



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

D. Caperton

SEP 26 1983

MEMORANDUM FOR: Darrell G. Eisenhut, Director
Division of Licensing

FROM: Hugh L. Thompson, Jr., Director
Division of Human Factors Safety

SUBJECT: REVIEW OF CONSULTANT REPORTS FOR TMI-1

A Staff Requirement dated June 2, 1983, directed the staff to complete its review of the RHR and BETA reports and to provide any resultant findings to the Appeal Board and to the Commission. An evaluation team composed of representatives from this Division and from Region I has now completed this review and the results have been prepared for publication as Supplement No. 4 to NUREG-0680, "TMI-1 Restart." The final draft of this material was reviewed by DL, ELD and Region I and their comments have been incorporated.

By separate cover, a camera ready copy of the report is being delivered to the TMI-1 Project Manager, J. Van Vliet, for final additions or alterations to conform the report to SER format. It is scheduled for publication and submittal to the Appeal Board and the Commission by September 30, 1983.

My staff (L. Crocker, x24891) is available to assist as necessary for this final stage of the effort.

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ABSTRACT

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) relative to TMI-1 management integrity affecting TMI-1 restart in light of the ongoing investigation of the allegations concerning falsification of leak rate data at Three Mile Island, Unit 2 (TMI-2). The team found no reasons to alter the previous NRC position supporting restart. During the inspection, the licensee offered the team for review reports by two licensee consultants (Rohrer, Hibler & Replogle, Inc. (RHR) and by Basic Energy Technology Associates, Inc. (BETA)), which contained information of potential safety and regulatory significance. After examining each report, 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 two consultant reports relative to their possible impact upon other matters related to TMI-1 restart. A Staff Requirement Memorandum from the Commission's Secretary to the Executive Director for Operations, dated June 2, 1983, directed the NRC staff 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 to perform a detailed review of these reports. Results of that review are presented in this report.

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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 designated portions of the organization, management, training programs, and operational practices at TMI-1 to determine whether we, the NRC staff, could maintain our previous position 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 previous 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 reports by two licensee consultants (Rohrer, Hibler & Replogle, Inc. (RHR) and Basic Energy Technology Associates, Inc. (BETA)), which contained information of potential safety and regulatory significance. After examining each report, the team concluded that the reports did not change its findings regarding management integrity and procedural adherence. (The results are reported in Section 15 of the team's inspection report, Appendix A.) However, prior to the completion of the inspection, the team did not have an opportunity to examine the two consultant reports relative to their 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 original team 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 document.

This report does not discuss the timing of the provision of the two consultant reports to the Commission and to the Appeal Board by the licensee. This question currently is under investigation by the NRC Office of Investigations, as described in a June 22, 1983 memorandum to the NRC Commissioners from the Executive Director for Operations.

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

It is important to emphasize 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, based on its experience and knowledge, perceived as possibly being raised.

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.

1.1 RHR Report

The RHR study, performed during the latter half of 1982, was issued on March 15, 1983. It 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 operator responses and from RHR's 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 by 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.

1.2 BETA Report

The BETA study, performed during the first half of 1982 and updated during the second half of 1982, was issued on February 28, 1983. It 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 operations. Appendix C lists the findings 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.

During the 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 6.

2.0 SUMMARY AND CONCLUSIONS

This report 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 and the TMI-1 and Oyster Creek plants, and to determine areas of concern to the licensed operators at these plants about which the licensee might make improvements, respectively.

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 consultant's reports indicated that they contained information that could be perceived as having safety or regulatory significance and which could have some impact upon previous NRC 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. An evaluation of the effect of the INPO draft findings is included in Section 6.

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 preview 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. Further, 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. 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 could be a bar to TMI-1 restart.

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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 responsible for the operation and management of TMI-1 was discussed and shown in Figures 6-1 and 6-2. Subsequently, an updated description of the organization and structure for the operation and management of TMI-1 was described in Supplement 1 to NUREG-0680 (November 1980) as follows:

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.

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 (73)* and that the new organization was

Numbers in parentheses indicate the RHR survey statements. See Appendix B for operator responses.

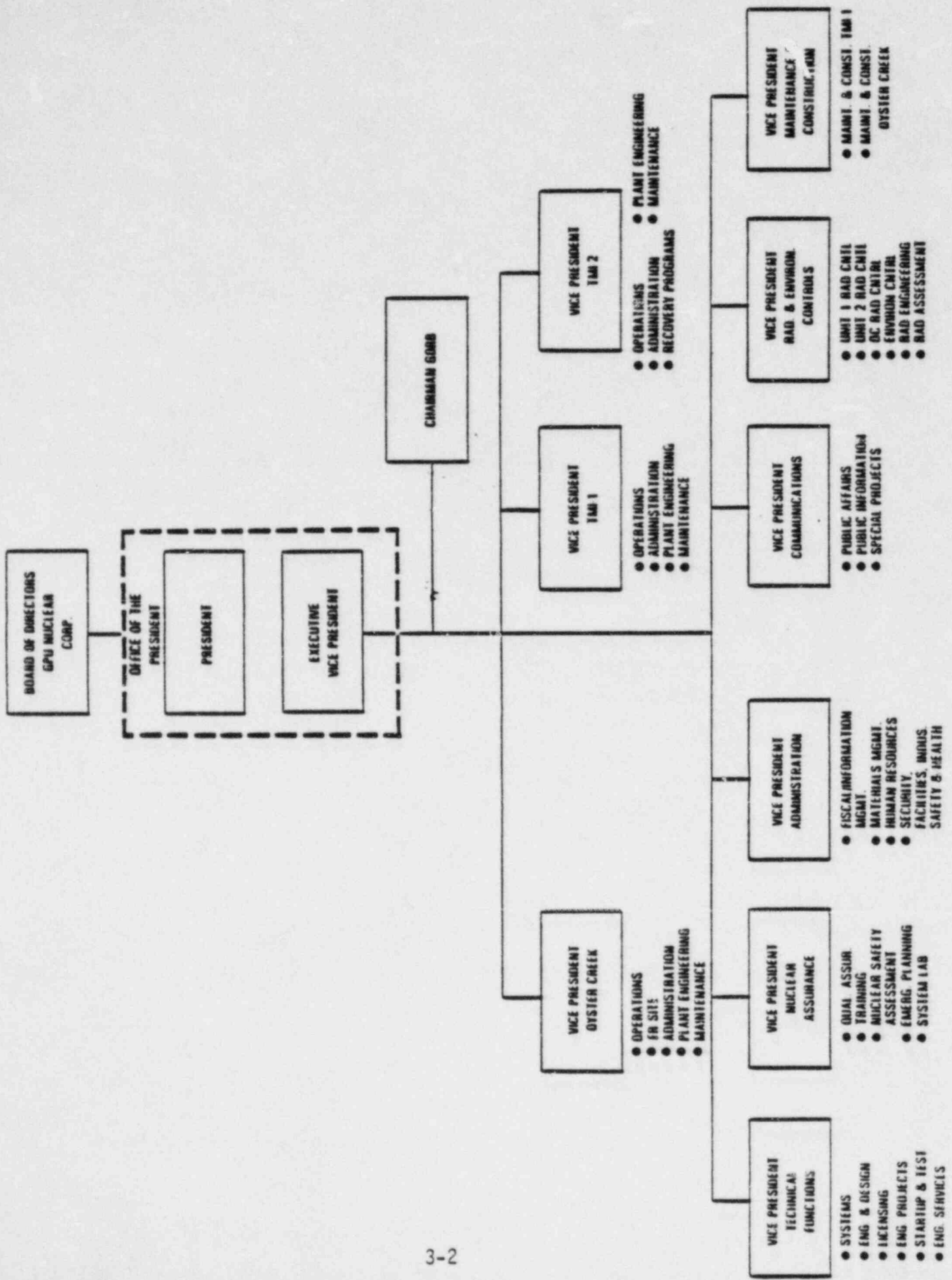


Figure 3-1 GPU Nuclear Corporation

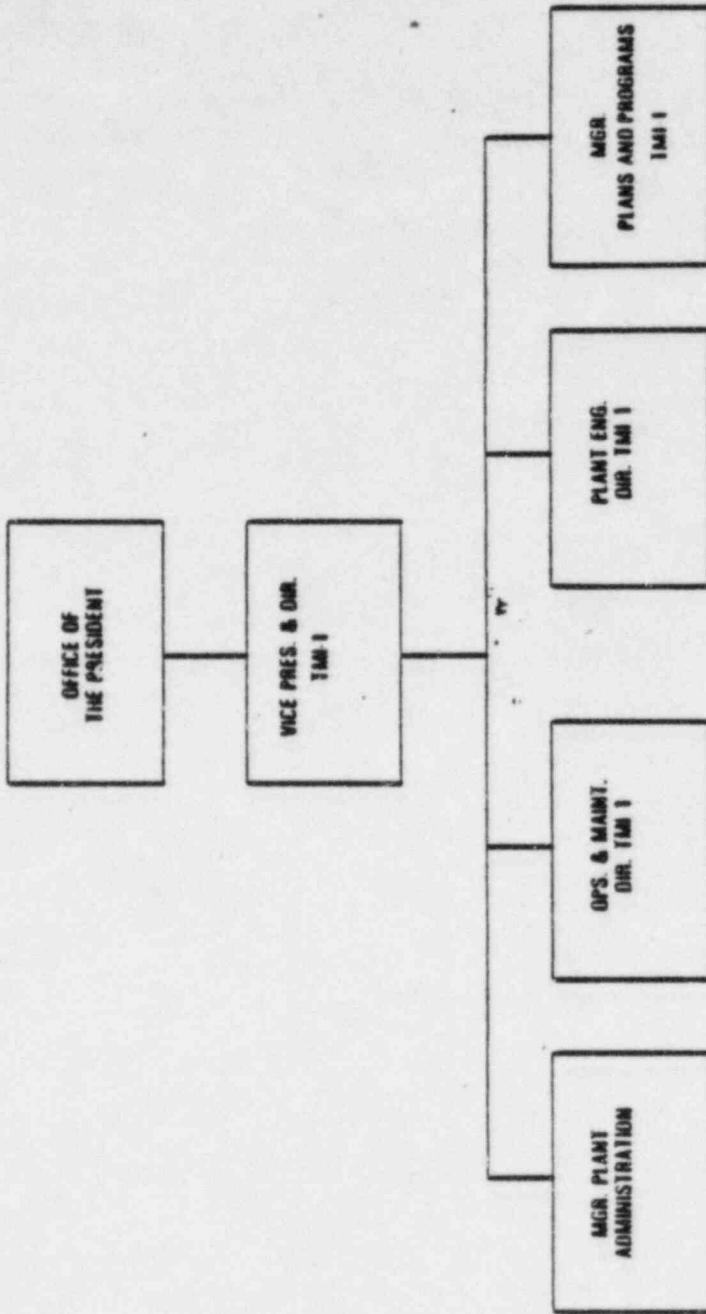


Figure 3-2 TMI-1 Division

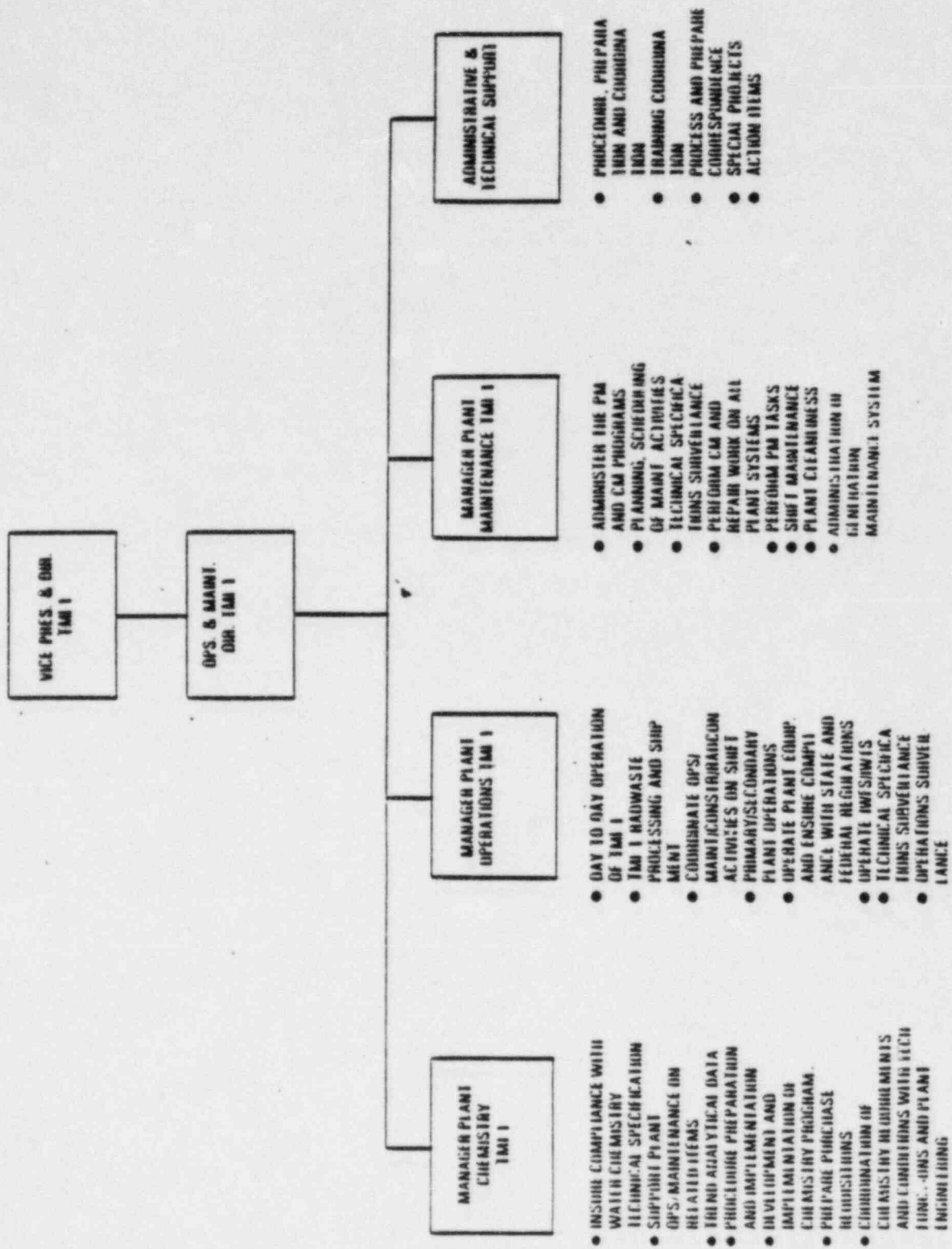


Figure 3-3 Organization responsible for operation and maintenance

designed to promote safer operation (69). However, they were concerned about how well the new organization was working in practice (74) and they felt strongly that the various departments needed to find better ways to work together (77). They felt that the other departments needed more knowledge of plant operations so as to better understand the effects of their actions on operations (93) and they considered that problems would be lessened if there were better coordination among the supervisors (94). In the perception of the operators, the support departments did not have the same sense of urgency as the operations department (95), and personnel in the other departments did not have the good of the whole organization in mind when they went about their daily work (85). To the extent there is a lack of cooperation between departments, the operators blamed themselves as much as they did others (82), and attributed their attitude in part to their lack of knowledge of the roles of the other departments (79 and 90). They felt that they got good cooperation from the other departments when they knew the individuals with whom they were dealing (75), and they expressed a desire to know their counterparts in the other departments better (78). They felt that better management would alleviate problems of cooperation (94). They did not perceive any difficulty with having the necessary authority onsite to handle both routine (72) and emergency (71) actions.

RHR concluded that the reorganization of 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 have all 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 should all 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.

Some initial Vice President/Director interdivisional meetings have been conducted. 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 operators 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 operators. 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, based upon the team's knowledge and experience, 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 perception 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 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 operator 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 (EPs) which are too detailed and/or complex by: (a) instituting Abnormal 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 Section 3.3.1.5 and Appendix D of this report.

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 unambiguously 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. We interviewed approximately 45% of the licensed operators, including 11 ROs and eight SROs (three of whom are STAs), and one unlicensed STA. Auxiliary operators (AOs) were not interviewed because of their non-licensed status and their lower level of familiarity with control room procedures. In addition, the fact that they were not included in the RHR survey would make comparisons difficult. 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 report 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 sincerity, concern, and promise of anonymity. To aid later interpretation of responses, care was taken to make questions free of bias, and uni-dimensional in meaning. 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." 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 could be questioned.

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 (See Appendix D), 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 not supported by our 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 partially 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 policies on procedural compliance are reasonable, and are clearly communicated to the operators.
- Management policies on procedural compliance are 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 emergency or abnormal 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 sufficient 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 operators have sufficient confidence in their procedures, in general, and in their Emergency and Abnormal Procedures, in particular, so as not to delay restart. However, weaknesses were identified in the following two areas (discussed in detail in Appendix D), which should be corrected at the earliest opportunity:

1. The licensee should 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 moved to other sections of the procedure, as appropriate. The licensee should 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 should endeavor to do so.

2. The licensee should 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.

We have discussed these matters with the licensee and, by letter dated September 23, 1983, the licensee has committed to take corrective action as noted. We therefore consider this matter to be resolved.

3.3.2 BETA Report

The BETA report contained no comments, findings or recommendations regarding procedures and procedural adherence other than its finding VI-B-1 regarding the length of time and the difficulty involved in getting Technical Functions Division procedures changed. (See Section 5.2 of this report for discussion of this finding.) 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 operator attitudes toward safety and operator perceptions of management's attitude toward safety.

Regarding operator attitudes, 93% of the TMI-1 operators disagreed with the RHR statement (134) that, "Safety gets too high a priority here" and 79% agreed with the RHR statement (118) that, "The objectives* of GPU Nuclear are valid." However, only a slight majority (56%) agreed with the RHR statement (131) that, "Efficiency of operations should not take a second place to public safety."

