---|---|
| 93. Members of support departments need more basic knowledge of plant operations so as to better comprehend the results of their actions on operations. | 53 | 39 | 7 | | 43 |

Staff Comments: See Section 3.1.1

| | | | | | |
|---|---|---|---|---|---|
| 94. There would be far less problems between operators and support departments if there were more coordination between the corresponding supervisors. | 9 | 88 | 2 | | 43 |

Staff Comments: See Section 3.1.1

| | | | | | |
|---|---|---|---|---|---|
| 95. The support departments have the same sense of urgency as do the operators. | | 16 | 65 | 19 | 43 |

Staff Comments: See Section 3.1.1

| | | | | | |
|---|---|---|---|---|---|
| 96. Middle managers of operations resist implementation of support department programs. | | 47 | 50 | 3 | 34 |

Staff Comments: See Section 3.1.1

Organizational Issues - Additional Comments

° There is concern among operators that not enough ROs want to be SROs and not enough equipment operators want to be ROs. They feel there needs to be more compensation in the transition to make the added burdens of the RO and SRO positions worth it.

Staff Comments: Not safety-related; see Section 3.2.1

° Operators rated the quality of their interactions with eight departments based on a) the people they interact with; b) the policies of the department. The table following outlines the results. 40% of the interactions were rated below the mean in satisfaction. Three quarters of these were for reasons of policy and only one quarter had to do with people. The department with whom operators had the least satisfactory relationship was Tech Functions followed by Quality Assurance. Rad-Con, Materials Management and Training were tied for the next place. At TMI, SROs had the largest number of unsatisfactory relationships.

Staff Comments: See Section 3.1.1

° In the small group interviews several causes were alleged by the operators for their dissatisfaction with Tech Functions. They did not know and had little direct contact with the individuals in that department, Tech Functions people had little direct operational experience and there were two sorts of communication problems. Tech Functions did not consult operations sufficiently before taking action which affected them and they did not give timely feedback on recommendations submitted to them by operations. The reasons for dissatisfaction vary from department to department based on the functions of each. TMI had its greatest dissatisfaction with Rad-Con policies and, after that, equally with Training and Management policies.

Staff Comments: See Sections 3.1.1 and 5.2.1

Satifactoriness of Interaction with People and Policies
of Specific Departments by License Status

| Department | Type of Interaction | Training | TMI RO | TMI SRO |
|---|---|---|---|---|
| Rad-Con | People | | | |
| | Policies | | X* | X |
| Training | People | X | | |
| | Policies | | | X |
| Quality Assurance | People | | | |
| | Policies | | | X |
| Technical Functions | People | | | |
| | Policies | X | X | X |
| Maintenance & Construction | People | | | |
| | Policies | | | |
| Materials Management | People | | | |
| | Policies | | | X |
| Security | People | | | |
| | Policies | | X | |
| Plant Maintenance | People | | | |
| | Policies | | | |

* X is rating below mean in satisfaction

° In small group discussions, operators say they disapprove of top management's handling of both regulatory agencies and of the attacks of anti-nuclear activists. The demands and criticisms of both groups are an irritant to them and they would like to see their management take a more aggressive stand. It leads them to view management as weak and passive.

Staff Comments: Not safety-related

° Operators feel they are not consulted in advance in matters which concern them nor informed, sufficiently in advance, of changes which affect their personal lives such as shift changes. They feel "dumped on" by management, e.g., blamed for things without their relative inexperience being taken into account. They miss not getting compliments. They would like to be addressed versus ignored when they cross paths with their leadership. At TMI-1 they remember that their management suggested retesting for licensing which has become a big burden for them.

They fault their leadership for crisis management although it is hard to imagine a company that has been through a greater succession of recent crises. More significantly, they are concerned about management's design of an organizational structure which creates multiple problems of coordination and the lack of management effort in bringing about coordination within this structure. They keep saying "there is no one in charge" even though they know that in a formal organizational sense this is not the case. Some are scandalized by what they consider waste of money and wrong priorities on spending. They cite dead wood in the management ranks and reward of managers for significant failures for which they would have been severely censured. They see a lack of a formal program of training to improve the skills of supervisors and managers.

Staff Comments: Not safety-related; see Section 3.1.1

° TMI-1 is farther along in the process of accepting the management structure. As mentioned before, there is more alienation from management at Oyster Creek than at TMI.

Staff Comments: Not safety-related

° In small group discussions, operators say they disapprove of top management's handling of both regulatory agencies and of the attacks of anti-nuclear activists. The demands and criticisms of both groups are an irritant to them and they would like to see their management take a more aggressive stand. It leads them to view management as weak and passive.

Staff Comments: Not safety-related

° Operators feel they are not consulted in advance in matters which concern them nor informed, sufficiently in advance, of changes which affect their personal lives such as shift changes. They feel "dumped on" by management, e.g., blamed for things without their relative inexperience being taken into account. They miss not getting compliments. They would like to be addressed versus ignored when they cross paths with their leadership. At TMI-1 they remember that their management suggested retesting for licensing which has become a big burden for them.

