
TMI-1 Restart

An Evaluation of the Licensee's
Management Integrity as
It Affects Restart of
Three Mile Island Nuclear Station
Unit 1 Docket 50-289

**U.S. Nuclear Regulatory
Commission**

Office of Nuclear Reactor Regulation



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ABSTRACT

Supplement 5 to the Safety Evaluation Report (SER) on TMI-1 Restart documents the review by the Nuclear Regulatory Commission (NRC) staff of nine investigations conducted by the NRC Office of investigations into matters identified as relevant and material to an evaluation of the licensee's "management integrity." The staff has included, as part of its evaluation, materials from its review of the GPU v. B&W lawsuit record (NUREG-1020LD, "GPU v. B&W Lawsuit Review and Its Effect on TMI-1") as well as other relevant materials developed since the close of the record in the TMI-1 Restart proceeding. In developing its position on General Public Utilities Nuclear Corporation's character (i.e., management integrity), the staff evaluated matters that cast doubt on the licensee's character, individually and collectively; considered the remedial actions taken by the licensee; and balanced past improper conduct of the licensee against its subsequent record of remedial actions and performance and record of current senior management of the licensee. The staff concluded that, while the past improper conduct was grave, the remedial actions taken, the subsequent record of performance, and the record of current senior management support a finding that GPUN can and will operate TMI-1 without undue risk to the health and safety of the public.

TABLE OF CONTENTS

	<u>Page</u>
ABSTRACT.....	iii
ACKNOWLEDGMENTS.....	ix
ACRONYMS AND INITIALISMS.....	xi
1.0 INTRODUCTION.....	1-1
2.0 SUMMARY AND CONCLUSIONS.....	2-1
3.0 BACKGROUND.....	3-1
3.1 Integrity Issue in the TMI-1 Restart Proceeding.....	3-1
3.2 Basis and Standard for the Integrity Inquiry.....	3-3
3.3 Guide to the Citations Used in This Report.....	3-5
4.0 TMI-1 LEAK RATE FALSIFICATION.....	4-1
4.1 Background.....	4-1
4.2 Investigation Results.....	4-2
4.2.1 Whether Leak Rate Tests Were Deliberately Falsified..	4-3
4.2.2 Discarding of Invalid Leak Rate Surveillance Tests...	4-10
4.2.3 Whether There Was a Motive for Leak Rate Falsification.....	4-13
4.2.4 Whether There Was Management Involvement in Any Leak Rate Falsification.....	4-14
4.2.5 Followup on Makeup Tank Level Indication Problems....	4-15
4.3 Staff Findings.....	4-17
5.0 HARTMAN ALLEGATIONS AND RELATED SAFETY CONCERNS.....	5-1
5.1 Background.....	5-1
5.2 TMI-2 Leak Rate Falsification.....	5-2
5.2.1 Investigation Results on TMI-2 Leak Rate Falsification.....	5-2
5.2.2 Staff Findings on TMI-2 Leak Rate Falsification.....	5-6
5.3 Estimated Critical Position.....	5-7
5.3.1 Investigation Results of Estimated Critical Position.....	5-7
5.3.2 Staff Findings on Estimated Critical Position.....	5-11

TABLE OF CONTENTS (Continued)

	<u>Page</u>
5.4 Emergency Feedwater (EFW) Pump Surveillance Tests.....	5-12
5.4.1 Investigation Results on EFW Pump Surveillance Testing.....	5-12
5.4.2 Staff Findings on EFW Pump Surveillance Testing.....	5-14
5.5 Request to Shut Down TMI-2 To Correct Leakage.....	5-14
5.5.1 Investigation Results on Request To Shut Down TMI-2 To Correct Leakage.....	5-14
5.5.2 Staff Evaluation.....	5-15
5.6 Termination of H. W. Hartman, Jr.....	5-15
5.6.1 Investigation Results.....	5-15
5.6.2 Staff Findings in Hartman's Termination.....	5-16
5.7 Reporting of the Faegre & Benson Investigation Report.....	5-17
5.8 Conclusion.....	5-18
6.0 BETA AND RHR REPORTS.....	6-1
6.1 Background.....	6-1
6.2 Investigation Results.....	6-2
6.3 Staff Findings.....	6-3
7.0 TRAINING.....	7-1
7.1 Preaccident Training.....	7-1
7.1.1 Background.....	7-1
7.1.2 Investigation Results.....	7-2
7.1.3 Staff Findings.....	7-5
7.2 Postaccident Training.....	7-5
7.2.1 Background.....	7-5
7.2.2 Investigation and Hearing Results.....	7-6
7.2.3 Staff Findings.....	7-10
7.3 Current Training.....	7-11
7.3.1 Background.....	7-11
7.3.2 Current Status.....	7-12
7.4 Staff Findings.....	7-14
8.0 KEATEN REPORT.....	8-1
8.1 Introduction.....	8-1

TABLE OF CONTENTS (Continued)

	<u>Page</u>
8.2 Evaluation of Changes in Draft Keaten Report for Possible Improper Influence.....	8-5
8.2.1 Background.....	8-5
8.2.2 Investigation Results.....	8-6
8.2.3 Staff Findings on Changes in the Keaten Report Drafts.....	8-13
8.3 Accuracy of Information Contained in Met-Ed's Response to the October 25, 1979, Notice of Violation.....	8-15
8.3.1 Background.....	8-15
8.3.2 Investigation Results.....	8-15
8.3.3 Staff Findings.....	8-19
8.4 Keaten Task Force Use of the Lucien Report.....	8-22
8.4.1 Background.....	8-22
8.4.2 Investigation Results.....	8-23
8.4.3 Staff Findings.....	8-27
8.5 Financial/Technical Interface.....	8-31
8.5.1 Background.....	8-31
8.5.2 Investigation Results.....	8-31
8.5.3 Staff Findings.....	8-33
8.6 Reportability of the Keaten Report.....	8-34
8.6.1 Background.....	8-34
8.6.2 Investigation Results.....	8-34
8.6.3 Staff Findings.....	8-35
8.7 Conclusion.....	8-35
9.0 CHANGES TO THE LUCIEN REPORT.....	9-1
9.1 Background.....	9-1
9.2 Investigation Results.....	9-2
9.3 Staff Findings.....	9-6
10.0 ALLEGED HARASSMENT OF PARKS, KING, GISCHEL.....	10-1
10.1 Background.....	10-1
10.2 Investigation Results.....	10-1
10.2.1 R. D. Parks Investigation Results.....	10-1
10.2.2 L. King Investigation Results.....	10-6
10.2.3 E. Gischel Investigation Results.....	10-10

TABLE OF CONTENTS (Continued)

	<u>Page</u>
10.3 Staff Findings.....	10-17
10.3.1 R. D. Parks Staff Findings.....	10-17
10.3.2 L. King Staff Findings.....	10-18
10.3.3 E. Gischel Staff Findings.....	10-21
10.3.4 Overview.....	10-23
11.0 CHANGE OF OPERATOR TESTIMONY.....	11-1
11.1 Background.....	11-1
11.2 Investigation Results.....	11-4
11.3 Staff Finding.....	11-7
12.0 LEGAL STANDARDS.....	12-1
13.0 STAFF POSITION ON MANAGEMENT INTEGRITY.....	13-1
13.1 Staff Position on Corporate Integrity.....	13-1
13.1.1 Matters Relating to Met-Ed Management Integrity...	13-1
13.1.2 Staff Conclusion on Met-Ed Management Integrity...	13-5
13.1.3 Events Relating to GPUN Management Integrity.....	13-5
13.1.4 Staff Conclusion on GPUN Management Integrity.....	13-6
13.2 Staff Position on Individual Integrity.....	13-10
13.2.1 Current GPU/GPUN/TMI-1 Management.....	13-11
13.2.2 Past Met-Ed/GPUSC/GPUN Management.....	13-18
13.3 Staff Position on Revalidation of Management Integrity....	13-18

LIST OF TABLES

1.1 Principal Issues Addressed in This Report.....	1-2
1.2 Location in This Report of the Integrity Issues Contained in the Commission's January 21, 1984, Memorandum.....	1-3
3.1 Reports Issued by the Office of Investigation in Relation to Three Mile Island.....	3-4
8.1 Chronology of Events.....	8-4
13.1 Individual Integrity of Current GPU or GPUN Officers and Employees.....	13-12
13.2 Involvement of Individuals in Met-Ed Events.....	13-19

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ACRONYMS AND INITIALISMS

ACRS	Advisory Committee on Reactor Safeguards
AEC	Atomic Energy Commission
AO	auxiliary operator
ASLAB	Atomic Safety and Licensing Appeal Board
ASLB	Atomic Safety and Licensing Board
ATOG	Abnormal Transient Operating Guidelines
B&W	Babcock & Wilcox Company
Bechtel	Bechtel North American Power Corporation
BETA	Basic Energy Technology Associates, Inc.
BN	Board notification
BOP	balance of plant
CLI	Commission Legal Issuance
CRO	control room operator
DOJ	Department of Justice, U.S.
DOL	Department of Labor, U.S.
dpm	decades per minute
ECP	estimated critical position
EDO	Executive Director of Operations, NRC
EFW	emergency feedwater
EI	Energy Incorporated
ELD	Office of the Executive Legal Director, NRC
FSAR	Final Safety Analysis Report
FSR	Fundamentals and System Review (Program)
GET	general employee training
GPU	General Public Utilities Corporation
GPUN	General Public Utilities Nuclear Corporation
GPUSC	General Public Utilities Service Corporation
HPI	high-pressure injection
HVAC	heating, ventilating, and air conditioning
I&C	instrumentation and control
IE	Office of Inspection and Enforcement, NRC
Met-Ed	Metropolitan-Edison Company
MUT	makeup tank
NGS	nuclear generating station
NOV	Notice of Violation
NRC	U.S. Nuclear Regulatory Commission
NRR	Office of Nuclear Reactor Regulation, NRC

OGC	Office of General Counsel, NRC
OLB	Operator Licensing Branch, NRC
OI	Office of Investigations, NRC
PID	Partial Initial Decision
POD	plan of the day
PORC	Plant Operations Review Committee
PORV	pilot-operated relief valve
RCDT	reactor coolant drain tank
RCS	reactor coolant system
RHR	Rohrer, Hibler and Reploye, Inc.
RO	reactor operator
SALP	Systematic Assessment of Licensee Performance
SECY	Office of the Secretary of the Commission, NRC
SER	Safety Evaluation Report
SL	Site Operations
SOE	sequence of events
SRO	senior reactor operator
TDR	technical data report
TMIA	Three Mile Island Alert (a restart intervenor)
TMI-1	Three Mile Island Unit 1
TMI-2	Three Mile Island Unit 2
TS	Technical Specification(s)
TWG	Test Working Group
UE&C	United Engineering and Constructors
UWI	unit work instruction

1.0 INTRODUCTION

When the Three Mile Island Unit 2 (TMI-2) accident occurred on March 28, 1979, the other nuclear power plant at the site, Three Mile Island Unit 1 (TMI-1), was in a power ascension mode after completion of a refueling outage. TMI-1 was immediately shut down by the licensee, Metropolitan-Edison Company (Met-Ed). TMI-1 has not been restarted.

The Nuclear Regulatory Commission (NRC) issued several orders after the accident, requiring the licensee to complete a number of actions before the restart of TMI-1 would be permitted. The Commission also decided that a public hearing should be held concerning the restart of TMI-1. A number of specific issues were identified by the Commission for resolution through the hearing process. See Commission Legal Issuance CLI-79-8, 10 NRC 141 (1979); CLI-80-5, 11 NRC 478 (1980).

On April 18, 1983, the staff informed the Commission that as a result of several developments that might bear on the competence and integrity of TMI management the staff was initiating actions to revalidate its position on the management integrity issue. In the course of that revalidation, a number of additional matters have arisen that also might bear on the competence and integrity of TMI management. All of these matters are described in Section 3.0, "Background," of this report.

The staff stated in a July 15, 1983, memorandum from the Executive Director for Operations (EDO) to the Commission that when the reviews and investigations related to integrity were complete, the staff would integrate them into an overall position on management integrity. It is the purpose of this report, Supplement No. 5 to the TMI-1 Restart Safety Evaluation Report (NUREG-0680), to provide the staff's overall position on licensee's management integrity and to document the bases for that position.

A summary of the staff's conclusions is presented in the following section (Section 2.0). The background of the management integrity issue in the TMI-1 restart proceeding is then provided. The background section (Section 3.0) includes a discussion of the basis for an examination of management integrity, the evolution of the integrity issue in the restart proceeding, and the organization of this report. The results of the staff's assessment* of the various matters bearing on the integrity of licensee's management are presented in Sections 4.0 through 11.0. Section 12.0 discusses the legal standards by which "management integrity" is to be judged. Finally in Section 13.0, the staff provides its overall assessment of licensee's management integrity based on the results discussed in Sections 4.0 through 11.0 and the legal standards discussed in Section 12.0.

*The staff's enforcement review is being conducted separately from its licensing review; however, these reviews are being internally coordinated.

Each of the principal subjects of investigation is addressed separately in Sections 4.0 through 11.0.

Table 1.1 identifies the principal issues evaluated in this report. Table 1.2 lists the integrity issues contained in the Commission's January 20, 1984, memorandum (numbering the issues as the Commission did) and identifies the section in which the particular issue is addressed.

Table 1.1 Principal issues addressed
in this report

Section	Issue
4.0	TMI-1 Leak Rate Falsification
5.0	Hartman Allegations and Related Safety Concerns
6.0	BETA/RHR Reports
7.0	Training (Cheating and Recertification Irregularities)
8.0	Keaten Report
9.0	Lucien Report
10.0	Alleged Harrassment of Parks, King, and Gischel
11.0	Change of Operator Testimony

Table 1.2 Location in this report of the integrity issues contained in the Commission's January 20, 1984, Memorandum*

Integrity Issue	Subject	Discussion
I.A.1-I.A.4	Information Flow	Resolved
I.B.1-I.B.5	Current Training Program	Resolved
I.B.6	Preaccident Training Program	Section 7.0
I.B.7	Current Training Program	Resolved
I.C.1-I.C.6	Activities Endangering Public Health and Safety	Resolved
I.D.1-I.D.2	Financial/Technical Interface	Section 8.0
I.E.1	Dieckamp Mailgram	Resolved
I.F.1	Hartman Allegations	Section 5.0
II.A.1-II.A.6	Management Response to Cheating	Resolved
II.B.1-II.B.3	Management Knowledge/Involvement in Cheating	Resolved
II.C.1-II.C.3	Extent of Cheating	Resolved
II.D.1-II.D.2	Training and Testing Program	Resolved
II.E.1	System for Certifying Candidates	Resolved
II.E.2-II.E.3	False Certification of Floyd	Section 7.0
III.A.1-III.A.5	TMI-2 Leak Rate Issue	Section 5.0
III.B.1-III.B.3	TMI-1 Leak Rate Issue	Section 4.0
III.C.1-III.C.3	Alleged Harassment of Parks, King, and Gischel	Section 10.0
III.D.1	Timely Reporting of Documents	Sections 5.0, 6.0, and 8.0
III.E.1-III.E.2	Keaten Report	Section 8.0
III.F.1-III.F.2	Operator Testimony	Section 11.0
III.F.3	Preaccident Reduction in Training	Section 7.0
III.F.4	Recognition of Preaccident Deficiencies	Section 8.0
III.F.5	Arnold's Testimony Before ASLB	Resolved
III.F.6	Condensate Polisher Bypass	Section 8.0
III.G.1-III.G.2	Boring Brothers Allegations	Resolved
III.H.1	Unattended Examinations and Answer Keys	Resolved
III.I.1	Psychological Testing Allegations	Resolved
III.J.1	Implementation of Long-Term Items	Resolved
III.J.2	Procedural Violations	Resolved

*In "NRC Staff's Comments on the Commission's January 20, 1984, List of Integrity Issues in Restart Proceeding," dated February 21, 1984, the staff expressed its view that a number of the issues identified by the Commission were resolved and identified the basis for such a view. Where an issue identified by the Commission is, in the staff's view, resolved as explained in the February 21, 1984, filing, the notation "Resolved" appears in this table.

2.0 SUMMARY AND CONCLUSIONS

The staff has reviewed the results of several investigations conducted by the NRC Office of Investigation (OI) and other materials previously identified as relevant and material to an evaluation of the licensee's "management integrity." The staff's conclusions from its review of the information within each subject area may be summarized as follows:

Section 4.0, TMI-1 LEAK RATE FALSIFICATION - The staff concludes that the evidence does not support a finding that leak rate surveillance tests were intentionally or systematically falsified nor was there a motive to do so at TMI-1 during the period investigated.

Section 5.0, HARTMAN ALLEGATIONS AND RELATED SAFETY CONCERNS - The staff finds that falsification of TMI-2 leak rate tests occurred and that negligence on the part of management created, in part, the circumstances that resulted in leak rate falsification. The staff also finds that the licensee failed to make a timely Board notification concerning the Faegre & Benson Report on the Hartman allegations and concerning certain depositions by Hartman.

Section 6.0, BETA/RHR REPORTS - The staff believes the licensee can be considered to have failed to meet its duty to make Board notifications and its obligation under Section 186 of the Atomic Energy Act by failing to provide the BETA and RHR Reports in a more timely fashion.

Section 7.0, TRAINING - The staff finds that training program deficiencies existed before the accident that were indicative of either a poor attitude on the part of management or a careless disregard of management responsibilities. Cheating on postaccident requalification examinations and irregularities in the certification for requalification of a management-level individual also raises questions about management's attitude and performance.

Section 8.0, KEATEN REPORT - The staff concludes that the process of review of the drafts of the Keaten Report by management did not result in a final product that was improperly influenced so as to reflect better on the licensee than would otherwise have been the case. On the basis of information related to the Keaten Report, however, the staff further concludes that statements were made by the licensee in its December 5, 1979, response to the October 25, 1979, Notice of Violation that were neither accurate nor complete and that were contrary to other information in the possession of the licensee.

Section 9.0, CHANGES TO THE LUCIEN REPORT - The staff finds that the circumstances under which changes were made to the report by K. Lucien of Energy Incorporated on the condensate/polisher system do not raise questions concerning the integrity of the licensee or its personnel.

Section 10.0, PARKS, KING, GISCHEL - The staff concludes that R. Parks was harassed by management officials of Bechtel with the knowledge of GPUN. The staff concludes that there was no harassment, intimidation, or retaliation directed at L. King or E. Gischel.

Section 11.0, CHANGE OF OPERATOR TESTIMONY - The staff finds that GPUN was not involved in improper activities with respect to any coercion of E. Frederick, C. Faust, or W. Zewe to change their testimony concerning an actuation of high-pressure injection (HPI) at 0541 on the day of the TMI-2 accident. The staff also finds that GPUN was under no obligation to report its change in position during the GPU v. B&W trial on 0541 HPI actuation.

The staff has also evaluated these matters collectively in revalidating a staff position on whether GPUN's character (i.e., management integrity) provides reasonable assurance that the licensee can and will adequately protect public health and safety. The improper activities of the licensee have been evaluated in conjunction with the licensee's remedial actions and subsequent performance. The pattern of activity by Met-Ed, had it been known by the staff at the time the staff formulated its position on management in the restart proceeding, would likely have resulted in a conclusion by the staff that Met-Ed had not met the standard of reasonable assurance of no undue risk to the public health and safety. However, the staff reaches a different conclusion with respect to the present licensee organization. Based on all the information reviewed by the staff and balancing the past improper activities of the licensee against its subsequent record of remedial actions and performance, as well as the record of current senior management of the licensee, the staff concludes that there is reasonable assurance that GPUN can and will conduct its licensed activities in accordance with regulatory requirements and that GPUN can and will operate TMI-1 without undue risk to the health and safety of the public. The staff, therefore, revalidates its position on licensee's management integrity.

The staff also has evaluated the "managerial integrity" of several current GPU/GPUN officials and determined there is reasonable assurance that GPUN can and will meet its regulatory responsibilities with these particular individuals in positions related to those responsibilities. The staff reaches no conclusion at this time on the managerial integrity of individuals who no longer hold management positions with GPU/GPUN. It is the staff's position, and an essential part of the staff's ability to revalidate its position on licensee's management integrity, that GPUN must obtain staff review and approval on a case-by-case basis before the assignment of any of several specific individuals to responsible management positions associated with supervision of operations or maintenance of GPUN's licensed nuclear facilities.

3.0 BACKGROUND

3.1 Integrity Issue in the TMI-1 Restart Proceeding

The question of management integrity was not explicitly identified by the Commission in its original Order and Notice of Hearing in the TMI-1 Restart proceeding. See CLI-79-8, 10 NRC 141 (1979). When the Atomic Safety and Licensing Board (ASLB) issued its partial initial decision (PID) on management issues, it considered the question of integrity in a number of areas and noted that management integrity was one of the "important issues considered" by the ASLB. See 14 NRC 381, 403 (1981). The question of the relationship between certain incidents of cheating on NRC operator examinations and management integrity was later explored in the reopened proceedings on cheating before the Special Master and before the ASLB. See 15 NRC 918 (1982); 16 NRC 281 (1982).

On April 18, 1983, the staff informed the Commission that the staff was initiating actions to revalidate the staff's position on the management integrity issue because of the pendency of several matters that might bear on the competence and integrity of TMI management. These matters included:

- (1) the GPU v. B&W lawsuit record review
- (2) the Hartman allegations concerning leak rate test falsification at TMI-2

In a May 13, 1983, memorandum to the Commission, the Executive Director for Operations (EDO) identified additional open issues relevant to management integrity. These issues included

- (1) the Parks and King allegations concerning irregularities in the cleanup of TMI-2 and harassment of "whistleblowers"
- (2) the staff's review of the contents of the BETA and RHR Reports to determine whether they contain any new information that is material to the resolution of the Commission's restart issues, the contentions of the parties, and the cheating issues*
- (3) the effect on management integrity of the licensee's failure to promptly report the BETA and RHR Reports to the Commission and ASLAB and any other failures of the licensee to promptly notify the Commission and/or ASLAB of other relevant and material information

The staff stated in a July 15, 1983, memorandum from the EDO to the Commission that when the reviews and investigations related to these items

*The results of the staff's technical review of the BETA and RHR Reports were presented in Supplement 4 of the TMI-1 Restart Safety Evaluation Report, NUREG-0680, dated October 1983.

were complete, the staff would integrate them into an overall position on management integrity.