As regards their perceptions of management attitude toward safety, 64% of the operators agreed with the RHR statement (132) that, "Top management is more concerned about public safety than it is about generating electricity."

*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 operator perceptions 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 statement (131) 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.

It is apparent from the responses to the other survey statements (134 and 118) that the operators themselves have a positive attitude toward safety. They agree that safety should have a high priority and they agree with the stated objectives of GPUN, which place first priority on the safety of operations. The operators are less certain regarding the relative priorities of top management. Only two-thirds of the operators agreed with the survey statement (132) that top management is more concerned about safety than about generating electricity. However, the survey statement is so phrased that an obvious interpretation of the results is that the one-third of the operators who disagreed with the statement may have perceived top management to be equally concerned with safety and generating electricity.

Our questioning of operators provided no information that indicated operators perceive top management to have a non-positive safety attitude, nor did we uncover any specific examples of top management displaying a non-positive attitude toward safety. We note that in response to survey statement 115, 93% of the operators expressed confidence in their plant management. We consider it unlikely that the operators would express such confidence in their plant management unless they perceived plant management priorities as compatible with their own priorities on all matters, including safety.

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, ¶s 400-401). Since then, our inspectors have not noted any slackening in GPUN management commitment to safety.

We conclude that operator attitudes toward safety are positive and, therefore, are unlikely to adversely affect the proper performance of their jobs. The safety attitude of top management previously was found by the Licensing Board to be acceptable and we have noted no decrease in the GPUN commitment to safety.

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.

The RHR report provided no clear nexus between safety and operator responses to the survey questions regarding supervision and productivity. During our interviews with and observations of the operators, we identified no safety problems or concerns attributable to poor quality of supervision or a lack of operator productivity. We therefore conclude that quality of supervision and operator productivity are not adversely affecting completion of safety-related work.

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 nothing 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, Section 15.1.3.1) and was not examined further during this review. These BETA findings are as follows:

Finding XII-A

Insufficient or poor supervision is contributing to poor productivity.

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.

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 affect 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 Staff Evaluation and 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. Further, based upon our previous review as reported in Appendix A, we conclude that the licensee in fact does take actions to improve the performance of or to terminate poor performers.

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 of safety and 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 use 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 who have had previous operating experience 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 (four) and the Training (three) 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 operator 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 (four) and Training (three) 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.

Based upon our review of the content of the training programs, coupled with personnel interviews, we conclude that none of the training issues raised in the RHR report should affect TMI-1 restart. Further, we conclude that the licensee's proposed corrective actions addressing issues raised in the RHR report are adequate.

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 responsibility; 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 than 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. Their interviews concentrated on eliciting efficiency information rather than safety information, as previously mentioned in the discussion of their findings (Section 4.2.1). Similarly, our review of this matter was limited to interviews with GPUN personnel to determine their perceptions regarding the BETA report findings. 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 Committee is charged with review of licensed and non-licensed operator training programs and it is required to provide both short- and long-range recommendations. The Committee expects to issue its report about October 1, 1983.

In actuality, we know of only two valid measures of the quality of a training program. The first of these involves performance on the NRC licensing examination and the second involves performance on the job after the individual has been licensed. For TMI-1, ten licensed operator trainees took the NRC examination earlier this year and all but one passed. The one who failed had difficulty with the simulator portion of the examination and this individual is now preparing to retake the simulator portion of the examination. The oral/operating examinations were conducted on the B&W simulator and at the TMI-1 plant. Although a non-site reference simulator was used for these examinations, the combined oral/operating examinations did provide a reasonable evaluation of training quality and job performance. Since TMI-1 is not in operation, only limited opportunities are available to evaluate continuing operator job performance. Evaluation of licensed operators, of necessity, is limited to performance on

those plant systems that are in service. However, our interviews with supervisory operations personnel and licensed operators indicated that operator job performance is adequate to the extent that they can satisfactorily operate those plant systems now in use.

We conclude that the training staff is performing adequately and is obtaining credible training results.

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 problem areas:

- 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.
- 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.
- 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, respectively:

- 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.
- Schedule more maintenance work on day shift with increased supervisory, planning and scheduling support.
- Do not assign cognizance of maintenance activities to M&C Division until after the restart of TMI-1.

5.1.2.2 Issue

We consider the issue to be whether safety-related equipment is being properly maintained.

5.1.2.3 Safety/Regulatory Concerns

The safety concern is whether the safety-related equipment is being maintained in such a manner that the operational availability of the equipment is acceptable.

5.1.2.4 GPUN Response

Based on our review of documents and on discussions with various TMI-1 personnel, we determined that GPUN has taken the following actions, respectively, to address the BETA identified problems:

- 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 detected during testing can be immediately corrected by the personnel who performed the maintenance.
- 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.
- The assignment of the maintenance responsibility to M&C Division will not be considered until after TMI-1 restart.

The GPUN response to the first problem area (lack of engineering involvement) does not agree with the BETA recommendation of a cognizant engineer, because GPUN considers that this approach would be too manpower intensive and could adversely affect other higher priority engineering activities. GPUN is evaluating whether this approach would be feasible in the future.

5.1.2.5 Staff Evaluation and Conclusion

We conclude that the second and third problem areas identified by BETA (night shift vs. day shift, and transferring responsibility to the M&C Division) are strictly efficiency issues and raise no safety or regulatory concerns.

We consider the first problem area (maintenance problems not getting solved) to involve a reluctance of GPUN to undertake the design modification process to upgrade and improve equipment design to prevent recurring maintenance work, and not an issue concerning the adequacy of maintenance work. Further, the majority of equipment needing such design modification appears to be non-safety related. These conclusions are based on the following:

- Neither the BETA report nor our discussions with BETA representatives on May 9, 1983 (see Appendix A) produced any examples of safety-related or important to safety equipment problems which were not solved.
- In a May 13, 1983 letter to GPUN, BETA stated that the "point relating to plant maintenance refers to cases where equipment would be properly repaired to solve the immediate, known problem, but would not necessarily be referred to engineering to determine what was causing the problem to occur. This often results in the problem recurring in a relatively short period of time, thus contributing to inefficient use of maintenance effort."
- From October 1981 to March 1983, the NRC staff conducted seven onsite inspections of various aspects of maintenance activities (including specific inspections of steam generator tube leak repairs). No major safety issues were identified by these inspections.
- Failure of a safety-related component must be reported as a Licensee Event Report (LER). LERs are trended by the licensee and are reviewed by the NRC. Multiple failures of a specific safety-related component would be detected by the trending analyses, which then would trigger an engineering evaluation to determine the root cause of the failures. The adequacy of licensee actions to correct problems with safety-related components is reviewed during routine NRC inspection activities and during the annual Systematic Assessment of Licensee Performance (SALP) reviews.

We conclude that the perceived GPUN reluctance to undertake design modifications to reduce recurring non-safety related maintenance work is not a safety issue; rather, it is an efficiency of operation issue.

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. Further, we have not found, during our inspections, any indications that lack of proper maintenance of safety-related equipment was 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 GPUN 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 madeIt 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-day 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 problem 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 was implementing corrective actions 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. We reviewed the draft response and determined that it 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

We perceive the issue to be 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.

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. We reviewed each of these findings 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.

We conclude there are no safety issues with regard to these findings.

*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.

6.0 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.

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, our 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, we expanded our activities to consider also the possible impact of the draft INPO findings. In accordance with the agreement between NRC and INPO, we did not discuss the draft INPO evaluation findings with the INPO evaluation team. Rather, in pursuing the INPO findings, we examined each finding to determine its potential for raising a safety/regulatory concern.

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 our 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

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

finding does not necessarily mean that a violation of an NRC requirement has occurred. We reviewed the draft INPO report to determine if any requirements were violated.

6.1 Organization and Administration

6.1.1 INPO Finding OA.6-1

6.1.1.1 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.

6.1.1.2 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.

6.1.1.3 Evaluation

We 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 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 designated as "controlled copy." This list is to be reviewed and updated quarterly. GPUN actions to ensure that technical manuals are adequately reviewed and controlled are under way. The review of the 60 technical manuals was started in July 1982 and is scheduled for completion by December of 1983.

6.1.1.4 Staff Conclusions

Based on the above evaluation, we conclude:

- (1) GPUN has taken the required actions to assure that vendor manuals are carefully reviewed and properly controlled;
- (2) GPUN's schedule for 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.

Future NRC inspections will assure that:

- (1) The licensee's program is completed as scheduled; and
- (2) The program implementation is adequate to accomplish its stated intent.

6.2 Operations

6.2.1 INPO Finding OP.2-1

6.2.1.1 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.

6.2.1.2 Issue

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

6.2.1.3 Evaluation

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

- Adequacy of shift supervision in the control room and out in the plant;
- Procedure adherence, including operator response to alarms; and
- 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 A0 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 our 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 operators 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 our 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.

6.2.1.4 Staff Conclusion

Shift supervisors are implementing their responsibilities and demonstrate the ability to prioritize their attention. Licensee management has provided controls so as not to overburden the shift supervisors with inordinate amounts of paperwork. No safety concerns or conditions adverse to regulatory requirements were noted during our independent observation.

6.2.2 INPO Finding OP.3-1

Additional emphasis is needed to improve operator response to equipment alarms, particularly those outside the control room. Equipment is sometimes operated with unresolved local alarms.

INPO Recommendations

Emphasize to operators the need for timely and thorough investigation of equipment alarms. Increase supervisory involvement in shift activities to ensure that alarms on operating equipment are minimized.

6.2.2.2 Issue

The regulatory concern is that the finding could imply that alarm response procedures are not being followed. The safety concern is that if numerous alarms for equipment are ignored, safety equipment could be, or could become, incapable of performing its intended safety function.

6.2.2.3 Evaluation

See the discussion under 6.2.1.3, above.

6.2.2.4 Staff Conclusion

Procedures are being implemented, including alarm response procedures. The INPO findings in this area are aimed at achieving a level of performance beyond regulatory requirements. No safety concerns or conditions adverse to regulatory requirements were noted during our independent observation.

6.2.3 INPO Finding OP.3-2

6.2.3.1 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.

6.2.3.2 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.

6.2.3.3 Evaluation

See the discussion under 6.2.1.3, above.

6.2.3.4 Staff Conclusion

No safety concerns or conditions adverse to regulatory requirements were identified. However, our 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.

6.2.4 INPO Finding OP.4-1

6.2.4.1 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.

6.2.4.2 Issue

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

6.2.4.3 Evaluation

We did not evaluate individual knowledge in these areas. However, we did evaluate lesson plans and OJT tasks in these areas and concluded that the training programs do contain adequate fundamentals to enable the operators to operate the diesel generators and respond to electrical distribution transients.

GPUN plans additional training and practical demonstrations regarding diesel generators and auxiliary systems during the next training cycle. In addition, electrical diagram and logic drawings will be included in the operator training program. The initial phase of these training modules will be conducted by November 1983.

We consider that additional training in diesel generators will reinforce those personnel who demonstrated deficiencies during the INPO evaluation. Training in the use of electrical diagram and logic drawings will further improve the ability of operators to analyze unusual electrical transients.

6.2.4.4 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. However, the GPUN response to the INPO findings will improve operator training.

6.2.5 INPO Finding CP.5-1

6.2.5.1 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.

6.2.5.2 Issue

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

6.2.5.3 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.

6.2.5.4 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.

6.3 Maintenance

6.3.1 INPO Finding MA.1-1

6.3.1.1 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 endor 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.

6.3.1.2 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.

6.3.1.3 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.

6.3.1.4 Staff Conclusions

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

6.3.2 INPO Finding MA.3-1

6.3.2.1 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.

6.3.2.2 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.

6.3.2.3 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 that 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.

6.3.2.4 Staff Conclusion

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

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

6.3.3.1 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 procedures 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.

6.3.3.2 Issue

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

6.3.3.3 Evaluation

We 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-TM-82-15, conducted October 7-November 2, 1982, and the INPO Audit.

6.3.3.4 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.

6.4 Technical Support

6.4.1 INPO Finding TS.3-1

6.4.1.1 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.

6.4.1.2 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.

6.4.1.3 Evaluation

We interviewed members of management and the Technical Functions Division 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.

6.4.1.4 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.

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

6.4.2.1 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.

6.4.2.2 Issue

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

6.4.2.3 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. However, we 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.

6.4.2.4 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.

6.4.3 INPO Finding TS.5-1

6.4.3.1 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.

6.4.3.2 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.

6.4.3.3 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, we consider 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.

6.4.3.3 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.

6.4.4 INPO Finding TS.6-1

6.4.4.1 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.

6.4.4.2 Issue

We consider 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.

6.4.4.3 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.

6.4.4.4 Staff Conclusion

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

6.5 Training and Qualification

6.5.1 INPO Finding TQ.3-1

6.5.1.1 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.

6.5.1.2 Issue

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

6.5.1.3 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 following 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.

6.5.1.4 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.

6.5.2 INPO Finding TQ.5-1

6.5.2.1 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.

6.5.2.2 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.

6.5.2.3 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. GPUN continues to train maintenance people one week out of seven. We 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.

6.5.2.4 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. We consider the GPUN response to be reasonable and appropriate.

6.5.3 INPO Finding TQ.5-2

6.5.3.1 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.

6.5.3.2 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.

6.5.3.3 Evaluation

We 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 6.5.2, we have 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.

6.5.3.4 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. We consider the GPUN response to be reasonable and appropriate.

6.5.4 INPO Finding TQ.9-1

6.5.4.1 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.

6.5.4.2 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.

6.5.4.3 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.

6.5.4.4 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.

6.6 Radiological Protection

6.6.1 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

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.

6.6.2 Issue

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

6.6.3 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.

6.6.4 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.

6.7 Chemistry

6.7.1 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 onsite and offsite 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 onsite and offsite 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.

6.7.2 Issue

We perceive the issue to be whether chemistry personnel performing safety-related activities; e.g., radiochemistry, technical specification analyses, etc., have sufficient knowledge to adequately perform their assigned tasks (CY.2-1). The remaining issues are non-safety matters, except for the implied danger to licensee personnel (CY.5-1).

6.7.3 Evaluation

None of the findings appeared to represent violations of NRC requirements. Nevertheless, onsite 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 of the health physics and chemistry training programs [as stated under Order Item 6 (Short-Term) Management Capability and Resources (NUREG-0680, 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.

The remaining two INPO findings relate to laboratory housekeeping and work habits (Findings CY.4-1 and CY.5-1). NRC followup inspection found that although work areas were small and congested, housekeeping practices were acceptable. Dust appeared to be a problem, however, and more frequent filter replacement will be required. Relative to laboratory work habits, which involved eating, drinking and smoking in proximity to hazardous chemicals, NRC inspection determined that this was probably due to the small work space allotted to the chemistry group. The Licensee has plans to enlarge the work area which should alleviate the latter two concerns.

A comprehensive inspection in this area is planned to be conducted prior to TMI-1 restart authorization.

6.7.4 Staff Conclusion

The chemistry program at TMI-1 is under continual review by onsite NRC Radiation Specialists and Resident Inspectors to determine 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.

APPENDIX A

IE INSPECTION REPORT 50-289/83-10

t



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
631 PARK AVENUE
KING OF PRUSSIA, PENNSYLVANIA 19406

MAY 17 1983

Docket No. 50-289

GPU Nuclear Corporation
ATTN: Mr. H. D. Hukill
Vice President and Director of TMI-1
P. O. Box 480
Middletown, Pennsylvania 17057

Gentlemen:

Subject: Inspection No. 50-289/83-10

This refers to the special team inspection conducted by Mr. G. Napuda of this office on April 20-22 and 25-28, 1983 of activities authorized by NRC License No. DPR-50 and to the discussions of our findings held by Mr. D. L. Capton with you and other members of your staff at the conclusion of the inspection. This also refers to meetings held with two of your consulting firms, BETA and RHR, on May 9, and with RHR on May 11, 1983, in furtherance of this inspection effort.

Areas examined during this inspection are described in the NRC Region I Inspection Report which is enclosed with this letter. Within these areas, the inspection consisted of selective examinations of procedures and representative records, discussions with personnel, and observations by the inspectors.

Within the scope of this inspection, no violations were observed. The inspection focused on your policies and practices relative to adherence to procedures and license conditions.

No reply to this letter is required. Your cooperation with us in this matter is appreciated.

Sincerely,

A handwritten signature in black ink, appearing to read "Thomas T. Martin".