They fault their leadership for crisis management although it is hard to imagine a company that has been through a greater succession of recent crises. More significantly, they are concerned about management's design of an organizational structure which creates multiple problems of coordination and the lack of management effort in bringing about coordination within this structure. They keep saying "there is no one in charge" even though they know that in a formal organizational sense this is not the case. Some are scandalized by what they consider waste of money and wrong priorities on spending. They cite dead wood in the management ranks and reward of managers for significant failures for which they would have been severely censured. They see a lack of a formal program of training to improve the skills of supervisors and managers.

Staff Comments: Not safety-related; see Section 3.1.1

° TMI-1 is farther along in the process of accepting the management structure. As mentioned before, there is more alienation from management at Oyster Creek than at TMI.

Staff Comments: Not safety-related

| G. Regulatory Atmosphere | Response Percentages | | | | |
|---|---|---|---|---|---|
| | SA | A | D | SD | N |
| 97. I have adjusted to living in a regulated environment and by and large it does not bother me. | 5 | 61 | 35 | | 43 |
| Staff Comments: Not safety-related | | | | | |
| 98. The growing procedural complexity is itself a hazard to safety. | 30 | 53 | 14 | 2 | 43 |
| Staff Comments: See Section 3.3.1 | | | | | |
| 99. By and large, procedures are up-to-date. | 2 | 79 | 19 | | 43 |
| Staff Comments: See Section 3.3.1 | | | | | |
| 100. Our procedures are too detailed. | 14 | 39 | 47 | 4 | 43 |
| Staff Comments: See Section 3.3.1 | | | | | |
| 101. We suffer from informational overload. | 23 | 51 | 26 | 4 | 43 |
| Staff Comments: See Section 3.3.1 | | | | | |
| 102. There are so many cumbersome procedures that in practice the GPU Nuclear policy on compliance is disregarded. | 5 | 19 | 70 | 7 | 43 |
| Staff Comments: See Section 3.3.1 | | | | | |
| 103. I worry about breaking some regulation without realizing it. | 9 | 52 | 38 | | 42 |
| Staff Comments: See Section 3.3.1 | | | | | |

| | Response Percentages | | | | |
|---|---|---|---|---|---|
| | SA | A | D | SD | N |
| 104. The compliance to procedures that we are held to by our management is reasonable. | 2 | 68 | 31 | | 42 |

Staff Comments: See Section 3.3.1

| | | | | | |
|---|---|---|---|---|---|
| 105. The policy on procedural compliance is clearly communicated to us by management. | 9 | 74 | 16 | | 43 |

Staff Comments: See Section 3.3.1

| | | | | | |
|---|---|---|---|---|---|
| 106. Our organization has too many policies and procedures which interfere with doing a good job. | 5 | 53 | 42 | | 43 |

Staff Comments: See Section 3.3.1

H. Discipline

| | | | | | |
|---|---|---|---|---|---|
| 107. There is not enough consultation with us before disciplinary policies are established. | 10 | 55 | 35 | | 40 |

Staff Comments: Not safety-related

| | | | | | |
|---|---|---|---|---|---|
| 108. We are sufficiently informed on the background of disciplinary regulations. | | 36 | 52 | 12 | 42 |

Staff Comments: Not safety-related

| | | | | | |
|---|---|---|---|---|---|
| 109. Disciplinary practices are fair. | | 44 | 49 | 8 | 39 |

Staff Comments: Not safety related

| | Response Percentages | | | | |
|---|---|---|---|---|---|
| | SA | A | D | SD | N |
| 110. When it comes to disciplinary policies there are two standards: a tough set for operators and an easier set for top management. | 5 | 41 | 54 | | 37 |

Staff Comments: Not safety-related

| | | | | | |
|---|---|---|---|---|---|
| 111. Regulations on mind altering substances are sound. | 39 | 53 | 7 | | 43 |

Staff Comments: Positive response

| | | | | | |
|---|---|---|---|---|---|
| 112. I accept the idea of an operator uniform. | 3 | 65 | 20 | 13 | 40 |

Staff Comments: Positive response; not safety-related

| | | | | | |
|---|---|---|---|---|---|
| 113. I am satisfied with the quality of the operator uniform. | | 57 | 33 | 10 | 40 |

Staff Comments: Not safety-related

I. Management

| | | | | | |
|---|---|---|---|---|---|
| 114. I have confidence in our corporate management. | 2 | 52 | 41 | 5 | 42 |

Staff Comments: See Section 3.1.1

| | | | | | |
|---|---|---|---|---|---|
| 115. I have confidence in our plant management. | 7 | 86 | 7 | | 43 |

Staff Comments: See Section 3.1.1

| | Response Percentages | | | | |
|---|---|---|---|---|---|
| | SA | A | D | SD | N |
| 116. The objectives of GPU Nuclear are clearly stated. | | 67 | 33 | | 43 |
| Staff Comments: See Section 3.4.1 | | | | | |
| 117. The objectives of GPU Nuclear are well communicated. | | 56 | 37 | 7 | 43 |
| Staff Comments: See Section 3.4.1 | | | | | |
| 118. The objectives of GPU Nuclear are valid. | | 79 | 21 | | 38 |
| Staff Comments: Positive response; see Section 3.4.1 | | | | | |
| 119. GPU Nuclear management is as concerned about its employees and organizational issues as it is about public relations and technical issues. | | 26 | 58 | 16 | 43 |
| Staff Comments: See Section 3.4.1 | | | | | |
| 120. GPU Nuclear is changing faster than I can adjust. | 2 | 27 | 71 | | 41 |
| Staff Comments: See Section 3.1.1 | | | | | |
| 121. I am happy with the quality of supervision I receive. | 5 | 72 | | | 43 |
| Staff Comments: See Section 3.5.1 | | | | | |

| | Response Percentages | | | | |
|---|---|---|---|---|---|
| | SA | A | D | SD | N |
| 122. Supervision of operators is too lax. | | 12 | 77 | 12 | 43 |