On September 2, 1983, the staff apprised the Commission of a new development related to the licensee's management integrity (see Board Notification BN-83-138). The staff identified irregularities in leak rate tests at TMI-1 that resulted in an investigation into this matter by the NRC Office of Investigations (OI).

In September 1983, the staff issued NUREG-1020,* which provided the results of the staff's GPU v. B&W lawsuit review. With respect to the management issues involved in the restart proceeding, the staff identified seven specific areas in which potential "management competence/integrity" issues were raised by the lawsuit documents. These areas were

- (1) the Hartman allegations concerning leak rate test falsification at TMI-2
- (2) the conduct of the licensee's internal investigation of the TMI-2 accident (the Keaten Report) and whether the process of review by management of the Keaten Report drafts improperly influenced that report
- (3) possible irregularities in the licensee's training programs and training records before the accident
- (4) possible knowledge by the licensee of defective plant conditions that may have contributed to the TMI-2 accident
- (5) certain incidents of cheating on licensing and operator examinations and requalification certification irregularities
- (6) questions concerning the knowledge of the licensee concerning the TMI-2 accident sequence
- (7) whether financial considerations had an undue influence on TMI operation before the TMI-2 accident

Several of these matters were referred to OI for appropriate action. The staff stated again in NUREG-1020 that, when the pending actions for each of the open items had been completed, the staff would evaluate the results and integrate them into an overall position on management integrity:

The staff's report on its overall position on management integrity will contain an evaluation of each of the issues identified as material to management integrity. In addition to considering the results of the investigations as they relate to each of these matters individually, the staff will consider whether a pattern

*On June 20, 1984, Board Notification BN-84-121 was issued. This Board Notification identified that the limited distribution version of NUREG-1020 (identified as NUREG-1020LD) was made publicly available.

of conduct emerges which is relevant to the staff's assessment of the licensee's management competence/integrity. The pace of OI's investigations of the several matters described above will determine when the staff's report on management competence/integrity can be issued. NUREG-1020, Section 10.10 at 10-24.

OI has completed 9 investigations relating to the issues referred to OI and has issued reports on its findings. Table 3.1 identifies all investigation reports that have been issued by OI in relation to TMI and correlates the relevant OI reports with the sections of this report where they are addressed.

3.2 Basis and Standard for the Integrity Inquiry

In its recent decision on the management phase of the TMI-1 restart proceeding, the Atomic Safety and Licensing Appeal Board (ASLAB) discussed the basis for the inquiry into the licensee's management integrity. See ALAB-772, 19 NRC ___ (May 24, 1984) (slip op. at 10-14). The ASLAB noted that what began as an inquiry into the licensee's technical capability and resources has evolved into a search for answers to questions concerning the integrity of the licensee's management as well (Id. at 10-11).

The ASLAB cited Section 182a of the Atomic Energy Act (AEA) (42 U.S.C. §2232a), together with Section 103b of the AEA (42 U.S.C. §2133b), as the basis for an inquiry into a licensee's "character" (Id. at 11). The ASLAB equated "character" and "integrity" for the purpose of this proceeding (Id. at 11-12).

The lack of any precise standards against which to measure licensee's conduct was acknowledged by the ASLAB (Id. at 14). The ASLAB noted that "[e]valuation of character always involves consideration of largely subjective factors" (Id. at 12). The NRC is not without precedents in judging character, however. The ASLAB cited several cases in which specific factors were highlighted as material to "character." See, e.g., Houston Lighting and Power Co. (South Texas Project, Units 1 and 2), CLI-80-32, 12 NRC 281, 291 (1980) (abdication of responsibility or abdication of knowledge by an applicant could provide a basis for adverse licensing action); Consumers Power Co. (Midland Plant, Units 1 and 2), CLI-83-2, 17 NRC 69, 70 (1983) (a plan to withhold material information reflects on character); Consumers Power Co. (Midland Plant, Units 1 and 2), ALAB-106, 6 AEC 182, 184 (1973) ("managerial attitude" is relevant in evaluating whether an applicant will carry out its regulatory responsibilities).

The ASLAB also emphasized a licensee's "great responsibility to the public" and the NRC's "heavy dependence on the licensee for accurate and timely information about the facility and its operation." ALAB-772, supra (slip op. at 13-14). The ASLAB concluded as follows:

Thus, while lacking precise standards against which to measure licensee's conduct, the foregoing views provide valuable aid for grasping the slippery concept of management competence. They serve as well as guideposts for our appellate review of the Licensing Board's decisions. Id. at 14.

Table 3.1 Reports issued by the Office of Investigation
in relation to Three Mile Island

OI Case Number/Date	Subject	SER Sector
1-83-028/April 16, 1984 and Supplement (same)	Possible falsification of reactor coolant system inventory leak rate tests	4.0
None/June 22, 1984	Investigative evaluation of remaining allegations relating to Harold Hartman	5.0
1-83-013/April 16, 1984	Alleged failure to provide BETA and RHR consultant reports to the NRC in a more timely fashion	6.0
Q-1-84-004/March 22, 1984 11-82-002/March 21, 1983	Possible training irregularities allegations regarding material false statements	7.0
1-83-012/May 18, 1984	Alleged improper influence by GPU upper management causing changes to be made to its internal TMI-2 accident review report	8.0
Q-1-84-006/May 18, 1984	Possible improper influence exerted on contractor to change report critical of the licensee	9.0
11-83-002/May 18, 1984 11-83-002/September 1, 1983	Allegations regarding discriminatory acts for raising safety concerns on safety- related modifications, quality assurance procedures, and the use of polar crane	10.0
1-84-005/July 13, 1984	Potential improper management influence on plant operators to change testimony	11.0
1-83-003/March 7, 1983 and Supplement October 12, 1983	Alleged compromise of pre-employment examination	None*
1-83-004/February 28, 1983	Circumstances surrounding GPUN senior management's decision not to report allegation regarding alleged testing improprieties to NRC and ASLAB	None*
1-83-015/July 13, 1984	TMI-2 alleged falsification of radiation monitoring report	None*
Q-1-83-016/July 1, 1983	Allegations concerning fire protection training deficiencies	None*

*This issue is not material to GPUN management integrity.

These same "guideposts" are being used by the staff in formulating its position on licensee's integrity. Near the beginning of the staff's review of the GPU v. B&W lawsuit record, the staff identified a number of factors from agency caselaw which appeared to be relevant and material to an evaluation of a licensee's integrity. These factors included such elements as false statements to the NRC, violations of regulatory requirements, failures to make required reports to the NRC, abdication of responsibility or knowledge, and management's attitude toward regulatory responsibilities. The staff used these factors as guidance in preparing Section 10, "Management Competence/Integrity," of NUREG-1020, "GPU v. B&W Lawsuit Reviews and Its Effect on TMI-1," September 1983.

These same factors, together with caselaw such as the ASLAB's recent ALAB-772, are relied on by the staff in formulating its overall position on licensee's management integrity in Section 13.0 of this report. Section 12.0 contains a detailed discussion of the legal standards that are applicable to an evaluation of management integrity.

3.3 Guide to the Citations Used in This Report

The report makes extensive reference to investigation reports completed by the Office of Investigations (OI) (see Table 3.1 for a complete identification of OI investigation reports). For ease of reference, each OI investigation report is cited within the text of this evaluation by the use of an abbreviated notation as follows:

<u>Notation</u>	<u>OI Report Date/Case Number</u>
OI LR-1	April 16, 1984/1-83-028
OI LR-1 Supp.	April 16, 1984/1-83-028, Supplement
OI Hartman	June 22, 1984/None
OI BETA/RHR	April 16, 1984/1-83-013
OI Training	March 22, 1984/Q-1-84-004
Not cited*	March 21, 1983/H-82-002
OI Keaten	May 18, 1984/1-83-012
OI Lucien	May 18, 1984/Q-1-84-006
OI Testimony Change	July 13, 1984/1-84-005
September 1, 1983, OI Report	September 1, 1983/H-83-002
May 18, 1984 OI Report	May 18, 1984/H-83-002

When reference is made to the OI report itself, the citation appears as the abbreviated notation for the report followed by the page or pages of the report being referenced (*i.e.*, OI LR-1 at 3). When reference is made to one of the numbered exhibits to an OI report, the citation appears as the abbreviated notation for the report followed by the exhibit number and then the page number of the exhibit being referenced (*i.e.*, OI Keaten Ex. 1 at 12).

Several of the OI investigations identified above were initiated as a result of the staff's review of the GPU v. B&W lawsuit record (NUREG-1020). The

*This report, which was referred to the Department of Justice (DOJ) for review, is, at the request of DOJ, not being released. The staff relied on other public documents in its evaluation of the subject.

staff has found it necessary to make reference to lawsuit documents in this evaluation. (NUREG-1020, Volume 2, provides a complete listing and identification of all lawsuit documents.) Lawsuit documents are referenced in this evaluation in the same format as was used in NUREG-1020. An example of each type of document is provided below:

<u>Notation</u>	<u>Explanation</u>
Herbein at Dep. Tr. 317	Pretrial deposition of Herbein at page 317
Zewe at Test. Tr. 2138	Trial testimony of Zewe at page 2138
B&W 351	B&W exhibit number 351
GPU 2079	GPU exhibit number 2079

4.0 TMI-1 LEAK RATE FALSIFICATION

4.1 Background

In July 1983, Region I commenced a special, unannounced inspection of reactor coolant system (RCS) leak rate test procedures, equipment, and records at TMI-1. The basic objective of the inspection was to determine if the records of RCS leak rate surveillance testing at TMI-1, for the period April 1, 1978, through March 31, 1979, showed any indications of practices similar to alleged irregularities at TMI-2. The allegations related to TMI-2 RCS leak rate testing involved the following:

- (1) Tests were often repeated until the results met the acceptance criteria of the Technical Specifications (TS); the unfavorable results were discarded.
- (2) RCS water inventory was adjusted during the leak test period. Contrary to procedural requirements, these water additions were neither recorded in the Control Room Operator's Log or the Shift Foreman's Log nor were they factored into the RCS leak rate test calculations.
- (3) Hydrogen gas was added to the makeup tank (MUT) in such a manner as to influence leak rate test calculations in a favorable way.
- (4) Computer data entries for the leak rate calculations were altered to make the leak rate test calculations appear acceptable.

OI LR-1 Ex. 1 at 5.

The results of the special inspection are documented in Inspection Report 50-289/83-20 dated September 21, 1983, and its subsequent revision dated February 24, 1984. From the 645 test records examined the revised inspection report identified 13 instances of water additions and 11 instances of hydrogen additions to the RCS MUT during the performance of RCS leak rate surveillance tests without these additions being properly accounted for in the test calculations. Additionally, 13 feed-and-bleed operations were identified as occurring during the performance of leak rate tests for which the leak rate calculations were not properly corrected for these evolutions. One instance of a combined hydrogen addition, water addition, and feed-and-bleed operation was found. These 38 instances amount to 5.9% of the surveillance tests examined. After these evolutions were considered, recalculation by the inspection team showed, with the exception of three instances, that the TS acceptance criteria would have been met even if these evolutions had not occurred.* OI LR-1 Ex. 17 at 7.

*The revised inspection report concluded four instances would not have met TS limits; however, as discussed in Section 4.2.1.3, the test beginning at 0047 on May 12, 1978, would not have exceeded 1 gpm and, therefore, was acceptable.

On the basis of the special inspection findings, T. E. Murley, Regional Administrator, Region I, requested on September 21, 1983, that the Office of Investigations (OI) conduct an investigation into suspected falsification of RCS leak rate test data at TMI-1. Murley requested that the investigation determine if there was a systematic pattern of falsification of RCS leak rate surveillance test data by control room operators at TMI-1 and, if so, to what extent licensee's management was cognizant of and/or involved in such activity. OI LR-1 at 1, 4.

The investigation was completed by the OI Field Office, Region I, and two reports dated April 16, 1984 (Investigation Report 1-83-028), were submitted. The first report was submitted as pending; the second report (supplemental) completed all investigative leads [Memorandum from B. B. Hayes (OI) to T. E. Murley (Region I) dated April 16, 1984]. A discussion of the results of the investigation is presented below.

4.2 Investigation Results

The principal conclusions of the investigation may be summarized as follows:

- (1) The percentage of questionable leak rate test results was small in comparison with the total number of leak rate tests examined (38 out of 645 or 5.9%). NRC recalculation of these tests concluded that the TS acceptance criteria would have been met, except for three tests, even if the unaccounted-for evolutions had not been made. OI LR-1 at 1.
- (2) The investigation did not disclose conclusive evidence to indicate that any TMI-1 licensed operator deliberately falsified RCS leak rate surveillance test results (OI LR-1 at 2; OI LR-1 Supp. at 1-2).
- (3) The investigation did not identify a systematic pattern of falsification of TMI-1 RCS leak rate surveillance tests, although the 11 instances of hydrogen additions during leak rate tests occurred only on 2 of the 6 operator shifts and was limited to 5 control room operators (OI LR-1 at 2).
- (4) It was common practice in the preaccident period for control room personnel to discard test results that were deemed invalid (OI LR-1 at 2).
- (5) No apparent motive existed for the operators to attempt to alter leak rate test results by making unaccounted-for water or hydrogen additions (OI LR-1 at 1).
- (6) No evidence was developed to indicate that any licensed operator was either directed or pressured by supervisory or management personnel to manipulate RCS leak rate surveillance tests (OI LR-1 at 2; OI LR-1 Supp. at 1-2).
- (7) A significant amount of information was available to plant management at TMI-1 regarding the effect of hydrogen additions on RCS MUT level indication (specifically, preaccident TMI-1 plant maintenance work requests and the September 1980 Faegre & Benson Investigation Report on TMI-2). Despite this information, the root cause of this effect (the existence

of a loop seal in the MUT level instrument reference leg), was not discovered until the Region I special inspection in the summer of 1983. Memorandum from B. B. Hayes to T. E. Murley, April 16, 1984.

A detailed discussion of each of these conclusions and their supporting bases is presented in the following sections. Section 4.2.1 addresses conclusions 1, 2, and 3 and Sections 4.2.2 through 4.2.5 cover conclusions 4 through 7, respectively.

4.2.1 Whether Leak Rate Tests Were Deliberately Falsified

On the basis of the relatively small percentage of questionable test results identified by the Region I special inspection, the investigation attempted to determine whether or not there was a consistent pattern to the questionable test results and whether a motive existed for the operators and their supervisors to attempt to manipulate leak rate test results (memorandum from B. B. Hayes to T. E. Murley, April 16, 1984).

As part of the investigation, all preaccident and current TMI-1 control room operators (CROs), shift foremen, and shift supervisors, who actually conducted leak rate surveillance tests during the period under investigation, were interviewed under oath. In addition, a large number of preaccident and current staff personnel (operational, engineering, instrumentation and control (I&C), and maintenance) and site and corporate management officials were also interviewed (OI LR-1 Ex. 33-112; OI LR-1 Supp. Ex. 1-12).*

Every individual interviewed testified that they were not aware of any willful attempt on the part of any operator to alter RCS leak rate surveillance tests at TMI-1 by making unaccounted-for hydrogen or water additions to the MUT or by any other method. Every individual interviewed also testified that they were never involved in, condoned, or were aware of any systematic pattern of falsification of leak rate tests. OI LR-1 at 17-18; OI LR-1 Supp. at 1.

As discussed in Section 4.2.3 under motive, there were a number of differences that existed between TMI-1 and TMI-2 in the RCS leak rate test area that resulted in significantly less motivation for test falsification on Unit 1. These included a more accurate measurement capability, less restrictive TS leakage requirements, and lower leak rates at Unit 1 (OI LR-1 Ex. 21 at 11).

The Unit 1 Technical Specifications required, in part, that if unidentified RCS leakage (excluding normal evaporative losses) exceeded 1 gpm, the reactor should be placed in hot shutdown within 24 hours of detection (OI LR-1 Ex. 2 at 3-12). The 1 gpm value is a typical specification for pressurized water reactors (PWRs). The Technical Specifications also required that RCS leakage should be evaluated daily when RCS temperature was greater than 525°F (OI LR-1 Ex. 3 at 4-8). The procedure for conducting RCS leak rate tests was contained in Surveillance Procedure (SP) 1303-1.1 (OI LR-1 Ex. 4). The plant computer was normally used to compute RCS leak rates. The computer would calculate leak rates on the basis of a 1-to-8-hour time interval. The majority of operator testimony indicated that a leak rate test interval of 1 hour was normally

*Exhibits to the OI Supplemental Report are so indicated by "Supp. Ex."

selected (e.g., OI LR-1 Ex. 36 at 5; Ex. 38 at 5). All but two of the questionable leak rate tests evaluated in the Region I inspection report were conducted with a 1-hour test duration. Provided the plant is maintained in a steady-state condition for the entire test period, the error inherent in the leak rate calculation is reduced as the test duration is extended. OI LR-1 Ex. 17 at 26. During the time interval that the test was being run, the procedure cautioned the operators to avoid evolutions such as chemical additions and inventory changes to the RCS. However, if changes were made to the RCS inventory during the test, the known values of the changes were to be provided as additional input to the computer at the end of the test, before the final leak rate calculations were performed by the computer (OI LR-1 Ex. 4 at 3.0).

There were normally two licensed control room operators (CROs) and one shift foreman [senior reactor operator (SRO)] on watch at each unit. In addition, a shift supervisor (SRO licensed on both units) was also assigned to each shift and split his time between TMI-1 and TMI-2. One of the CROs was designated the "panel" or "console" operator and the other was assigned duties as the "switching and tagging" operator. The "switching and tagging" operator would normally be the operator who would interface with the plant computer to conduct the leak rate test. The operator at the panel was the individual who would control all operational evolutions, including water or hydrogen additions to the RCS MUT and feed-and-bleed operations. E.g., OI LR-1 Ex. 35 at 6.

Because the operator running the leak rate test was not the same operator at the console, it was necessary for the operator running the test to inform the console operator that the test was in progress and for him to avoid making any unnecessary changes to critical plant parameters (e.g., OI LR-1 Ex. 38 at 5). From testimony provided by operators, it is apparent that at times the operator conducting the test either forgot to tell the console operator that the test was in progress or that the console operator forgot the test was in progress and altered the steady-state condition of the plant in such a manner that the results of the leak rate test were affected without the knowledge of the operator conducting the test (e.g., OI LR-1 Ex. 36 at 8). In most cases, when this was detected, the operators would "invalidate" the test and start the leak rate test over again. (The discarding of invalid leak rate tests is discussed in Section 4.2.2.) The preponderance of sworn testimony by the operators indicated that when the plant was maintained in a steady-state condition, with no operator-induced changes, there was little problem getting valid leak rate test results that met the acceptance criteria of the Technical Specifications (e.g., OI LR-1 Ex. 39 at 10; Ex. 42 at 6; Ex. 44 at 7).

While the Technical Specifications required that RCS leak rate be determined every 24 hours, actual leak rate tests were conservatively run once per shift (every 8 hours) as a matter of routine. Therefore, even if the operators experienced some difficulty in obtaining a valid leak rate test on their shift because of plant conditions, they did not feel pressured by management or supervisory personnel to obtain a valid leak rate test because it could be performed on the next shift (e.g., OI LR-1 Ex. 41 at 18).

During the course of the interviews, operators were questioned at length regarding the three principal methods by which leak rate test results were

called into question (that is, unaccounted-for additions of water and hydrogen to the RCS MUT, and feed-and-bleed operations). Each of these is discussed below.

4.2.1.1 Hydrogen Additions

The addition of hydrogen to the RCS MUT was required periodically to limit the oxygen content in the RCS and to provide an increased net positive suction head for the RCS makeup pumps. The addition of hydrogen, theoretically, should not have affected MUT indicated level; however, because of the configuration and environment of the MUT level detection instrumentation system at TMI-1, water condensed and collected in the low-pressure reference leg. Under this condition, hydrogen additions to the MUT could cause a temporary increase in the indicated MUT level without actually adding water to the tank. Therefore, the addition of hydrogen at the appropriate time (after the initial data collection and before the final data readings) could affect the leak rate results in a nonconservative manner (that is, the calculated leak rate would be less than the actual leak rate) (OI LR-1 Ex. 1 at 27-28).

The RCS leak rate test procedure, SP 1303-1.1, prohibits the addition of chemicals during the test, although the procedure did not specifically identify hydrogen as a chemical. Some of the operators interviewed stated that they did not consider the addition of hydrogen to the MUT as a chemical addition prohibited by the procedure (e.g., OI LR-1 Ex. 35 at 39).

A review of the 12 hydrogen additions (including the combined hydrogen addition, water addition, and feed-and-bleed operation on January 6, 1979) disclosed that these additions were made only during two shifts, "A" and "D." Five CROs were identified as being involved in these additions and five shift foremen provided approval signatures on the associated RCS leak rate surveillance test calculation documents. OI LR-1 at 18. Four of the five CROs testified they were not aware of the effect of hydrogen additions on leak rate tests at the time. One CRO was aware of the effect (OI LR-1 at 18). Three of the five shift foremen testified that they were not aware of the effect of hydrogen additions on leak rate tests at the time. Two shift foremen were aware of the effect (OI LR-1 at 18-19; OI LR-1 Supp. Ex. 12 at 30).

A technical evaluation of the TMI-1 hydrogen additions was performed by IE Headquarters (OI LR-1 Ex. 21 at 2). Any hydrogen addition while the leak rate test was in progress, had potential to affect the leak rate calculations. However, this evaluation showed that to be most effective in reducing the indicated leak rate, the hydrogen additions would need to be made during the latter half of the leak rate test. The majority of the additions evaluated were not made near the end of the test. Those that were done near the end of the test were accomplished during a period when the actual leak rates were quite low; therefore, there would have been no reason to attempt to reduce the test results. In one case, the hydrogen was added right before the test began and any error caused by adding hydrogen at that time would tend to result in an increase in calculated leak rate. OI LR-1 Ex. 21 at 2-3. The possibility that the hydrogen additions were made at random (as a result of normal plant operations) was considered by IE. In reviewing copies of the strip charts for MUT level indication provided in the Region I inspection

report, IE identified three other hydrogen additions of similar short duration during periods where no RCS leak rate tests were being performed.* These additions would tend to support the claim of operators during OI interviews that similar hydrogen additions were made for legitimate operational reasons during normal plant operations (OI LR-1 Ex. 21 at 4).