Thomas T. Martin, Director
Division of Engineering and
Technical Programs

Enclosure: NRC Region I Inspection Report Number 50-289/83-10

cc w/encl:

R. J. Toole, Operations and Maintenance Director, TMI-1
C. W. Smyth, Supervisor, TMI-1 Licensing
E. G. Wallace, Manager, PWR Licensing
J. B. Liberman, Esquire
G. F. Trowbridge, Esquire
Public Document Room (PDR)
Local Public Document Room (LPDR)
Nuclear Safety Information Center (NSIC)
NRC Resident Inspector
Commonwealth of Pennsylvania
Ms. Mary V. Southard, Co-Chairman, Citizens for a Safe Environment
(Without Report)

bcc w/encl:

Region I Docket Room (with concurrences)
L. Barrett, Deputy Program Director, TMI Program Office
Senior Operations Officer (w/o encls)
Ms. Mary V. Southard, Co-Chairman, Citizens for a Safe Environment
DPRP Section Chief

U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 50-289/83-10

Docket No. 50-289

License No. DPR-50 Category C

Licensee: GPU Nuclear Corporation
P. O. Box 480
Middletown, Pennsylvania 17050

Facility Name: Three Mile Island Nuclear Station, Unit 1

Inspection At: Middletown, Pennsylvania

Inspection Conducted: April 20-22, 25-28, 1983

Inspectors: F. R. Allenspach
F. R. Allenspach, Management Engineer

5/17/83
date

D. L. Capton
D. L. Capton, Chief, Management
Programs Section

5/16/83
date

N. J. Logan
N. J. Logan, Reactor Engineer

5/16/83
date

R. J. Conte for
R. J. Conte Senior Resident
Inspector (TMI-1)

5/16/83
date

L. P. Crocker
L. P. Crocker, Section Leader,
Licensee Qualification Branch

5/17/83
date

G. W. Meyer
G. W. Meyer, Reactor Engineer

5/16/83
date

G. Napuda
G. Napuda, Lead Reactor Engineer

5/16/83
date

L. R. Plisco for
L. R. Plisco, Reactor Engineer

5/16/83
date

E. T. Shaub
E. T. Shaub, Reactor Engineer

5/16/83
date

Approved by: D. L. Capton
D. L. Capton, Chief, Management
Programs Section, Engineering
Programs Branch

5/16/83
date

Inspection Summary: Inspection on April 20-22, and 25-28, 1983 (Inspection Report No. 50-289/83-10)

Areas Inspected: Special announced inspection by regional inspectors, the Senior Resident Inspector and NRR Licensee Qualification Branch engineers. The inspection was held to evaluate the effectiveness of GPU actions to ensure adherence to procedures since issuance of the staff's evaluation (NUREG-0680, Supplement 1, November 1980). The inspection involved 380 inspector-hours onsite during which the following areas were reviewed: (1) the TMI-1 conduct of operations procedures (2) the training program relative to procedural adherence for new employees and the requalification program for existing employees, both licensed and non-licensed, (3) the Operational Quality Assurance program, (4) the TMI-1 audit program, and (5) the disciplinary measures taken by the licensee to enforce its policy of adhering to procedures. The inspectors also reviewed the existing TMI-1, GPU corporate and support organizations to identify individuals who may have been knowledgeable of or party to the alleged falsification of TMI-2 leak rate test data and/or the alleged falsification of records associated with an April, 1978 TMI-2 reactor startup and were now in a position that could impair the safe operation of TMI-1. The inspectors further evaluated TMI-1 management actions taken at TMI-1 to enhance safe plant operation in accordance with the lessons learned as a result of the TMI-2 accident. The inspectors evaluated the role, responsibility and effectiveness of the following positions for adherence to lessons learned criteria: (1) the Shift Technical Advisor for review of procedures and operator adherence to procedures, (2) the Independent Safety Engineering Group (for TMI-1, the Independent On-Site Safety Review Group) for review of procedures and personnel adherence to procedures, and (3) the individuals and groups assigned responsibility for independent review of plant procedures and facility adherence to procedures. Finally, the inspectors reviewed past inspection reports, Licensee Event Reports, SALP reports and INPO evaluations for insight regarding procedure adherence and management issues since issuance of NUREG-0680 in November 1980.

Results: No adverse findings were identified during the inspection and the inspection team found that the licensee's policies and practices relative to adherence to procedures and license conditions continued to meet regulatory requirements.

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ATTACHMENTS

1. Memorandum from William J. Dircks, EDO to Chairman Palladino, NRC.
Subject: Program to Revalidate NRC Staff Position Supporting TMI-1
Restart in Light of Management Integrity, April 26, 1983
2. Pre-accident TMI Organization for Station Operations
3. Position Comparison for Pre- and Post-Accident TMI Organization
4. Position Comparison for Post- and Pre-Accident TMI-1 Organization

DETAILS

1 PERSONS CONTACTED

1.1 DURING ON-SITE INSPECTION

GPU Nuclear Corp. (GPUN)

- *B. Ballard, Sr. - Manager, TMI - Quality Assurance (QA)
Modification/Operations
- R. Coe - Director, Training/Education
- W. Craft - Radiological Assessor
- H. Crawford - Shift Technical Advisor
- P. Christman - Generation Administration Manager
- D. Deiter - Operations QA Monitoring Supervisor
- R. Fenti - Quality Control Manager
- J. Fornicola - Operations QA Manager
- E. Fuhrer - Plant Chemistry Manager
- R. Galviano - Plant Analysis Supervisor
- H. Hansen - TMI-1 Procedure Coordinator
- R. Harper - Corrective Maintenance Manager
- N. Herneisey - Shift Maintenance Supervisor
- W. Heysek - Site Audit Supervisor
- D. Hosking - Operations QA Monitoring Supervisor
- *H. Hukill - Vice President and Director, TMI-1
- R. Hurd - TMI-1 Manager of Safety Review
- C. Incorvati - QA Lead Auditor
- N. Kazanas - Director, Quality Assurance
- *R. Kneif - Manager, Plant Training
- *G. Kuehn - Manager, TMI-1 Radiological Controls
- D. Langan - Operations QA Monitoring Lead
- R. Long - Vice President, Nuclear Assurance
- R. Markowski - Site Audit Manager (Oyster Creek)
- R. Natale - Lead Mechanical Foreman
- M. Nelson - Supervisor, TMI-1 Review Program
- S. Newton - Operator Training Manager
- C. Paczolt - Manufacturing Assurance Manager
- J. Paules - Shift Technical Advisor
- J. Pfadenhaver - Quality Systems Engineer
- C. Rippon - Lead Electrical Foreman
- *M. Ross - Manager, Plant Operations
- D. Shalikashvili - Support Training Manager
- R. Shaw - Manager, Radiological Engineering
- H. Shipman - Operations Engineer
- D. Shovlin - Manager, Plant Maintenance
- *C. Smyth - Supervisor, TMI-1 Licensing Engineer
- W. Stanley - Shift Technical Advisor
- C. Stephenson - TMI-1 Licensing
- *M. Stromberg - Manager, QA Program/Audits
- J. Titus, Jr. - QA Trending Coordinator
- *R. Toole - Operations and Maintenance Director

*Denotes those present at the exit interview conducted on April 28, 1983.

D. Tuttle - Radiological Controls Field Operations Manager
R. Whitesel - Ombudsman and Nuclear Safety Assessment Director
G. Wert - Instrumentation and Control Department Foreman
R. Zechman - Technician Training Manager

The inspectors also held discussions with other licensee and contractor employees, including administrative, engineering, operations, QA, and support personnel.

1.2 SUBSEQUENT TO THE ON-SITE INSPECTION

Subsequent to the on-site inspection, additional inspection team review time was focused on two consultant reports (See Section 15 for details).

Meeting at Bethesda, Maryland on May 9, 1983

Representing the licensee:

R. Arnold - President, GPU Nuclear
W. Bass - Vice President, BETA (Basic Energy Technology Associates, Inc.)
E. Blake - Council to GPU Nuclear
P. D'Arcy - Senior Consultant, RHR (Rohrer, Hibler and Replogle, Inc.)
J. Sauer - Manager, RHR
W. Wegner - President, BETA

Representing the NRC:

F. Allenspach - Management Engineer
H. Bocher - Licensing Qualification Board, Chief, NRR
D. Capton - Chief, Management Programs Section
E. Case - Deputy Director, NRR
L. Crocker - Section Leader, Licensee Qualification Branch
H. Denton - Director, NRR
J. Goldberg - Attorney, ELD
J. Gray - Attorney, ELD
R. Keimig - Project Branch Chief, Region I
G. Meyer - Reactor Engineer
T. Shaub - Reactor Engineer
M. Wagner - Attorney, ELD
D. Ziemann - Assistant Deputy Director, NRR

Meeting at New York, New York on May 11, 1983

Representing the licensee:

P. D'Arcy - Senior Consultant, RHR
J. Sauer - Manager, RHR

Representing the NRC:

L. Crocker - Section Leader, Licensee Qualification Branch
G. Meyer - Reactor Engineer
M. Wagner - Attorney, ELD

PURPOSE AND BACKGROUND

In Supplement No. 2 to NUREG-0680, "TMI-1 Restart," the staff noted that a Department of Justice (DOJ) investigation was then underway into the Hartman allegations concerning the possible falsification of leak rate test data for the Three Mile Island, Unit 2 (TMI-2) reactor coolant system. The staff also stated that following completion of the DOJ investigation, the NRC would complete its investigation of the concerns raised by these allegations. The staff pointed out, however, that there appeared to be no direct connection between the alleged falsification of data and the TMI-2 accident, and that no indication of practices at TMI-1 similar to those alleged at TMI-2 had been identified. The staff concluded that actions taken by the licensee, subsequent to the Hartman allegations, were adequate to address the concerns identified.

In a filing to the Commission on April 18, 1983 ("NRC Staff's Comments on the Analysis of GPU v. B&W Transcript"), the staff stated that it previously had taken the position that the three Partial Initial Decisions by the Atomic Safety and Licensing Board in the TMI-1 restart proceeding provided the basis for the Commission to rescind the TMI-1 shutdown order. The staff further stated that, except for the Hartman allegations concerning falsification of leak rate test data, nothing in the report on the GPU v. B&W record provided a basis for the staff to change its views. Even so, the staff went on to state that the Hartman allegations call into question the competence and integrity of TMI management, and that, therefore, the staff was initiating actions to revalidate its previous position on the management integrity issue in support of TMI-1 restart to ensure that the Hartman allegations do not present health and safety concerns which require resolution prior to restart. Since the DOJ investigation also addressed the Hartman allegation concerning falsification by shift personnel of records associated with an April 1978 reactor startup, this issue was also addressed in the revalidation effort. These actions include an evaluation of the effectiveness of the steps GPU has taken to ensure adherence to station procedures and a review of current TMI-1 personnel and their current responsibilities compared with their responsibilities during the period covered by the Hartman allegations. A memorandum from William J. Dircks, Executive Director of Operations, to Chairman Palladino, dated April 26, 1983 (Attachment 1), described the specific actions the staff was undertaking to perform this revalidation. This report documents the results of this inspection.

3 CONDUCT OF OPERATIONS

3.1 References

- Administrative Procedure (AP) 1029, Conduct of Operations, Revision 9
- Administrative Procedure (AP) 1001G, Procedure Utilization, Revision 4
- Policy Memorandum, P.R. Clark, GPU "Compliance With Operation and Maintenance Procedures for Nuclear Generating Stations," March 7, 1980. (This policy memorandum was issued by P. R. Clark, GPU Executive Vice-President, to senior management re-emphasizing GPU Nuclear Service Corporation's (GPUN) policy of following written, approved procedures for plant operation and maintenance. The memorandum delineated the responsibilities of workers, supervisors, and managers for procedural compliance and required that all company employees, subcontractor management, and subcontractor employees be made aware of and abide by the policy. In addition, the memorandum called for incorporation of the policy into administrative and other appropriate procedures. The applicable procedures, AP 1029, Conduct of Operations, and AP 1001G, Procedure Utilization, are discussed in Section 3.2 of this report. The means by which personnel are made aware of this policy are discussed in Section 4).

3.2 Program Review

GPU Administrative Procedure 1029 (AP 1029), Conduct of Operations, establishes formal guidelines and requirements for the safe and professional conduct of operations at TMI-1. The procedure applies to all personnel who enter the plant. Section 5.0 of AP 1029 states that the primary responsibility of all plant personnel is that they carry out their assigned duties in a safe and responsible manner and that they use approved procedures in order to ensure safe operation of the unit and compliance with the license, technical specifications and rules, regulations and orders of the NRC and other regulatory agencies. Section 5.12, Procedural Compliance, states that strict compliance with approved procedures is absolutely essential for the safe operation of the plant. It also requires that the plant be operated and maintained in accordance with approved written procedures which have been formally issued and distributed for use. Personnel are prohibited from giving directions, guidance, recommendations or clarifications which are in conflict with approved procedures. The responsibility for following procedures is placed on both the supervisor directing the activity and with the individual performing the activity.

AP 1029 also gives guidance to the reactor operator who, because of a conflict, cannot follow a procedure as written. Under these circumstances he is to place the system or component into a stable and safe condition and advise his supervisor of the conflict immediately. Work must not resume until the supervisor resolves the conflict. This administrative procedure gives supervisory personnel the responsibility for indoctrinating subordinates in procedure adherence, ensuring that personnel understand the procedures being used, encouraging positive feedback, and for enforcing compliance. Administrative Procedure 1029 also makes explicit that its guidelines are not intended to restrict personnel from taking immediate actions required to prevent or correct an unsafe situation which could adversely affect the health and safety of the public or of plant personnel, or that could lead to serious equipment or system damage.

Administrative Procedure 1001G, Procedure Utilization, provides guidance for the proper use of written procedures affecting activities at TMI-1. Paragraph 3.1.1 states, "Activities affecting the safety-related and/or environmental impact related functions of structures, systems and components at TMI Unit 1 shall be performed in accordance with written approved procedures." It places the responsibility on the procedure user to ensure that only the latest revision of a procedure is used in the performance of work activities and discusses the methods to accomplish this verification. This procedure also discusses the actions required if the procedure user believes he should not follow the procedure as written. These actions and the actions to be taken in case of an emergency are consistent with AP 1029.

3.3

Findings

AP 1029 which governs the conduct of operations, clearly establishes the rules for adherence to procedures. Both administrative procedures are consistent with each other and adequately discuss the purpose, responsibilities and requirements of procedure adherence.

There were no adverse findings with respect to regulatory requirements.

4 TRAINING OF PERSONNEL

4.1 References

- GPU Nuclear General Employee Training Program
- Policy Memorandum, P. R. Clark, GPU "Compliance with Operation and Maintenance Procedures for Nuclear Generating Stations," March 7, 1980

4.2 Program Review

The inspectors reviewed the licensee's program for General Employee Training (GET), in which all employees and contractor personnel are initially trained in their responsibilities for procedural adherence. The GET retraining program, given annually for all radiation and non-radiation workers, was also reviewed for emphasis on compliance with procedures. The GET program provides training in procedures for the following areas.

- What is a procedure and what is its purpose
- What are the individual's responsibilities for adhering to procedures
- What must be done if a conflict prevents a procedure from being followed
- What methods exist for changing procedures
- How to distinguish a controlled copy of a procedure from an information only copy
- How to verify the current revision of a procedure

Several inspectors attended a GET session as part of the site badging process.

The inspectors also reviewed the licensee's technical training and operator training programs to determine whether procedure adherence was further emphasized during departmental training and qualification. The Chemistry, Radiological Control, and Maintenance (including I&C) Departments discuss procedure compliance in their continuing training programs. With regard to initial licensed operator training, AP 1029, "Conduct of Operations," is included as a Practical Factor in the qualification of senior reactor operators and control room operators. In the licensed operator requalification program the administrative procedures are covered. Also, training on

industry experiences (LER, Unusual Event, etc.) emphasizes those events that were caused by procedure violations and/or inadequate procedures. For auxiliary operators, procedure compliance is covered in their continuing training program.

4.3 Implementation

The inspectors conducted discussions with management, supervisory personnel, and plant workers to determine: (1) the effectiveness of the training administered in the GET program and (2) whether personnel were knowledgeable in the methods used to modify/revise procedures.

In addition, discussions with licensee management and supervision indicated a variety of mechanisms enhancing emphasis on procedural adherence, including:

- pre-job briefings of workers and operators by foremen, to ensure understanding of the procedure to be performed and the expected results;
- departmental meetings every morning; and,
- weekly job critiques by maintenance foremen.

NRC inspectors held discussions with workers and operators from various departments, including licensed and unlicensed operators, radiological control technicians, electricians, mechanics, I&C technicians, utility workers, and contractor personnel concerning procedural compliance.

4.4 Findings

The general attitude of personnel interviewed is positive toward procedural compliance. Senior management emphasizes procedural compliance and this attitude has been communicated through the various levels of management and supervision to the plant worker. Personnel are knowledgeable about their responsibilities in complying with procedures and of the actions required to be taken when a procedure cannot or should not be followed as written. The training on procedural adherence is acceptable. (This issue is further discussed in section 15 of this report.)

There were no adverse findings with respect to regulatory requirements.

5 DISCIPLINARY MEASURES FOR FAILURE TO ADHERE TO PROCEDURES AND POLICIES

5.1 References

- Record of Disciplinary Actions for 1980-83
- Security Incident Reports, Plant Incident Reports, and Radiological Incident Reports Associated with Disciplinary Measures 1979-1983

5.2 Discussion

On a sampling basis, the above-noted references were reviewed to verify that disciplinary measures are being taken by the licensee to enforce its policy of adhering to procedures. Disciplinary measures include: informal counseling (usually by key site managers) and written or oral reprimands; and formal actions that are documented in a Record of Disciplinary Action. These formal actions involve warnings, suspension without pay and discharge. These usually stem from an event or problem.

5.3 Findings

The review found the above measures were applied to bargaining unit, supervisory, and contractor personnel. Counseling and/or verbal or written reprimands are widely used informal disciplinary measures. Based on the sample review, the majority of formal actions resulted in suspensions, although personnel were discharged for knowing and willful violation of procedures or policies.

Management appears firm in its actions and is willing to pursue the full grievance process, despite the cost in time and resources. In addition, the company severely disciplined those who violated the company's drug and alcohol abuse policy (e.g., suspension for possession of alcohol on owner-controlled property). The licensee's disciplinary measures were found to be implemented relative to enforcing personnel compliance with company policy and procedures. (This issue is further discussed in section 15 of this report.)