Staff Comments: See Section 3.5.1

| | | | | |
|---|---|---|---|---|
| 123. Our management works together as a team. | 41 | 57 | 2 | 42 |

Staff Comments: See Section 3.1.1

| | | | | |
|---|---|---|---|---|
| 124. I feel that top management is sufficiently in touch with what is going on at my level. | 21 | 49 | 30 | 43 |

Staff Comments: See Section 3.1.1

| | | | | |
|---|---|---|---|---|
| 125. Management has committed to an accountable organization which resolves problems at the correct level. | 47 | 47 | 5 | 38 |

Staff Comments: See Section 3.1.1

| | | | | |
|---|---|---|---|---|
| 126. Management here sees to it that there is cooperation between departments. | 36 | 61 | 3 | 39 |

Staff Comments: See Section 3.1.1

| | | | | |
|---|---|---|---|---|
| 127. The supervisors in this organization allow too many infringements of company rules to go by unnoticed. | 22 | 76 | 2 | 41 |

Staff Comments: See Section 3.5.1

| J. Safety | Response Percentages | | | | |
|---|---|---|---|---|---|
| | SA | A | D | SD | N |
| 128. On balance, we are better prepared for an emergency as a result of changes since the TMI-2 accident. | 26 | 65 | 7 | 2 | 43 |

Staff Comments: See Sections 4.1 and 6.1.1

| | | | | | |
|---|---|---|---|---|---|
| 129. Any benefits from the constructive changes made since the accident are more than offset by the cumbersome procedures and organizational structure. | 2 | 43 | 52 | 2 | 42 |

Staff Comments: See Sections 3.1.1 and 3.3.1

| | | | | | |
|---|---|---|---|---|---|
| 130. Our new kind of functional structure may be having growing pains, but it has the potential to function well. | | 88 | 12 | | 42 |

Staff Comments: See Section 3.1.1

| | | | | | |
|---|---|---|---|---|---|
| 131. Efficiency of operations should not take a second place to public safety. | 10 | 46 | 39 | 5 | 41 |

Staff Comments: See Section 3.4.1

| | | | | | |
|---|---|---|---|---|---|
| 132. Top management is more concerned about public safety than it is about generating electricity. | 5 | 59 | 36 | | 42 |

Staff Comments: See Section 3.4.1

| | Response Percentages | | | | |
|---|---|---|---|---|---|
| | SA | A | D | SD | N |
| 133. Because we live so closely with our technology, we operators tend to underestimate the potential danger. | 2 | 28 | 56 | 14 | 43 |

Staff Comments: See Section 3.4.1

| | | | | | |
|---|---|---|---|---|---|
| 134. Safety gets too high a priority here. | | 7 | 84 | 9 | 43 |

Staff Comments: See Section 3.4.1

K. Job Performance

| | | | | | |
|---|---|---|---|---|---|
| 135. I understand my job responsibilities and they have been made clear to me. | 9 | 88 | 2 | | 43 |

Staff Comments: See Sections 3.1.1, 4.1, and 6.1.1

| | | | | | |
|---|---|---|---|---|---|
| 136. Others with whom I work understand their job responsibilities. | 2 | 91 | 7 | | 43 |

Staff Comments: See Section 3.1.1

| | | | | | |
|---|---|---|---|---|---|
| 137. I have adequate support (facilities, procedures, equipment, etc.) for doing my job. | | 76 | 21 | 2 | 42 |

Staff Comments: See Section 3.1.1

| | | | | | |
|---|---|---|---|---|---|
| 138. We have management support in helping us do our job. | | 86 | 14 | | 42 |

Staff Comments: See Section 3.1.1

| | Response Percentages | | | | |
|---|---|---|---|---|---|
| | SA | A | D | SD | N |
| 139. My concerns related to job responsibility are being addressed. | | 71 | 29 | | 35 |

Staff Comments: See Section 3.1.1

| | | | | | |
|---|---|---|---|---|---|
| 140. I am being kept current (through required reading of LER, plant changes, etc.) on industry events. | | 88 | 12 | | 41 |

Staff Comments: See Sections 4.1, 6.11 and 6.2.7

APPENDIX C

BETA REPORT FINDINGS

This Appendix provides a listing of Findings extracted from the report on "A Review of Current and Projected Expenditures and Manpower Utilization for GPU Nuclear Corporation," conducted by Basic Energy Technology Associates, Inc., (BETA Report) issued on February 28, 1983. Only those findings that relate to the GPUN corporate structure and to the TMI-1 plant are included. Report findings applicable strictly to the Oyster Creek plant of GPUN are not considered.