It is not clear from operator testimony that the addition of hydrogen could always be accomplished from the control room alone during the period under investigation. Some testimony indicated that for safety reasons the hydrogen bottles were left isolated (valved-out) locally. In these cases an auxiliary operator (AO) would be sent to open the local valve first when the operator in the control room wished to add hydrogen. Because of this uncertainty regarding whether hydrogen was available to be added from the control room alone, some operators testified that they would check the valve lineup by opening the hydrogen addition valve from the control room and immediately shutting it again to see the effect on MUT pressure (e.g., OI LR-1 Ex. 35 at 36). Thus, this "testing of the valve lineup" provides a partial explanation of why only small amounts of hydrogen were added to the MUT during some of the leak rate tests.

Log entries were not normally made in the CRO's Log for hydrogen additions (e.g., OI LR-1 Ex. 76 at 54). Therefore, if the console operator inadvertently added hydrogen to the MUT during the performance of a leak rate test and forgot to inform the operator performing the test, there would be no way for either the operator performing the test or the shift foremen reviewing the test results to know that such an error had been made.

In summary, there were legitimate operational reasons why hydrogen was added to the RCS MUT periodically. The frequency of addition varied with plant conditions. Hydrogen additions were not routinely logged in the CRO's Log. Miscommunication between the operator conducting the leak rate test and the operator at the console could lead to inadvertent hydrogen additions being made during the performance of leak rate tests. A detailed review, by Region I of the MUT strip charts of 645 surveillance tests conducted during the period under investigation, identified only 12 occasions where hydrogen was added to the MUT during the performance of leak rate tests. While only 5 CROs and 5 shift foremen were involved in the 12 hydrogen additions, 4 of the CROs and 3 of the shift foremen testified at the time that they were not aware that hydrogen additions could impact leak rate test results. All 10 of the operators testified that they never added hydrogen to intentionally alter the results of leak rate tests. In addition, the IE evaluation of the 12 hydrogen additions concluded that none of the additions would have affected leak rates in such a way that if the additions were not made, the limits for RCS leakage would have been exceeded. On the basis of the information presented in the investigation, the staff finds that the evidence does not support a conclusion that the operators at TMI-1 intentionally added hydrogen to affect the results of RCS leak rate surveillance tests.

*A telephone conversation between NRR staff and Region I inspectors on June 6, 1984, confirmed that the MUT level indication strip charts for the 1-year period under investigation show numerous hydrogen additions of short duration during periods when no leak rate tests were in progress.

4.2.1.2 Water Additions

When water is added to the MUT during a RCS leak rate test (after the initial data set is taken, but before the final readings are taken), there will always be a reduction in the calculated leak rate unless the addition is properly accounted for in the calculations. The leak rate surveillance procedure, SP 1303-1.1, cautioned the operators to avoid the addition and removal of water from the RCS during the test; however, the procedure provided a data sheet for accounting for operator-caused changes to RCS inventory (OI LR-1 ix. 4 at 1.0 and 18.0). However, because of an error in the calculational procedure, the program did not account for water expansion as the cold water from the MUT (125°F) heated up in the RCS (579°F); consequently, even a correctly entered water addition would result in an error (OI LR-1 Ex. 1 at 37).

Administrative Procedure 1012, "Shift Relief and Log Entries," Section 3.3.11, required that log entries be made for the addition of boron or dilution of RCS boron concentration (OI LR-1 Ex. 7 at 7.0). Therefore, during the time period under investigation, water additions to the MUT should have been recorded in the CRO's Log.

By reviewing the MUT strip chart recorder traces of 645 surveillance tests performed during the period under investigation, the revised Region I inspection report identified 14 water additions to the MUT (this includes the combined hydrogen addition, water addition, and feed-and-bleed operation on January 6, 1979) that were made during periods in which RCS leak rate surveillance tests were in progress. Ten of the additions were not logged in either the CRO's or the Shift Foreman's Logs. Thirteen of the 14 additions were not factored into the leak rate calculations. The one addition that was included in the calculation did not account for the correct amount of water added. OI LR-1 Ex. 17 at 39. Both the revised Region I inspection report and the IE review of the Region I inspection report identified some additions where the water appeared to be added gradually (jogged) in several small steps, a procedure that could indicate an attempt to hide the addition (OI LR-1 Ex. 17 at 38; Ex. 21 at 4).

However, a review of the 14 water additions did not disclose any visible pattern regarding either a particular operator shift, CROs, or shift foremen (OI LR-1 at 19). A total of 12 different CROs and 7 different shift foremen were involved in the additions (OI LR-1 Ex. 19).

Recalculation of the leak rate data, taking into account these water additions, identified only three instances where the leak rate test results were affected in such a manner that, had these additions not been made, the calculated leak rate would have exceeded the TS acceptance criteria for unidentified leakage (OI LR-1 Ex. 17 at 38). These three additions were made by three different CROs approximately 1 month apart (April 30, 1978; May 26, 1978; and June 21, 1978). The leak rate surveillance tests that were performed during these additions were reviewed and approved by three different shift foremen.

The 19 operators involved, either as CROs or shift foremen, in the 14 water additions, along with other operational personnel who were interviewed, denied any knowledge of, or involvement in, any deliberate attempt to alter RCS leak rate surveillance test results by unrecorded and unaccounted-for water additions to the MUT. The interviewees did admit that water additions could have

been inadvertently made during the performance of RCS leak rate tests by the console operator failing to notify the operator conducting the surveillance test that water had been added. Additionally, the interviewees denied gradually adding water during leak rate tests. None of the operational personnel interviewed were aware of any incident in which unaccounted-for water additions were knowingly made and the leak rate surveillance tests were accepted as valid (OI LR-1 at 20).

In summary, out of the 645 leak rate surveillance tests reviewed, 14 showed evidence of water additions being made to the MUT during periods when leak rate tests were being conducted. Ten of these additions were not logged in either the CRO's or Shift Foreman's Logs. Operator testimony classified the failure to make log entries as an operational mistake. The leak rate surveillance procedure, SP 1303-1.1, required operator-induced inventory changes (for example, water additions) to be taken into consideration in the leak rate test calculations. Operator testimony characterized this as miscommunication between the console operator making the addition and the operator performing the surveillance test. While these actions appear to indicate an atmosphere of operational laxity and a failure by operators to comply with approved plant procedures, other facts identified in the investigation supported the argument that these additions were not intentionally made for the purpose of altering leak rate test results at TMI-1. Only 2% of the surveillance tests examined exhibited evidence of unaccounted-for water additions. Of these, only three cases were identified where the TS acceptance criteria would not have been satisfied had the additions not been made. There was no visible pattern of involvement by individual CROs or shift foremen in making the additions. The 14 additions involved 12 different CROs and 7 different shift foremen with no one individual being involved in more than 2 unaccounted-for additions. The sworn testimony of all operators was unanimous in stating that they never participated in, or were aware of, any unaccounted-for water additions knowingly being made for the purpose of altering RCS leak rate surveillance test results. On the basis of the information presented in the investigation, the staff concludes that the evidence does not support a finding that there was any willful or systematic pattern of falsification of leak rate surveillance tests at TMI-1 by unaccounted-for water additions during the period in question.

4.2.1.3 Feed-and-Bleed Operations

Feed-and-bleed operations are usually done to change the RCS boron concentration and the amount of coolant removed is normally equal to the amount added. Performing this operation during a RCS surveillance test would tend to reduce the accuracy of the leak rate test results; however, it would not be an effective means of reducing the measured leak rate unless the amount of coolant added exceeded the amount removed (OI LR-1 Ex. 21 at 6). The leak rate surveillance procedure, SP 1303-1.1, cautioned the operators to avoid boration or deboration while performing leak rate tests; however, the procedure provided a data sheet for accounting for operator-caused changes to RCS inventory (OI LR-1 Ex. 4 at 1.0, 18.0).

Administrative Procedure 1012, "Shift Relief and Log Entries," Section 3.3.11, required that log entries be made for the addition of boron or dilution of RCS boron concentration (OI LR-1 Ex. 7 at 7.0). Therefore, during the time period under investigation, feed-and-bleed operations should have been recorded in the CRO's Log.

The revised Region I inspection report identified 14 feed-and-bleed operations (including the combined hydrogen addition, water addition, and feed-and-bleed operation on January 6, 1979) that were conducted during periods in which RCS leak rate surveillance tests were in progress. Ten of the 14 operations were not logged in either the CRO's or Shift Foreman's logs. Only 1 of the 14 operations was taken into account in the leak rate calculations. OI LR-1 Ex. 17 at 15, 36.

The revised Region I inspection report did not provide the same detailed evaluation for the identified feed-and-bleed operations that it did for the hydrogen and water additions to the MUT. The report listed 14 uncompensated feed-and-bleed operations and, where possible, identified the corrected leak rate values. Nine of the tests were determined to be invalid and corrected leak rate values were not provided. The corrected leak rates for the five remaining feed-and-bleed operations showed that the TS acceptance criteria would not have been exceeded had the feed-and-bleed operations not been conducted (OI LR-1 Ex. 17 at 15 and 36).

The OI investigation report identified the feed-and-bleed operation that was conducted during the leak rate surveillance beginning at 0047 on May 12, 1978, as having a corrected leak rate value that exceeded the TS limit for unidentified leakage (OI LR-1 at 15). The narrative section of the Region I inspection report also supported this conclusion (OI LR-1 Ex. 17 at 7). However, the corrected leak rate for this evolution was stated as being 1.000 gpm (OI LR-1 Ex. 17 at 15). Section 3.1.6.2 of the TMI-1 TS for leakage states that "[i]f unidentified reactor coolant leakage (excluding normal evaporative losses) exceeds one gpm or if any reactor coolant leakage is evaluated as unsafe, the reactor shall be placed in hot shutdown within 24 hours of detection" (OI LR-1 Ex. 2 at 3-12). Thus, the recalculated leak rate was at the TS limit, but was not in violation of the TS acceptance criteria of greater than 1 gpm. IE Headquarters conducted a technical review of 13 of the 14 feed-and-bleed operations identified in the Region I inspection report. (The combined hydrogen addition, water addition, and feed-and-bleed operation evaluation was not included.) OI LR-1 Ex. 21 at 6-8. The review concluded that in only four cases could it be shown that the feed-and-bleed operations were effective in reducing the measured leak rates for the associated tests and that the corrected leak rates for these four were within the allowable limits.

Because no detailed technical evaluation of the feed-and-bleed operations was contained in the Region I inspection report, the OI interviews of the CROs and shift foremen involved in the feed-and-bleed operations concentrated on possible falsification of leak rates by the addition of water or hydrogen to the MUT. The operators were asked, however, if they were aware of any other method besides hydrogen and water additions that could be used to manipulate leak rate test results (e.g., OI LR-1 Ex. 33 at 67; Ex. 35 at 60; Ex. 74 at 42). None of the operators interviewed identified feed-and-bleed operations as a possible method for obtaining altered leak rate results. When the technical evaluation of the feed-and-bleed events was provided by IE, OI used this information in later interviews with five of the six shift supervisors (OI LR-1 Supp. Ex. 1 at 47; Ex. 2 at 39; Ex. 3 at 69; Ex. 4 at 75; and Ex. 5 at 47). Miscommunication between the operator performing the test and the operator conducting the feed-and-bleed operation was the only explanation

offered by the shift supervisors as to the reason why a feed-and-bleed operation would be conducted during the performance of a leak rate test (OI LR-1 Supp. Ex. 1 at 48; Ex. 2 at 40; Ex. 5 at 47).

A review of the 14 questionable feed-and-bleed operations did not disclose any visible pattern regarding particular operator shifts, CROs, or shift foremen. A total of 10 different CROs and 8 shift foremen were involved in these evolutions. No individual CRO was involved in more than two of the questionable tests and no shift foreman was involved in the approval of more than three of the affected tests. OI LR-1 Ex. 20.

In summary, out of the 645 leak rate surveillance tests evaluated, 14 showed evidence of possible feed-and-bleed operations during the periods when the leak rate tests were being conducted. Contrary to Administrative Procedure 1012, only four of these feed-and-bleed operations were logged in either the CRO's Log or the Shift Foreman's Log. The OI investigation did not determine the reason why these evolutions were not logged. Limited testimony, provided by the shift supervisors during this period, offered miscommunication between the console operator performing the feed-and-bleed operation and the operator conducting the leak rate test as a possible reason why such a situation could occur. The actions specified above appear to be additional examples of operational informality and failure to comply with approved plant procedures. However, other facts identified in the investigation tend to support the argument that these feed-and-bleed operations were not performed for the purpose of altering leak rate test results at TMI-1. Only 2% of the surveillance tests examined exhibited evidence of possible feed-and-bleed operations being done in parallel with leak rate testing. Of these, no cases were identified where the TS acceptance criteria would have been exceeded had these operations not been done. No visible pattern of involvement by individual CROs or shift foremen was identified. The sworn testimony of these CROs and shift foremen did not specifically address feed-and-bleed operations as a possible method for manipulating leak rate data. However, each was interviewed extensively on hydrogen additions and water additions to the MUT as other possible methods. Each of the operators denied being involved in any type of leak rate manipulation. On the basis of the information presented in the investigation, the staff concludes that the evidence does not support a finding that there was any willful or systematic pattern of falsification of leak rate surveillance tests at TMI-1 by operators manipulating test results through the conduct of RCS feed-and-bleed operations.

4.2.2 Discarding of Invalid Leak Rate Surveillance Tests

TMI-1 Technical Specification Table 4.1.2, "Minimum Equipment Test Frequency," required that RCS leakage be determined daily when the RCS temperature was greater than 525°F (OI LR-1 Ex. 3). Surveillance Procedure 1303-1.1, "RC System Leak Rate," was the approved procedure that governed how the leak rate tests were to be conducted (OI LR-1 Ex. 4). Testimony provided by operators identified that a more conservative test frequency was established than required by the Technical Specifications. The leak rate surveillance tests were routinely performed every shift (every 8 hours). E.g., OI LR-1 Ex. 72 at 6.

The surveillance procedure could be run either by using the plant computer or by performing hand calculations. In almost all cases, the computer was used

to perform the test during the period under investigation. OI LR-1 Ex. 17 at 16.

The test procedure included a specified test duration of 1 to 8 hours. During this period, the procedure included a precaution to avoid the addition and removal of water from the reactor coolant and makeup systems. Makeup or chemical addition to the makeup system and boration or deboration were listed as two of six evolutions that should not be conducted during the test. OI LR-1 Ex. 4 at 1.0. On initiation of the computer calculation, data was taken automatically from hard-wired, predesignated computer points. Manual actions required by the computer method were input specifications, such as test interval (normally 1 hour), and any identified leakage and any operator actions that would affect leak rate results, such as makeup water additions and reactor coolant drain tank (RCDT) pumping. OI LR-1 Ex. 17 at 16.

If, following completion of the leak rate test, the RCS leakage was in excess of the acceptance criteria, the procedure stated that the operator was to proceed as follows:

- 6.4.1 Perform another determination of RCS leak rate.
- 6.4.2 Insure that no unaccounted for operator action has occurred that would change the RCS inventory....If such an action has occurred, it invalidates the measurement. Enter this in the Remarks section of the data sheet, clearly describing the action that invalidated the measurement.

OI LR-1 Ex. 4 at 3.0.

TS 6.5, "Station Operating Records," required that records of periodic checks, tests, and calibrations be prepared and retained for a period of 5 years (OI LR-1 Ex. 5 at 6-5). The licensee's Administrative Procedure (AP) 1010, "Technical Specification Surveillance Program," required that when the surveillance tests were completed, the results were to be compared to the acceptance criteria. If any part of the result was unsatisfactory or if problems were encountered while performing the test, it was to be recorded on an "Exception and Deficiency" list, (OI LR-1 Ex. 6 at 9.0 and 10.0). AP 1012, "Shift Relief and Log Entries," required that the start and completion times be recorded (OI LR-1 Ex. 7 at 7.0).

The RCS leak rate test procedure utilized at TMI-1 during the year prior to the accident at TMI-2 contained several inadequacies. These would, in most instances, have calculated leak rate values that were less than the actual leak rates (OI LR-1 Ex. 1 at 6). Because of these errors in the test calculations, the surveillance test records frequently showed negative leak rate results. For example, leak rate test results for the months of May and June 1978 showed that almost 40% (48 out of 121) of the calculated and recorded unidentified leak rates had negative values (OI LR-1 Ex. 17, 12, 14). The leak rate procedure did not prohibit acceptance of test results showing negative leakage. Nevertheless, many of the operators testified that they normally would consider the test invalid if the calculated leak rates were more

negative than approximately -0.5 to -1.0 gpm (e.g., OI LR-1 Ex. 38 at 9; Ex. 48 at 19; Ex. 72 at 9).

The investigation determined, through sworn testimony by the preaccident operators, that it was common practice at TMI-1 to discard leak rate test results that were determined to be "invalid." Fourteen of the 18 CROs, 6 of the 8 shift foremen, 4 of the 6 shift supervisors, and the Supervisor of Operations all testified that they were aware of this practice (e.g., OI LR-1 Ex. 36 at 7; Ex. 75 at 8; Ex. 107 at 13; Supp. Ex. 5 at 10). Except for a former TMI-1 Plant Superintendent (J. O'Hanlon), none of the line managers responsible for TMI-1 stated that they were aware of the practice of discarding invalid leak rate tests [OI LR-1 (O'Hanlon) Ex. 58 at 21; (Seelinger) Supp. Ex. 9 at 13; (Miller) Ex. 106 at 22; (Lawyer) Ex. 104 at 38; (Herbein) Ex. 102 at 16].

According to testimony of the operators, there was no formal guidance provided by management for determining whether a leak rate test was classified as valid or invalid. However, most operators agreed that either large, positive leak rates that were not representative of what other plant instrumentation indicated or large, negative leak rates were routinely considered invalid (e.g., OI LR-1 Ex. 36 at 8; Ex. 44 at 7; Ex. 71 at 6). When an invalid leak rate test result was obtained, the operators would start a new leak rate calculation. When a valid leak rate result was obtained, the invalid test was thrown away. Invalid tests were not recorded in the log (as required by AP 1012); the reasons why the tests were considered invalid were not written in the remarks section of the data sheet (as required by SP 1303-1.1); problems encountered while performing the tests were not recorded on "Exception and Deficiency" reports (as required by AP 1010); and test results were not maintained on file for a period of 5 years (as required by TS 6.5.4).

The majority of operators testified that invalid leak rate tests were caused by several factors such as plant oscillations or transients during the test; operator actions, such as water additions or pumping of the reactor coolant drain tank; computer input error by the operator performing the test; instrument errors; and possible problems with the computer program itself (e.g., OI LR-1 Ex. 70 at 6; Ex. 75 at 7; Ex. 45 at 11; Ex. 33 at 16). The operators indicated that invalid leak rate tests were not indicative of actual plant conditions and, because the information obtained from the computer was in error, they did not believe it was required to be kept. For example, D. C. Janes, a shift foreman during the period under investigation, stated: "If there were obviously an error, our policy at the time was to retain the test that was bad and rerun it, and when we had a valid test, then we would discard the invalid one and submit the valid one....It seems to the best of my recollection that the operators and foremen at the time thought that the intent was to get an accurate leak rate. And if it was obviously way off, we felt that it was in had faith to turn it in." OI LR-1 Ex. 75 at 8, 9. None of the testimony indicated that the discarding of the leak rate tests that were deemed invalid, was done with an ulterior motive to conceal derogatory information about plant conditions from regulatory officials (OI LR-1 at 25).

Interviewees indicated that there was minimal difficulty in obtaining good leak rates. By and large, they considered the leak rate surveillance procedure to be a valid procedure. Except for one former CRO (J. C. Banks) (Ex. 33

at 16), the operators believed that the tests were reliable and consistent with the status of the plant and that they routinely experienced few problems in obtaining satisfactory leak rate tests. OI LR-1 at 25. However, it is apparent from interviews conducted with the CROs that the performance of RCS leak rate tests at TMI-1 was considered mundane and repetitive and that the actual performance of the tests was approached in a very perfunctory manner [memorandum from B. B. Hayes (OI) to T. E. Murley (Region I) dated April 16, 1984 at 2].

In summary, it appears, from the testimony taken during the investigation, that the practice of discarding what operators deemed invalid leak rates was common practice at TMI-1 as far back as any of the interviewees could recall. There was no formal written policy from supervisory or management personnel that either provided criteria for determining the validity of leak rate results or directed that invalid leak rate tests be discarded. Not logging all tests, not providing proper justification and documentation for invalid tests, and not retaining the invalid test results are violations of plant Technical Specifications and approved plant procedures. However, the evidence does not support a finding that operators were either performing these actions as a deliberate attempt to conceal actual leakage that was in violation of TS acceptance criteria or attempting to conceal this information from the NRC.

4.2.3 Whether There Was a Motive for Leak Rate Falsification

An important element in trying to determine whether there was leak rate test falsification at TMI-1 similar to that which was alleged to occur at TMI-2 was to determine whether there was a motive or need to manipulate leak rate results at TMI-1.

The IE Headquarters review of the Region I inspection report discusses several key differences between TMI-1 and TMI-2 (OI LR-1 Ex. 21 at 8-10). These differences may be summarized as follows:

- (1) At Unit 2 the wrong water density was used in the computer calculation of the identified leakage collected in the reactor coolant drain tank (RCDT). As a result, any time that the identified leakage exceeded approximately 2.5 gpm, the computer should have, theoretically, calculated an unidentified leakage rate in excess of the allowable 1 gpm limit, even if the actual unidentified leakage was zero. For the majority of time, during the last four months of operation of TMI-2 the identified leakage did exceed 2.5 gpm. OI LR-1 Ex. 21 at 8.
- (2) Both TMI-1 and TMI-2 used a temperature versus RCS density conversion table in their computer programs that only went up to 582°F. This was not a problem for Unit 1 because RCS temperature rarely exceeded 582°F. Unit 2 operated at a higher temperature than this for about a third of the tests reviewed by IE. This deficiency introduced an error of approximately 1 gpm into the results of those tests which exceeded 582°F (OI LR-1 Ex. 21 at 9).
- (3) At Unit 1, RCS losses to certain connecting systems such as the RCDT, were not considered leakage and, thus, were subject to the limit for

leakage plus losses of 30 gpm. For Unit 2, these losses were considered to be identified leakage and, therefore, subject to a limit of 10 gpm. OI LR-1 Ex. 21 at 9.