6 QUALITY ASSURANCE (QA) INSPECTION AND MONITORING OF PROCEDURE COMPLIANCE

6.1 References/Requirements

- 10 CFR 50, Appendix B, Quality Assurance Criteria for Nuclear Power Plants
- Regulatory Guide 1.30/ANSI N45.2.4 - 1972, Quality Assurance Requirements for Inspection and Testing of Instrumentation and Electrical Equipment
- Regulatory Guide 1.33, Rev. 2/ANSI N18.7 - 1976, Quality Assurance Program Requirements (Operations)
- Regulatory Guide 1.58, Rev. 1/ANSI N45.2.6 - 1978, Qualification of Inspection, Examination, and Testing Personnel
- Regulatory Guide 1.116/ANSI N45.2.8 - 1975, Quality Assurance Requirements for Inspection and Testing of Mechanical Equipment

6.2 Program Review

The above documents specify that inspection and monitoring work comply with the following requirements:

- that inspections are performed in accordance with written procedures, by trained personnel independent of the work being inspected and qualified for the applicable inspection
- that administrative procedures provide sufficient guidance to direct the overall inspection effort
- that detailed procedural instructions are used to ensure thorough inspections
- that records exist for the results of the inspection

The inspector reviewed the following procedures to verify that the licensee maintains an administrative system to meet the above requirements:

"Operational Quality Assurance Plan" Revision 0, September 1, 1982

- 6.2 Control of Inspections
- 6.3 QA Monitoring

"TMI Quality Assurance Modification/Operations Procedure Manual"

- 6110-ADM-7201.05, QA Modification/Operations Section Procedure Organization and Responsibility, Rev. 0

- 6110-ADM-7201.06, Vice President/Director's Report and Director QA Section Report, Rev. 0
- 6110-QAP-7201.04, Operations Quality Assurance Organization and Responsibilities, Rev. 0
- 6110-QAP-7202.02, Indoctrination and Certification of QA Mod/Ops Section Monitors, Rev. 0
- 6110-QAP-7210.01, QA Modifications/Operations Section Monitoring Program, Rev. 0
- 6110-QAP-7210.02, QA Modifications/Operations Section Inspection Program, Rev. 0
- 6110-QAP-7214.01, Inspection/Examination/Monitoring/Scheduling and Planning, Rev. 0
- TMI-15-03, Important to Safety Material Non-Conformance Reports, Rev. 1
- TMI-16-02, Important to Safety Quality Deficiency Reports

Inspection and monitoring of procedure compliance at TMI-1 is performed primarily by two site QA sections; Operations Quality Assurance (OQA) conducts monitoring of plant activities such as maintenance, operations, surveillance testing, calibrations, security, radiological control, and chemistry whereas Quality Control (QC) performs inspections of the receipt, maintenance, installation, and modification of equipment. The primary concern of Quality Control (QC) is equipment acceptability, although QC does verify procedure compliance associated with equipment being inspected.

Violations of quality requirements are documented and corrected by means of Material Nonconformance Reports (MNCRs) for equipment and Quality Deficiency Reports (QDRs) for procedure violations. The OQA Section has the close-out responsibility for QDRs, and although any site organization can initiate a QDR, the OQA section follows the QDR until it is resolved. Accordingly, any procedure violations found by QC are written by them on QDRs and then followed by OQA.

6.3 Implementation

The inspector reviewed the following information to verify implementation of the QA program for inspection and monitoring of procedure compliance.

- Organization chart for the OQA Section, which showed 11 people including the OQA Manager
- Organization chart for the QC Section, which showed 15 GPU people including the QC Manager, plus 12 contracted people

- Monitoring Schedules for January, February, and March, 1983
- 35 TMI-1 Quality Assurance Monitor Reports (QAMR's) from 1983
- 1983 Monitor Report Number Log
- 10 Quality Deficiency Reports (QDRs 51-, 52-, 53-, 54-, 72-, 73-, 74-, 76-, 77-, and 82-82)
- 1981, 1982, and 1983 QDR Logs
- Certifications on three monitors, including the Monitor for TMI-1 operations who met the TMI requirement of having been a licensed SRO (Senior Reactor Operator) or of having completed SRO training.
- 1982 and 1983 QAMR Trending Data Logs

In addition, the inspector witnessed the monitoring of liquid penetrant examinations performed on April 22, 1983, under procedure 6110-QAP-7209.02. The monitoring was reported in QA Monitor Report (QAMR) 439-83, April 22, 1983, which the inspector later reviewed.

Further, the inspector reviewed the 1982 TMI QA Trend Analysis of Audit Findings, QDRs and MNCRs, dated April 8, 1983, with respect to QDRs. As presented in the trend analysis, the total QDRs on TMI-1 have decreased from 114 in 1981 to 81 in 1982, a decrease of 29%. Also, the percentage of TMI-1 monitoring reports which resulted in QDRs decreased from 5.3% in 1981 to 3.4% in 1982, a decrease of 36%.

6.4

Findings

The inspector found that the inspection and monitoring of procedure compliance as performed by the OQA and QC sections is effective in identifying and correcting areas where procedures are violated.

There were no adverse findings with respect to regulatory requirements.

7 AUDITS

7.1 References/Requirements

- Operational Quality Assurance Plan (OQAP), Rev. 0 (Sections 1.6, 2.3, 2.4, 5.1 and 9, and Appendix C)
- ANSI N18.7-1976, Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants
- ANSI N45.2.12-1977, Auditing of Quality Assurance Programs for Nuclear Power Plants
- ANSI N45.2.23-1978, Qualification of Quality Assurance Program Audit Personnel for Nuclear Power Plants

7.2 Program Review

The following procedures were reviewed to verify that their implementation provides QA overview with respect to assuring personnel adherence to and compliance with procedures.

- 7-2-01, Indoctrination and Training, Rev. 2
- 7-2-05, QA Program Review, Rev. 0
- 7-2-06, QA Department Annual Program Assessment, Rev. 0
- 7-2-07, Quality Assurance Systems Engineering Program Review/Evaluation, Rev. 0
- 7-7-01, Surveillance of Vendors and Suppliers, Rev. 4
- 7-7-04, Evaluation and Selection of Suppliers (QA), Rev. 4
- 7-18-01 Attachment A, Generic Audit Checklist, Rev. 0
- 7-18-01 Attachment B, Technical Audit Checklist, Rev. 0
- 7-18-02, Quality Assurance Auditor Qualifications, Rev. 4
- 1000-ADM-7218.01, Response to GPUNC Quality Assurance Audits, Rev. 0-00
- 6100-QAP-7218.01, Quality Assurance Audit Program, Rev. 8-00

Also reviewed were the following:

- Audit Matrix, which identified 41 discrete elements (along with 10 CFR 50 Appendix B Criteria) within the Quality Assurance Program and 26 functional areas onsite in which some or all of these elements are performed

- Audit Scope Documents (a sample), each of which addresses a given functional area and identifies the standards, procedures, manuals, commitments, etc. that apply to the quality program elements and activities within that area and are used by auditors to develop specific checklists
- Qualification Records for two auditors and the current staffing level
- Audit Corrective Action System and a sampling of records for the followup of adverse audit findings, including escalation action and provisions
- Long Range Audit Schedule (1979-83)

7.3

Implementation

The Audit Matrix was in the process of further refinement during the course of this inspection so as to identify better those specific activities that are quality program elements. The inspector discussed this ongoing effort with the Supervisor of Site Audits at TMI-1 and with the Manager of Site Audits from Oyster Creek.

The working package for Audit S-TMI-83-03, Drawing Control (an unannounced audit), which utilized approximately ten procedures (established to administratively control this activity) in lieu of checklists, was reviewed for adequacy and comprehensiveness. The checklists for Audits S-TMI-82-16, Plant Operations, and S-TMI-83-04, Training (audit in process), were also reviewed in depth to determine the following.

- that checklists reflected the matrix information and guidance provided by the respective Audit Scope Document
- that checklists were adequate and comprehensive with respect to the functional activity or area addressed and included a characteristic(s) addressing compliance with procedures
- that checklist "working notations" involving unsatisfactory findings, when applicable, were accurately transcribed into the report

The followup and tracking of unsatisfactory audit findings is now entirely computer based. Various printouts were reviewed to determine that a backlog of open findings was not developing, that response and followup were timely, and that adverse findings selected from several audits were included in the data base. Unsatisfactory findings associated with Audits 80-11, Chemistry; 82-11, Information Management; and, 83-03, Drawing Control, were reviewed in depth to determine such things as the adequacy of proposed corrective action(s), completeness of responses, and timeliness of actions.

The review of the long term schedule and other supporting documents and records indicated that each identified functional activity and area had been audited, at least within the established frequency.

During the review of audit schedules, the fact emerged that the licensee had conducted more audits than required by the QA Program commitments in four functional areas, as depicted in the following table.

| <u>Area</u> | <u>Conducted in 1980-82</u> | <u>Scheduled for 1983</u> | <u>Requirement</u> |
|-------------------|---------------------------------|-------------------------------|--------------------|
| Maintenance | 3 | 1 | 1 per 24 mos. |
| Operations | 6 | 1 | 1 per 12 mos. |
| Plant Engineering | 2 | 1 | 1 per 24 mos. |
| Radwaste | 3 | 1 | 1 per 24 mos. |

Additionally, seven unscheduled audits have been conducted since 1980 in areas such as RadCon and followup to NUREG-0600 requirements.

The Supervisor of Site Audits continues to forward to the offsite Manager of Audits a monthly report detailing such items as problem areas, a listing of open findings (including the status of each), and the length of time these findings have been open. Several such reports were reviewed. The inspector also reviewed two Quality Assurance Deficiency Management Escalation Notices from the Site Audit Section, which had been sent to two vice presidents.

7.4

Findings

No adverse issues were identified with respect to regulatory requirements. The inspector determined that the audit program was an effective management tool for identifying program deficiencies. The program also assures that adequate corrective actions are taken in a timely manner. The more important results of this examination are discussed below, including an Inspector Follow Item (IFI) determined as requiring further inspection.

7.4.1

Audit Matrix

Prior to the conclusion of this inspection, the inspector noted that the Audit Matrix had been modified after discussions with the NRC inspector. Such responsiveness and their assignment of offsite assistance to this task demonstrates management willingness to allocate resources for the purpose of program enhancement.

The audit checklists do adequately provide a comprehensive overview of the particular activity program elements. Also, the checklist is formatted to parallel the Audit Matrix and Audit Scope Documents. The use of procedures to conduct a detailed audit of a rather narrow range of activities is an appropriate approach to an area identified as needing increased attention.

The tracking system for followup of open audit findings and corrective actions appears to be effective in ensuring prompt corrective action and there is no large backlog of open items. Long standing items are escalated for management action. Open Audit 80-19 appearing on the Board of Directors' meeting agenda is an instance of corrective action escalation. The use of Quality Assurance Deficiency Management Escalation Notices is an indication of direct accessibility to upper management by QA personnel.

The unscheduled RadCon audit was an investigation requested by the Vice President and Director, TMI-1, indicating the utilization of the QA Department by line management to examine a problem area so that needed corrective actions could be identified and taken.

7.4.2 Drawing Control

A number of unsatisfactory conditions in the drawing control area during Audit 83-03 were identified by the licensee. A review of the findings and proposed corrective actions indicates that the auditee intends to revise the manner in which aperture cards (i.e., microfilm of drawings) and outstanding as-installed information affecting a given card are to be used. The effectiveness of this revised method will be reviewed during a subsequent inspection along with the other corrective actions required as a result of this audit (IFI 289/83-10-01).

8 QUALITY ASSURANCE PROGRAM OVERVIEW

8.1 References/Requirements

- Operational Quality Assurance Plan (OQAP), Rev. 0, (Sections 1.3, 1.4, 1.5, 2.2, 2.3, 2.4, 2.8, 2.9, and Appendix C)
- ANSI N18.7-1976, Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants

8.2 Program Review

The following procedures were reviewed to verify that their implementation provides QA overview with respect to assuring personnel adherence to and compliance with procedures.

- 7-2-MO-001, Vice President's/Director's Report, Rev. 1
- 7-2-MO-002, Quality Assurance Audit/Monitor/Inspect System (QAMIS) Data Acquisition, Rev. 2
- 7-16-MA-001, Supplier Corrective Action Request, Rev. 0
- 7-2-05, QA Program Review, Rev. 0
- 7-2-06, QA Department Annual Program Assessment, Rev. 0
- 7-2-07, Quality Assurance Systems Engineering Program Review/Evaluation, Rev. 0
- Maintenance Department Standing Order No. 14, Corrective Action Systems, Rev. 0
- 1000-ADM-7218.01, Response to GPUNC Quality Assurance Audits, Rev. 0-00
- 6110-ADM-7201.02, Quality Assurance Audit/Monitor/Inspect System (QAMIS) Data Acquisition Procedure, Rev. 0
- 6110-ADM-7201.06, Vice President/Director's Report and Director QA Section Report, Rev. 0

The referenced procedures were also reviewed to verify that:

- the scope and applicability of the QA Program were defined;
- the procedures provided appropriate guidance for their intended use;
- adequate implementation of the procedures would fulfill QA Program requirements and objectives;

- management controls and overview were addressed; and,
- authorities and responsibilities for QA positions were specified.

8.3

Implementation

The following information was reviewed to establish the extent of licensee activity and effort in the areas of corrective action, evaluations, trending, etc.

- Report on 1981 TMI Audit Program, May, 1982
- Radiological Investigative Reports (RIRs) and Radiological Deficiency Reports (RDRs) Monthly Summary of Causes and Status, December-1980 through December-1982
- TMI QA Trend Analysis for 1982 of Audit Findings, QDRs (Quality Deficiency Reports) and MNCRs (Material Nonconformance Reports), April 8, 1983
- Various 1982 monthly reports: Site Audit Supervisor to the QA Audit Manager; QA Audit Manager to the Director of QA; Manager-TMI QA Modifications and Operations to the Director of QA; Director of QA to the Vice President-Nuclear Assurance; and, VP-Nuclear Assurance to the other senior management
- Assessment of the Implementation and Effectiveness of the Quality Assurance Program-1982, Manager-TMI QA Modifications and Operations to the Director of QA, VP-Nuclear Assurance and other senior management
- Quality Assurance Systems Engineering (QASE) Report, Evaluation of Adequacy of Document Reviews by QA/QC
- QASE Report, Evaluation of Plant Use and Effectiveness of QA Monitoring Reports
- QASE Report, Evaluation of Conduct of Operations (AP-1029)
- QASE Report, Evaluation of Propagation and Tracking of Goals and Objectives

The corrective action systems include the following.

- Correction/followup of unsatisfactory audit findings including the Quality Assurance Deficiency Management Escalation Notice
- Material Nonconformance Reports (MNCRs)
- Quality Deficiency Reports (QDRs)

- Radiological Deficiency Reports (RDRs)
- Radiological Investigation Reports (RIRs)
- Supplier Corrective Action Requests (SCARs)
- Various QA summary reports to succeeding higher levels of management

Discussions were held with individuals involved with the analysis, gathering, input, etc. of the data and information discussed in the documents listed above to ascertain the accuracy, reliability and validity of their presentations and conclusions.

Discussions were also held with selected management members to determine if these documents were utilized to better the quality program and promote improved personnel performance.

Additional documents, such as memoranda, meeting minutes and notices, were also reviewed to verify management involvement in the resolution of problems and the actions taken to correct these problems.

Finally, comparisons were made among the above documents, applicable NRC inspection reports, and LERs to assess the effectiveness of these licensee activities as discussed in Section 8.4. (Also see Section 12.)

8.4

Findings

Management involvement in and overview of the QA program has increased over the previously acceptable levels discussed in NRC Inspection Report 289/81-22 and has generally shown consistent improvement, as described in NRC inspection reports from approximately June 1980 to the present.

Management involvement, overview, and the resulting corrective actions continue to be effective with respect to improving the QA program and personnel performance. The more noteworthy areas are specifically discussed below.

The corrective action systems, including followup of unsatisfactory audit findings (see Section 7), and the wide distribution of their respective corrective action requests and reports are timely and appear to be effective. For example, there are steadily decreasing instances of identified procedure problems, particularly of failures to follow established procedures.

The trending analysis performed this year was a distinct improvement over the one completed in October 1982. The fact that positive results from this effort will take time to be realized is well understood by licensee management, who stated their intention to continue such trending. An important missing consideration in the

latest analysis, qualitative designations of unsatisfactory findings, is to be added to the data base for the next trending analysis. A review of the current report indicates decreasing instances of failures to follow procedures and of general procedural problems, as were noted above. (Also see Section 6.3.) Thus management is paying attention to and emphasizing quality program compliance and personnel adherence to established procedures.

The analyses performed by the QA Systems Engineering groups (QASE); the wide distribution of these reports; the awareness of management about report content; and, evidence of post-report quality program re-direction/re-emphasis demonstrate the licensee's continuing efforts in support of senior management's stated pursuit of excellence.

No adverse findings were identified with respect to regulatory requirements.

9 OPERATIONAL SAFETY REVIEW

9.1. References/Requirements

- Technical Specification (TS), Section 6, Administrative Controls
- Regulatory Guide 1.8, Rev. 1-R/ANSI N18.1-1978, Personnel Selection and Training
- Regulatory Guide 1.33, Rev. 2/ANSI N18.7-1976, Quality Assurance Program Requirements (Operation)

9.2 Plant Procedures Review System

9.2.1 Program Review

The inspector reviewed the TMI-1 program for review and approval of plant procedures to determine the effectiveness of the independent review of procedures and procedure changes. The inspector reviewed the following procedures, which establish the TMI-1 procedure review and approval system.

- 1000-ADM-1291.01, GPU Nuclear Safety Review and Approval Procedure, Revision 0, with Review and Approval Matrix
- AP-1001A, Procedure Review and Approval, Revision 2
- AP-1034, Plant Review Group, Revision 2

9.2.2 Implementation

The Review and Approval Matrix of Procedure 1000-ADM-1291.01 provides a detailed listing by procedure type of the organization responsible for the technical review and the organization responsible for the independent review of procedures. The inspector reviewed the Review and Approval Matrix to verify that the Matrix covers the subjects to be reviewed as required by Section 6.5.1 of the Technical Specifications, the independent safety review of procedures as required by Section 6.5.2, and the procedures which must be written, reviewed and approved as required by Section 6.8. Also, this administrative procedure describes the qualification requirements for those individuals performing the reviews, the provisions for cross-disciplinary review, training of reviewers and the requirements for performing the technical review.