In the listing that follows, each applicable finding is identified by the same number used in the BETA report and the finding is stated. Each of these findings has been evaluated by the NRC staff evaluation team that prepared Supplement 4 to NUREG-0680. For those findings that could potentially raise a safety or regulatory concern, we have indicated the section in Supplement 4 where the finding is discussed. Those findings that do not potentially raise a safety or regulatory concern are noted to be "Not safety-related" and are not discussed in Supplement 4.

FINDING III-A

The role of the Director, TMI-1 needs to be clarified and strengthened with respect to his over-all site responsibilities.

Staff Comments: See Section 3.1.2

FINDING III-B

The positions for five "engineers" presently reporting to the TMI-1 Manager, Plant Operations should be better defined.

Staff Comments: See Section 3.1.2

FINDING III-C

Maintenance at TMI-1 can improve its support of the plant.

Staff Comments: See Section 5.1.2

FINDING III-D

Major deficiencies in the chemistry program at TMI-1 were identified two years ago. Corrections have been slow.

Staff Comments: See Section 5.2.2

FINDING III-E

The number of different engineering groups at the site is contributing to loss of efficiency.

Staff Comments: See Sections 3.1.2 and 5.1.2.

FINDING III-G-1

The warehouse inventory records have enough nomenclature inaccuracies to degrade efficiency.

Staff Comments: See Section 5.4

FINDING III-G-2

The amount of stock at TMI is excessive.

Staff Comments: Not safety-related

FINDING III G-3

The period of time from preparation of a requisition to delivery of purchased material is too long.

Staff Comments: Not safety-related

FINDING III-F

There are too many instances where radiological controls are not as good as they should be. The work force has not accepted enough of the responsibility for high quality radiological work performance. Excessive generation of radioactive waste is part of these problems.

Staff Comments: See Section 5.3.2

FINDING III-H

There is a need for the TMI Human Resources group to improve further their responsiveness to site needs.

Staff Comments: Not safety-related

FINDING III-I

A review of the number of people assigned to administration work at TMI-1 appears excessive.

Staff Comments: Not safety-related

FINDING V-A

The group presently assigned to Nuclear Assurance located at Reading should be eliminated and the functions reassigned to Parsippany.

Staff Comments: Not safety-related

FINDING V-C-1

There are more Quality Assurance engineers than necessary to carry out the requirements contained in the GPUN Operational Quality Assurance Plan.

Staff Comments: Not safety-related; see Section 3.2.2

FINDING V-C-2

There are too many people assigned to Ops QA for the expected decline in the future workload.

Staff Comments: Not safety-related; see Section 3.2.2

FINDING V-C-3

The Manufacturing Assurance section is larger than is required for known future work.

Staff Comments: Not safety-related; see Section 3.2.2

FINDING V-C-4

There is a risk associated with the new Operational QA Plan.

Staff Comments: Not safety-related

FINDING V-C-5

The TMI-1 Quality Assurance Department creates the illusion in the minds of others that the Department is not supporting the plants.

Staff Comments: Not safety-related; see Section 3.1.1

FINDING V-B-1

There are many training and development courses offered which are useful but not essential.

Staff Comments: Not safety-related; see Section 4.2.

FINDING V-B-2

The headquarters training group is not concentrating enough on coordinating plant training efforts.

Staff Comments: See Section 4.2

FINDING V-B-3

There are inefficiencies in the TMI training effort due to a lack of meaningful scheduling. The Training Department has difficulty in obtaining data to schedule its training.

Staff Comments: See Section 4.2

FINDING V-B-4

There is an overly "understanding" attitude which prevails in the TMI Training Department, especially with respect to operator training.

Staff Comments: See Sections 4.2 and 6.1.1

FINDING V-B-5

There exists a lack of supervision of instructors in the TMI Training Department.

Staff Comments: See Sections 4.2 and 6.1.1

FINDING VI-A

The overall effectiveness of T/F in supporting TMI-1 and Oyster Creek is lacking.

Staff Comments: See Section 5.2.2

FINDING VI-B-2

The Engineering Cost Analysis section is not analyzing costs.

Staff Comments: See Section 5.2.2

FINDING VI-B-3

Drawings have not been revised to show completion of modification work.

Staff Comments: See Section 5.2.2

FINDING VI-B-4

Rework, as measured by the number of Field Change Notices, is excessive.

Staff Comments: See Section 5.2.2

FINDING VI-C

There are too many people assigned to the Director, Licensing & Regulatory Affairs.

Staff Comments: See Section 5.2.2

FINDING VI-D

There is a lack of intimate, day-to-day knowledge of the problems being found at the plants that require engineering support or involvement.

Staff Comments: See Section 5.2.2

FINDING VI-E-1

The Shift Technical Advisor (STA) program at both sites, but particulary Oyster Creek, needs to be reviewed and strengthened.

Staff Comments: See Section 6.1.3

FINDING VI-E-2

The need for a Systems Analysis Director is questionable.

Staff Comments: Not safety-related

FINDING VI-E-3

There is lack of involvement by Technical Functions in the conduct of the Training Program, particularly operator training.

Staff Comments: See Section 5.2.2

FINDING VI-E-4

GPUN's goal to achieve an in-house licensed nuclear design capability may not provide the anticipated advantages.

Staff Comments: Not safety-related

FINDING VI-F-2

The training of project engineers is weak.