- (4) The Unit 1 limit for unidentified leakage was 1 gpm after subtracting an evaporative loss factor of 0.51 gpm. The Unit 2 limit did not include an evaporative loss factor. OI LR-1 Ex. 21 at 9.
- (5) The final significant difference between Unit 1 and Unit 2, pointed out by IE, was that the actual leak rates at TMI-1 were lower. Therefore, Unit 1 could tolerate a larger measurement error before calculating an unacceptably high value. OI LR-1 Ex. 21 at 9, 10.

The Region I inspection report identified several procedural inadequacies associated with the TMI-1 leak rate procedure. However, these inadequacies would, in most cases, have lead to a less conservative leak rate calculation (that is, the calculated leakage would have been less than the actual leakage) OI LR-1 Ex. 1 at 6, 22-24.

The consensus of testimony provided by operators and supervisory personnel classified TMI-1 as a "tight" plant in terms of leakage. Operators experienced minimal difficulty obtaining acceptable leak rate test results (e.g., OI LR-1 Ex. 41 at 15; Ex. 44 at 13; Ex. 76 at 76; Ex. 77 at 18; Supp. Ex. 1 at 8; Supp. Ex. 2 at 3-11). As discussed in Section 4.2.2, when invalid leak rates were obtained, operators identified the problem in most cases as being caused by plant oscillations or operator-induced errors. None of the operators, supervisory personnel, or management officials interviewed were aware of any actual leak rate problems at TMI-1 during the period under investigation.

In summary, the investigation does not support a finding that there was a motive or need to cheat on leak rate tests at Unit 1 as appears to have been the case at Unit 2. The recalculation of leak rates by Region I and IE Headquarters did not identify actual leak rate problems for Unit 1 during the 1-year period that was evaluated. On the basis of the technical analysis performed by IE and Region I, combined with the sworn testimony of the operators and management personnel, the staff concludes that there was no apparent motive or need to falsify leak rates at TMI-1.

4.2.4 Whether There Was Management Involvement in Any Leak Rate Falsification

As stated in Section 4.1, the purpose of this investigation was to determine if there was a systematic pattern of falsification of RCS leak rate surveillance test data by operators at TMI-1 and, if so, to what extent licensee's management was cognizant of and/or involved in such activities. This section addresses the latter half of this question.

On the basis of the information presented in Sections 4.2.1 through 4.2.3, the staff has concluded that the evidence does not support a finding that there was any willful or systematic pattern of manipulation or falsification of leak rates at TMI-1. In addition, there was no apparent motive for operators to manipulate leak rate tests. The operators experienced only minimal difficulty performing leak rate tests and obtaining results within the allowable TS limits. The investigation did identify apparent violations of the

Technical Specifications and approved plant procedures by operators not logging all tests, not providing proper justification and documentation for invalid tests, and not retaining test results deemed to be invalid. This latter practice was common and known to be occurring at the time by the majority of CROs, shift foremen, shift supervisors, and the Supervisor of Operations. However, the evidence did not identify that these actions were being performed either as a deliberate attempt to conceal actual leakage that was in violation of the Technical Specifications or to conceal this information from the NRC.

During each interview, licensed and unlicensed CROs were specifically questioned regarding real or perceived pressure from supervisory or management personnel to obtain valid leak rate tests. They were also asked if they were ever directed to perform any actions that would result in the manipulation or falsification of leak rate data by either supervisory or management personnel. Other than the normal pressure placed on the operators to do all things right, testimony by CROs was unanimous that they were never directed by any supervisor or management official to manipulate test data in any matter. None of the operators testified that they felt undue pressure by supervisory or management personnel to obtain leak rates that were within the TS limits. E.g., OI LR-1 Ex. 33 at 23; Ex. 35 at 47; Ex. 36 at 17; Ex. 38 at 30; Ex. 39 at 15; Ex. 40 at 16; Ex. 41 at 18; Ex. 43 at 35.

Similar testimony was obtained from the SROs who were assigned as shift foremen and shift supervisors during the period under investigation. These supervisory personnel stated that they were never pressured to manipulate or obtain good leak rates at TMI-1 by any management official (e.g., OI LR-1 Ex. 71 at 34; Ex. 72 at 31; Ex. 74 at 39; Supp. Ex. 1 at 18; Supp. Ex. 4 at 32; Supp. Ex. 6 at 22). In like manner, TMI station management and corporate management officials also were interviewed under oath. Each of these interviewees (e.g., Arnold, Herbein, Miller, Ross, and Shipman) stated that they neither directed nor were aware of any undue influence placed upon TMI-1 operators or supervisory personnel to manipulate leak rate tests for the purpose of obtaining good leak rate results at TMI-1 (e.g., OI LR-1 Ex. 97 at 23; Ex. 102 at 27; Ex. 106 at 51; Ex. 107 at 73; Ex. 109 at 27).

In summary, there is no basis identified in the investigation that would support the conclusion that management or supervisory personnel placed pressure on the operators at TMI-1 to manipulate or falsify leak rate test results.

4.2.5 Followup on Makeup Tank Level Indication Problems

On April 16, 1980, the law firm of Faegre & Benson was contracted by Met-Ed to direct an investigation of allegations made by H. W. Hartman, Jr., after WOR-TV, New York, broadcast an interview with him on March 24, 1980. Hartman alleged that leak rate test results were intentionally manipulated for the purpose of obtaining results within the TS limits at TMI-2. He stated that one of the techniques utilized by operators at TMI-2 to alter leak rate results was to add hydrogen gas to the makeup tank (MUT) during the performance of test. OI LR-1 Ex. 113 at 1.

According to the Faegre & Benson Report dated September 17, 1980:

Under operating conditions, there is no theoretical reason why hydrogen added to the make-up tank even during the performance of a leak rate test would improve the results. Because Hartman had alleged that hydrogen additions were used to improve the results, we reviewed the make-up tank system to see whether any abnormalities might permit this effect to occur.

We discovered that a loop existed in the dry-reference leg tubing which runs from the top of the make-up tank to the make-up tank level sensing instrument. The configuration of the loop is such that any condensation which might gather at the bottom of the loop could form a water plug. Such a water plug, because its density is greater than the density of hydrogen, would distort the effect of pressure changes in the make-up tank which occur when hydrogen is added. Assuming the existence of a water plug, increases in hydrogen overpressure would increase indicated water level in the make-up tank even though the make-up tank water level remained the same. Thus, increases in hydrogen overpressure during a leak rate test could decrease the calculated unidentified leakage in some cases.

OI LR-1 Ex. 113 at 42, 43.

On July 11, 1983, as part of the Region I inspection of reactor coolant leak rate tests at TMI-1, the inspector discovered the existence of a similar loop seal in the dry reference leg of the MUT level instrumentation at TMI-1. Subsequently, the inspector, accompanied by a licensee representative, verified that the U loop (loop seal) in the dry leg was more than 4 feet in height (OI LR-1 Ex. at 30). Followup tests conducted by the licensee and Region I inspectors on July 28, 1983, confirmed that the addition of small amounts of hydrogen to the MUT could, under the proper conditions, cause indicated level in the MUT to increase (OI LR-1 Ex. 1 at 31, 32). As discussed in Section 4.2.1.1, the addition of hydrogen at the appropriate time during leak rate testing can affect the leak rate results in a nonconservative manner.

The OI investigation developed testimony regarding two subtopics related to the loop seal. First, during the preaccident period, was the licensee aware of the existence of the loop seal on TMI-1? Second, if the licensee was not aware of the existence of the loop seal on TMI-1 in the preaccident period, why had the existence of the loop seal not been identified by the licensee following the publication of the Faegre & Benson Report?

Evidence existed, during the period under investigation, as documented in maintenance work requests, that there were periodic problems with MUT level indication (OI LR-1 Ex. 11-15). Entries on these work requests indicated that some members of the plant staff were aware of the effect of water condensation in the low pressure leg of the level instrument. A conclusion can be drawn from the testimony of the operational personnel, instrumentation and control (I&C) technicians, and the plant engineering staff that site personnel failed in the preaccident period to recognize that the collection of water in

the dry reference leg and the resultant problem with the MUT level recorder resulted from the existence of the loop seal in the sensing line. Except for periodic draining of the dry reference leg, when a work request was submitted, the licensee did not formally analyze the problem to determine its root cause. OI LR-1 at 22.

During the postaccident period, the licensee's own internal investigation into the Hartman allegations enumerated leak rate test discrepancies and abnormalities at TMI-2, including the identification of a loop seal on the dry reference leg of the MUT level instrument system. Several management personnel were questioned to determine whether the licensee tried to ascertain if the TMI-2 problems pointed out in the Faegre & Benson Report were equally applicable to TMI-1. The majority of these individuals testified that TMI-1 leak rate procedures and hardware were examined as a result of the report; however, the existence of the loop seal was not identified until discovered by the Region I inspection on July 11, 1983. OI LR-1 at 24.

On the basis of the information identified during the investigation, OI has concluded that a significant amount of information was available to plant management regarding the hydrogen effect as a result of the loop seal in the RCS MUT at TMI-2 and its apparent cause and effect on leak rate surveillance tests. Despite this information, no affirmative actions were initiated to determine if the potential existed for the same problem at TMI-1 until the NRC Region I inspection.

The staff concludes that, in hindsight, there was information available to the licensee that could have led to the discovery of the loop seal before July 1983. However, because approximately half of the operators testified that they were aware of the effect of hydrogen additions on MUT level, the exact cause or mechanism that allowed this phenomenon to occur is not considered significant in determining whether leak rate tests were falsified at TMI-1.

4.3 Staff Findings

On the basis of an independent review of the information contained in Investigation Report 1-83-028, "Three Mile Island Nuclear Generating Station (NGS) Unit 1 - Possible Falsification of Reactor Coolant System Inventory Leak Rate Tests," and its exhibits, the staff concludes that the evidence does not support a finding that leak rate surveillance tests at TMI-1 were intentionally or systematically falsified during the period investigated. The staff notes, however, that it is impossible to exclude the possibility that individual operators may have attempted to manipulate test results for some unknown reason. The specific staff findings discussed earlier in this section are summarized below.

- (1) Only a small percentage (5.9%) of the 645 leak rate surveillance tests that were conducted at TMI-1 between the period April 1, 1978, and March 31, 1979, and that were examined by Region I, were accomplished during periods when operator-induced evolutions occurred that would call into question the validity of these tests. These include 38 unaccounted-for hydrogen and water additions to the MUT and feed-and-bleed operations. See Section 4.1.

- (2) Of the 38 questionable tests, technical analyses by Region I and IE Headquarters, show that, except in three instances, the TS acceptance criteria for unidentified leakage would have been satisfied had the operator-induced evolutions not occurred. This represents only 0.5% of the 645 test records examined. See Section 4.1.
- (3) There is no conclusive evidence to indicate that any TMI-1 licensed or unlicensed operator intentionally performed plant evolutions during leak rate testing with the intended purpose of manipulating or falsifying leak rate results. There is also no pattern of specific operator involvement in the questionable tests. The 38 questionable tests involved 12 of 16 licensed and unlicensed CROs and all 10 shift foremen.

The example that would come the closest to showing a pattern would be shift D in which two CROs (P. Chalecki and P. Wooddell) and their Shift Foreman (D. Janes) were involved in 9 of the 38 tests. These tests involved four hydrogen additions, two water additions, two feed-and-bleed operations, and one combined hydrogen addition, water addition, and feed-and-bleed operation during periods when leak rate tests were being conducted. Both Janes and Wooddell have testified that they were unaware of the effect of hydrogen additions on leak rate test results, while Chalecki stated he was aware of the effect and was told not to make hydrogen additions during leak rate testing. All three operators admitted the possibility that accidental additions could have been made during these tests; however, each denied, under oath, that they ever performed any type of evolution to intentionally affect the outcome of leak rate tests. None of the nine tests involving these operators had recalculated leak rates in excess of the TS acceptance criteria.

During the period under investigation, there were six rotating shifts assigned at TMI-1. Therefore, it is reasonable to assume that these operators performed approximately 1/6 of the 645 tests examined or 108 tests. Thus, the nine questionable tests involving these operators represents only approximately 8% of the leak rate tests performed by these individuals. See Section 4.2.1.

- (4) There was no apparent motive or need to manipulate leak rate tests at TMI-1. Operators experienced only minimal difficulty in conducting leak rate tests. In most cases, operators attributed any difficulty in performing the tests to either miscommunication between the panel operator and the operator performing the leak rate test or to failure to maintain steady-state conditions during the period the leak rate data was being obtained. As a result of the calculation inadequacies in the leak rate program, negative leak rate results were often obtained. Technical analyses by Region I and IE Headquarters supported the fact that there was no actual leak rate problem at TMI-1 during the period investigated. See Section 4.2.3.
- (5) The investigation did not identify any evidence that would indicate supervisory or management personnel placed pressure on the operators at TMI-1 to manipulate or falsify leak rate test results. See Section 4.2.4.

- (6) It was common practice, during the period under investigation, for operators to discard what were deemed "invalid" leak rate test results. There was no formal written policy from supervisory or management personnel that either provided criteria for determining the validity of leak rate results or directed that invalid leak rate tests be discarded. This practice was apparently known and condoned by plant supervisory and management personnel up to the level of Manager of Plant Operations for TMI-1 (M. Ross). Testimony of the former TMI-1 Superintendent (J. Seelinger), Station Superintendent (G. Miller), and Metropolitan Edison Vice-President of Generation (J. Herbein) indicated that they were not aware, at the time, that operators were discarding invalid leak rate tests at TMI-1. While the practices of not logging all surveillance tests, not providing proper justification and documentation for invalid tests, and not retaining the invalid tests are violations of plant Technical Specifications and approved plant procedures, the evidence developed during the investigation does not support a finding that the operators were either performing these actions as a deliberate attempt to conceal actual leakage that was in violation of the TS acceptance criteria or to conceal this information from the NRC. See Section 4.2.2.
- (7) On June 26, 1984, the staff received the licensee's report entitled "TMI-1 Reactor Coolant Inventory Balance Testing" (Stier Report). The staff performed a review of the report (including appendices) and finds that the conclusions of the Stier Report are consistent with the staff's evaluation of the TMI-1 leak rate issue presented in Section 4.2 with the exception of two points: First, with respect to the design configuration of the MUT level indication, the Stier Report claims the installation of a drain valve on the low point of the "loop seal" at TMI-1 is a major difference between TMI-1 and TMI-2. This valve allows draining of condensation from the loop seal, rendering the effect of hydrogen additions to the MUT at TMI-1 negligible. The staff disagrees. Approximately half of the operators at TMI-1 testified that they were aware of the effect of hydrogen additions on MUT level. Thus, while the drain valve was installed, the frequency of its use is not clear. During an OI investigation, I&C technicians were interviewed regarding maintenance on the MUT level instrumentation. It was established that work requests were initiated by operations personnel because of erratic behavior of the MUT level indication. However, the corrective action did not include using the drain valve to remove condensate from the reference leg (Stier Report at 32). Also, no regularly scheduled preventive maintenance program was established to ensure that condensation was drained from the loop seal at a frequency sufficient to preclude hydrogen additions from having an effect on MUT level indication. The Stier Report argument that the TMI-1 level instrument is not defective because of the existence of a drain valve is moot because condensation and/or valve leakage collected in the reference leg causing erratic MUT level indication. Second, the Stier Report claims it was unable to confirm any of the hydrogen additions and could confirm only 3 of the 14 water additions and 5 of the 14 feed-and-bleed operations. The staff agrees with the Stier Report in that the method of identifying water additions and hydrogen additions to the makeup tank is necessarily subjective (Stier at 53), and, therefore, disagreement in interpretation can be expected. The staff considers its evaluation of the IE inspection and the OI investigation sufficient to conclude that the preponderance of evidence does

not support a finding that leak rate test results were intentionally manipulated at TMI-1. In sum, the staff agrees with the statement in the Stier Report that "even if all the suspected additions had, in fact, taken place, they would have involved such an insignificant number of tests that no inference of test manipulation could reasonably be drawn" (Stier at 60).

5.0 HARTMAN ALLEGATIONS AND RELATED SAFETY CONCERNS

5.1 Background

In May 1979, H. W. Hartman, Jr., a former control room operator (CRO) at TMI-2, made allegations to the NRC regarding improper and unsafe conduct on the part of operating personnel at TMI-2 before the accident. Hartman's allegations included the following three issues:

- (1) Some operators at TMI-2 falsified reactor coolant system (RCS) leak rate surveillance test data to provide test results that were within the allowable acceptance criteria of the TMI-2 Technical Specifications (TS).
- (2) On one occasion, while performing a reactor startup, the reactor went critical before reaching the procedurally established lower control rod limit for criticality. A startup rate inhibit alarm was received, a source range startup rate meter reading of three decades per minute (dpm) was observed, the shift supervisor directed actions that were in violation of procedures, and a new estimated critical position (ECP) was computed subsequent to startup to satisfy the administrative and recordkeeping requirements.
- (3) Surveillance tests performed on the emergency feedwater (EFW) pumps frequently yielded suction, discharge, and flow rate values that did not meet the acceptance criteria. Further, Hartman alleged that each time they were unable to obtain test results that fell within the acceptable limits, inservice testing engineers would develop new reference values (based on the results of the previous test) so that the surveillance test results on the next test were within the allowable acceptance criteria of the Technical Specifications.

OI Hartman Ex. 1 at 4, 10, 12.

Hartman's allegations first came to public attention on March 24, 1980, when WOR-TV in New York broadcast an interview with Hartman on "What's Happening America." In addition to discussing the leak rate and ECP issues, it was implied during the interview that Hartman was harassed and finally forced to resign as a result of voicing his concerns about faulty plant safety equipment and violations of plant operating procedures. OI Hartman Ex. 1 at 15; Ex. 2 at 1.

On March 22, 1980, at the request of IE Headquarters, Region I commenced a special investigation into the Hartman allegations. The investigation identified an additional allegation that was not raised by Hartman: before the accident at TMI-2, a shift supervisor, concerned about leakage from the pressurizer relief and safety valves, allegedly requested permission from the load dispatcher to shut down the plant for repairs; permission was denied. OI Hartman Ex. 1 at 14.

The Region I special investigation into the Hartman allegations proceeded, unimpeded, until April 10, 1980, when TMI-2 control room operators refused to participate in further interviews except under subpoena. Efforts were underway to obtain subpoenas when, on April 28, 1980, the records and investigation were turned over to the Department of Justice (DOJ). At the request of the DOJ, the NRC investigation effort was then suspended. OI Hartman Ex. 1 at 3.

At a Commission meeting on May 24, 1983, the Commission directed Region I to provide a summary status of its suspended, special investigation and for OI to reopen the investigation into the Hartman allegations. Region I provided its summary status of the suspended investigation in a memorandum (OI Hartman Ex. 1) from T. T. Martin (Region I) to H. H. E. Plaine (OGC) dated June 3, 1983. OI reopened the investigation on June 27, 1983.

A separate issue related to the Hartman allegations involves the licensee's investigation into the matters raised by Hartman and the licensee's failure to report, on a prompt and timely basis, the report of that investigation. This issue also is addressed in this section.

The following sections provide a detailed discussion of each of the seven issues.

<u>Section</u>	<u>Issues</u>
5.2	TMI-2 Leak Rate Falsification
5.3	Estimated Critical Position
5.4	Emergency Feedwater Pump Surveillance Testing
5.5	Request to Shut Down TMI-2 to Correct Leakage
5.6	Hartman's Resignation
5.7	Reporting of the Faegre & Benson Investigation Report

5.2 TMI-2 Leak Rate Falsification

5.2.1 Investigation Results on TMI-2 Leak Rate Falsification

As discussed in the introduction to this section, the Region I special investigation into the Hartman allegations began on March 22, 1980. The specific allegations made by Hartman related to TMI-2 leak rate falsification that were investigated by Region I may be summarized as follows:

- (1) The pressurizer code safety valves were leaking for at least 3 months before the accident.
- (2) The computer program used for computing RCS leak rates was unreliable, frequently yielding unrealistic results, and it became more difficult to get "good leak rates" as the date of the accident approached.
- (3) The records of RCS leak rate tests, which documented failures to meet the acceptance criteria of the Technical Specifications, were thrown away.
- (4) The operators at TMI-2 were under pressure to get acceptable leak rate test results.

- (5) Some operators at TMI-2 manipulated the RCS leak rate test results by (a) entering the wrong data into the computer, (b) adding gas to the makeup tank, (c) adding water to the makeup tank and not entering that data into the computer, and (d) leaking water into the makeup tank while performing a water transfer operation involving other tanks.

OI Hartman Ex. 1 at 4.

As discussed earlier, the Region I special investigation into the Hartman allegations was suspended at the request of DOJ. At that time, a substantial amount of information had been gathered by the investigation team (see Attachment 3 to OI Hartman Ex. 1). After April 28, 1980, the Region I investigation team efforts were directed toward record analysis, documentation of findings, and supporting DOJ. OI Hartman Ex. 1 at 3.

At a Commission meeting held on May 24, 1983, the Commission directed Region I to provide a summary status of its suspended investigation and the Office of Investigation to reopen the investigation of the Hartman allegations in parallel with DOJ. On June 3, 1983, in a memorandum from T. T. Martin (Region I) to H. H. E. Plaine (OGC), the requested summary status was provided. The TMI-2 leak rate investigation conclusions were stated as follows:

- [1] One or both Pressurizer Code Safety Valves were leaking prior to the accident, but not at rates in excess of the Technical Specification limits.
- [2] Both the Computer Program and the Hand Calculation Procedure for Reactor Coolant System Leak Rate Tests were inadequate, did yield unbelievable numbers, and did make it more difficult to get good results as the date of the accident approached. Members of licensee management were aware of some errors in the test calculations and the difficulty of getting good leak rates, but failed to take appropriate timely action to resolve Operator concerns.
- [3] Records of failed Reactor Coolant System Leak Rate Tests were thrown away in violation of TMI-2 Technical Specification 6.10.1.d.
- [4] Contrary to the commitment contained in the narrative of LER 78-68/1T, appropriate personnel were not adequately instructed in the requirements of applicable sections of the Technical Specifications or in the requirement to immediately invoke Technical Specification Action Statements when the associated Limiting Condition for Operation is not met.
- [5] Licensee management failed to establish an environment where everyone knew that compliance with procedures and license conditions was a condition of employment.
- [6] Some licensed Operators did add Hydrogen gas to the TMI-2 Makeup Tank, during the performance of Reactor

Coolant System Leak Rate Tests, for the purpose of falsifying test results.