AP 1001A defines the authority and responsibility of TMI-1 individuals for ensuring that appropriate reviews and approvals are conducted. The procedure also defines the flow path for the review and approval of procedures.

AP 1034 defines the responsibilities and activities of the Plant Review Group (PRG). The PRG is the responsible TMI-1 group for the independent reviews as defined by the review and approval matrix. AP 1034 defines the composition of the PRG, qualifications and responsibilities of this group, and how they are to conduct their reviews.

The assignment of personnel qualified to conduct the reviews, the qualifications of these individuals and a procedure change request were reviewed.

9.2.3 Findings

The review and approval of procedures is implemented in accordance with regulatory requirements and licensee commitments. Further, the independent review of plant procedures is effectively performed according to the established TMI-1 program.

9.3 Independent Safety Review

9.3.1 Program Review

The independent safety review is performed by the Independent On-Site Safety Review Group (IOSRG). The IOSRG performs a comparable function to that defined by Item I.B.1.2 of the Task Action Plan, NUREG-0660, and by NUREG-0737 for the function of an Independent Safety Engineering Group.

GPU Nuclear Corporate Policy and Procedures Manual Procedure No. 6310-ADM-1010.01 describes the qualification requirements and the review functions of the IOSRG. The IOSRG must consist of the Manager, Safety Review, and a minimum staff of three engineers.

The IOSRG functions on a selective and overview basis to accomplish the following.

- Evaluate procedures important to the safe operation of the unit for technical adequacy and clarity
- Evaluate unit operations from a safety perspective
- Assess unit safety programs
- Assess unit performance regarding conformance to requirements related to safety
- Review any other matter involving safe operation of the nuclear power plant that the Manager, Safety Review, deems appropriate for consideration
- Evaluate the effectiveness of the TMI-1 Quality Assurance Program
- Review Safety Evaluations to determine if an unreviewed safety question or Technical Specification change is involved
- Review all Safety Evaluations involving unreviewed safety questions or Technical Specifications changes and concur with Safety Evaluation conclusion or provide comments for resolution

9.3.2 Implementation

The current composition of the IOSRG is the Manager and four members. The qualifications and training of the current members of the IOSRG were reviewed. The Manager and three members have a bachelor's degree in engineering. The fourth member has about ten years nuclear experience and has held a Senior Reactor Operator license at TMI-2.

The Reviews Item Log Book and the Action Items Log Book which contain items of past and the current activity of the IOSRG were reviewed. Also reviewed was a recent monthly report, that contained a summary of monthly activities, review items opened during the report period, and the activity on open action items. Although located on-site, the IOSRG is independent of the plant staff.

9.3.3 Findings

The independent safety review IOSRG function was found to be established and implemented in accordance with regulatory requirements and licensee commitments. The inspector concluded that the IOSRG has excellent cooperation from plant staff personnel. Senior TMI-1 plant staff personnel consider the IOSRG an asset with respect to identifying plant safety problems and aiding in problem resolution.

There were no adverse findings with respect to regulatory requirements.

10 TMI-1 ORGANIZATION

10.1 References

- Organization chart for the TMI Station as of March 28, 1979
- Organization chart for TMI-1 as of April 25, 1983
- Various personnel records of GPU organizations from March 1979

10.2 Program

The inspectors compared positions occupied by existing personnel at TMI-1 and in GPU management and corporate support roles with positions occupied by these personnel prior to the TMI-2 accident. The reviewers sought to identify anyone who may have been involved in the alleged falsification of leak rate test data prior to the accident at TMI-2 or the alleged improper startup in April 1978 and whose present assignment in the TMI-1 management could raise questions regarding management integrity.

The reviewers did not interview individuals in the TMI-1 organization, nor did they attempt to examine job descriptions to determine precise duties of personnel. Rather, the comparison was based upon the titles of the job positions and the reviewer's understanding of the duties that normally would be assigned to such positions.

10.3 Implementation

There have been many TMI-1 organization changes since the TMI-2 accident. At the time of the accident, TMI Units 1 and 2 were operated by Metropolitan Edison Company (Met Ed), and technical support was provided by the General Public Utilities Service Corporation. Since the accident, a new corporate entity -- General Public Utilities Nuclear Corporation (GPUN) -- was established and given direct responsibility for all GPU nuclear plants: TMI-1, TMI-2 and Oyster Creek. Met Ed is no longer responsible for operation of either TMI unit. At the time of the accident, the two TMI units operated as a station with many shared functions. Since the accident, the two units have been separated such that each is now operated as a separate entity by a separate organization.

The inspectors thus approached the comparison efforts from two standpoints. First, the organization in existence at the time of the accident was examined and the personnel staffing the various positions were identified. Then it was determined if and where these personnel are located in the present TMI-1 plant organization or corporate structure. Second, the present TMI-1 plant organization and corporate support structure was examined to determine the incumbents in each management position, and then checked to see where these individuals were located in the pre-accident organization. In

addition, the inspectors reviewed NRC records of licensed operators to identify those individuals who were licensed on TMI-2 at any time prior to the accident and who now are assigned licensed operator duties on TMI-1 or who are in the TMI-1 management structure.

Throughout, mindful of the Hartman allegations, attention was concentrated on those individuals who likely would have had knowledge of or a vested interest in the alleged leak rate testing irregularity or who might have been involved in the improper startup in April, 1978. The individuals of most interest were the personnel in the TMI-2 operating organization at the time of the accident who currently occupy positions in the TMI-1 operating organization. There are two reasons for this focus. First, the major thrust of the Hartman allegations is limited to leak rate testing on Unit 2 (The Hartman allegations relative to the improper reactor startup involve only three individuals who were also involved in leak rate testing.). Second, as stated earlier in Section 2, the staff had noted in Supplement 2 to NUREG-0680, "TMI-1 Restart," that no indication of practices at Unit 1 similar to those alleged at Unit 2 had been identified. In this connection, it should be noted that the Technical Specification requirements for leak rate testing at TMI-1 were not as restrictive as were the requirements for TMI-2.

A simplified chart of the pre-accident organization for station operations is shown in Attachment 2. At the plant level, in addition to the two Unit Superintendents, were a Superintendent of Maintenance and a Superintendent of Administration. As shown on the chart, the shift supervisors and auxiliary operators were shared by the two units, while the shift foremen and control room operators were assigned to either Unit 1 or Unit 2.

In examining the pre-accident Unit 2 organization and management hierarchy from the level of Supervisor of Operations through the corporate structure, the inspectors found only three individuals who are a part of the GPUN management organization.

1. The Manager of Generation Quality Assurance for Met Ed in the Reading office prior to the accident is presently Manager of Maintenance and Construction Planning for GPUN in Parsippany.
2. The Manager of Generation Administration for Met Ed in the Reading office prior to the accident is presently Manager of Plant Administration at TMI-1.
3. The Supervisor of Operations for Unit 2 at the time of the accident is now an engineer in the TMI-2 Safety Review Group.

All other managers employed at TMI-2 at the time of the accident have either left GPU or are presently assigned duties outside of GPUN. Attachment 3 shows a list that compares the TMI organization at the time of the accident with the current positions for these people.

Of the three individuals mentioned above, the Manager of Generation Administration would have had no responsibility for plant operations and, hence, would not have been involved in any falsification of leak rate test data at TMI-2. His duties were such that he would have had no responsibility for leak rate test data. Similarly, his present duties with TMI-1 do not involve responsibility for these data. The Manager of Generation Quality Assurance could have known of the TMI-2 leak rate testing, although he was so far removed from the site, both organizationally and physically, that such awareness is not likely. As Manager of Maintenance and Construction Planning he is not involved in the day-to-day operations at TMI-1. The third individual, the former Supervisor of Operations for TMI-2, could have been aware of leak rate testing activities. However, he no longer has any connection with TMI-1 so he need not be considered in an evaluation of TMI-1 management concerns, provided he is not later assigned to Unit 1.

Outside the operational chain in the pre-accident plant organization were two additional individuals who are now connected with TMI-1. One, the Superintendent of Maintenance for the TMI station, is now the Manager of Plant Maintenance for TMI-1. The second, who was the Radiation Protection Supervisor, is now the Radiation Training Manager of the Radiation Controls Division. The Superintendent of Maintenance could have been aware of the results of the leak rate testing, but it is not likely that either individual would have been aware of the details regarding leak rate testing activities at TMI-2 since their duties would not have required that they be familiar with such procedures. Further, in their current positions, neither is involved in day-to-day plant operations, although the Manager of Plant Maintenance is probably aware of reported plant leak rates.

Of the seven shift supervisors at TMI-2 when the accident occurred, three have left the company. Of the remaining four, two now occupy positions with the TMI-2 organization and two are connected with TMI-1. One of the latter is now a shift supervisor for TMI-1, while the other is the Manager of Radwaste Operations for TMI-1.

Of the seven shift foremen at TMI-2 when the accident occurred, one has now left the company, three are still with the TMI-2 organization, and three are connected with TMI-1. One of the latter three is now a member of the TMI-1 safety review staff, one is a supervisor of licensed operator training, and the third is now with the Startup and Test group of the GPUN Technical Functions Division.

There were 17 control room operators for TMI-2 at the time of the accident. Of these, 11 have now left the company, five are still assigned to TMI-2 licensed operator duties, and one is a supervisor of non-licensed operator training.

There were 31 shift supervisors, shift foremen, or control room operators for TMI-2 prior to the accident who may have had knowledge of or actually participated in the generation of leak rate test data. Of these, only six are presently connected with TMI-1. Three function in support roles on the GPUN staff, one with the Startup and Test group of the Technical Functions Division, and two with the Training Department. None of them have a direct responsibility for day-to-day plant operations at TMI-1. Accordingly, none are in positions where, by their actions or inactions, they could directly affect public health and safety.

The individual on the TMI-1 safety review staff is neither in a management position nor do his actions have a direct affect on public health and safety. He does review plant safety matters, including the actions of others, to help assure plant safety. These reviews are subjected to independent reviews by other knowledgeable staff members and are given final approval by a senior manager.

The Manager of Radwaste Operations is not in a position to have a direct affect on day-to-day operations, but his actions could affect public health and safety. However, given his position in the plant staff management chain, his actions are subject to three levels of management oversight and review. Further, given the management commitment to follow procedures, it is unlikely that he would take actions not in accordance with approved procedures.

To summarize, of the six individuals currently occupying positions in the TMI-1 operating organization who had previously been at TMI-2, five individuals are not in positions in the current TMI-1 organization or corporate support structure where they would be likely to have a direct impact on day-to-day plant operations or where they could, because of independent reviews and management oversight, adversely affect the public health and safety. The sixth individual, who now is a shift supervisor for TMI-1, could have a direct impact upon plant operations and on the public health and safety. During back shifts, he could be the senior member of management at the plant.

As noted earlier, the inspectors also examined the present TMI-1 organization and corporate support structure. Attachment 4 provides a listing of the positions in the present TMI-1 management structure. Also shown, for each individual in the present organization, is his/her position in the pre-accident structure. In the management chain from the President, GPUN, down through the Director of Operations and Maintenance at TMI-1, only one individual was a member of the pre-accident organization. That individual, the President of GPUN, was Vice President of Generation for the GPU Service Corporation in Parsippany, New Jersey, during the pre-accident period. In that position, he was responsible for providing technical support to the TMI Station, but he had no control over station operations. Thus, it

is not likely that he would have been aware of leak rate testing activities at TMI-2 during that period. The Executive Vice President of GPUN, the Vice President of TMI-1, and the Director of Operations and Maintenance at TMI-1 are all new to the organization. (The Director of Operations and Maintenance, was previously with GPU, but was the Unit Superintendent of the Homer City fossil plant operated by Pennelec.)

Of the six vice presidents in the GPUN corporate support structure, only three were with GPU during the pre-accident period. The Vice President of Technical Functions was the Director of Technical Functions for the GPU Service Corporation; the Vice President of Nuclear Assurance was the Manager of Generation Productivity, GPU Service Corporation; the Vice President of Radiation and Environmental Controls was the Manager of Projects, GPU Service Corporation. Because of their location in Parsippany, New Jersey, and their separation from day-to-day plant operations, it is unlikely that any of these GPU officials would have been aware of TMI-2 leak rate test details during the pre-accident period.

The inspectors concluded that none of the current TMI-1 management staff would have been likely to have had any direct connection with the TMI-2 leak rate testing irregularities. The present Manager of Plant Operations at TMI-1 was the Supervisor of Operations at TMI-1 during the pre-accident period. He may have been aware of leak rate testing difficulties at TMI-2 since he held a dual license for both units. However, he would have had no reason to be involved in the TMI-2 testing activities other than during periods, if any, when he may have been serving as shift supervisor on TMI-2. A similar problem did not exist at TMI-1. (The Technical Specifications were more stringent for TMI-2). The Manager of Plant Administration, and the Director of Plant Engineering were assigned to the Met Ed Reading office at the time of the accident. The Manager of Plans and Programs, and the Supervisor of the Plant Review Group are new to the organization, although the Supervisor of the Plant Review Group had worked for Met Ed as a startup engineer on TMI-1 and TMI-2. (He left in March 1978 and returned in April 1980.) The Manager of Plant Chemistry was a radiation protection and chemistry engineer at TMI-1 prior to the accident. The Manager of Plant Maintenance was the Superintendent of Maintenance for the station prior to the accident, as previously discussed. The Technical Analyst to the TMI-1 Director of Operations and Maintenance was a Technical Analyst at TMI-1 prior to the accident.

The inspectors examined the individuals currently assigned as shift supervisors, shift foremen and control room operators at TMI-1. With the exception of the one shift supervisor noted previously, none of the other individuals are likely to have had a direct connection with the pre-accident leak rate testing at TMI-2.

10.4 Findings

The inspectors concluded that of all the individuals in the present TMI-1 organization and the supporting corporate structure, only one, a shift supervisor, could have had a direct connection with pre-accident leak rate testing at TMI-2 or with the alleged improper TMI-2 startup. Another, the present Manager of Plant Operations for TMI-1, may have been aware of TMI-2 leak rate testing difficulties since he held a dual license for the two units. However, the inspectors consider his connection with TMI-2 to have been limited since he was normally assigned to Unit 1 and it is unlikely that he would have directly participated in leak rate testing at Unit 2.

In view of the changed organizational structure for TMI-1, as compared to the pre-accident organization, the changes in personnel responsible for plant operation, and the emphasis on procedure adherence, as reported elsewhere in this report, the inspectors concluded that problems such as are alleged to have occurred in the leak rate testing or startup at TMI-2 are unlikely to occur at TMI-1. However, any subsequent assignment of individuals to TMI-1 who were members of the pre-accident TMI management or licensed operator group should be made only after the NRC has evaluated the possible impact of such assignment.

There were no adverse findings with respect to regulatory requirements.

11 SHIFT TECHNICAL ADVISOR

11.1 References/Requirements

- Technical Specifications (TS), Table 6.2-1 and Section 6.3.3. (Table 6.2-1 requires a Shift Technical Advisor on shift whenever Tave >200°. Section 6.3.3 states that "the Shift Technical Advisors shall have a bachelor's degree or equivalent in a scientific or engineering discipline with specific training in unit design, response and analysis of transients and accidents.")
- Task Action Plan Item 1.A.1.1, NUREG-0660

11.2 Program Review

The inspectors reviewed GPU Nuclear Standard ES-005, "Shift Technical Advisor Duties and Responsibilities," which describes the STAs primary responsibility to provide technical information to the operating staff when needed. The inspectors noted that the procedure made no specific mention of review of procedures or operator adherence to procedures. In discussions with STAs, they stated that the STAs have no formal role in the review of operator adherence to procedures and that the only formal role that STAs have in the review of procedures is that they perform an independent review for technical and safety adequacy of Temporary Change Notices (TCNs) and Special Operating Procedures when these procedures must be implemented prior to completion of the normal offsite independent review. This independent review is appropriate since the STAs report to the Technical Functions Division, the offsite organization which performs the normal offsite independent review of procedures.

GPU Nuclear Procedure No. TAP-005, "Shift Technical Advisor Selection & Training," defines the qualification requirements for the position of Shift Technical Advisor and outlines the training program for Shift Technical Advisor trainees. At the completion of training, each candidate must demonstrate qualifications by satisfactory completion of a written examination and an oral board review.

The inspectors reviewed the qualification and training records of the six STAs at TMI-1 to verify that the Technical Specification requirement was met.

11.3 Findings

The STA program is established and operating in accordance with regulatory requirements and licensee commitments. The STAs have no formal role in the review of operator adherence to procedures. The STAs are effectively performing their limited role in the review of procedures.

There were no adverse findings with respect to regulatory requirements.

12 PROCEDURE ADHERENCE AND MANAGEMENT ISSUES

12.1 References

- NRC Inspection Report Findings for 1980, 1981, 1982, and 1983
- Licensee Event Reports (LER) and revisions thereto for 1980, 1981, 1982, and 1983 (LER Nos. 80-01 through 80-19; 81-01 through 81-07; 82-01 through 82-15; and 83-01 through 83-11)
- NRC Systematic Assessment of Licensee Performance (SALP) dated May 4, 1981 and associated letter from B. Grier, NRC, to N. Mosley, NRC, memorandum, dated June 24, 1981 for the period April 1, 1980 to March 31, 1981
- Institute of Nuclear Power Operations (INPO) Evaluation Report, dated October 1981, for Three Mile Island Nuclear Power Station - Unit 1 and associated status reports from R. Arnold, GPU, to E. Wilkinson, INPO, dated June 3, 1982 and from R. Arnold to A. Tollison, INPO, dated April 1, 1983
- NRC SALP dated December 10, 1982 and associated letter from R. Haynes, NRC, to R. Arnold, GPUN, dated January 20, 1983 for the period October 1, 1981 to September 30, 1982

12.2 Discussion

The references cited were sampled for insight regarding procedure adherence and management issues.