Staff Comments: See Section 5.2.2

FINDING VI-F-3

Project engineers do not receive adequate information concerning the progress, cost, and trends in progress and cost for the budget activities for which they were the originating source of authority for the modification or the major O&M project.

Staff Comments: Not safety-related

FINDING VI-G

A separate group at the Director level for Start-up and Test is questionable.

Staff Comments: Not safety-related

FINDING VI-H

Neither the chemistry group in Technical Functions nor the System Laboratory has assumed a leadership role in the TMI-1 or Oyster Creek chemistry improvement programs.

Staff Comments: See Section 5.2.2

FINDING VII-A

The Administrative Division needs to improve its ability to provide a service function and to lessen the perception that it is a control function.

Staff Comments: Not safety-related

FINDING VII-B

The Manager of Management Services has a narrow scope of work assigned.

Staff Comments: Not safety-related

FINDING VII-C

The efforts of the Operations Analysis (Ops Analysis) group within Administration are not effectively channeled.

Staff Comments: Not safety-related

FINDING VII-D

The cost reductions possible with more sophisticated contracting methods are not being achieved.

Staff Comments: Not safety-related

FINDING VII-E

GPUN has no employee who is a medical doctor at headquarters or TMI-1 or Oyster Creek to oversee medical aspects of the GPUN radiological health program. Part-time contract physicians and a contractor are used for these functions.

Staff Comments: Not safety-related

FINDING VII-E-1

Some security administrative functions at TMI-1 and TMI-2 can be combined to save manpower.

Staff Comments: Not safety-related

FINDING VII-E-2

The Response Force capability at TMI-1 and TMI-2 can be considered to be 10 armed guards (each plant will support the other). Because outside support is readily available, a smaller Response Force would meet NRC requirements.

Staff Comments: Not safety-related; see Section 5.4

FINDING VII-E-3

Inadequate engineering and construction support for the TMI-1 and TMI-2 security operations is resulting in the need to substitute guards for security hardware. Such substitutions are expensive.

Staff Comments: Not safety-related; see Section 5.4

FINDING VII-E-4

The TMI-2 entrance to the protected area uses a temporary building and manual search to control entry of personnel. This facility and its operation is inefficient in the use of guard manpower.

Staff Comments: Not safety-related

FINDING VII-E-5

The protected area perimeter alarm system at TMI has an excessive number of alarms.

Staff Comments: See Section 5.4

FINDING VII-E-6

Manpower requirements fluctuate as a result of training requirements, special security assignments and multi-shift operations. Extensive overtime is required to support this fluctuating workload.

Staff Comments: Not safety-related; see Section 5.4

FINDING VII-E-7

Guard protection is being provided to areas that may not require the protection or warrant the expense.

Staff Comments: Not safety-related

FINDING VII-E-8

GPUN has not received adequate support from Vikonics in correcting keycard access system deficiencies.

Staff Comments: Not safety-related; see Section 5.4

FINDING VII-E-9

Approval has been requested to reorganize the security force to establish a Lieutenant position at each site.

Staff Comments: Not safety-related

FINDING VII-E-10

The security operations require extensive overtime.

Staff Comments: Not safety-related

FINDING VIII-1

There is a need to reduce the time it takes to complete a personnel action.

Staff Comments: Not safety-related

FINDING VIII-2

The number of GPUN personnel who have the title of "Manager" or above, is high in comparison to the total number of GPUN employees.

Staff Comments: Not safety-related

FINDING VIII-3

Productivity at the nuclear plant sites is adversely affected by current bargaining unit agreements.

Staff Comments: See Section 3.5.2

FINDING IX-A

Little radiological engineering is performed at Parsippany.

Staff Comments: See Section 5.3.2

FINDING IX-B

GPUN is spending more than it should in dollars and manpower for environmental monitoring at TMI-1 and Oyster Creek.

Staff Comments: Not safety-related

FINDING X-A

The Maintenance and Construction Division in its effort to become established is not capitalizing on the capabilities throughout the Corporation's functional organization.

Staff Comments: Not safety-related

FINDING XI

The number of [Communications Department] people assigned to this function appears excessive.

Staff Comments: Not safety-related

FINDING XII-A

Insufficient or poor supervision is contributing to poor productivity.

Staff Comments: See Section 3.5.2

FINDING XII-B

There is too much paper being generated and distributed throughout the GPUN organization.

Staff Comments: Not safety-related

FINDING XII-C

There is an overall tendency within GPUN to force decision-making up too high in the organization.

Staff Comments: Not safety-related

FINDING XII-D

There appears to be a reluctance within the GPUN system to take action either to improve the performance of poor performers or to terminate their employment.

Staff Comments: See Section 3.5.2

FINDING XII-E

Since the creation of GPUN, too many small groups (cells or staffs) have been formed to carry out functions which should be handled within the normal functioning groups.