- [7] No evidence was found or developed which confirmed or refuted the alleged practice of attempts to falsify leak rate test results by directly inputting the wrong data to the computer typewriter.

OI Hartman Ex. 1 at 8, 9.

As directed by the Commission, OI reopened the TMI-2 leak rate investigation on June 27, 1983; however, because of the constraints by the ongoing DOJ criminal action, the investigation was limited to screening interviews of auxiliary operators and members of the plant engineering staff. Further interviews were planned following DOJ's investigation.

On November 11, 1983, DOJ announced that a Federal grand jury in Harrisburg, Pennsylvania, returned an 11-count indictment charging the Metropolitan-Edison Company with criminal misconduct arising out of the TMI-2 leak rate falsification issue. On February 28, 1984, Met-Ed pleaded guilty to one count of the criminal indictment and nolo contendere to six additional counts. The remaining four counts were dismissed by the government as part of the plea agreement. The court accepted the plea agreement on February 29, 1984.

In the prosecuting attorney's Statement of Facts that was read into the record as part of the trial settlement, three Met-Ed management personnel above the level of shift supervisor were implicated in acts of wrongdoing: J. R. Floyd (TMI-2 Supervisor of Operations), J. Seelinger (TMI-2 Supervisor of Technical Support from January 1977 to November 1978) and G. Kunder (TMI-2 Superintendent of Technical Support from December 1978 through TMI-2 Accident). The involvement of J. G. Herbein (Vice-President for Generation) and/or G. P. Miller (Station Manager) was also alleged. Several senior operations personnel (i.e., shift supervisors and shift foremen) also were identified as having been knowledgeable of, or implicated in, improper activities. In addition, four control room operators (CROs) admitted knowing, observing, or personally manipulating leak rate tests to obtain acceptable leak rate test results. The evidence presented to the grand jury and developed by the U.S. Attorney did not indicate that any of the directors or officers of GPUN, from the time of its organization in 1982 to the date of the indictment, or any of the directors of Met-Ed, during the period covered by the indictment, participated in, directed, condoned, or were aware of the acts or omissions that were contained in the indictment. See Licensee's Notice to Commission, Appeal Board, Licensing Board and Parties dated March 2, 1984, Enclosure 2, Statement of Facts Submitted by the United States (Statement of Facts).

On March 23, 1984, the Commission was briefed by OI on the status of the ongoing investigations related to TMI-1 restart. The Commission provided the following guidance regarding OI's TMI-2 leak rate investigation:

- [1] OI will not duplicate matters resolved in the criminal trial.

- [2] OI is to present all Hartman material to NRR. NRR is to screen the material and refer back to OI any matters that warrant further investigation.
- [3] OI is to identify in its report to the Commission any individuals that might be culpable or may have had knowledge of the falsification of TMI-2 leak rate data.
- [4] OI is to determine if TMI management created a climate that encouraged leak rate falsification to occur, including interviewing Mr. Ross [current TMI-1 Supervisor of Operations], if necessary.

See memorandum from S. J. Chilk (SECY) to B. B. Hayes (OI) and W. J. Dircks (EDO) dated April 2, 1984.

As directed by the Commission, NRR reviewed the available materials concerning the TMI-2 leak rate investigation during April 9 through 13, 1984. The available material included 136 leak rate tests conducted at TMI-2 during the period September 1978 through March 1979 and other data necessary to support the analyses of the leak rate tests. Notes and statements of operators from NRC interviews in 1980 also were available. In addition, material gathered by OI after reopening the TMI-2 leak rate investigation in June 1983 also was available. This material included screening interviews with auxiliary operators, interviews with members of the plant engineering staff, and interviews with some of the dual-licensed operators. OI assisted NRR in identifying and extracting the relevant material from the available records. Additional documentation was provided by OI to DOJ for use during the grand jury proceeding and subsequent criminal trial; however, that material is part of the grand jury proceeding record and has not been released to the NRC. See memorandum from H. R. Denton (NRR) to B. B. Hayes (OI) dated May 3, 1984.

As directed by the Commission, the NRR review did not duplicate matters resolved by the criminal trial. Because the prosecuting attorney's Statement of Facts cleared all directors and officers of the current GPUN organization, no review of corporate involvement was conducted. The involvement of five former Met-Ed management personnel was identified in the Statement of Facts. However, Herbein, Miller, Seelinger and Floyd are no longer involved in activities regulated by the NRC. Kunder, while no longer licensed or involved in TMI-1 restart, is currently employed by GPUN as Manager, TMI-2 Safety Review Group. The staff position regarding Kunder is addressed in Section 13.0 of this report.

At the time of the NRR review, the TMI-1 leak rate investigation field work was complete and the investigation report was in preparation. On the basis of preliminary TMI-1 leak rate investigation results, it was felt that manipulation or falsification of leak rate data at TMI-1 did not occur. On the basis of its subsequent review of the TMI-1 leak rate investigation (see Section 4.0), NRR concluded that none of the operational or management personnel at TMI-1 were involved in culpable activities or had knowledge of falsification of TMI-2 leak rate data.

For the reasons discussed above, NRR's detailed review of the TMI-2 leak rate materials focused on those individuals who were either licensed on TMI-2 or held a dual license for TMI Units 1 and 2 before March 1979. Of the 35 individuals in this category, NRR recommended further joint NRR/OI investigation of some individuals. None of the individuals recommended for further investigation are currently involved in TMI-1 restart activities. Following NRR's review and recommended course of action regarding these individuals, the Commission was briefed on the matter and concurred in the proposed action.

5.2.2 Staff Findings on TMI-2 Leak Rate Falsification

The staff accepts, as fact, the prosecuting attorney's Statement of Facts, read into the record as part of the trial settlement, that five Met-Ed management personnel were involved or implicated in the indictment. The five individuals identified were: J. G. Herbein, Vice-President for Generation; G. P. Miller, Station Manager; J. R. Floyd, Supervisor of Operations for TMI-2; and J. Seelinger and G. Kunder, Superintendents of Technical Support TMI-2. The prosecuting attorney's Statement of Facts also identified individuals who were not implicated in the government's indictment. These individuals included ATT current directors and officers of GPUN.

The Statement of Facts does not address the issue of M. J. Ross, the current TMI-1 Supervisor of Operations. On the basis of the staff's review of the TMI-1 and TMI-2 leak rate investigations, the staff concludes that no evidence exists that Ross was implicated in either hydrogen or water additions during leak rate testing. No testimony offered by others during interviews implicated Ross in actual wrongdoing or in pressuring operators to obtain acceptable leak rate tests. There is also testimony by other dual-licensed operators indicating that Ross was a stickler for detail and followed procedures. Ross was interviewed under oath by OI on January 25, 1984. During that interview, he stated that he may have performed leak rate tests only once or twice while on shift. It is clear from the testimony provided by Ross and others that Ross spent very little time in the control room at TMI-2 before the accident. Ross stood the minimum required watches to maintain his license (i.e., 4 hours per month at TMI-2). On the basis of the OI investigations, the staff concludes that Ross was not involved in any wrongdoing with respect to leak rate manipulation at TMI-2.

As a result of the criminal trial settlement and on the basis of the NRC investigation, it has been established that four CROs at TMI-2 have admitted knowing of, observing, or personally performing manipulations of leak rate tests to obtain acceptable test results. Therefore, the staff finds that leak rate test results were manipulated intentionally for the purpose of obtaining results within TS limits at TMI-2. It also has been established that because of the existing TMI-2 plant conditions, it was extremely difficult for operators to obtain satisfactory leak rate test results. Thus, a motive existed to manipulate leak rate tests by the addition of either water or hydrogen to the makeup tank in order to meet leak rate requirements for continued operation of the facility. On the basis of these facts, the staff finds that TMI management was responsible for the operational environment that was permissive of poor performance and had loose standards that led to

conditions that motivated some operators to falsify leak rate tests. Follow-up action regarding some licensed operators is being handled separately from this proceeding.

The staff findings that falsification of TMI-2 leak rate tests occurred and that negligence on the part of management created, in part, the circumstances that resulted in leak rate falsification, raise questions concerning Met-Ed character or management integrity. These findings are addressed in Section 13.0 as part of the staff's overall position on management integrity.

5.3 Estimated Critical Position

5.3.1 Investigation Results of Estimated Critical Position

During an interview conducted by IE with H. W. Hartman, Jr., on May 22, 1979, Hartman alleged that on one occasion, while performing a reactor startup at TMI-2, the reactor went critical before reaching the procedurally established lower control rod limit for criticality as calculated in the estimated critical position (ECP). Hartman alleged that during the startup: a startup rate inhibit alarm was received; a 3-decade-per-minute (dpm) startup rate was observed on the source range startup rate meter; Shift Supervisor, B. A. Mehler, directed actions that were in violation of procedures; a new ECP was computed after the startup; and the numbers in the ECP were somehow "fudged" to make it right. OI Hartman Ex. 1 at 10.

The only TMI-2 reactor startup that matched the alleged shift composition, time of day, and time of year occurred on April 13, 1978 (OI Hartman Ex. 1 at 10). According to Hartman, the shift composition at the time of the startup included B. A. Mehler (Shift Supervisor), K. R. Hoyt (Shift Foreman), R. R. Booher (CRO), J. M. Kidwell (CRO), and Hartman (CRO). OI Hartman Ex. 2 at 167-168. Hartman recalled that his shift was assigned to take the reactor critical and proceed to 15% of rated power by the end of the shift (0700). According to Hartman, an ECP calculation had been done before the startup by Booher. It was given to Hartman before the startup; however, Hartman stated "things got busy, and I didn't have time to review it." Id. at 172. Hartman recalled that the Booher's calculations estimated the reactor would go critical at a control rod height of 52% withdrawn on Group 6/7. On the basis of the Booher ECP, the lower control rod window for criticality was 32% withdrawn on Group 6/7 according to Hartman's statement. Hartman accepted Booher's ECP and commenced the reactor startup. Id. at 173.

The next significant event that Hartman recalled during the startup was actuation of a high startup rate control rod inhibit alarm.* Hartman says he did not notice the rapid increase in the source range count rate because, at the time, he was watching the back panel to see whether Group 5 rods were fully withdrawn. When the control rod inhibit alarm was received, Hartman stated he observed the source range detector was registering a startup rate of 3 to 3.5 dpm. Id. at 175. At the time of the control rod inhibit,

*The control rod inhibit function prevents all control rods from being further withdrawn and is actuated when either the startup rate reaches 2 dpm on the source range neutron detector or 3 dpm on the intermediate range detector.

Hartman stated Group 6/7 rods were about 28% withdrawn. This was 4% below Booher's lower window of 32%. Hartman stated that when the control rod inhibit took effect, he began to insert the control rods. Hartman says he began inserting rods based on the "CAUTION" statement given in the "Approach to Criticality" operating procedure. This procedure requires that if the reactor goes critical before the lower window calculated in the ECP, the reactor should be taken subcritical (with a 1% shutdown margin) and a new reactivity balance (ECP) performed, before reinitiating the startup. Id. at 176. Hartman stated that shortly after commencing control rod insertion, he was told by Mehler to stop inserting rods and continue the startup. Hartman recalled Mehler telling him: "You just continue to start going up to 10 to the minus 8 amps. We will refigure another ECP. . . . We have to be at 15 percent power in the morning." Id. at 177. At Mehler's direction, Hartman continued the startup without further incident. Id. at 178. Hartman logged the reactor critical at 10^{-8} amps at 0158 in the Control Room Operator's Log on April 28, 1978 (Id. at 188).

During Hartman's interview on April 29, 1980, with the law firm of Faegre & Benson, Hartman was questioned as to whether he believed that Mehler's statement, "We will refigure another ECP," referred to another calculation that Mehler had already performed or whether it referred to recalculating the ECP at some point in the future. Hartman responded, "it was a fact that they didn't have one, and that they recalculated an ECP after criticality." Id. at 178. According to Hartman, shortly after the incident, Hoyt recalculated the ECP and submitted it to Mehler for signature. Hartman stated that he witnessed Mehler signing the document at about 0200 (i.e., after the startup). The record copy of Hoyt's ECP shows Hoyt's signature at 0045 and Mehler's approval signature at 0100 (i.e., before the startup). Id. at 179. Hartman stated that he saw the original Booher ECP in the wastepaper basket before the end of that particular shift. He does not know who threw it away. Id. at 180.

The Hartman allegations, described above, were investigated by IE (OI Hartman Ex. 1) and by GPU (Faegre & Benson) (OI Hartman Ex. 2). The IE investigation found that the neutron flux trace for the startup of April 23, 1978, was consistent with the alleged control rod operations described by Hartman. That is, the trace showed a period of rod withdrawal terminating at a point of maximum startup rate, a short period of rod insertion, and then rod withdrawn and settling out at about 10^{-8} amps in the intermediate range, before pulling rods to heatup. OI Hartman Ex. 1 at 10. The IE analysis of the neutron flux trace indicated that a maximum indicated startup rate of about 1.5 dpm occurred during the startup.* This calculated value is below the source and intermediate range for the startup rate rod withdrawal inhibit alarm set points of 2 and 3 dpm, respectively. This value also is significantly below the 3-to-3.5-dpm startup rate Hartman alleged he observed during the startup.

*NRR staff note: This startup rate was based on a 2-inch-per-hour chart speed and the slope of the neutron flux trace using a straightedge; it thus represents the average startup rate over a period of time and not the peak startup rate that may have occurred.

During the investigation, IE requested printouts from the TMI-2 utility typewriter and the alarm computer from Met-Ed. No printout sheets for the period April 22 and 23, 1978, could be located. Thus, the existence or nonexistence of the rod withdrawal inhibit alarm could not be confirmed. Id.

The IE investigation located only one calculation of the ECP for the startup of April 23, 1978 (the Hoyt ECP). The data used in the calculation was available before startup and, therefore, may have been performed before the alleged event. During the course of its investigation, IE interviewed Mehler, Hoyt, Booher, and J. R. Floyd (Supervisor of Operations for TMI-2) concerning the startup of April 23, 1978. Each of these individuals denied any knowledge of criticality outside procedural limits, the alleged sounding of the startup rate rod withdrawal inhibit alarm, the alleged directed violation of procedures, and the alleged "fudging" of an after-the-fact ECP calculation. Id. at 10, 11.

The overall conclusion by IE regarding these allegations was that the physical records of the reactor startup during the mid-shift on April 23, 1978, bore a strong resemblance to the alleged event. However, key elements such as the alarms, startup rates, alleged rod position at peak startup rate,* the recorded entry into Mode-2 operations, and the availability of data supporting Hoyt's ECP calculation challenges the plausibility of the alleged event (Id. at 11).

The Faegre & Benson investigation into the events of April 23, 1978, is quite thorough and detailed. However, other personnel in the control room that evening (Mehler, Hoyt, Booher, and Kidwell) were represented by counsel at the time in connection with government investigations of the Hartman allegations and were unavailable to Faegre & Benson to interview for the purpose of confirming or rebutting Hartman's version of the events. Thus, the reconstruction of events of April 23, 1978, was based solely on Hartman's statements. OI Hartman Ex. 2 at 070.

Some of the principal conclusions reached by Faegre & Benson may be summarized as follows:

- (1) The general sequence of events as described by Hartman could have occurred. The report concludes that an initial criticality probably occurred in the source range at about the time (0141) Hartman indicated and that a rod withdrawal inhibit alarm seems to have occurred shortly after that criticality. Id. at 211-212.

*NRR staff note: Lack of data on alarms prevents a finding on whether a high startup rate rod inhibit signal occurred or not. An analysis of neutron trace records does not preclude a high startup rate (e.g., a high startup rate is possible at low counts in the source range where background noise would result in masking the rate of change of counts on the neutron flux strip chart).

- (2) No violations of the TMI-2 Technical Specifications occurred, assuming that Hartman's data as given in his April 29, 1980, interview with Faegre & Benson is relatively accurate (Id. at 212).
- (3) The Hoyt ECP calculation was not "fudged," as Hartman originally stated. Hartman verified during his April 1980 interview with Faegre & Benson that it is an accurate calculation. Thus, one of Hartman's most serious allegations that the numbers were arbitrarily changed to validate what had already occurred, was determined to be unfounded (Faegre & Benson at 52).
- (4) On the basis of Hartman's 1980 recollection of the Booher ECP input data (boron concentration and rod positions), Booher's ECP value was found to be marginally incorrect for plant conditions at the time the logged criticality occurred (0158). However, different values for xenon concentration can be obtained for use in a given ECP calculation; thus, different ECPs may result. OI Hartman Ex. 2 at 212.
- (5) On the basis of three specific scenarios, Faegre & Benson concluded that certain reactor startup procedure steps may have been violated. Depending on what the operators actually knew at the time and assuming that the Booher ECP did exist, the report concluded that:
 - (a) If Mehler knew of the ECP value calculated by Hoyt before the first criticality at 0141 (as his signature on the Hoyt ECP (0100) would indicate), then Mehler should not have allowed Hartman to use the Booher ECP, or, as a minimum, Mehler should have delayed the startup until the discrepancy between the two ECPs was resolved and the correct ECP given to Hartman for use in the startup. Similar actions should have been taken by the Shift Foreman (Hoyt), who calculated the ECP and signed the document at 0045.
 - (b) If the Hoyt ECP was not calculated until after the first criticality at 0141, then both Mehler and Hoyt signed their names to the document indicating a time which was approximately 1 hour earlier than the actual calculation was performed, as alleged by Hartman.
 - (c) If Mehler did not know the Booher ECP was incorrect and the reactor was taken critical at 0141, then criticality was achieved at a control rod height below the procedurally established lower limit as calculated in the Booher ECP. In this case, the procedural requirement to take the reactor subcritical with a 1% shutdown margin was not performed until after the control rod inhibit function was initiated. In addition, a new reactivity balance (ECP) should have been calculated at that point before reinitiating the startup. Id. at 212-213.
- (6) In general, independent of the scenarios described in item (5) above:
 - (a) A reactor startup rate greater than the 1 dpm allowed by the procedure occurred as a result of improper plant monitoring.
 - (b) Proper communications among fellow CROs and supervisors seemed to be lacking.

- (c) Logging of unexpected events in either the CRO's Log, the Shift Foreman's Log, and/or the relevant procedure signoff sheets was not performed.
- (d) Proper filing of all required data sheets, the alarm computer printout, and alternate ECPs was not evident.

Id. at 214.

- (7) On April 23, 1978, Hartman made an entry in the CRO's Log and signed off on certain procedural steps that appear to contradict statements made in his testimony (Id. at 214-217).
- (8) An entry made by Hartman at 0135 that the reactor had entered Mode 2 with Group 6/7 at 18% withdrawn, is consistent only with Hoyt's ECP. This evidence supports the argument that the Hoyt ECP not only existed at the time of the first criticality, but that Hartman knew about it and was using it at the time of the startup. Faegre & Benson at 55.*

In summary, Faegre & Benson found that the event, as described by Hartman, could have happened and is consistent with the objective data. The Hoyt ECP was not "fudged" and it is an accurate reflection of the conditions at TMI-2 at the time of the planned criticality. No violation of the Technical Specifications occurred, assuming Hartman's version of the events is generally accurate. A number of specific startup procedures were not followed and most scenarios suggest that the shift lacked the following control room disciplines:

- (1) proper review of an ECP calculation with an authorized approval
- (2) maintenance of a proper startup rate at all times
- (3) logging of unexpected events
- (4) filing of procedures, data sheets, and ECP calculations

Faegre & Benson at 55, 56.

5.3.2 Staff Findings on Estimated Critical Position

On the basis of interviews conducted with Hartman by IE and Faegre & Benson and on the basis of the neutron flux trace record for the TMI-2 startup of April 23, 1978, Hartman's allegations appear plausible, and the staff concludes that the startup scenario, as described by Hartman, likely occurred.

However, Hartman's statement that the ECP of record (Hoyt's calculation) was generated shortly after the plant reached criticality for the second time (at 0158) and that the numbers were arbitrarily changed ("fudged") to support the actual critical rod height, proved to be partly unfounded. Hartman's original allegation, that the numbers were "fudged" was not based on Hartman's

*NRR staff note: Hartman stated that the times of significant events were recorded on a separate sheet of paper during the startup and that his log entries were made later in the shift. His log entry for entering Mode-2 operations was made after the fact and was based upon Hoyt's ECP. OI Hartman Ex. 3 at 220-222.

review of the document. During his interview with Faegre & Benson on April 29, 1980, Hartman reviewed the Hoyt ECP in detail for the first time. As a result of that review, Hartman concluded that the ECP calculation was technically correct. The Hoyt ECP was within 1% of the actual critical rod height on the morning of April 23, 1978. However, whether the ECP was calculated by Hoyt at 0045 (as indicated by his signature on the document) or whether it was calculated shortly after the startup, as alleged by Hartman, could not be resolved. A technically valid ECP could have been calculated at either time. In addition, there is no independent evidence that the Booher ECP existed except as alleged by Hartman.

The IE investigation included interviews with the other control room personnel involved in the startup (Mehler, Hoyt, and Booher). Each of these individuals denied all allegations made by Hartman concerning the event. The Faegre & Benson investigation, while very thorough and technically sound, was handicapped by the investigators being unable to interview these same individuals. The staff concludes that the findings of the Faegre & Benson Report show that, as a minimum, loose watchstanding practices likely contributed to poor communications and misunderstandings between control room personnel during startup on April 13, 1978.

On the basis of the evidence developed by both investigations, it is not possible to conclude that procedural violations did occur or that procedural violations did not occur. In any event, these issues are moot with respect to management integrity in that none of the individuals involved are currently in positions responsible for the operation or the supervision of operation at TMI-1. Currently, Mehler is the manager, Radwaste Operations at TMI-1; Hoyt is the Supervisor, Radiological Field Engineering for TMI-2; Booher is a licensed Senior Reactor Operator at Waterford 3; and Hartman is no longer employed in the nuclear industry.

With respect to questions concerning the individual integrity of these employees, the staff believes that it would be improper and possibly factually incorrect to impugn their integrity on such weak and conflicting evidence.