Four major NRC inspections were conducted in 1979 and 1980. The reports resulting from these inspections are:

- NRC Investigation into the Accident at Three Mile Island, Unit 2 (50-320/79-10);
- Near Term Operating License Review (50-289/80-19);
- NRC Performance Appraisal Branch Review (50-289/80-21); and
- NRC Health Physics Evaluation (including Emergency Preparedness) (50-289/80-22).

An evaluation of these reviews was documented in NUREG-0680 (Supplement 1), "TMI-1 Restart Evaluation Report." The key issues identified in these reports are noted below.

- Organization delineation and definition
- Safety review activities

- Training program development and delineation, especially in the nonlicensed areas
- Procedures development and implementation throughout various divisions, and especially radiological control practices

A Systematic Assessment of Licensee Performance (SALP) was conducted in May 1981, for the period April 1, 1980 to March 31, 1981; it basically reiterated the findings noted above.

Also during July and August 1981, the Institute of Nuclear Power Operations (INPO) conducted a management review. The issues of this review common to those noted above were in the nonlicensed training area (specifically in middle management training), in radiological control practices, and in implementation of document controls.

A second NRC SALP was conducted in December 1982, for the period October 1, 1981 to September 30, 1982. Overall, the report was positive about organization and program implementation. The issues common to others noted above were in the control of high radiation areas and implementation of document controls.

The nature of NRC inspections at TMI-1 have changed since mid-1981. Prior to this time (but after the TMI-2 accident in March 1979), programmatic reviews were predominant and were usually performed by inspection teams. They were conducted to assure that the licensee's programs in various functional areas were consistent with regulatory requirements for carrying out the responsibilities of managing an operating reactor facility. Several implementation inspections were conducted by the resident staff during this period to ensure that the licensee was meeting NRC requirements on a daily basis.

With programmatic deficiencies identified, and in the process of being corrected by the licensee, NRC emphasis shifted to inspections of the manner in which the programs were being implemented (i.e., to policy and procedure adherence) from mid-1981 to the present. Regional and resident inspector reviews focused on the licensee's procedure implementation, especially in the verification of restart design changes and modifications.

12.3

Findings

A review of licensee event reports (LERs) indicated that some of the LERs were clearly attributable to licensee personnel failure to follow procedures, to personnel errors, and to procedural inadequacies. The inspector did not consider these LERs to be unusual or indicative of an adverse trend or symptom.

The total number of violations, on a yearly basis, declined. Some inspector findings were clearly attributable to failure to follow procedures, to personnel error, and to procedure inadequacy. These were not considered to be unusual or indicative of an adverse trend

or symptomatic of a problem. Of the numerous inspection findings identified in the special reviews conducted in 1979 and 1980 for the TMI-1 Restart Hearing, only one remains open for NRC followup inspection. This finding relates to hot functional testing, which is not currently scheduled until June 1983. For all others, NRC followup inspections have confirmed completion of licensee action and programs consistent with industry standards and NRC regulatory requirements.

The key issues identified during these inspections, which include the review of LERs, and their resolutions are consistent with the findings of the SALP and INPO reports.

In summary, procedure adherence, procedure adequacy and personnel error problems have occurred and can be expected in the future. Overall, plant personnel do appear to have a high regard for procedure adherence, considering the number of action items implemented at the plant on a daily basis, and licensee management appears to be willing to identify and correct procedure inadequacies and personnel errors.

(This issue is further discussed in Section 15 of this report.)

13 TMI MANAGEMENT INITIATIVES

13.1 Off Shift Tour Program

13.1.1 Program Review

The Off Shift Tour Program was established in a January 20, 1981, memorandum by the Vice President, TMI-1, as "a means to measure and observe what is going on in the plant with the goal of upgrading (TMI-1) performance by on-the-spot observation by senior management." The program is not required by formal regulatory requirements but represents part of the management controls used by the licensee to oversee plant operations. Specifically, the Off Shift Tour Program requires a two-hour inspection each week by designated management personnel during an evening shift, a midnight shift and a weekend shift (a total of three tours per week). The tour reports document the time of the tour, the areas inspected, and any problems or comments noted. They are distributed to TMI-1 senior management. The tours are performed by managers from departments other than operations and maintenance, such as engineering, training, quality assurance, and independent safety review.

The inspector reviewed six memoranda from the Vice President, TMI-1, issued between January 20, 1981, and October 12, 1982, that updated the Off Shift Tour Program. In addition, the inspector discussed the program and its intent with the Vice President and Director, TMI-1.

13.1.2 Implementation

The inspector reviewed 13 Off Shift Tour Reports from 1983 to verify that the program was being implemented on a continuing basis and in accordance with the established guidelines. Further, the inspector verified that when problems or comments were made in the reports, an individual was assigned to resolve them. In addition, the inspector selected five problems identified in the Off Shift Tour Reports (three concerning hardware/equipment and two concerning procedures) and physically verified that the identified problems had been satisfactorily corrected.

13.1.3 Findings

The inspector found that the Off Shift Tour Program is being effectively implemented and that it is achieving its intended objective of overseeing plant operation during back shift and weekend hours.

13.2 Management/Employee Interaction

Discussions with the Director of TMI-1 were held on April 26, 1983, regarding upper management communications with employees with respect to the established policies and procedural compliance. The Director

of TMI-1 stated that he personally holds a private dialog lasting approximately two hours in his office with each operator on an annual basis. He also stated that approximately one half hour is spent on procedural compliance. He also stated that he is completely committed to the procedures and policy goals established by the company to assure safety first. He emphasized that procedural compliance at TMI-1 is a solid commitment and stated that this is strongly conveyed to the individual operators in these meetings as well as to other staff in other meetings. He further stated that he has 321 people on his plant staff and has talked to every individual, stressing these policies and goals.

The Director stated that initiatives are underway by vice presidents of other departments involved with TMI-1 to convey to their departments the overall company policies, goals and objectives. He further stated that managers will meet six times a year with employees in training to reinforce their commitments to the established policies and goals.

13.3 Accessibility to Upper Management

Discussions with licensee management resulted in repeated statements by them that an "Open Door" policy exists for any employee that desires to bring a concern to the attention of his/her immediate supervisor. The prerogative also exists for an employee to seek resolution at succeeding higher management levels until satisfaction is achieved. (The ombudsman feature is discussed in Section 13.4.) The inspectors confirmed this statement of policy during discussions with various first and second line supervisors.

The awareness and occasional use of this avenue was discussed with employees contacted during the course of the inspection. No unresolved safety concern was brought to the attention of the inspectors.

Four major methods (see Section 8.3) exist for documenting unsatisfactory activities or conditions and for bringing them to the attention of QA/QC and management. The use of the Material Nonconformance Report (MNCR) and the Quality Deficiency Report (QDR) has been expanded so that all personnel can now initiate either of these reports, part of the corrective action systems (see Sections 8.3 and 6.2). The Quality Assurance Deficiency Management Escalation Notice has been established to bring problems and unresolved issues to the attention of upper management. Instances of the use of this notice are discussed in Section 7.4. The last is the use of QA summary reports that summarize and draw attention to unsatisfactory conditions and which identify responsible groups and problem types (see Section 8.3). Examples are the Quality Assurance Deficiency Summary and the Quality Assurance Activities Summary. An instance of a problem area brought to the attention of the Board of Directors is noted in Section 8.3.

The inspector determined that avenues of accessibility to upper management do exist and there is verified evidence of their use.

13.4 Ombudsman

The licensee has established a program that makes available to employees an independent person located offsite and readily accessible via telephone to whom they can go in confidence about perceived safety or quality problems. The Ombudsman functions to investigate employee concerns about plant safety or quality. The Ombudsman provides every employee a confidential outlet to assure that their concerns are properly handled if the employee's normal management channels are considered to be unresponsive or ineffective. The inspector's discussions with the Ombudsman identified no complaints from employees regarding procedures or ineffectiveness of the procedures program at TMI-1.

The Ombudsman stated that he had received only one complaint in the last two years at TMI-1 and that it had been investigated and satisfactorily resolved. Discussions with several persons at TMI-1 about this low frequency of use indicated that the openness of normal management channels for resolution of employee concerns minimized the employees' need to use the Ombudsman.

Employees are informed about the Ombudsman program annually as part of the General Employee Training (GET) program. The inspectors witnessed GET and actual discussions being conducted with employees about the Ombudsman.

13.5 Radiological Assessor

13.5.1 References

-- GPU Nuclear Corporate Radiation Protection Plan 1000-PLN-4010.10, Revision 0

13.5.2 Program Review

The licensee's Radiation Protection Plan requires the radiological control program to be assessed on a continuous basis by the Radiological Assessor, who reports to the Vice-President of Radiological and Environmental Controls and is responsible for providing senior management with a continuing assessment of all aspects of the radiological controls program. The Radiological Assessor's reviews include, but are not limited to, radioactive waste generation, disposal, and shipping; radiological control training; control of internal and external exposure; radioactive material and contamination control; and the implementation of the ALARA program. All relevant departments and contractor operations are included in the Assessor's review.

13.5.3 Implementation

The inspectors discussed the radiological assessment program with the Assessor to determine how he implements the program. The Assessor spends approximately 40% of his time in the plant observing routine and nonroutine plant operations and checking radiological control practices, including posting, housekeeping, and adherence to Radiation Work Permits.

In addition, the inspectors reviewed and discussed several Radiological Assessment Reports with the Assessor to evaluate findings and ensure that corrective action was taken as necessary. Although the Assessor does not use a formal corrective action system, the findings are discussed at length with senior management and corrective action is evaluated by the Assessor during subsequent plant tours.

13.5.4 Findings

The Radiological Assessor provides senior management with an additional and effective overview of the implementation of the radiological controls program.

13.6 Radiological Deficiency Reports and Radiological Investigation Reports

13.6.1 References

- RCP 1798, Radiological Deficiency Reporting, Revision 3
- RCP 1696, Radiological Investigations, Revision 3

13.6.2 Program Review

The Radiological Deficiency Report (RDR) has been developed to identify radiological control deficiencies, in addition to radiological engineer tours, radiological assessment tours, quality assurance monitoring and audits of the radiological protection program. RDRs may be initiated by any individual who observes a deviation from good radiological practices. These reports are evaluated by Radiological Engineering for corrective action as necessary.

If there is a radiological incident, an investigation is conducted to determine the cause(s) of the incident and the corrective actions and program improvements required, if necessary. A Radiological Incident Report (RIR) is issued in this circumstance.

13.6.3 Implementation

The inspectors reviewed the Radiological Deficiency Reports (RDR) and Radiological Incident Reports (RIR) issued for 1982 and 1983 to determine whether the systems were being used as a vehicle to report

radiological deficiencies and to investigate incidents. Further, the inspectors reviewed the Radiological Engineer's evaluations associated with RDRs and RIRs, including the suggested and actual corrective action, investigation critiques, and final disposition of the RIRs and RDRs.

The inspectors reviewed the RDR status log and RIR log to verify that timely corrective action is taken and that RDRs and RIRs are tracked until completion of the required corrective action.

On a monthly basis RDRs and RIRs are evaluated by the Radiological Engineers to (1) assign a category and cause code, and (2) determine if any trends are developing. These evaluations are then incorporated into the Monthly Radiological Control Status Report that is distributed to senior management. The inspectors discussed the evaluation and trending process of RIRs and RDRs with the Manager of Radiological Engineering.

13.6.4 Findings

The Radiological Deficiency Reports and Radiological Investigation Reports with associated critiques are being used as an effective management tool to assess procedural compliance with the radiological controls program.

13.7 Radiological Engineer Tours and Audits

13.7.1 References

- GPUN Corporation Radiation Protection Plan, 1000-PLN-4010.01, Revision 0
- Radiological Control Procedure 1652, Internal Audits, Revision 2

13.7.2 Program Review

As an integral part of the radiological management controls, Radiological Engineering performs monthly inspection tours of the radiological work areas within the plant to assess the following areas: compliance by radiological control technicians and radiation workers; establishment and posting of radiological areas; areas or situations of ALARA concern; and, possible improvements in radiological control procedures or practices. The Radiological Engineers conducts internal audits to evaluate compliance with the Radiation Protection Plan as required by Procedure 1652.

13.7.3 Implementation

The inspectors reviewed the Surveillance Inspection Reports generated for the 13 tours completed to date in 1983 and spot checked several of the 182 reports generated in 1982, to verify that the tours/inspections were being implemented. Further, the inspectors reviewed

the reports to assess the findings and to ensure that corrective actions were completed as necessary. In addition, the inspectors discussed the tour program with the Manager of Radiological Engineering to determine tour scheduling, personnel involvement, and corrective action tracking and trending.

13.7.4 Findings

The Radiological Engineer's tours are being adequately implemented and provide an effective vehicle to oversee radiological control procedural and program adherence. However, due to the current workload on steam generator repairs, the Radiological Engineers are not performing audits but are substituting additional surveillances of routine activities. This item was identified by the licensee QA monitoring activity, and licensee management stated that this internal audit program will be further developed and implemented when the current workload is reduced.

No adverse findings with respect to regulatory requirements were identified.

13.8 Plant Event and Incident Reporting

13.8.1 References

- Administrative Procedure (AP) 1029, Conduct of Operations, Revision 9
- Administrative Procedure (AP) 1044, Event Review and Reporting Requirements, Revision 9

13.8.2 Program Review

The inspector reviewed the plant administrative systems for event/incident review and reporting to determine whether the documented incidents reflected a poor attitude towards proper plant operation or procedure compliance. Two administrative systems exist at TMI-1 for event/incident review and reporting: (1) Plant Incident/Reports, which are used to convey "Lessons Learned" from operational events to applicable site personnel, and (2) Potentially Reportable Event Forms, which control the licensee review of events to determine whether the events are reportable to various federal and state agencies. The two systems are separate, though related, and an event can be written in both a Plant Incident Report and a Potentially Reportable Event, or in one or the other. The Plant Incident Reports are described in AP 1029, while the Potentially Reportable Event Forms are described in AP 1044.

The inspector reviewed AP 1029 and AP 1044 and discussed the event review/reporting systems with the Operation and Maintenance Director, the Manager, TMI Quality Assurance Mod/Ops, and the Supervisor, TMI-1 Review Program to verify that the event review/reporting systems were being consistently applied.

13.8.3 Implementation

The inspector reviewed approximately 60 Potentially Reportable Event Forms from 1982 and 1983, along with the associated Procedure Review Group (PRG) Event Review Forms. The inspector reviewed the corrective actions to verify that the actions were appropriate. The inspector noted no unusual trends in the number of reports or the severity of the events.

The inspector reviewed 17 Plant Incident Reports from 1981 through 1983 and noted an increase in the number of Plant Incident Reports which had been written in 1983. In discussions with the Operations and Maintenance Director, he stated that plant management has made a concerted effort to increase the awareness of the plant staff to potential problems during operation. He further stated that the Plant Incident Report has therefore been increasingly utilized to document operational events for operating experience feedback to personnel.

13.8.4 Findings

The inspector found no adverse issues with respect to regulatory requirements. The inspector concluded that event review and reporting systems are being properly used and that the documented events did not reveal a poor attitude toward plant operation and procedure compliance.

13.9 Consultant Studies for Licensee

13.9.1 References

- Basic Energy Technology Associates. "A Review of Current and Projected Expenditures and Manpower Utilization for GPU Nuclear Corporation," February 28, 1983
- RHR Consultation. "Priority Concerns of Licensed Nuclear Operators at TMI and Oyster Creek and Suggested Action Steps," March 15, 1983

13.9.2 Discussion

In 1982 the licensee commissioned two consultants to review various aspects of the organization and its effectiveness from the viewpoint of its personnel. One consultant reviewed the current organization to identify areas where efficiency could be improved from a cost-effectiveness and manpower utilization standpoint. The other was to

assess the attitudes of licensed operators, identifying and ranking their important issues and recommending actions to improve their attitudes and, therefore, their morale. This review included individual and group interviews and a customized survey which was administered to a group of these licensed operators. However, this latter report was written such that in certain respects it was difficult to separate which operator views originated at which plant since the opinion survey was conducted at both TMI-1 and Oyster Creek.

Both reports identified various areas where improvements should be made and recommended specific actions to be taken. (For more discussion concerning these two reports, see Section 15.) In general, the more significant deficient areas have previously been identified by NRC in SALP reports and by INPO in evaluation reports. The licensee currently has the consultants' recommendations under consideration. Some have been evaluated, with responses in preparation, while others are in the process of being evaluated. Licensee actions in evaluating and implementing those recommendations which have the potential for affecting the operation of the facility will be monitored by resident and regional inspectors to determine their effectiveness. (IFI 289/83-10-02.)

13.10 Overall Conclusions Regarding TMI Management Initiatives

Management initiatives observed during the inspection are positive and indicate a desire by management to operate TMI-1 safely. These initiatives show a willingness to provide for independent and objective reviews of performance.

This is especially demonstrated by the licensee's initiative to commission independent consultants to review the organization and solicit the views of employees at all levels as to how the current organization could be improved for the betterment of all personnel and the organization as a whole. This positive initiative is encouraged for all licensees by NRC and reflects favorably on licensee management.

14

SITE MEETINGS

Licensee management was informed of the scope and purpose of the inspection on April 20, 1983, at the entrance interview conducted at TMI-1.

The preliminary findings of this inspection were discussed with licensee representatives periodically during the inspection and in a meeting with licensee management on April 22, 1983.

An exit interview was conducted at TMI-1 on April 28, 1983, at which time the findings of the inspection were presented. (See Section 1 for a list of attendees.)

15. REVIEW OF CONSULTANT REPORTS: BETA MANPOWER UTILIZATION STUDY AND RHR OPERATOR OPINION SURVEY.

Subsequent to the site inspection, additional inspection team reviews of the two consultant reports were conducted to determine whether the results of these reports conflicted with the inspection team's on-site findings. The team's review of the two reports was limited to items relating to management integrity and adherence to station procedures as affected by the Hartman allegations.