Staff Comments: Not safety-related

APPENDIX D

## NRC Staff Evaluation of TMI-1 Operator Attitudes Toward Procedures and Adherence

During the period June 13-17, 1983, the NRC staff conducted an independent survey of operators and shift technical advisors at the TMI-1 plant regarding operator attitudes toward procedures and procedure adherence, and operator opinions regarding management policies relative to procedure adherence. The NRC survey was designed to clarify statements contained in a report by Rohrer, Hibler & Replogle, Inc. (RHR), regarding operator attitudes and opinions, issued on March 15, 1983. The RHR report combined the responses of operators at the Oyster Creek and TMI-1 plants of the General Public Utilities Nuclear Corporation and also included the perceptions of the RHR personnel who conducted the survey. Under these conditions, it was difficult for the staff to specifically ascertain the attitudes and opinions of the TMI-1 operators.

This appendix presents the results of the NRC staff's evaluation. Each question from the RHR survey which pertained to procedures and procedural adherence is quoted and the stated percentage response of the TMI-1 operators to the RHR question is shown. Then, the NRC staff findings, based upon the staff's survey of the same topic are presented. The staff survey was based upon focused, individual interviews with 20 individuals: 11 reactor operators, 8 senior reactor operators (3 of whom are Shift Technical Advisors), and one unlicensed Shift Technical Advisor. The questions and follow-up questions used by the NRC staff are attached at the end of this appendix.

1. RHR Survey

Question 33 - "We have too much training in specific procedures."

Results -

Respondents = 43 9% Agree
91% Disagree

Staff Findings

Our question asked: "In terms of the training you receive on specific procedures, would you say that it is too little, too much, or about right? The question was asked of 16 respondents, of whom only one felt that there was too much training or procedures; five (31%) would like more; six (38%) thought that the amount of training was adequate; and three (1.5%) felt that it was variable - about the right amount on some procedures, particularly APs and EPs, but not enough on OPs and less common EPs.

2. RHR Survey

Question 34 - "We do not have enough training in analyzing plant conditions."

Results -

Respondents = 43 14% Strongly Agree
61% Agree
23% Disagree
2% Strongly Disagree

Staff Findings

Ten (63%) of our 16 respondents felt that the amount of such training is adequate as is; whereas four (25%) felt that there was too little of it; and two (13%) did not directly respond.

3. RHR Survey

Question 98 - "The growing procedural complexity is itself a hazard to safety."

Results -

Respondents = 43

30% Strongly Agree
53% Agree
14% Disagree
2% Strongly Agree

Staff Findings

The wide range of responses to this question may reflect the nature of the question more than anything else. For example, what is the meaning of the term "procedural complexity," and how does it differ from detail - which is asked in question 100? The question as posed, actually tells the operator that complexity is growing. It cannot be determined whether an "Agree" response indicates that the operator believes that procedural complexity is increasing, that (theoretically) such complexity can be a hazard to safety, or both.

After discussing with respondents their definitions of the terms "detail" and "complexity," we asked: "Would you say that a procedure that is too complex or too detailed can be a hazard to safety?

Fifteen of our 20 respondents (75%) felt that, under certain hypothetical circumstances, one or both of these attributes could cause a procedure to be a safety hazard.

Our follow-up probe question dealt with whether any such procedural problems actually existed at TMI-1. The question stated: "Are any of your procedures, either individually or as a group, complex to the point that they may be a hazard to safety?"

Fourteen respondents (70%) felt that none of the procedures in use at TMI-1 were too complex for safety. Of the six respondents who expressed concerns about this issue, one expressed concern about the fact that event-based EPs might require operators to use several procedures at once, thus increasing the chances for error; two thought that some EPs were lengthy

and cumbersome (e.g. Station Blackout and Small Break LOCA); two believed that the required memorization of immediate manual actions coupled with the fact that some EPs had as many as 14 manual actions and lengthy notes, could lead to difficulties; and one expressed concern about STPs (Special Temporary Procedures) which were often handwritten, complex, and difficult to read or follow.

3. RHR Survey

Question 99 - "By and large, procedures are up to date."

Results -
Respondents = 43 2% Strongly Agree
79% Agree
19% Disagree

Staff Findings:

All respondents, without exception, believed that procedures were generally up-to-date. The only ones thought to be less current than others were: (a) those still being changed (e.g. SGTR), or (b) those that had not recently been used due to plant status (e.g. procedures related to the Electrical Distribution System).

4. RHR Survey

Question 100 - "Our procedures are too detailed"

Results -
Respondents = 43 14% Strongly Agree
39% Agree
47% Disagree

Staff Findings

The RHR Report and the survey on which it was based did not define the term "detail." We found that the term had different meanings to different persons,

and that these differences affected replies to this question. We asked respondents to define "detail" and "complexity" and to compare them. Although there were many different definitions of these terms, we can interpret the distinctions made by TMI-1 respondents as follows: Procedural detail refers to the number of steps in a procedure, and the degree of specificity or guidance contained within those steps. Procedural complexity refers to the degree of difficulty, either of the task itself, the coordination required to perform the task (between procedures, systems, and people), or the difficulty in following the procedure to perform the task.

Ten respondents (50%) thought that in general, the amount of detail in procedures was about right. Six (30%) felt that APs and EPs were too detailed. Those procedures cited most often were: Small Break LOCA; Reactor Trip; and Station Blackout with Loss of Diesels. The major criticisms were: too many immediate manual actions (in one case 27), too many notes and cautions in this part of procedure, and steps that were too wordy and could be easily simplified. Other respondents were concerned about too much detail in procedures other than EPs and APs. For example, Surveillance, ISI, STP, OP, and Admin procedures were each judged too detailed by at least one respondent.