5.4 Emergency Feedwater (EFW) Pump Surveillance Tests

5.4.1 Investigation Results on EFW Pump Surveillance Testing

During interviews conducted by IE with H. W. Hartman, on May 22, 1979, and March 26, 1980, Hartman alleged that surveillance tests performed on the EFW pumps frequently yielded suction, discharge, and flow rate values that did not meet the acceptance criteria of the surveillance procedure. Further, Hartman alleged that each time they were unable to obtain test results that were within the allowable acceptance criteria, new acceptance criteria (reference values) were developed by the inservice testing engineers. The new reference values were based on the results from the previous test. OI Hartman Ex. 1 at 12.

The essence of Hartman's allegation was that the reference values used in the surveillance procedure were frequently changed to make the measured values fall within the acceptable tolerance values stated in the acceptance criteria. As part of the IE investigation effort, a review of the test

procedure and the records of completed test results was conducted to determine conformance with the ASME Code* and TMI-2 Technical Specification requirements. The IE investigation established that operators at TMI-2 did frequently experience difficulty in meeting the acceptance criteria of Surveillance Procedure 2303-M27 A/B, "Motor Driven Emergency Feedpump Functional Test and Valve Operability Test." This was confirmed by Hartman's Shift Foreman, K. R. Hoyt, and the Supervisor of Operations for TMI-2, J. R. Floyd. Id.

IE identified deficiencies in the procedure itself and in the way the procedure was performed. Specific procedural inadequacies included:

- (1) requiring the isolation of both trains of EFW simultaneously
- (2) referencing nonexistent subsection and paragraphs
- (3) requiring certain valves to be reopened that were never shut during the test sequence
- (4) failing to address the testing of all valves covered by the scope of the procedure
- (5) failing to require the recording of certain critical test instrument readings
- (6) attempting to control both independent and dependent variables simultaneously
- (7) allowing inappropriate delay in declaring equipment inoperable when test acceptance criteria were not met

Id.

Before August 27, 1978, the instrument used to measure differential pressure across the pump did not meet either the procedural requirements or the ASME Code. Several completed test records lacked required information on test instrument identification, test data, or names of individuals performing or approving test results. Id. In addition, some of the pump operability tests resulted in data that did not meet the acceptance criteria of the test. However, while IE's investigation identified a significant number of the deficiencies related to this procedure, it did not identify inadequacies in the way changes were made to the reference values. The test records revealed that analyses of test results, which did not meet the acceptance criteria, were conducted by the licensee and appropriate corrective actions were taken. Where changes were made to the reference criteria, the changes satisfied the requirements of the ASME Code. Id.

IE concluded that licensee management did not adequately review and approve various revisions to the EFW pump surveillance procedure and that procedural

*ASME Boiler and Pressure Vessel Code, Section XI, Subsection IWP and IWV, "Inservice Testing of Pumps and Valves in Nuclear Power Plants."

recordkeeping requirements were not met on at least three occasions between September 1977 and March 1979. However, they also concluded that with respect to test results that did not meet the acceptance criteria, proper analysis and corrective actions were taken. No objective evidence was found that tampering with the test results or reference values occurred. Changes made to reference values met regulatory requirements. Id. at 13.

5.4.2 Staff Findings on EFW Pump Surveillance Testing

IE's investigation confirms Hartman's original allegation that the surveillance tests performed on the EFW pumps frequently yielded data that did not meet the specified acceptance criteria. New acceptance criteria were established when previous values could not be met. However, the changes that were made to the acceptance criteria (i.e., reference values) were made after review and analysis by the inservice testing engineers and these changes satisfied the appropriate requirements of the ASME Code. Deficiencies were identified in the surveillance procedure and in the way the procedure was performed and documented. In a transcribed interview on March 26, 1980, Hartman indicated that he had no basis for concluding that the inservice testing engineers were intentionally manipulating the data in any deceitful manner. The staff finds that Hartman's concern that it was difficult to run these procedures without getting results outside of the allowable acceptance criteria was valid. While IE concluded that the licensee's review, evaluation, and implementation of revised reference values was technically correct, it is apparent that the bases for those changes were not communicated to the operators conducting the tests. Thus, Hartman was not aware that these changes were technically sound. The review of the TMI-1 procedure for EFW pump surveillance testing has not yet been completed. It is currently under review by Region I as part of the licensee's Restart Test Program.

5.5 Request to Shut Down TMI-2 To Correct Leakage

5.5.1 Investigation Results on Request To Shut Down TMI-2 To Correct Leakage

During the course of IE's investigation into the Hartman allegations, control room personnel being interviewed alleged that before the TMI-2 accident, a specific shift supervisor (J. J. Chwastyk) was concerned with high pressurizer relief and safety valve leakage and had requested permission from the load dispatcher to shut down the plant for repairs. This permission was allegedly denied. OI Hartman Ex. 1 at 14. While not the source of the allegation at the time of the IE investigation, on August 22, 1979, C. F. Mell, former CRO in training at TMI-2, was interviewed by staff members of the U.S. Senate, Subcommittee on Nuclear Regulation of the Committee on Environment and Public Works. During this interview, Mell stated that sometime shortly before the accident at TMI-2, he believed, one of the shift supervisors had telephoned the load dispatcher to request permission to shut down TMI-2 for repairs. Mell indicated that the repairs were associated with the leaking pressurizer code safety valves or the PORV. Mell indicated that the load dispatcher had denied permission for Unit 2 to shut down. OI Hartman Ex. 5.

J. J. Chwastyk, Mell's Shift Supervisor before the accident, was interviewed regarding the allegation. Chwastyk denied that he had ever made such a

request. Chwastyk indicated that he was concerned about the leakage problem and stated that he may have suggested that the unit should come off the line. He stated it was not his responsibility to take the unit off-line for repairs. He would bring that type of suggestion to the attention of J. B. Logan (TMI-2 Plant Superintendent) or G. P. Miller (TMI Station Superintendent). Chwastyk indicated that the shift supervisor, with good reason, could make the decision to take the unit off-line "unilaterally." In an emergency, the unit would be taken off-line immediately; however, if a shutdown was required and time permitted, Chwastyk indicated he would contact Logan or J. R. Floyd (Supervisor of Operations for TMI-2) first and call Miller prior to initiating the shutdown. OI Hartman Ex. 6.

The IE investigation determined that procedures were in effect before the accident that required permission from the dispatcher to shut down the unit for a planned maintenance outage or reduction in station load. (The same form also is filled out to document forced outages.) OI Hartman Ex. 1 at 14. Requests for planned or maintenance outages are sequentially numbered and copies are kept by the load dispatcher and the plant. During 1979 six "Generating Equipment (Or Reduction) Outage Requests" for TMI-2 were identified by the licensee. Each was sequentially numbered from 79-1 through 79-6. The last request, number 79-6 dated March 6, 1979, requested a power reduction to 65% for a one-half hour duration to allow for turbine valve testing. The request was not completed and subsequently cancelled. Id. The last official request document on file with the load dispatcher was numbered 79-5, dated February 10, 1979. Id.

5.5.2 Staff Evaluation

On the bases of the information discussed above, the staff concludes that there is no reliable evidence to support the allegation that a request was made to the dispatcher by Chwastyk to shut down TMI-2 for reactor coolant system leakage repairs and that his request was denied. Concerns expressed by operating personnel regarding leakage from the PORV and/or code safety valves before the accident is discussed in detail in Section 8.3 of this report.

5.6 Termination of H. W. Hartman, Jr.

5.6.1 Investigation Results

On March 30, 1979, Hartman and other TMI employees returned from a Babcock and Wilcox Company (B&W) training course. While at the TMI Observation Center, Hartman told G. Hitz (TMI-2 CRO) that he did not think he was going to be in after his assigned days off. OI Hartman at 4. Hartman telephoned J. Floyd, the TMI-2 Operations Supervisor later that day to resign and said he would submit a written resignation when he returned to work after his scheduled days off (Id.). Hartman's resignation was written on April 5, 1979, and backdated to reflect resignation as of March 30, 1979 (Id. at 5).

The Faegre & Benson investigation found that Hartman actually submitted a written resignation on March 30, 1979, to be effective April 13, 1979. After his days off, Hartman returned to the site and indicated his desire to withdraw his resignation. At that point, Met-Ed advised him that he would

have to undergo psychological evaluation to determine if he could resume his job as CRO (Id.). Hartman agreed to have this evaluation performed by Dr. S. Lecker of Corporate Stress Control Services, Inc. (Stress Control), on April 12, 1979 (Id.). During the psychological evaluation, Hartman answered "true" to the statement: "I have used alcohol excessively" and, in response to another questionnaire, he stated he would like to "control my drinking better." As a result, Dr. Lecker concluded, "While I do not think Mr. Hartman is an alcoholic, he has had a need to resort to the use of this substance to deal with his stress." Id. Ex. 2 at 6.

Following the Stress Control evaluation, Dr. Lecker orally advised Met-Ed that Hartman was not equipped to take the pressure/stress of a job at a nuclear facility (OI Hartman at 5). As a result of this finding, Hartman was not recommended for control room access and hence was not offered employment; that is, his resignation was accepted (Id. at 6).

Hartman's deposition dated August 18, 1982, associated with the GPU v. B&W lawsuit, provided additional information. Hartman was diagnosed as having "labile hypertension" by a psychologist (not a physician). This hypertensive condition is directly related to periods of high anxiety. After the anxiety is removed, the hypertension goes away. Id. Ex. 4 at 277. His blood pressure reading was 180 over 110 when he left employment at Met-Ed at the age of 30 (Id. at 5). Hartman felt "he could not take it any more" (Id. at 6). Hartman said that his earlier comments about being "hassled" were related to startup and test operation (and apparently not to the circumstances surrounding his resignation). Id. at 5.

As mentioned in Section 5.1 of this report, Hartman's allegations first came to public attention on March 24, 1980, when an interview with Hartman was broadcast on station WOR-TV in New York during the show "What's Happening America." During this interview it was implied that Hartman was harassed and ultimately forced to resign as a result of raising safety concerns about plant safety equipment.

5.6.2 Staff Findings on Hartman's Termination

The staff concludes that Hartman was not forced to resign because of harassment or intimidation for having raised safety concerns. While the record concerning Hartman's removal is somewhat sketchy and contains some contradictory information, the contradictions are primarily limited to the sequence of time during which certain events occurred.

Hartman took issue with the way in which his WOR-TV interview was edited. He felt that the station tended to "exaggerate and . . . glorify" his concern and felt that his statements were taken out of context (Id. Ex. 2 at 2, footnote). Also, in a signed and sworn statement given on March 26, 1980, Hartman said, "I feel I was forced to resign but not because of safety issue[s] I had raised but I feel it was because of my hypertension."

The staff, therefore, concludes that (1) Hartman was not constantly harassed and threatened about losing his job for expressing his concerns as was implied on "What's Happening America"; (2) Hartman's job was not in jeopardy because he voiced complaints; and (2) Hartman had voluntarily resigned on

March 30, 1979. Id. Ex. 1 at 15. The staff finds that there was no impropriety in the employment termination of Hartman.

5.7 Reporting of the Faegre & Benson Investigation Report

The background of this issue was provided to the Commission in a June 29, 1983, memorandum from the EDO to the Commission. In short, after the Hartman allegations were made public, the licensee retained a law firm, Faegre & Benson, on April 16, 1980, to conduct an investigation into the Hartman allegations. The investigation report, entitled "Results of Faegre & Benson Investigation of Allegations by Harold W. Hartman, Jr., Concerning Three Mile Island Unit 2," is dated September 17, 1980. At a meeting on March 21, 1983, between R. C. Arnold of GPUN and members of the NRC staff team reviewing the GPU v. B&W lawsuit record, Arnold referred to a GPU investigation into the Hartman allegations and noted that GPU was considering giving the investigation report to the DOJ (which was also investigating the matter).

As discussed in the EDO memorandum of June 29, 1983, the Faegre & Benson Report was subsequently forwarded by GPU to DOJ and through DOJ to the NRC with the request from DOJ that NRC maintain the report in confidence. In early April of 1983, the NRC received a copy of the report directly from GPU with no limits placed on its use. The Faegre & Benson Report was discussed at the Commission meeting of March 30, 1983, and the staff was requested to examine whether any reporting requirements were violated by GPU's submittal of the report in 1983, nearly 3 years after the report had been finalized.

The staff also was requested to determine whether the depositions of Hartman taken in the GPU v. B&W lawsuit on July 16 and August 18, 1982, should have been submitted to the NRC. The depositions were received by the staff on March 21, 1983, following a specific request to GPU.

In the EDO memorandum of June 29, 1983, the staff examined these questions and drew the following conclusions:

- (1) The creation of the Faegre & Benson Report and the Hartman depositions themselves did not appear to give rise to any new reporting obligation under the plant Technical Specifications or a specific Commission regulation.
- (2) The Faegre & Benson Report and the Hartman depositions do not expand the scope of the allegations, resolve any of the allegations, or add substantially to the information of which the NRC was aware. Therefore, there is insufficient basis to support a finding that a "reasonable agency expert" would have been influenced, thus no material false statement by omission was made.
- (3) In light of the matter being adjudicated in the TMI-1 restart proceeding, including the Hartman allegations, the licensee should have made a Board notification concerning the Faegre & Benson Report and the Hartman depositions.

OI did not conduct a further inquiry into the circumstances surrounding the reporting of the Faegre & Benson Report and the Hartman depositions

in connection with its investigation of TMI-2 leak rate falsification. Thus, the staff's conclusions as discussed in the EDO memorandum of June 29, 1983, remain the basis for the staff's evaluation of this issue today. In the staff's view, the licensee failed to make a timely Board notification concerning the Faegre & Benson Report and the Hartman depositions.

5.8 Conclusion

The results of the staff's review of the Hartman allegations and other related safety issues are documented throughout Section 5. The principal conclusions drawn by the staff are summarized as follows:

- (1) The staff finds that falsification of TMI-2 leak rate tests occurred and that negligence on the part of management created, in part, the circumstances that resulted in leak rate falsification. See Section 5.2.
- (2) The staff finds it is not possible to conclude whether procedural violations did or did not occur during the reactor startup at TMI-2 on April 13, 1978, as alleged by Hartman. In any event, the issue does not raise questions concerning management integrity. See Section 5.3.
- (3) The staff finds that Hartman's concern that it was difficult to perform EFW pump surveillance testing and obtain results within the allowable acceptance criteria was valid. While IE's investigation concluded that the licensee's review, evaluation, and implementation of revised reference values was technically correct, it is apparent that the bases for those changes were not communicated to the operators conducting the tests. See Section 5.4.
- (4) On the bases of the information available, the staff concludes there is no evidence to support the allegation that before the accident at TMI-2, a shift supervisor requested permission from the load dispatcher to shut down the plant for repairs because of high leakage from the pressurizer safety and relief valves and that that permission was subsequently denied by the dispatcher. See Section 5.5.
- (5) The staff finds that Hartman was not harassed or threatened about losing his job for voicing his concerns about safety issues. Hartman had voluntarily resigned. There is no evidence of impropriety by management in the termination of Hartman. See Section 5.6.
- (6) The staff also finds that the licensee failed to make a timely Board notification concerning the Faegre & Benson Report on the Hartman allegations and certain depositions by Hartman. See Section 5.7.

The conclusions concerning TMI-2 leak rate falsification and failure to make a timely Board notification concerning the Faegre & Benson Report are material to the staff's overall assessment of management integrity and are addressed in Section 13.0.

6.0 BETA AND RHR REPORTS

6.1 Background

In January 1982, GPUN retained Basic Energy Technology Associates, Inc. (BETA), to conduct a review of current and projected manpower and overall cost expenditures for the TMI-1 and Oyster Creek nuclear plants. In June 1982, GPUN retained Rohrer, Hibler and Replogle, Inc. (RHR), to assess the attitudes of licensed reactor operators at TMI-1 and Oyster Creek. BETA forwarded its report to GPUN on February 28, 1983. RHR submitted its report to GPUN on March 15, 1983. OI BETA/RHR at 1, 8-9.

On April 22, 1983, H. D. Hukill of GPUN informed an NRC inspection team conducting a special inspection at TMI-1 at that time of the existence of these two reports. On April 25, 1983, the team requested and received copies of the reports with the understanding that they would be returned after review and would not be released to the public. The reports were reviewed and returned during the week of April 25th. OI BETA/RHR at 9-10.

During a May 3, 1983, conference call among several NRC employees to discuss the significance of these reports to the current inspection, J. R. Goldberg (OELD) raised a concern about the reportability of the BETA and RHR Reports as information relevant and material to issues involved in the TMI-1 restart proceeding. On May 4, 1983, H. L. Thompson (NRR) directed the inspection team to obtain and review copies of these reports. OI BETA/RHR at 3, 10; BETA/RHR Ex. 17 at 2.

Between May 5 and 9, 1983, Goldberg had telephone conversations with E. Blake and G. Trowbridge, counsel for GPUN in the TMI-1 restart proceeding, concerning the reportability of the BETA and RHR Reports as a Board notification to the Commission and the ASLAB. After examining the reports, counsel for GPUN informed Goldberg of their opinion that the information within the reports was not "relevant and material" and that GPUN was not obligated to make a formal notification in the restart proceeding. BETA/RHR Ex. 17 at 2.

A meeting was held with GPUN and their consultants, BETA and RHR, on May 9, 1983, at the request of the NRC staff to discuss the BETA and RHR Reports. During this meeting, H. R. Denton (NRR) urged R. C. Arnold (GPUN) to provide the two reports to the Commission and the ASLAB as a Board notification in the TMI-1 restart proceeding. Arnold maintained that the reports were not relevant and material and thus did not warrant a Board notification. Denton made it clear that if GPUN did not provide the reports as a Board notification, the NRC staff would. On May 10, 1983, Blake informed Goldberg that a Board notification would be made by GPUN, but not until GPUN obtained supplemental letters from BETA and RHR that explained the purpose of the studies. These letters would be transmitted as part of the Board notification. The BETA and RHR Reports, together with the two supplemental letters, were provided to the Commission and the ASLAB on May 16, 1983. BETA/RHR Ex. 17 at 3-4; OI BETA/RHR at 4, 12-13.

On June 2, 1983, the Commission requested the staff to review the contents of the BETA and RHR Reports and provide the results to the Commission and ASLAB. In October 1983, the staff issued Supplement No. 4 to NUREG-0680, which contained the staff's evaluation of the contents of the BETA and RHR Reports.

In a June 14, 1983, memorandum, the NRC Executive Legal Director concluded that both the BETA and RHR Reports were relevant and material to issues in the TMI-1 restart proceeding and that GPUN ". . . can be considered to have failed to meet its duty to make Board notifications and its obligation under Section 186 [of the Atomic Energy Act] by failing to provide the BETA and RHR reports in a more timely fashion" (BETA/RHR Ex. 27 at 5). On June 27, 1983, the EDO requested that OI investigate the circumstances and reasons why GPUN did not provide the BETA and RHR Reports to the NRC at an earlier date (OI BETA/RHR at 1). OI's report of its investigation was issued on April 16, 1984.

6.2 Investigation Results

The investigation did not disclose any evidence of a deliberate attempt or conscious management decision by GPUN to withhold the information in the BETA and RHR Reports from the NRC (OI BETA/RHR at 4). The evidence demonstrates, rather, that until the NRC staff raised the issue of reportability, GPUN did not consider the possible need for a Board notification. Consistent statements to this effect were provided by R. C. Arnold (BETA/RHR Ex. 1 at 27, 36), H. D. Hukill (BETA/RHR Ex. 11 at 32), E. L. Blake (BETA/RHR Ex. 20 at 12-13 and H. M. Dieckamp (BETA/RHR Ex. 21 at 15), and P. R. Clark (BETA/RHR Ex. 2 at 16, 32, 43). Similar testimony was given by interviewees connected with BETA and RHR: R. W. Bass (BETA/RHR Ex. 3 at 12, 15, 22), W. Wegner (BETA/RHR Ex. 4 at 13, 37-38), and P. F. D'Arcy (BETA/RHR Ex. 7 at 26-27). In the words of Dieckamp:

[A] failing on our part was to have not explicitly raised that question of Board Notification, and then having provided a record of conscious decision-making relative to it. Somehow, it never even came up. Internally, we somehow did not sense that these reports were sufficiently close to that obligation that we even bothered. BETA/RHR Ex. 21 at 15-16.

After the NRC staff raised the issue of Board notification responsibility, GPUN resisted the suggestion that the BETA and RHR Reports should be formally reported (OI BETA/RHR at 3, 12, 14). GPUN's counsel in the TMI-1 restart proceeding expressed their view that the reports did not contain relevant and material information (OI BETA/RHR at 11). In the absence of an obligation to provide the reports, GPUN was reluctant to see them disclosed to the public (OI BETA/RHR at 12). As to BETA, GPUN believed that certain recommendations for reduced staffing levels could adversely affect organizational morale (OI BETA/RHR at 15). As to RHR, GPUN was concerned that the breach of interviewee confidentiality would handicap any future audits or surveys of employee attitudes and perceptions (OI BETA/RHR at 15). A concern also was expressed that portions of the reports could be taken out of context and misinterpreted (OI BETA/RHR at 3). Arnold stated that his decision to

comply with the staff's request for a GPUN Board notification was based on his acceptance that the staff's concerns overshadowed those of GPUN and his recognition that the staff would make the notification if GPUN did not (OI BETA/RHR at 14-15).

As a result of the BETA and RHR reportability issue, steps were taken by GPUN to remind its employees to be sensitive to reportability issues and to provide guidance on the performance of reporting obligations (BETA/RHR Ex. 2 at 20, 22; BETA/RHR Ex. 11 at 46-47; BETA/RHR Ex. 19 at 33-34).

6.3 Staff Findings

The staff has previously concluded that the licensee can be considered to have failed to meet its duty to make Board notifications and its obligations under the Atomic Energy Act by failing to provide the BETA and RHR Reports in a timely manner. For example, the information in the RHR Report concerning operator attitudes toward emergency procedures, which resulted in the identification through staff interviews of operator concerns with the Small Break Loss of Coolant Emergency Procedure, is in the staff's view clearly relevant and material to the TMI-1 restart proceeding (see TMI-1 Restart Supp. 4 at 3-14). The staff is satisfied, however, on the basis of the results of OI's investigation, that there was no deliberate attempt or conscious management decision by GPUN to withhold the information in the BETA and RHR Reports from the NRC. The evidence demonstrates, instead, that GPUN lacked an effective process for the consideration of possible reportability issues arising from consultant reports. GPUN has now initiated such a process.