A meeting was held on May 9, 1983, in Bethesda, Maryland, at which team members and other NRC representatives met with cognizant members of the two consultant firms, as well as licensee senior management, to discuss the team questions concerning the consultant reports. The consultants presented their views and perspectives better to characterize the documented results.

The team's review of the two reports and the team's understanding of the information gathered at the meeting are discussed in paragraphs that follow.

15.1 Basic Energy Technology Associates, Inc. (BETA)

15.1.1 BETA Persons Contacted

The following BETA personnel were contacted by team members on May 9, 1983, in Bethesda, Maryland.

W. Bass, Vice President, BETA, Inc.

W. Wegner, President, BETA, Inc.

15.1.2 Reference

-- A Review Of Current And Projected Expenditures And Manpower Utilization For GPU Nuclear Corporation, February 28, 1983, conducted by Basic Energy Technology Associates, Inc., Arlington, Virginia

-- BETA letter of explanation, dated May 13, 1983

15.1.3 Discussion

The BETA report was a study assessing the manpower utilization, including efficiency of the GPUN organization, excluding TMI-2. The BETA personnel have extensive nuclear experience from supervising the naval nuclear program and use, as a basis for their findings, a standard of "excellence" as opposed to an industry standard or regulatory requirement. The one-year study identified 85 findings and 156 recommendations for improvement of manpower utilization. The 145 page report details the findings and makes recommendations to improve the GPUN organization.

The inspectors' initial review of the BETA study identified specific findings which raised questions in some areas that were inspected. After detailed review and evaluation of the entire report, taken in proper context, the following conclusions were reached by the team with respect to those questions raised by the report.

15.1.3.1 BETA 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.... There is an administrative procedure in existence which covers the termination of a GPUN employee for poor performance. It is not clear that people are willing to follow it."

Based on our discussions with the consultants and our analysis of the report, it was determined that this comment applied to poorly motivated employees whose productivity was less than expected rather than to a problem of employees failing to follow directions. As previously discussed in this report (paragraph 5), the licensee has used disciplinary measures ranging from counseling of employees to termination to enforce its stated policy of adhering to procedures. Although room for improvement in this respect may exist, these actions taken by the licensee to enforce policy/procedure compliance indicate that management is serious regarding adherence to this policy.

15.1.3.2 BETA 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."

Based on our discussions with the consultants and our analysis of the report, it was determined that the first part of this comment is based on a standard of "excellence" and the second part refers to self motivation of workers in the implementation of high quality radiological controls in carrying out their work. BETA's discussion of this finding states, "TMI-1 has reached a state where few of its radiological deficiencies are of enough significance to be noted by NRC inspectors. TMI-1 has reached the level where it can be called average in comparison with other utilities in performance of the radiological control program." The BETA report also states, "management support for a strong radiological control program continues to be apparent not just in the words used, but in the allocation of money and manpower."

As described earlier in this NRC report (Section 13), there are several mechanisms which identify deficiencies or necessary improvements in the radiological control program, i.e, Radiological Assessor, Radiological Engineer Tours, and the Radiological Deficiency and Investigation Reports (RDRs & RIRs). From this standpoint BETA's finding does not change the inspection team's conclusions.

15.1.4 Findings

The inspection team's analysis of the BETA report does not change the conclusions stated in Section 16.

15.2 Rohrer - Hibler - Replogle, Inc. (RHR)

15.2.1 RHR Persons Contacted

The following RHR personnel were contacted by members of the inspection team on May 9, 1983, in Bethesda, Maryland, and on May 11, 1983, at the RHR office in New York, New York. The visit to the RHR office was conducted to review specific data available there and to differentiate that data collected at TMI-1 from that collected from Oyster Creek.

P. F. D'Arcy, Ph.D., Licensed Psychologist

J. R. Sauer, Ph.D., Manager, N.Y. Office

15.2.2 Reference

-- Priority Concerns of Licensed Nuclear Operators at TMI[-1] and Oyster Creek and Suggested Action Steps, Final Report of RHR Consultation with GPU Nuclear Management, March 15, 1983

-- RHR letter of explanation, dated May 13, 1983

15.2.3 Discussion

Based on review of the RHR report and supporting data and discussions with the authors, the inspectors concluded that the following restrict the extent to which the consultant's report can be used as part of this inspection.

1. The opinion survey and the discussions with operators, on which the report is based, were intended as an initial step in an extended consultant evaluation process. The purpose of the survey and the discussions with licensee employees was to identify the strongly held opinions, beliefs, and frustrations of the operators. One of the authors estimated that the work completed so far represented ten percent of the planned effort.

The survey was conducted more as a pilot study as opposed to a fully scientific study from which supportable conclusions could be reached. For example, there was little attempt to pretest the validity or reliability of the questions and no attempt was made to check the consistency of any one person's answers.

2. The consultant who was primarily responsible for developing, administering, and analyzing the survey had little prior experience in the nuclear industry (his only prior nuclear industry experience was psychological testing of management personnel for possible employment with licensees). The consultant stated that he did not fully understand some of the terminology in the survey until after it was developed and was being administered; for example, he made no distinction with regard to "procedures" because he was not aware of the different kinds of procedures, e.g., administrative, safety-related operations procedures, non-safety-related operating and maintenance procedures.
3. The survey had many potentially misleading and confusing questions, such as "Efficiency of operations should not take a second place to public safety." (On first reading the statement is not clear whether or not public safety or station operations should be more important.)
4. Consistent with the intent of determining strong opinions, the survey allowed only the following answers:
 - Strongly agree
 - Agree
 - Disagree
 - Strongly disagree
 - Does not apply

Since there was not a neutral or a "no opinion" answer available, the "agree" and "disagree" answers may have represented confusion or lack of a firm opinion. It was also noted that some operators did not respond to all questions.

In spite of the inspectors' concerns regarding the basic validity of the survey information, the inspectors searched for those survey questions that appeared to be relevant to the inspection's mission. Those relevant survey questions which produced definite agreement or disagreement at TMI-1 were then evaluated. (The inspection team defined definite agreement on any question as a mean between 1.00 and 2.25 when each "strongly agree" answer is assigned a value of 1, "agree" = 2, "disagree" = 3, "strongly disagree" = 4 and definite disagreement as a mean between 2.75 and 4.0.)

The following are the survey questions considered:

- There are so many cumbersome procedures that in practice the GPU Nuclear policy on compliance is disregarded. (disagree)
- The policy on procedural compliance is clearly communicated to us by management. (agree)

- I have confidence in our plant management. (agree)
- Supervision of operators is too lax. (disagree)
- The supervisors in this organization allow too many infringements of company rules to go by unnoticed. (disagree)
- I understand my job responsibilities and they have been made clear to me. (agree)
- We have management support in helping us do our job. (agree)

The above survey questions supported the previous inspection findings. However, the following statements in the RHR report did raise concerns about procedural adherence and management integrity at TMI-1. The report states, "Verbatim compliance leads to covert noncompliance when due to waning condition of equipment, procedures are in the minds of operators, frequently inappropriate." It also states, "Foremen are said to push their operators to keep things moving and this requires deviating from written procedures."

One of the consultants stated that these statements were applicable only to Oyster Creek and that he had become aware of these issues during discussions with operators at Oyster Creek. The inspectors reviewed an interim report (from the period when TMI-1 interviews were completed, but Oyster Creek interviews were still in process) and noted that the above statements were not included.

(At the request of the staff, the licensee and RHR have agreed to make available to the staff the underlying data from which it can be determined which statements apply to which facility. The licensee has further agreed to make public that data which the staff deems necessary to understand these statements.)

15.2.4 Findings

The operator opinions that definitely agreed or disagreed with the survey questions were analyzed and found to support the inspection findings. The opinion survey questions that resulted in less than definite agreement or disagreement were not analyzed because it could not be determined whether the result represented an actual lack of a consensus, confusion with the question, or the lack of definite opinions by the operators who responded.

The report, including the consultant's interpretation of operator discussions, was reviewed in light of the inspection team's on-site findings and did not alter the inspection team's findings.

15.3 Conclusions

The BETA study on manpower utilization presented areas for improvement within the GPU Nuclear organization, including TMI-1, which did not alter the inspection's findings on management integrity and procedure adherence.

The RHR study on the opinions of operators presented the operators' responses to an opinion survey and the results of group discussions. The operator opinions that either definitely agreed or disagreed with the survey statements were analyzed and found to be consistent with the inspection's findings on management integrity and procedure adherence.

In summary, when the inspection team's findings from the BETA and RHR reports were integrated with the onsite inspection findings, the team's findings regarding management integrity and procedure adherence were not changed.

REPORT CONCLUSIONS

Based on the findings of this inspection and program review, on a sampling of internal audit results, and on a review of consultant studies of the licensee's organization and efficiency, the inspection team concludes:

- That the licensee's policies and practices related to adherence to procedures and license conditions, as reflected in its management organization, procedures, training, reviews and commitment to safety and quality are acceptable and do support the restart of TMI-1.
- 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 the restart of Unit 1.
- Management initiatives observed during the inspection were found to be positive toward safety and reflected a desire and commitment to operate TMI-1 safely.



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

ATTACHMENT 1

April 26, 1983

MEMORANDUM FOR: Chairman Palladino

FROM: William J. Dircks
Executive Director for Operations

SUBJECT: PROGRAM TO REVALIDATE NRC STAFF POSITION SUPPORTING
TMI-1 RESTART IN LIGHT OF MANAGEMENT INTEGRITY

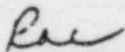
On April 18, 1983, the staff filed its comments on the analysis of the GPU V. B&W transcript as it affects the TMI-1 Restart hearing. In that filing, we stated that the staff is initiating actions to revalidate the staff position, supporting TMI-1 restart, on the management integrity issue. Your memorandum of April 22, 1983, requested an explanation of revalidation and details of this effort.


In the staff's comments on the immediate effectiveness of the Licensing Board's partial initial decisions (PIDs) on management and cheating issues, the staff stated its position that those PIDs removed the management concerns which formed part of the basis for the Commission's immediately effective shutdown order for TMI-1. The open issue of the Hartman allegations concerning the falsification of leak rate data could possibly affect the staff's position on management integrity. Because the Department of Justice (DOJ) investigation into this matter is not yet complete, and, by agreement with DOJ, further NRC investigation is not appropriate at this time, the staff is taking interim actions to ensure that this one open issue does not affect the validity of the staff's position on management integrity. Thus, by stating that the staff is taking actions to "revalidate" the NRC staff position on management integrity, the staff means that the actions it is taking are designed to ensure that, should TMI-1 be permitted to restart before completion of the DOJ investigation into the Hartman allegations, the above-stated staff position on management integrity would remain valid.

This revalidation effort consists of an inspection and review program, jointly developed by NRR and Region I, as outlined in the enclosure. This inspection and review effort is now underway and we anticipate completion by May 6, 1983. We do not plan to conduct any interviews with TMI-1 personnel unless we have obtained clearance for such interviews from the Department of Justice.

CONTACT:
L. P. Crocker, NRR 492-4891
T. T. Martin, Region I 488-1280

This activity may have an effect on other NRR review efforts. In particular, it may have an impact on the Salem Task Force review and on the Human Factors Program Plan expedited schedules. In addition, staff personnel involved in this revalidation program will also be providing input for the staff's answer to the recent motion by the Aamodts to reopen the TMI-1 restart proceeding.


(Signed) William J. Dircks

 William J. Dircks
Executive Director for Operations

Enclosure: as stated

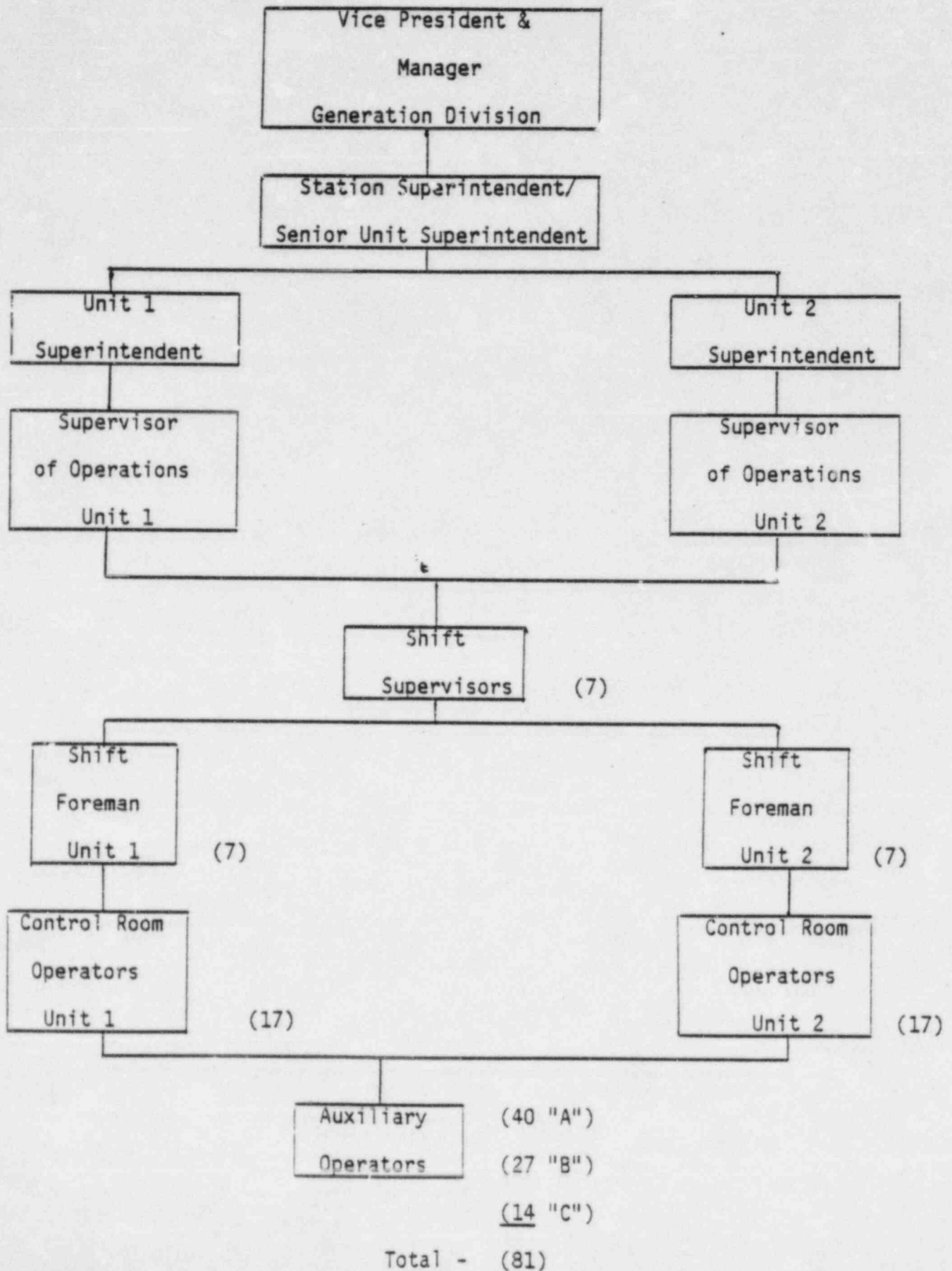
cc: Commissioner Gilinsky
Commissioner Ahearne
Commissioner Roberts
Commissioner Asselstine
SECY
OPE
OGC

ENCLOSURE

INSPECTION AND REVIEW PROGRAM OUTLINE TMI RESTART MANAGEMENT INTEGRITY ISSUE

1. NRR and Region I will conduct a combined review to evaluate the effectiveness of GPU actions to ensure adherence to procedures since issuance of the staff's evaluation (NUREG-0680, Supplement 1, November 1980). This review will include the following:
 - a. Review the TMI-1 Conduct of Operations Manual for clarity of its intended purpose in establishing rules for adherence to procedures. (Region I)
 - b. Review the training program for new employees and the re-qualification program for existing employees, both licensed and non-licensed, for emphasis on adherence to procedures in both safety and non-safety areas. (Region I)
 - c. Review the Operational Quality Assurance program for emphasis on procedure adherence. (Region I)
 - d. Review the TMI-1 audit program as it relates to verification of compliance with procedures. (Region I)
 - e. Review the disciplinary measures taken by the licensee to enforce its policy of adhering to procedures. (Region I)
2. Review of existing personnel at TMI-1 and in the GPU corporate management and support structure vis a vis their positions prior to the TMI-2 accident. (NRR)
3. Evaluate the effectiveness of actions taken at TMI-1 to enhance safe plant operation in accordance with the lessons learned as a result of the TMI-2 accident, including:
 - a. Evaluate the role/responsibility and effectiveness of the Shift Technical Advisor for review of procedures and operator adherence to procedures. (NRR)
 - b. Evaluate the role/responsibility and effectiveness of the Independent Safety Engineering Group (for TMI-1, the Independent On-Site Safety Review Group, IOSRG) for review of procedures and personnel adherence to procedures. (NRR)
 - c. Evaluate the role/responsibility and effectiveness of the individuals/groups assigned responsibility for independent review of plant procedures and facility adherence to procedures. (NRR)
4. Review past inspection reports, Licensee Event Reports, SALP reports and INPO evaluations for insight regarding procedure adherence and management issues since above cited staff's safety evaluation, November 1980.