5. RHR Survey

Question 101 - "We suffer from informational overload."

Results -

Respondents = 43

23% Strongly Agree
51% Agree
26% Disagree

Staff Findings

We rephrased the RHR statement as follows: "I'd like to ask you a little about the number of procedures that you have to deal with. Do you think that you suffer from informational overload?"

Fifteen out of 20 respondents (75%) believe that information overload is present or is a real possibility. Most of the blame was placed on EPs and particularly the length and number of immediate manual actions that must be memorized (seven individuals commented on this). Four respondents believed that the number of procedures and steps, as well as the burden of memorization was placed upon all licensees by the NRC. Three respondents stated that too much irrelevant information was included in procedures and that this was a particular burden for newly licensed operators.

The term "information overload" is, of course, highly subjective, and several respondents who answered the question affirmatively qualified their responses with phrases such as: "the amount of procedures we have is not more than needed for a plant this size;" "it's not the procedures that are at fault - if we had an incident then we had to write a procedure to cover it - it's the same with new equipment; "there is a lot of information, but EPs and APs are at a measurable level."

6. RHR Survey

Question 102 - "There are so many cumbersome procedures that in practice the GPU Nuclear policy on compliance is disregarded."

Results -

Respondents = 43

5% Strongly Agree
19% Agree
70% Disagree
7% Strongly Disagree

Staff Findings

The fact that responses to this RHR question filled each of the four categories indicates the question may have been misleading. The item asks for a single response to two different thoughts (i.e., "there are so many cumbersome procedures" and "policy on compliance is disregarded"). Thus it is not possible to unambiguously interpret a response to this item.

Our interview question asked: "Do you feel that management's policy on compliance is disregarded in practice?"

One hundred percent of the respondents stated that they were not aware of any incidents in which Management's policy was ever disregarded, although three stated that they thought it could happen inadvertently upon rare occasion, either due to operator error, laziness, or procedural detail or complexity.

7. RHR Survey

Question 103 - "I worry about breaking some regulation without realizing it."

Results -

Respondents = 42

9% Strongly Agree
52% Agree
38% Disagree

Staff Findings

Eleven respondents (55%) were concerned with this issue, eight (40%) were not, and one (an unlicensed STA) felt that it did not apply to him. The division of positive and negative responses was, however, based upon similar philosophical views. Nearly all respondents seemed to feel that the possibility of unintentional violation of regulations (particularly Environmental Tech Specs) was a "way of life" on the job, about which little could be done. The prevailing opinion was that the operator did the best job he could at all times. Those who worried about this issue tended to be CROs with relatively recent licenses (9 of 11). Those who did not worry tended to be SROs with longer experience (6 of 8).

8. RHR Survey

Question 104 - "The compliance to procedures that we are held to by our management is reasonable."

Results -

Respondents = 42

2% Strongly Agree
68% Agree
31% Disagree

Staff Findings

Seventeen of 20 respondents (85%) felt the policy was reasonable. Of the three who were not in complete agreement, all were CROs. One was one of the same individuals who expressed confusion about the changing policies - and thus could not judge it as reasonable or unreasonable. A second was more concerned with some specific procedures than he was with the policy, believing that, under certain circumstances these procedures could not be followed as written. The third individual was "pretty much" in agreement, but expressed concern that management would be harsh on an operator who committed an inadvertent human error.

9. RHR Survey

Question 105 - "The policy on procedural compliance is clearly communicated to us by Management"

Results -

Respondents = 43

9% Strongly Agree
74% Agree
16% Disagree

Staff Findings

Eighteen of 20 respondents (90%) felt that the policy was clearly communicated. Of the two who disagreed, both were CROs who expressed confusion about what they perceived as a changing policy, and about which they were unsure of management's latest position.

10. RHR Survey

Question 106 - "Our organization has too many policies and procedures which interfere with doing good job."

Results -

Respondents = 43

5% Strongly Agree
53% Agree
42% Disagree

Staff Findings

The question as posed seems to be two questions, leading to difficulty in interpretation of answers. The first question posed is: "Our organization has too many policies and procedures." The second is; "the number of policies and/or procedures interferes with doing a good job."

We posed these questions as two follow-up items to the question on information overload.

In response to the question: "Do you think that there are too many procedures and policies?", two respondents blamed policies - one for their variability, and one for too much irrelevant training. Eleven (55%) thought that there were too many procedures (all cited EPs except one who was concerned with the Emergency Plan). Seven (35%) did not think there were too many policies or procedures.

When we asked: "Does the number of them interfere with your ability to do a good job?", four respondents (20%) (of whom one was concerned strictly with the facility's Emergency Plan) said yes, 14 (70%) said no, and two did not provide a direct response.

QUESTIONS ASKED BY NRC OF
A SAMPLE OF TMI-1 LICENSED OPERATORS
AND SHIFT TECHNICAL ADVISORS DURING
WEEK OF JUNE 13, 1983

NOTE Numbers in parentheses refer to the relevant RHR survey question. Words or questions in parenthesis are "probe" questions which were used only in the event of a specific response to a previous question.

QUESTION

OK. Just for our records, could you tell me what position you hold at the plant?

- Are you presently licensed?

- How long have you held your license?