On June 19, 1984, the ASLAB issued a Memorandum and Order (ALAB-774) in the restart proceeding denying an intervenor motion to reopen the record based, in part, on the OI investigation concerning the reporting of the BETA and RHR Reports. The ASLAB stated that it was unable to reach a conclusion that the licensee was legally obligated to release these reports more promptly and "voluntarily" than he did. ALAB-774, 19 NRC ___, slip op. at 10 (June 19, 1984). The ASLAB found that whether the BETA and RHR Reports are "material" is "a question not readily answered." Id., slip op. at 12. The ASLAB also found that the licensee acted with reasonable promptness when reportability was made an issue by the staff. Id., slip op. at 13-14. In conclusion, the ASLAB found "no improper action by licensee with regard to the reporting of the BETA and RHR studies and, accordingly, no basis for reopening the record on that event." Id., slip op. at 15.

The staff does not find, in the record compiled by OI on BETA and RHR, any basis for questioning the managerial integrity of any individual involved in these matters. However, the licensee's failure to have undertaken an evaluation of the BETA and RHR Reports for the purpose of assessing possible reportability issues represents a lapse in the performance of the licensee's regulatory responsibilities. The episode will be assessed as one part of the overall evaluation of management integrity in Section 13.0 of this report.

7.0 TRAINING

7.1 Preaccident Training

7.1.1 Background

In the course of the NRC staff review of the GPU v. B&W lawsuit, a memorandum by A. Tsaggaris, dated April 27, 1976, was identified that raised questions about management knowledge of, or involvement in, failures to comply with NRC training requirements (see NUREG-1020, Section 10.3). The memorandum was directed to J. G. Herbein, J. J. Colitz, and G. P. Miller and concerned problems in the requalification program for non-shift personnel (including Herbein, Colitz, and Miller) related to poor lesson attendance, delay in completing makeup lessons, and insufficient time spent in the control room. The memorandum also stated: "We are required by federal law to meet certain requirements for licensed individuals and in several cases we do not meet them." A. Tsaggaris was the Supervisor of Training at TMI from January 1976 until the spring of 1977. His responsibilities were for Units 1 and 2. He is no longer employed by Met-Ed or GPU. An NRC investigation was conducted to determine facts underlying the Tsaggaris memorandum of April 27, 1976. The results of this investigation are in OI Report Q-1-84-004, March 22, 1984, "General Public Utilities Nuclear (GPUN)/Possible Training Irregularities."

Additionally, in a memorandum to J. P. O'Hanlon, the TMI-1 Plant Superintendent, dated June 17, 1977, T. L. Book, a former TMI-1 Shift Foreman, discussed the inadequacy of reactor operator training and implied that the number of hours of training recorded in the operator training records was not correct. The contents of this memorandum were the subject of a previous OI investigation (OI Report Q-1-83-014, May 31, 1983). Also, an undated memorandum (approximately June 1977) to G. Kunder, TMI-1 Supervisor of Operations, from L. G. Noll, then a Shift Foreman, implied that other shifts at TMI-1 were falsifying training records. The contents of this memorandum also were the subject of a previous OI investigation (OI Report Q-1-83-015, July 26, 1983).

In NUREG-1020LD, Section 10.3 at 10-7, the staff "requested that OI conduct a further investigation into training program irregularities as part of the Keaten Investigation inquiry." Additionally, a memorandum to B. B. Hayes (OI) from H. R. Denton (NRR) dated November 7, 1983, discussed training irregularities and suggested possible areas of inquiry. These areas included the Tsaggaris memorandum; actions taken by Herbein, Colitz, and Miller in respect to that memorandum; and the relationship, if any, to the Book and Noll memoranda.

The investigation (OI Training) also explored the issue of whether the GPU Accident Review Task Force report (Keaten Report) deliberately tried to exclude the identified training problems. A. Tsaggaris was a member of the Keaten task force and participated in the preparation of the report.

7.1.2 Investigation Results

The investigation report stated:

The term in the A. Tsaggaris memorandum "non-shift personnel" applied to any licensed individual who was not a member of an operating shift such as the Supervisor of Operations or a Unit Superintendent. In order to ensure that non-shift personnel would log in the necessary number of hours of control room time to meet the NRC standards for biennial requalification as required by 10 CFR Part 55, Appendix A, Tsaggaris established an internal program requiring these individuals to spend a stated number of hours per month in the control room. The purpose of the program was to avoid a situation in which an individual would not have spent any time in the control room for several months and be forced to catch up to meet the federal requalification requirements. Tsaggaris currently believes that it was a failure on the part of several individuals to log in sufficient control room time on a monthly basis to which he was referring in the April 1976 memorandum rather than a violation of the NRC requalification requirements. Tsaggaris could not recall the specific individuals to whom he was referring in the April 1976 memorandum. OI Training at 2.

Tsaggaris' statement during the OI interview that the 4-hours-per-month watch in the control room is not an NRC requirement, is correct. NRC required 48 hours of watch per year. Thus, failure to stand 4 hours of watch per month would not, in itself, be a violation of NRC requirements.

Tsaggaris stated he was not aware of any violations of Federal regulations governing training while he was Supervisor of Training at TMI and emphasized that his memorandum was not addressing actual instances of noncompliance (Id.). Additionally, Colitz, Herbein, and Miller were not aware of any willful violations of Federal regulations in the requalification program (Id. at 2-3).

In its approval letter to the licensee dated March 21, 1974, the AEC found the Operator Requalification Program (Amendment 47 to TMI-1 FSAR) acceptable, subject to the incorporation of comments by the Atomic Energy Commission (AEC). One of the comments stated: "to comply with the requirements of Appendix A, a statement should be included that no more than 50% of the FSR [Fundamentals and System Review] program may be accomplished through the means of films, videotapes and/or individual study." Thus, the lack of attendance at scheduled training lessons would result in violations of NRC requirements. The following facts from the Tsaggaris memorandum lead to the conclusion that some individuals likely did not attend lessons for 6 months and, therefore, could not meet NRC requirements for 50% attendance at FSR lectures. The memorandum stated: "Poor lesson attendance (in some cases no lesson attendance) . . . The tendency now is not to attend lectures and just do the makeup assignments. . . . I am just now receiving makeup material that was taught back in early fall."

The second potential violation identified by the Tsaggaris memorandum is the absence from watch-standing duties for more than 4 months. The memorandum stated: "We have some people, who have not logged time in the control room for the last six to eight months."

Amendment 47 to the Final Safety Analysis Report described the licensee's Four Month Absence Program as follows:

If a licensed person has not actively carried out the functions of his license for a period in excess of four months he shall:

- (a) review all materials presented or schedule to have been presented in the OR lecture series for the period of inactivity
- (b) be given an oral examination on the applicable section of the OR lecture series and the current plant status

Upon receipt of a satisfactory rating, the licensed person shall be certified by the Operations Supervisor, Training Coordinator or other suitable qualified person designated by the Station Superintendent and returned to normal duties.

In addition to the licensee program, the AEC required: "A certification of a satisfactory rating must be made to the AEC prior to the individual's return to licensed duties." Administrative Procedure 1006, "Metropolitan Edison Operator Requalification Program," implemented the Four Month Absence Program as modified by the AEC requirement. However, NRC files do not include any licensee certification of a satisfactory rating or any approval by AEC to return these operators (listed below) to normal licensed duties.

The Tsaggaris memorandum indicates that more than one non-shift licensed operator had not stood watch in the control room for 6 to 8 months. The following individuals were licensed non-shift personnel at TMI-1 at that time:

Nelson Brown	Joseph J. Colitz
James Floyd	John G. Herbein
George Kunder	Gary Miller
Dennis Boltz	William Marshall
James O'Hanlon	James Seelinger

Herbein's (Station Superintendent) license expired February 22, 1975, and was not renewed. In a letter dated October 20, 1976, Herbein advised the NRC that Miller (Unit 2 Superintendent) had stopped his participation in the requalification program and was no longer permitted to perform licensed duties. Colitz's (Unit 1 Superintendent) license (SOP 2049-1) was renewed on February 23, 1976. If the Tsaggaris memorandum was referring to failure to stand watch on the part of Herbein, it is possible that because his license was not renewed, Herbein was not involved in violations of NRC requirements.

Miller's license was continued for 6 months after the Tsaggaris memorandum. The other eight licensed off-shift operators maintained their licenses and thus were required to participate in the requalification program. Because at least two operators failed to stand watch for more than 4 months and, assuming that Herbein was one of these operators, it appears that a violation of the four-month-absence program on the part of at least one other operator occurred. However, the OI investigation did not develop evidence to indicate which non-shift operators failed to stand their required watches.

The staff accepts the Tsaggaris memorandum as fact. As discussed below, Tsaggaris' rationale in 1984 for concluding that NRC requirements were not violated is incomplete and not credible. Tsaggaris had been in his position as Supervisor of Training since January of 1976. His memorandum indicates that his initial audit covered periods before January 1976. For example, he had to review control room records for more than 8 months to conclude that some licensed individuals had not stood watch for at least 6 to 8 months. Also, the individuals who were failing to perform in accordance with requalification program requirements were senior managers, some of whom were Tsaggaris' supervisors. It is likely, therefore, that Tsaggaris carefully reviewed his audit results before sending a memorandum to station and plant management (Colitz, Miller, and Herbein) that was critical of their personal performance. On the basis of the evidence, the staff concludes that in the 1975-1976 time frame non-shift licensed operators (i.e., station and plant management) failed to comply with NRC requalification requirements.

The Noll memorandum implied that other shifts at TMI-1 were falsifying training records (OI Training at 6). The Book memorandum implied that the number of hours of training recorded in the operator training records was not correct (Id.). These memoranda relate to personnel assigned to operating shifts. The Book memorandum and the Noll memorandum express frustration on the part of the authors with respect to condition of the Requalification Training Program. As discussed previously, the Tsaggaris memorandum relates to failures of licensed non-shift operators (management personnel) to meet requalification program requirements (OI Training Ex. 1). Clearly these managers did not set a good example for other licensed operators in the Requalification Training Program. This raises questions concerning management's attitude toward the operator requalification program. A poor attitude on the part of management toward operator requalification would likely foster poor attitudes and performance on the part of other licensed operators.

The OI investigation determined the Tsaggaris memorandum did not come to light during the Keaten task force investigation and, thus, did not influence the Keaten Report (Id. at 4). R. W. Keaten did not specifically remember the Tsaggaris memorandum, but did recall discussing, during the investigation by the task force, some of the topics addressed in the memorandum (e.g., poor lesson attendance) (Id. at 4). Keaten explained that the task force did not investigate or audit the training area, rather, they interviewed the Training Department staff about their perception of the training area (Id. at 4-5). Tsaggaris stated that his primary assignment on the task force was in the area of emergency planning and that he was not involved in the training aspects of the report because the task force felt that he may not have been able to be objective because he had had responsibilities for training at TMI

(Id. at 5). Tsaggaris did not bring the April 1976 memorandum to the attention of the task force (Id. at 5). The Book and Noll memoranda do not appear to have had any effect upon the Keate Report (Id. at 7).

7.1.3 Staff Findings

The investigation reinforced the staff's prior conclusion that the licensee had problems with its training program before the accident at TMI-2. Several TMI investigations have identified that the preaccident program was deficient. However, the issue of concern for restart of TMI-1 is postaccident training of licensed operators. A revised training program was put into place in the TMI-postaccident period. The ASLB found that the licensee had in place, at TMI-1, a comprehensive and acceptable training program (August 27, 1981, PID 91-276 at 159; 14 NRC at 475). The ASLB in the reopened proceeding on cheating found that its conclusions of August 27, 1981, should remain in effect (July 27, 1982, PID 91-2396 at 170). On May 24, 1984, the ASLAB reopened the management phase of the hearing concerning the adequacy of the postaccident training program on the basis of a concern for the impact of cheating (see Section 7.2.2) on the quality of the postaccident training program.

Despite the focus of the inquiry into postaccident training adequacy in the restart proceeding, evidence of preaccident training irregularities may be relevant to the management integrity issue. The staff finds that the preaccident training program deficiencies are indicative of either a poor attitude on the part of management or a careless disregard of their management responsibilities. Thus, the preaccident training irregularities investigated by OI would be material and relevant to management integrity, if the management involved in the preaccident time frame was still involved in the postaccident time frame.

The OI investigation developed testimony, on the basis of individuals' recollections, that actual noncompliances did not occur. The OI investigation did not determine which individuals failed to stand watch for more than 4 months and whether those individuals resumed licensed duties without being certified to the NRC. Neither did the OI investigation determine which individuals failed to attend scheduled training lessons. These matters were discussed with the staff before the OI investigation was closed out. The staff concluded that further investigation to develop these facts was not warranted. The staff accepts, as fact, the written statements contained in the Tsaggaris, Noll, and Book memoranda. The impact of these training irregularities are considered in the staff's overall position on management competence and integrity in Section 13.0.

7.2 Postaccident Training

7.2.1 Background

A partial initial decision (PID) concerning the management phase of the TMI-1 restart proceedings was issued on August 27, 1981. The ASLB concluded the licensee has in place, at TMI-1, a comprehensive and acceptable training program (August 27, 1981, PID 91-276). However, immediately before issuing this PID, the ASLB received notification of alleged cheating by two TMI-1

shift supervisors on the April 1981 NRC senior reactor operator (SRO) examinations. Later the licensee also notified ASLB of its own concern about answers on some licensee-administered examinations. The ASLB reopened the evidentiary record to inquire into these matters and appointed Administrative Judge G. L. Milhollin Special Master to preside over the hearing. The record of the reopened hearing by Administrative Judge G. Milhollin is at 15 NRC 918 (1982).

During the July 1981 investigation into cheating on operator licensing examinations (HQS-81-003), the licensee advised the NRC that J. J. Floyd* had obtained assistance in completing two of the four areas on an examination that was part of his requalification program for an NRC SRO's license. In an August 3, 1979, letter signed by G. Miller to the Commission certifying Floyd for renewal of his SRO's license, an examination score was cited that was obtained on a section partially completed by someone else. The ASLB concluded that the licensee's letter of August 3, 1979, was "a false material statement to the NRC" (July 27, 1982, PID ¶2296). An OI investigation was initiated to determine the circumstances surrounding Floyd's certification to the NRC (OI Report H-82-002, March 21, 1983).**

7.2.2 Investigation and Hearing Results

7.2.2.1 Individual Cheating

The investigation of cheating on the NRC SRO examination of April 1981 and licensee-administered examinations involved a number of individuals. Because of a stipulation of confidentiality agreed to by the parties, some of the individuals are referred to by a system of letters instead of names. Individuals that were mentioned in the hearing were designated as O, W, G, H, H. Shipman, GG, W, MM, P, C. Husted, U, S, Y, VV (Floyd), G. Miller, M. Ross, J. Herbein, H. D. Hukill, J. Wilson, and R. C. Arnold. The relationship of Herbein, Hukill, Wilson, and Arnold to the incidents is important because it shows management's responses to the issues and thus relates to management integrity.

As a result of the reopened proceeding and subsequent appellate review, the following facts and conclusions regarding cheating were developed. Six individuals (O, W, G, H, GG and Floyd) cheated and/or cooperated on NRC or licensee examinations or both. One individual, Husted (who did not cooperate during the investigation), may have solicited information on an NRC examination from another individual, however there was insufficient evidence developed to support a definitive conclusion. Another individual, who was

*Floyd was referred to as VV during the restart proceeding; a waiver of confidentiality has been filed by Floyd (see Licensee Notice to the Commission, ASLB, ASLAB, and parties, dated June 19, 1984). For this reason, Floyd's name is used in this report rather than the letter designation VV.

**This report, which was referred to the Department of Justice (DOJ) for review, is, at the request of DOJ, not being released at this time (letter from Stephen S. Trott (DOJ) to the Honorable Nunzio J. Palladino (NRC) dated May 7, 1984, and NRC response from Nunzio J. Palladino to Stephen S. Trott, dated June 6, 1984).

not identified, solicited the answer to an examination question from H. Shipman.

The ASLB concluded: "Four cheaters have been positively identified. O and W are shift supervisors whose cheating on the April 1981 NRC operators license examination gave rise to the need to reopen the record. We find also that G and H, non-supervisory licensed reactor operators, cheated on licensee-administered requalification examinations." July 27, 1982 PID ¶2039. Additionally, the ASLB concluded that two shift supervisors, O and W, cheated extensively on licensee-administered examinations as well as on an April 1981 NRC examination. G and H, reactor operators, cheated on licensee-administered examinations. See ALAB 772, 19 NRC _____, slip op. at 23 (May 24, 1984).

H. Shipman, a plant operating engineer, took a licensee examination and the NRC RO's and SRO's examinations in April 1981. During one of the examinations, Shipman took a break and went to the coffee machine in the hallway. He was approached by an individual who asked him the answer to an examination question, or possibly a question related to an examination question. Shipman spontaneously provided the brief answer. After the reopened hearings on cheating began, Shipman voluntarily reported the incident to H. D. Hukill, TMI-1 Vice-President, but not the identity of the questioner. The ASLB disagreed with the Special Master's recommendation that the licensee not be permitted to use Shipman in the operation of TMI-1 until he either names the unidentified questioner or provides a credible reason why he cannot do so (Id., slip op. at 37). The ASLB concludes that "in these circumstances, the formal reprimand is sufficient" (Id., slip op. at 40).

On a licensee-administered examination of December 19, 1980, the answers to two questions by W and GG bore similarities to such an extent that this issue became a matter of investigation. At the time of the incident, W was a shift supervisor and GG was a shift foreman. The Special Master concluded that "given the extent and nature of the similarity between answers of GG and W, the copying appears to have occurred with GG's participation" 15 NRC 918 (1982) at 93. With respect to W and GG, the ASLB concluded that GG permitted W to copy, or at least knew that he copied (July 27, 1982, PID at ¶2134). W was also the supervisor of GG, which put GG in a difficult position (Id. at 2135). The ASLB imposed no sanctions on GG (Id. at 2138). W has resigned from TMI.

C. Husted, a licensed operator instructor in April 1981, allegedly solicited an answer from P in an unproctored room during an NRC-administered examination. This was based on an interview with P by NRC inspectors on September 25, 1981. Husted denied the allegation. 15 NRC 918 (1982) at 105. On the witness stand, P denied that there had been solicitation (Id. at 104). The Special Master and the ASLB criticized the conduct of Husted during the testimony. Additionally, Husted failed to cooperate with NRC investigators who were inquiring into the overall cheating controversy. The ASLB was advised by the licensee that Husted has been named Supervisor of Non-Licensed Operator Training. The ASLB subsequently stated:

We seriously question licensee's judgment in promoting Husted to an important position with management responsibilities, given his documented past failure to cooperate

with the NRC in its cheating investigation. We therefore require, in addition to those commitments reflected in the stipulation with the Commonwealth and the conditions imposed by the Licensing Board should restart be authorized, that Husted have no supervisory responsibilities insofar as the training of non-licensed personnel is concerned. See ALAB 772, slip op. at 46.

The Special Master stated that the following clearly constituted cheating by VV:

In early July of 1979 VV [Floyd], who was Supervisor of Operations at TMI-2, handed in to the training department a closed-book, make-up up examination comprised of four sections. . . . Of these four sections, two were written in the hand of VV [Floyd], one was written in the hand of O, and one was written partly in the hand of VV [Floyd] and partly in the hand of O. . . . The examination was to have been completed by the examinee alone. 15 NRC 918 (1982) at 135.

The training department assigned Floyd (VV) a passing grade on Section A of the examination, a section on which he had received help from O.

7.2.2.2 Certification Irregularities

Miller certified to P. Collins, Chief, Operator Licensing Branch of the NRC, in a letter dated August 3, 1979, that on retesting, Floyd had received a score of 89.1% on Section A, 80.5% on Section G and a score of 99.8% on the other two sections, E and H. The letter did not mention the incident involving O's help to Floyd (Section A was partially in O's handwriting). The ASLB concluded that the letter of August 3, 1979, which was the basis for Floyd's operator's license renewal, was a material false statement to the NRC. July 27, 1982, PID ¶2296, 2306. The ASLB recommended "that the Commission direct the staff to conduct an investigation into the circumstances surrounding the August 3, 1979, certification (Id. at ¶2312).

Floyd submitted his annual requalification examination, which was comprised of eight sections, on July 2, 1979. Two of these sections (A and H) were not entirely his own work. He had help from O. Miller was notified of this problem by J. L. Seelinger (TMI-1 Superintendent at that time). On July 3, 1979, Miller informed Herbein of the incident in a handwritten note (see B&W Ex. 796). Herbein advised Arnold of the Floyd incident, including the fact that someone else had provided some of the answers on an examination (Arnold at Dep. Tr. 450). Herbein directed Miller to conduct an investigation into the incident (Herbein at Dep. Tr. 318). A memorandum dated July 10, 1979, from R. Zechman to G. P. Miller contained a summary of events associated with Floyd's participation in the requalification program (see B&W Ex. 797). Miller advised Herbein of the results of his investigation, including recommended disciplinary action against Floyd (see B&W Ex. 798). Herbein and Miller discussed the results of the investigation and proposed disciplinary action for Floyd. Herbein knew the event was relevant to Floyd's retaining his NRC SRO's license and that Miller was preparing a letter to the NRC

stating that Floyd had completed his training requirements. See Herbein at Dep. Tr. 319, 334, 335. Herbein told Miller to send a copy of the letter to the attorneys to check before sending the letter to the NRC (*Id.* at 335). Miller transmitted a draft on July 27, 1979, of the proposed certification letter to the NRC to E. Blake (counsel for the licensee) with a copy to Herbein and Parker. On August 3, 1979, Miller sent the recertification letter to the NRC (see B&W Ex. 799).

A letter from Miller to Arnold dated August 8, 1979, noted the proposed disciplinary action against Floyd. Arnold knew that the satisfactory participation in the requalification program was required by NRC for an operator to maintain his NRC license (Arnold at Dep. Tr. 455). Arnold did not concur with the proposed disciplinary action of suspending Floyd. Arnold insisted that the appropriate action was to remove Floyd from his position because this incident was another event in which Floyd had demonstrated poor judgment. *Id.* at 457. Arnold did not consider this incident an act of cheating, but characterized it as one of poor judgment on the part of Floyd (*Id.* at 461, 462). Herbein also characterized the Floyd incident as poor judgment on the part of Floyd (Herbein at Dep. Tr. 317). On August 20, 1979, Floyd was assigned to the GPU Accident Investigation Group. Arnold considers Floyd's reassignment to be a punitive measure; however, Floyd was never told that his reassignment was punitive (July 27, 1982, PID ¶2281). Neither Miller, Herbein, nor Arnold were asked, as part of the B&W trial, why they did not notify the NRC that O had helped Floyd on two sections of his annual requalification program examination.*

7.2.2.3 Licensee's Response to Cheating

The licensee's response to the cheating incidents was extensively litigated and is summarized in the following paragraphs. (Management's response to Floyd's cheating has been described above.)