PRE-ACCIDENT TMI ORGANIZATION FOR STATION OPERATIONS



ATTACHMENT 3

POSITION COMPARISON FOR PRE- AND POST-ACCIDENT TMI ORGANIZATION

Position - 3/28/79

Position - 4/25/83

Vice President & Manager
Generation Division

Vice President - Pennelec

Manager - Generation QA

Manager, Maintenance &
Construction Planning - GPUN

Supervisor - Training

Manager Tech. Training - GPUN

TMI QC Supervisor

Gone

Manager - Generation Operations

Gone

Manager - Generation Maintenance

Manager - Generation Maintenance,
Met Ed, fossil only

Manager - Generation Engineering

Manager - Generation Engineering,
Met Ed, fossil only

Manager - Generation Administration,
Met Ed, Reading

Manager - Plant Administration,
TMI-1

Station Superintendent

Met Ed - Director Special
Projects, fossil only

Unit 1 Superintendent

Gone

Unit 2 Superintendent

Gone

Unit 1 Tech Analyst

Supervisor - Maint. Planning,
TMI-1

Unit 1 Tech Analyst

Tech Analyst - Opns. & Maint.
Directorate, TMI-1

Unit 2 Tech Analyst

Supervisor - Planning, Maint.
& Const. Division, GPUN

Unit 2 Tech Analyst

Tech Analyst - Startup & Test
Tech Functions Div., GPUN

Position - 3/28/79

Supervisor of Operations, Unit 1

Operations Engr., Unit 1

Operations Engr., Unit 1

Operations Engr., Unit 1

Supervisor of Operations, Unit 2

Operations Engr., Unit 2

Operations Engr., Unit 2

Shift Supervisors (7)
(Dual licensed)

Shift Foremen, Unit 1 (7)

Shift Foremen, Unit 2 (7)

Position - 4/25/83

Manager, Plant Operations, TMI-1

Operations Engr., TMI-1

Operations Engr., TMI-1

Operations Engr., TMI-1

Engr., TMI-2 Safety Review Group

Mech. Engr., TMI-2 Plant
Engineering

Operations Engr., TMI-2

1. Gone
2. Manager, Plant Opns., TMI-2
3. Shift Supervisor, TMI-1
4. Manager, Radwaste Opns.,
TMI-2
5. Manager, Radwaste Opns.,
TMI-1
6. Gone
7. Gone

1. Shift Supervisor, TMI-1
2. Ops. Radcon Monitoring
Supervisor, QA
3. Gone
4. Gone
5. Shift Supervisor, TMI-1
6. Shift Foreman, TMI-2
7. Shift Supervisor, TMI-1

1. Safety Review Staff, TMI-1
2. Radwaste Support Mgr., TMI-2
3. Foreman, Radwaste Opns.,
TMI-2
4. Gone
5. Supervisor, Licensed
Operator Training
6. Operations Engr., TMI-2
7. Startup & Test, Tech Functions
Division, GPUN

Position - 3/28/79

Control Room Operators,
Unit 1 (17)

Control Room Operators,
Unit 2 (17)

Supt. of Tech. Services, Unit 1

Supt. of Tech. Services, Unit 2

Supt. of Maintenance

Position - 4/25/83

1. Shift Foreman, TMI-1
2. CRO, TMI-1
3. Shift Supervisor, TMI-1
4. CRO, TMI-1
5. CRO, TMI-1
6. CRO, TMI-1
7. Gone
8. Gone
9. Shift Foreman, TMI-1
10. Gone
11. QA Monitor
12. Shift Foreman, TMI-1
13. Gone
14. Shift Supervisor, TMI-1
15. CRO, TMI-1
16. Shift Foreman, TMI-1
17. Gone

1. CRO, TMI-2
2. Gone
3. Gone
4. Shift Foreman, TMI-2
5. Gone
6. Gone
7. Supervisor, Non-Licensed
Operator Training
8. Gone
9. Gone
10. CRO, TMI-2
11. CRO, TMI-2
12. Gone
13. Gone
14. Gone
15. Shift Supervisor, TMI-2
16. Gone
17. Gone

Reactor Disability & Defueling
Rad. Tech. Manager, TMI-2

Manager, TMI-2 Safety Review
Group

Manager, Plant Maint., TMI-1

Position - 3/28/79

Supervisor of Maintenance,
Unit 1 (Acting)

Supervisor of Maintenance, Unit 2

Supt. of Administration

Supervisor, Rad Protection
and Chemistry

Rad. Protection Supervisor

Chemical Supervisor
(Vacant)

Position - 4/25/83

Manager, Plant Maint., TMI-2

Gone

Gone

Rad. Training Manager, Rad.
Controls Division

ATTACHMENT 4

POSITION COMPARISON FOR POST- AND PRE-ACCIDENT TMI-1 ORGANIZATION

| <u>Position - 4/25/83</u> | <u>Position - 3/28/79</u> |
|--|--|
| President - GPU Nuclear Corp. (GPUN) | Vice President - Generation GPU Service Corp., Parsippany |
| Executive VP, GPUN | New |
| Chairman, GORB | Jersey Central |
| VP, Oyster Creek | New |
| VP, TMI-1 | New |
| VP, TMI-2 (Bechtel) | --- |
| VP, Technical Functions | Director, Tech. Functions, GPU Service Corp., Generation Div. |
| VP, Nuclear Assurance | Manager, Generation Productivity, GPU Svc. Corp., Gen. Div. |
| VP, Administration | New |
| VP, Communications | New |
| VP, Radiation and Environmental Controls | Manager, Projects, GPU Service Corp., Gen. Div. |
| VP, Maintenance & Construction | New |
| Manager, Plant Administration, TMI-1 | Manager - Generation Admin., Met Ed, Reading |
| Manager, Plans and Programs, TMI-1 | New |
| Director, Operations & Maintenance, TMI-1 | Unit Superintendent, Homer City (fossil), Pennelec |
| Manager, Plant Chemistry, TMI-1 | Engr., Radiation Protection & Chemistry, TMI-1 |

Position - 4/25/83

Manager, Plant Operations, TMI-1
 Manager, Plant Maintenance
 TMI-1
 Administrative & Technical
 Support, TMI-1
 Supervisor, Plant Review Group,
 TMI-1

 Director Plant Engineering - TMI-1

 Lead Mechanical Engineer
 Lead Nuclear Engineer
 Lead Electrical Engineer
 Lead I&C Engineer
 Technical Analyst -
 Fire Protection
 Special Project Engineer
 Supervisor - Chemistry

 Manager - Radiological
 Controls, TMI-1

 Rad. Engineering Mgr., TMI-1
 Rad. Field Ops. Mgr., TMI-1
 Administrator, Rad Controls, TMI-1

Position - 3/28/79

Supervisor of Operations, TMI-1
 Superintendent of Maintenance,
 TMI
 Tech Analyst, TMI-1

 New

 Director, Generation Projects
 Engineering, Met Ed, Reading

 Lead Mechanical Engr , TMI-1
 Nuclear Engineer, TMI-1
 Lead Electrical Engr., TMI-1
 I&C Engineer, TMI-1
 Plant Fire Protection - Tech.
 Analyst
 Engineer - Met Ed, Reading
 Chemistry Foreman, TMI-1

 New

 New

 New

 New

Position - 4/25/83Position - 3/28/79

| | |
|---|--|
| VP, Nuclear Assurance, GPUN | |
| Director, Quality Assurance | Manager, Quality Assurance, GPU Svc. Corp., Gen. Div. |
| Director, Training & Education | New |
| Manager - TMI QA Modifications/ Operations | New |
| Nuclear Safety Assessment Director | New |
| Manager, Emergency Preparedness | New |
| VP & Dir. - Technical Functions, GPUN | |
| Chairman, TMI Generation Review Committee | Elec. Power & Instrumentation Mgr., GPU Svc. Corp., Gen. Div. |
| Manager, Engineering Svcs. | Engr., - GPU Svc. (Forked River) |
| Director, Licensing & Regulatory Affairs | Manager, Environmental Affairs, GPU Svc., Gen. Div. |
| Director, Engineering & Design | Manager, Engineering & Design, GPU Svc. Corp., Gen. Div. |
| Director, Systems Engineering | Control & Safety Analysis Mgr., GPU Svc., Gen. Div. |
| Director, Engineering Projects | Manager, Systems Engineering, GPU Svc. Corp., Gen. Div. |
| Director, Startup & Test | Oyster Creek |
| VP/Director - Administration, GPUN | |
| Director, Fiscal Info. Management | New |
| Director, Materials Mgmt. | New |
| Director, Human Resources (now reports directly to Office of the President) | New |

Position - 4/25/83

Director, Security, Facilities,
Industrial Safety & Health

VP & Director, Radiological &
Environmental Controls, GPUN

Manager, TMI-1 Radiological Controls

TMI Radiological Assessment

Manager, Environmental Controls

Corporate Radiological Engineering

VP & Director, Maintenance and
Construction, GPUN

M&C Director, TMI-1

Manager, M&C Planning

M&C Production Director

Manager, M&C Methods & Proced.

M&C Admin. Spt. Manager

Position - 3/28/79

Administration Division, GPU
Svc. Corp., Gen. Div.

New

New

Jersey Central

GPU Licensing, Parsippany

Forked River

Manager - Generation QA
GPU Svc. Corp., Gen. Div.

Forked River

New

New

APPENDIX B

RHR REPORT FINDINGS

This Appendix contains the RHR questions sent to TMI-1 operators and their response to each question by percent. 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 operators at 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 here.

The survey questions with response percentages are provided in the original order. Each of the responses, issues, and findings has been evaluated by the NRC staff evaluation team that prepared this report. For those findings that could potentially raise a safety or regulatory concern, we have indicated the section in this report 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 further.

The Priority Issues detailed below are more or less 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. Attendance at repeat courses is viewed as boring by operators, whose attitude in turn, affects trainers.

Staff Comments: See Section 4.1.

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

Response Percentages

SA A D SD N

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-related

| | | | | |
|--|----|----|----|----|
| 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 related

| | | | | |
|---|---|----|---|----|
| 14. I learn useful material while preparing for my requalification exams. | 6 | 89 | 6 | 33 |
|---|---|----|---|----|

Staff Comments: Positive response

Response Percentages

| <u>SA</u> | <u>A</u> | <u>D</u> | <u>SD</u> | <u>N</u> |
|-----------|----------|----------|-----------|----------|
|-----------|----------|----------|-----------|----------|

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

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 Section 4.1.

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

Staff Comments: See Section 4.1.

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 Section 4.1.

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

Staff Comments: See Section 4.1.

22. Our current training prepares us for what we actually do as operators. 26 59 14 42

Staff Comments: See Section 4.1.

23. The overall quality of the training staff is poor. 9 39 47 5 43

Staff Comments: See Section 4.1.

Response Percentages

SA A D SD N

| | | | | | |
|---|----|----|----|----|----|
| 24. The training department is not oriented to the needs of the operators. | 14 | 65 | 21 | | 43 |
| Staff Comments: See Section 4.1. | | | | | |
| 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 | | | | | |
| 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 Section 4.1. | | | | | |
| 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 | | | | | |

Response Percentages

| <u>SA</u> | <u>A</u> | <u>D</u> | <u>SD</u> | <u>N</u> |
|-----------|----------|----------|-----------|----------|
|-----------|----------|----------|-----------|----------|

33. We have too much training in specific procedures. 9 91 43

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 Section 4.1.

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 Section 4.1.

° Requalification training is often cancelled at the last moment.

Staff Comments: See Section 4.1.

° 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 Section 4.1.

° 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. | <u>Career</u> | Response Percentages | | | | |
|-------------------------------------|---|----------------------|----------|----------|-----------|----------|
| | | <u>SA</u> | <u>A</u> | <u>D</u> | <u>SD</u> | <u>N</u> |
| 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-related | | | | | | |
| 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 | | | | |
|--|----------------------|----------|----------|-----------|----------|
| | <u>SA</u> | <u>A</u> | <u>D</u> | <u>SD</u> | <u>N</u> |
| 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 Section 4.1. | | | | | |
| E. <u>Motivation</u> | | | | | |
| 50. I am/would be proud to be a licensed operator. | 44 | 51 | 5 | | 43 |
| Staff Comments: Positive response; not safety-related | | | | | |
| 51. Being a licensed operator is worth the effort and demands to me. | 33 | 53 | 14 | | 43 |
| Staff Comments: Not safety-related | | | | | |
| 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 |

| | | Response Percentages | | | | |
|------------------------------------|--|----------------------|----------|----------|-----------|----------|
| | | <u>SA</u> | <u>A</u> | <u>D</u> | <u>SD</u> | <u>N</u> |
| 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 | | | | | | |
| 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 | | | | | | |
| 63. | The role of the operator has been evolving over the last few years in a good direction. | | 46 | 40 | | 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 |

Response Percentages

| <u>SA</u> | <u>A</u> | <u>D</u> | <u>SD</u> | <u>N</u> |
|-----------|----------|----------|-----------|----------|
|-----------|----------|----------|-----------|----------|

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

| | | | | |
|---|---|----|----|----|
| 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 <u>emergency</u> 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 <u>daily activities</u> . | 5 | 2 | 76 | 17 | 42 |
|---|---|---|----|----|----|

Staff Comments: See Section 3.1.1

| | Response Percentages | | | | |
|---|----------------------|----------|----------|-----------|----------|
| | <u>SA</u> | <u>A</u> | <u>D</u> | <u>SD</u> | <u>N</u> |
| 73. The concept of support departments makes sense in theory. | 14 | 86 | | | 42 |
| Staff Comments: See Section 3.1.1 | | | | | |
| 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 3.1.1. | | | | | |
| 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 | | | | | |
| 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 | | | | | |

Response Percentages

SA A D SD N

| | | | | |
|---|----|----|----|------|
| 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 | | | | |
| 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 | | | | |
|---|----------------------|----------|----------|-----------|----------|
| | <u>SA</u> | <u>A</u> | <u>D</u> | <u>SD</u> | <u>N</u> |
| 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 | | | | | |
| G. <u>Regulatory Atmosphere</u> | | | | | |
| 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 | | | | | |

| | | <u>Response Percentages</u> | | | | |
|------------------------------------|---|-----------------------------|----------|----------|-----------|----------|
| | | <u>SA</u> | <u>A</u> | <u>D</u> | <u>SD</u> | <u>N</u> |
| 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 | | | | | | |
| 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. | <u>Discipline</u> | | | | | |
| 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

| | <u>SA</u> | <u>A</u> | <u>D</u> | <u>SD</u> | <u>N</u> |
|--|-----------|----------|----------|-----------|----------|
| 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. <u>Management</u> | | | | | |
| 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 | | | | | |
| 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 | | | | | |

Response Percentages

| <u>SA</u> | <u>A</u> | <u>D</u> | <u>SD</u> | <u>N</u> |
|-----------|----------|----------|-----------|----------|
|-----------|----------|----------|-----------|----------|

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

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. | <u>Safety</u> | Response Percentages | | | | |
|----|---|----------------------|----------|----------|-----------|----------|
| | | <u>SA</u> | <u>A</u> | <u>D</u> | <u>SD</u> | <u>N</u> |
| | 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 Section 4.1. | | | | | |
| | 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 | | | | | |
| | 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. | <u>Job Performance</u> | | | | | |
| | 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 and 4.1. | | | | | |
| | 136. Others with whom I work understand their job responsibilities. | 2 | 91 | 7 | | 43 |

Response Percentages

SA A D SD N

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

| | | | | |
|---|----|----|--|----|
| 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 Section 4.1.

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 while.

Staff Comments: Not safety-related; see Section 3.2.1

° Operators rated the quality of their interactions with eight departments based on the people they interact with and the policies of the department. The following table outlines the results. Forty percent 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 Technical 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 Technical Functions. They did not know and had little direct contact with the individuals in that department, Technical Functions people had little direct operational experience and there were two sorts of communication problems. Technical 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 personnel. The reasons for dissatisfaction vary from department to department based on the functions of each. TMI had its greatest dissatisfaction with Rad-Con policies followed by equal degrees of dissatisfaction with Training and Management policies.

Staff Comments: See Sections 3.1.1 and 5.2.1

Satisfactoriness of Interaction with People and Policies
of Specific Departments by License Status

| Department | Type of Interaction | TMI | | |
|----------------------------|---------------------|----------|----|-----|
| | | Training | RO | SRO |
| Rad-Con | People Policies | | X* | X |
| Training | People Policies | X | | 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 indicates a rating below mean in satisfaction

° In small group discussions, operators say they disapprove of top management's handling of both regulatory agencies and attacks by 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. Its current posture 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 rather than 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 in the area of 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

APPENDIX C

BETA REPORT FINDINGS

This Appendix provides a listing of findings from "A Review of Current and Projected Expenditures and Manpower Utilization for GPU Nuclear Corporation," a study by Basic Energy Technology Associates, Inc. (BETA Report), and issued on February 28, 1983. Only findings that relate to the GPUN corporate structure and to the TMI-1 plant are included. Findings applicable strictly to the Jyster 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. Each of these findings has been evaluated by the NRC staff evaluation team that prepared this report. For those findings that could potentially raise a safety or regulatory concern, we have indicated the section in this report 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 further.

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 Section 4.2.

FINDING V-B-5

There exists a lack of supervision of instructors in the TMI Training Department.

Staff Comments: See Section 4.2.

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 particularly Oyster Creek, needs to be reviewed and strengthened.

Staff Comments: See Section 5.2.2

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 procedural adherence, and operator opinions regarding management policies relative to procedural 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 interviews with 20 individuals: 11 reactor operators, eight senior reactor operators (three 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

NRC question: "In terms of the training you receive on specific procedures, would you say that it is too little, too much, or about right?" Of the 16 respondents, of whom only one felt that there was too much training on 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 Administrative Procedures (APs) and Emergency Procedures (EPs), but not enough on Operating Procedures (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; 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 procedural details, 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 the 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, In-Service Inspection (ISI), STP, OP, and administrative 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 manageable 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 that 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. Questions in parentheses are "probe" questions which were used only in the event of a specific response to a previous question. Answers in parentheses triggered specific followup questions.

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 \neq 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 receive 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 receive 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?