- Do you have any nuclear operating experience prior to coming to TMI?

- (If needed) - Where was that?

QUESTION (RHR-99)

In general, how current, or up-to-date do you feel your plant procedures to be?

- Are some procedures less up-to-date than others?

  (Yes) Which are not current?

  (Yes) In what way are they not current?

  (Yes) Do you know of any steps being taken to bring them up-to-date?

QUESTION

Can you briefly describe management's policy on procedural compliance?

(If unsure of Q, ask: What does the term procedural compliance mean to you?)

(RHR-105)

- Do you think that this policy is clearly communicated by management?

- (No, or partial) In what areas is it lacking?

(RHR-104)

- Do you think this policy is reasonable?

  (No) Why not?

  (No) If you were to recommend a change in management policy on compliance, what would it be?

QUESTION

Is there a management policy on how procedures are to be followed? By that I mean: Procedure in-hand and checked off step-by-step; procedures to be memorized, or any other policies?

  (Yes) Can you describe the policy?

- How well does the policy work?

QUESTION (RHR-102)

Do you feel that management's policy on compliance is disregarded in practice?

  (Yes) Why do you think that is?

- Might there be some aspect of the procedures themselves that might cause disregard for compliance?

  (Yes) What might that be?

  (If needed) Can you show us an example?

QUESTION

Can the safety of the plant be impaired by ever following procedures literally?

(Yes) Can you give any examples?

QUESTION (RHR-100)

Tell me about the amount of detail contained in your procedures. Overall, would you say they have too much detail, too little, or about the right amount?

(If little, or much) - Why do you say that?

(If needed) - Can you show me an example?

- Are some procedures worse than others?

(Yes) Can you tell me which they are?

- Could you show me an example of a procedure that has about the right amount of detail?

QUESTION

When I talk about procedural complexity, what does that mean to you?

- In your opinion, what is the difference between complexity and detail in a procedure?

(If =) So, you would say that complexity and detail mean about the same thing? (Skip to next question)

(If ≠) - In general, then, how would you rate the complexity of your procedures - too complex, overly simplified, or about right?

- Can you give me some examples?

(Ask these only if detail ≠ complexity)

- Are some procedures worse than others in terms of complexity?

  (Yes) Can you identify them?

- Off-hand, can you show me an example of a procedure that has about the right level of complexity?

QUESTION (RHR-98)

Would you say that a procedure that is too complex (or detailed) can be a hazard to safety?

  (Yes) - Why would you say that?

- Are any of your procedures, either individually or as a group, complex to the point that they may be a hazard to safety?

  (Yes) Which ones fit into that category?

  (Yes) What would you do to minimize this complexity?

QUESTION

We've been talking about complexity. How about simplicity? Is it possible for a procedure to be too simplified?

  (Yes) Are any of your procedures too simplified?

  (Yes) Can you give me some examples?

- Would you say that a procedure that is too simple can be a hazard to safety?

  (Yes) Why would you say that?

- Are any of your procedures (either individually or as a group) simplified to the point where you feel that they may be a hazard to safety?

  (Yes) Which ones fit into that category?

  (If given) What would you do to correct that situation?

- Has there been a trend in your procedures? In other words, have they become more complex over time, less complex, or remained about the same in complexity?

QUESTION (RHR-101)

I'd like to ask you a little about the number of procedures that you have to deal with. Do you think that you suffer from information overload?

(Yes) What do you think is most to blame for that problem?

(No) Why do you think some people feel that way - What might they be concerned about?

QUESTION (RHR-106)

Do you think that there are too many procedures and policies?

(Yes) Does the number of them interfere with your ability to do a good job?

(Yes) Is it the procedures that's the problem, the policies, or some combination?

- What can be done to reduce this burden?

QUESTION (RHR-103)

Do you ever worry about breaking some regulation without realizing it?

(Yes) Can you give me some examples?

QUESTION

Can you briefly describe your most recent training on procedures - where it took place, when, and which procedures you trained on?

- How would you evaluate the usefulness of that training?

QUESTION (RHR-33)

In terms of the training you received on specific procedures, would you say that it is too little, too much, or about right?

QUESTION (RHR-34)

On the same scale, how would you evaluate the training you have received in analyzing plant conditions?

QUESTION

Can you describe the system that exists for you to make or recommend changes to procedures?

- Have you ever used the system to institute a procedural change?

- How well or poorly does the system work?

  (Poorly) - Why do you think that is?

  (Poorly) - What might be done to improve it?

- In general, do you have the feeling that management cares about your input on procedures?

QUESTION

You may have heard about the new symptom based EPs that are coming along. Have you had any exposure to them?

- Are there any problems with the EPs which you have been using?

  (Yes) Can you describe these problems?

  (If needed) Can you show us some examples of what you mean?

QUESTION

We've talked about procedures in a general way - and a little about emergency procedures. I'd like you to tell me your opinions about any of the other plant procedures that you use - e.g., systems, general plant, abnormal, etc.

QUESTION

One of the conclusions reached by the RHR Report was that - despite being better prepared for an emergency as a result of changes since the accident, these gains are more than offset by cumbersome procedures and organizational structure.

- What do you think they meant by that?

- Would you agree with that conclusion?

- What should be taking place to improve the situation?