After the NRC investigation of O and W was complete and O and W had admitted cheating, Arnold interviewed them and informed them that they were fired. Arnold then met with the operators to explain his decision to fire O and W. Hukill also met with each licensed operator, to explain in further detail management's position on cheating and to obtain comments from the operators.

The licensee reviewed weekly examinations that had not been reviewed by the NRC investigators, by searching for similarities in the answers of these examinations. Several sets of similar answers were discovered. 15 NRC 918 (1982) at 200. On the basis of these findings, Wilson, an attorney for GPUN, with the help of an associate, Lloyd, conducted the licensee's investigation. The ASLB found "that the licensee conducted an adequate investigation into the cheating incidents" (July 27, 1982, PID ¶2271).

*By Board Notification dated June 1, 1984, and correction dated June 5, 1984, the licensee advised the Commission, ASLB, ASLAB, and parties of an additional instance of cheating by Floyd on a licensee-administered examination.

7.2.3 Staff Findings

7.2.3.1 Cheating

During the postaccident training period, cheating occurred on both licensee- and NRC-administered examinations of licensed operators. Some of the individuals culpable in these incidents held responsible management positions within TMI (i.e., Operations Shift Supervisor TMI-2, shift supervisors, and shift foreman). The licensee's after-the-fact response to these incidents was litigated and found to be satisfactory from both an investigative and employee-discipline standpoint. However, the licensee's response did not initially include an evaluation of the circumstances that resulted in poor employee attitude and lack of respect for the training program, which created, in part, the motivation for operators to cheat.

Management was clearly responsible for the testing environment that provided the opportunity to cheat and has responded with revised procedures to control and proctor examinations (*Id.* at 2330, 2331). Management's concern for operator attitudes and respect for the training program was the basis, in part, for initiation of the RHR study (see OI Report 1-83-013, April 16, 1984, "General Public Utilities Nuclear-Alleged Failure to Provide BETA and RHR Consultant Reports to the NRC In a More Timely Fashion," Ex. 1 at 21, Ex. 11 at 7; NUREG-0680, Supp. 4, at Section 1.1). This licensee effort to discover and subsequently improve conditions that led to a poor operator attitude toward training is commendable and should be encouraged (see 18 NRC 177 (1983) at 199; NUREG-0680 Supplement 4 at Section 4.1).

The remaining issue, which relates to management competence and integrity, is whether the incidents were of sufficient magnitude to cast doubt on the quality of implementation of the postaccident training program and more specifically management's culpability for poor implementation of the program. This issue is addressed in Section 13.0.

7.2.3.2 Certification Irregularities

The certification of Floyd's successful completion of operator requalification requirements was determined by the ALAB to be both material and false. In July 1979 the licensee discovered that the TMI-2 Supervisor of Operations (Floyd) submitted answers to questions in his annual requalification examination that were written by another operator. Miller advised Herbein, by a handwritten memorandum dated July 3, 1979, that "Floyd just handed in his overdue FSR exams," that he failed two sections, and that "one exam is not in his handwriting" (see B&W 796). Miller confirmed that he wrote the memorandum and discussed it with Herbein (Miller at Dep. Tr. 846).

Senior Met-Ed management (Miller, Zechman, et al.), at the direction of corporate management (Herbein), conducted an investigation (see B&W 797, 798) into the Floyd cheating event and recognized its relationship to Floyd's NRC license requirements (Herbein at Dep. Tr. 318, 332). Met-Ed management (Miller and Herbein) discussed the issue of Floyd's certification of completion of NRC requalification program requirements following their investigation (*Id.* at 319). Herbein told Miller to clear the certification letter with counsel before submitting it to the NRC (*Id.* at 335, 337). Miller's memorandum of July 27, 1979, to counsel highlighted the "handwriting problem"

(i.e., that portions of Floyd's examination were written by another individual) and stated that this section of the examination was not being mentioned in the draft certification letter; a copy of this section was attached (Ex. 1A of Licensee's Investigation of VV and O Incident by F. Speaker, November 2, 1982). The actual certification letter was submitted to the NRC on August 3, 1979 (B&W 799). It certified the successful completion of Floyd's accelerated requalification program requirements. By letter on August 8, 1979, Miller advised Arnold the results of his investigation into the Floyd incident and recommended that Floyd be suspended. Floyd's cheating was not reported to the NRC for 2 years, when Arnold brought the matter to the attention of the NRC after an NRC investigation (July 1981, HQS-81-003) was initiated into other instances of cheating on an NRC-administered examination. As a result of the reopened proceeding on cheating, the ASLB made a recommendation that OI investigate the licensee's false material statement concerning Floyd's certification. Subsequent to the OI investigation IE concluded that a material false statement had been made and a civil penalty of \$100,000 was proposed by the Director, IE.

The staff concludes that licensee management covered up Floyd's cheating and made a subsequent false certification to the NRC. The staff concludes that these acts demonstrate a deliberate disregard of management responsibilities.

The licensee's response to this event was to reassign Floyd. However, no licensee censure of Miller or licensee investigation into the involvement of Herbein, Arnold, and Blake is apparent. During depositions taken by B&W in the course of the GPU v. B&W lawsuit, Herbein and Arnold each denied seeing the July 27, 1979, draft of the certification letter. Herbein admits knowledge of the pending certification of Floyd to NRC and of directing Miller to obtain legal counsel. It is not credible that Miller would act alone given the seriousness and sensitivity upper management attributed to this issue. Testimony of the involved individuals appears to focus on the cited grade (that is, 89.1% for Section A) and the fact that this portion of the letter was not required or carefully reviewed. The implication is that this was a careless error. For the reasons discussed above, the staff finds these arguments lack merit and raise further questions about management's attitude. This event raises questions concerning management integrity, which is addressed in Section 13.0 of this report.

7.3 Current Training

7.3.1 Background

From 1976 through the time of the accident (March 28, 1979), there were several documented instances of training irregularities as discussed in Section 7.1 of this report. These instances are considered "preaccident" training irregularities. J. G. Herbein, J. J. Colitz, and G. P. Miller, all members of plant management, were involved in these training irregularities. It is clear that plant management established the real and perceived standards by which other licensed personnel then viewed the training program.

From the time of the accident through the cheating incident (postaccident training) the instances of cheating on NRC- and licensee-administered

examinations reflected the attitude of examinees on the training program and on the examinations as addressed in Section 7.2 of this report.

ASLAB expressed it this way:

The Special Master essentially concluded that although licensee's upper management did not encourage, condone, participate in, or know of the cheating at the time it occurred, it was responsible for the negative attitude among its staff toward the NRC examination process that led to the cheating and similar incidents revealed in the record. ASLAB-772 slip op. at 8.

7.3.2 Current Status

The staff has conducted numerous inspections and performed other evaluations since the cheating incident that, among other things, included the licensee's training program. During the period October 4 through 9, 1982, the staff reviewed the GPUN general employee training, the non-licensed technical training, licensed-operator requalification program, and the licensed-operator replacement training program. This review included a review of records, observation of a training session, a program review, and some personnel interviews. No violations were identified. See NRC Office of Inspection and Enforcement (IE) Report 50-289/82-19 at Sections 4.1, 4.2, and 4.3.

By letter dated January 20, 1983, from R. C. Haynes (Region I) to GPUN Corporation (Attention: R. Arnold), the NRC forwarded the results of the NRC Systematic Assessment of Licensee Performance (SALP) for October 1, 1981, through September 30, 1982. Section A, "Plant Operations," includes reports on licensed and non-licensed operator training programs. Section I, "Licensing Activities," includes reports on the significant improvement in the passing rate of the operator licensing examinations.

The TMI Instructor Evaluation Programs and the records of nine evaluations that were performed were reviewed by IE January 1 through February 4, 1983. During this period the supervisory training in administrative and technical areas and the two most recent quality assurance audits of the Training Department were reviewed. The inspection found both areas satisfactory. See IE Report 50-289/83-02 at 9, 10.

Because of issues raised during the hearing, the ASLB required that the licensee develop a training instructor indoctrination and evaluation program [see July 27, 1982, PID #2421(2)]. The licensee developed TMI Training Procedure 6210-ADM-2610.2, Revision 1-00, "Operating Training Instructor Indoctrination (Qualification Training Program)" in response to this ASLB requirement. In a July 28, 1983, staff SER on the subject of qualification of instructors at TMI, the staff concluded "that GPU Nuclear has developed a satisfactory program to provide indoctrination, training and certification of instructors, including continuing training and participation in applicable requalification programs."

The licensee has issued TMI Training Procedure 6210-ADM 2604.01, Revision 1-00, "Control of Examinations for Units 1 and 2," to implement a program for

routine sampling and review of examination answers for evidence of cheating. The staff in a letter dated July 13, 1983, found the sampling methods, grading techniques, and review criteria intended to detect cheating were comparable to those used by NRC examiners. See IE Report 50-289/83-22 at 3.

The staff has reviewed the training program for TMI with respect to the provisions for procedural adherence at the corporate policy level and at the departmental level. The review concluded that the training on procedural adherence is acceptable. See IE Report 50-289/83-10 at Section 4.

During the period October 17 through 21, 1983, the staff conducted an inspection of the licensee's training program at TMI-1. This inspection included general employee training, non-licensed technical training, licensed operator requalification and replacement programs, and training department administration. With respect to general employee training (GET), the training program and its implementation were reviewed. The inspection included a review of records of attendance, records of training, GET examination results, and verification of retraining for individuals who had failed the examination, and interviews with several employees. With respect to non-licensed technical training, the inspection included a program review of the auxiliary operator training program description, maintenance training program description, chemistry technician training program description, and the Unit 1 Chemistry Procedure 1836, "Chemistry Technician Qualification/Training Standard," Revision 1, February 11, 1983.

The implementation of training in each of these areas also was reviewed. The administration and implementation areas of the Licensed Operator Requalification and Replacement Program were reviewed. The review of the requalification program included the program contents, review of records of six licensed operators, and interviews with two licensed operators. The interviews were conducted to determine that the training is meaningful to the participants and that training records reflect actual training. The review of the replacement operator program included a program review and inspection of the program implementation. The administrative controls governing Training Department activities were reviewed to verify the training activities were in conformance with the operating quality assurance program and hearing commitments for restart of TMI-1. The inspector reviewed the areas of the Training Department's Instructor Qualification/Certification and Evaluation Program, and the control of training department examinations. The overall conclusion of the inspection was that the program was satisfactory with no violations or deficiencies and only two open items requiring followup inspection. See IE Report 50-289/83-29.

During the period of February 13 through 17, 1984, a safeguards inspection of the licensee's Training and Qualification Plan, with respect to the Security Organization, was found to be adequate and appropriate to meet program performance requirements and objectives. See IE Report 50-289/84-04 at 5.

From February 22 through 24, 1984, an NRR team observed the TMI-1 Abnormal Transient Operating Guidelines (ATOG) Training Program held at the B&W training center in Lynchburg, Virginia. Classroom and simulator-training sessions and evaluations were observed by the team. The GPUN evaluator was M. Ross. GPUN has developed a series of complex exercises (drill packet)

that present severe challenges to the shift crew and to each individual's knowledge and performance in the use of ATOG procedures. The NRR team concluded that the shift crew performed well and met or exceeded the performance level required by GPUN and exceeded the current standards of the NRC.

The NRC's most recent SALP Report is dated April 2, 1984. The assessment period for this report was October 1, 1982, through January 31, 1984. As part of the review it was concluded that "management's commitment to safety is also apparent from their extensive commitment to personnel training. . . ." In the subject area of plant operations it was found that "[p]ersonnel training on the numerous restart modifications are found to be generally well developed, timely and supplemented by training briefs prepared and presented by the Operations Department." With respect to the area of radiological controls, "training for personnel is well-defined and implemented with dedicated resources." With respect to emergency planning "[a]ll levels of management have received substantial formal training in Emergency Preparedness by dedicated training personnel on the licensee's staff. . . .the training program was thorough, well implemented, and oriented toward public safety." See April 2, 1984, SALP Report, Unit 1, at 5, 12, and 20.

An Operational Readiness Evaluation of TMI-1 licensed personnel was conducted on February 8 and 9, 1984, to assess licensed operators' overall operational knowledge and understanding of reactor theory, thermodynamics, plant systems, operating and abnormal transient procedures, administrative procedures, Technical Specifications, and the emergency plan. Twenty-six licensed operators were interviewed and were found, overall, to have received adequate training and to be knowledgeable. Individual weaknesses in operators' knowledge were identified in the areas of plant systems, which is characteristic of responses expected following a period of prolonged shutdown conditions. These deficiencies are not programmatic in nature and do not reflect adversely on the quality of the current training program. Action is being taken to upgrade the operators' knowledge of plant systems. See IE Report 50-289/84-05.

The NRC by letter from H. R. Denton (NRC) to H. D. Hukill (GPUN) dated April 9, 1984, has approved Design Data Laboratories as independent consultants to perform an in-depth audit of training [see July 27, 1982 PID ¶2421 (1)].

7.4 Staff Findings

The record, as noted in Sections 7.1 and 7.2, attests to problems in training in the past that reflect on management's attitude and/or the abdication of management responsibility for the training program.

The licensee has developed new procedures and improved training programs since the cheating incident. The staff has reviewed these procedures and programs and found them to be effective. The staff will further address the implementation and effectiveness of the current training program, along with the deficiencies in preaccident and postaccident training, in Section 13.0 of this report as part of the staff's overall position on management integrity.

8.0 KEATEN REPORT

8.1 Introduction

In NUREG-1020, Section 10.2, the staff identified certain concerns that had been raised about the conduct of the licensee's internal investigation of the TMI-2 accident. The staff's analysis of several draft versions of the Keaten task force's report led the staff to refer the matter to OI for an investigation of the facts pertinent to the licensee's internal investigation and of any improper conduct in relation to the investigation and the development of the report of the investigation (the Keaten Report).

The Keaten Report was the culmination of an effort that began on the day of the TMI-2 accident, March 28, 1979. R. C. Arnold recognized after hearing of the event on March 28, 1979, that General Public Utilities Service Corporation (GPUSC) would need to assist Met-Ed in understanding the event. He set up a group of GPUSC Generation Division technical people under R. Wilson and dispatched them to the site on the afternoon of the accident. OI Keaten Ex. 17 at 9. Arnold later drafted a more specific charter for the group, which then worked on developing an understanding of the sequence of events for the accident (Id. at 10).

In late June 1979, Arnold thought it desirable "to look at a number of issues more specifically than they had been looked at in the course of developing the sequence of events." (OI Keaten Ex. 17 at 10). In a memorandum dated July 2, 1979, Arnold established a task force to be headed by R. W. Keaten to undertake an investigation into seven specific areas (Id. at 11). Those areas, as stated in B&W Ex. 338, were

1. The factors related to the trip of the main feedwater pumps including system design features, equipment malfunctions, operating procedures and practices, awareness by operators, supervision and management of system problems prior to March 28 and significant actions by the auxiliary operators prior to and subsequent to the loss of feed conditions.
2. The rationale for the control room and staff personnel response to the plant upset conditions as they did during the first few hours, including information availability, procedural considerations and exercise of authority by supervision. In particular, evaluate the circumstances that caused the operators to modulate high pressure injection when reactor coolant system pressure was abnormally low.
3. The Emergency Plan implementation, including timeliness of declaration of site and general emergencies, notifications, identification of off-site releases, and communication of plant status to appropriate management and public officials.

4. The pressurizer electromatic relief valve failure mode, including failure data from other installation and consideration of full scale testing of a prototypical valve.
5. The pathways by which radioactive fluids were transported from the Reactor Building to the Auxiliary Building, the chronology of transfer and the quantities associated with the transfers.
6. The factors leading to the incorrect status of EF-V12A and EF-V12B at [the] time of the accident, including the reasons the surveillance procedures were written so as to simultaneously isolate both trains of emergency feedwater, the practices that apparently permitted the completion of the procedure without insuring attainment of proper valve lineup, and the reasons the improper positions of the valves could apparently exist undiscovered for almost two days.
7. The adequacy of assessment by plant supervision and company management of the extent of the damage to the core, and the potential for off-site releases, including timeliness, availability and flow of information and technical accuracy.

B&W Ex. 338.

Copies of the July 2, 1979, memorandum were apparently sent to, among others, W. G. Kuhns, H. M. Dieckamp, and R. F. Wilson (Id.). At the time of his assignment to head up this task force, R. W. Keaten was Manager of Systems Engineering at GPUSC (OI Keaten Ex. 4 at 3).

The members of the task force were selected by Arnold (OI Keaten Ex. 17 at 18). In addition to R. W. Keaten, they were: R. L. Long, A. Tsaggaris, R. L. Williams, and T. L. Van Witbeck (Energy Incorporated). The task force members were assisted by a number of people. In particular, T. G. Broughton, P. S. Walsh, and E. G. Wallace participated extensively in the activities of the task force and in the preparation of the Keaten Report. OI Keaten Ex. 4 at 6-8.

Over the next several months, the Keaten task force held meetings, conducted interviews, analyzed technical data, and prepared a report on the results of its investigation. The first draft of a task force report was prepared by Keaten. This draft, dated September 28, 1979, was sent to the task force members and to some of the other people who were working with the task force. OI Keaten Ex. 4 at 12; Ex. 5 at 18. A meeting was then held at which the task force members and others "sat around a table and literally rewrote it" (OI Keaten Ex. 4 at 13). Keaten stated that the task force tried, and to the best of his memory succeeded, in achieving, in all cases, a wording to which everyone could agree (Id. at 13, 116, 187; see also OI Keaten Ex. 5 at 8; Ex. 8 at 15, 16). Keaten was responsible for accumulating suggestions and for generating revised drafts of the report (Id. at 14).

Eight versions of the task force's report were prepared between September 28, 1979 (first draft) and December 15, 1980 (final report). Table 8.1 is a chronology of significant events before and during that period. Keaten believed that the "only reports that were distributed to anyone, including Arnold, outside of those people who were directly participating in the task force activities, were versions of the report which are signed" (OI Keaten Ex. 4 at 16). Signed versions of the report were dated October 29, 1979, November 28, 1979, and December 15, 1980. According to Keaten, no member of top management received any draft before the version of October 29, 1979. Id. at 16, 190.

The version of October 29, 1979, was styled as an interim report. Keaten described one purpose of the distribution of an interim report as ". . . to see if management agrees with what our interpretation of what the charter is." By "management," Keaten explained that he meant the people who had instigated the task force activity--Arnold and Dieckamp (OI Keaten Ex. 4 at 29).

Keaten could recall having received substantive comments on drafts of the task force report from only three people who were not members of or general participants in the task force: H. M. Dieckamp, R. C. Arnold, and R. C. Seltzer of the law firm of Kaye, Scholer, Fierman, Hayes and Handler, outside counsel to GPU (Id. Ex. 4 at 21-26, 191-194). Keaten could not recall any substantive comments by W. Kuhns, P. Clark, M. Ross, R. Wilson, H. D. Hukill, I. Finfrock, or anyone associated with the board of directors of GPU (Id. at 184-190, 294).

The final Keaten Report was issued on December 15, 1980. A distribution list for the final report was compiled by Keaten, apparently based on discussions with Dieckamp and Arnold (Id. Ex. 4 at 186). The list, which appears in handwriting on the face of B&W Ex. 357, contains the following names: W. G. Kuhns, H. M. Dieckamp, W. A. Verrochi, S. Bartnoff, R. C. Arnold, P. R. Clark, R. F. Wilson, G. R. Hovey, H. D. Hukill, J. G. Herbein, R. W. Conrad, B. H. Cherry, R. L. Long, I. R. Finfrock, J. R. T. [Thorpe], A. Tsaggaris, R. Seltzer, T. L. Van Witbeck, and R. W. Keaten.

The Keaten Report was provided to the NRC as a result of a request by Commissioner Gilinsky in November 1981. The various drafts of the report were obtained as part of the record of the GPU v. B&W lawsuit.

At the staff's request, the OI investigators examined several questions that the staff had identified in relation to the Keaten Report. In a "Request for Investigation" of August 5, 1983, the staff asked OI to investigate "whether the process of review by management of the drafts of the [Keaten task force] investigators' report improperly influenced that report and, if so, who was involved in such conduct." See OI Keaten Ex. 1; see also Board Notification BN-83-117 (August 4, 1983). The specific changes in the Keaten Report drafts, which raised the issue of possible improper influence, were identified for OI by the staff in NUREG-1020LD, Section 10.2, and in a memorandum from H. R. Denton (NRR) to B. B. Hayes (OI) dated November 7, 1983. The staff's evaluation of the evidence compiled by OI on this issue is presented in Section 8.2 of this report.

As a result of the staff's review of the GPU v. B&W lawsuit documents, the staff also identified in NUREG-1020LD, Section 10.4.1, certain questions

Table 8.1 Chronology of Events

Date	Keaten Task Force Events	Other Events
March 28, 1979		TMI-2 Accident
March 29, 1979	TMI-2 Incident Review Group established by H. Dieckamp under R. Wilson (B&W Ex. 338)	
July 1979		Draft NUREG-0600 forwarded to licensee
July 2, 1979	TMI-2 Accident Review Task Force established by R. C. Arnold under R. W. Keaten (B&W Ex. 338)	
July 2, 1979		NRC issues order directing shut-down of TMI-1.
August 1979		NUREG-0600 issued by NRC
August 9, 1979		NRC issues order setting broad issues to be addressed in restart hearing (CLI-79-8)
September 28, 1979	First draft of Keaten Report (B&W Ex. 347)	
October 6, 1979	Second draft of Keaten Report (B&W Ex. 349)	
October 17, 1979	Third draft of Keaten Report (B&W Ex. 350)	
October 25, 1979		NRC issues Notice of Violation to GPU
October 29, 1979	Fourth draft of Keaten Report (B&W Ex. 351)	
October 30, 1979		President's Commission Report (Kemeny)
November 28, 1979	Fifth draft of Keaten Report (B&W Ex. 352)	
December 5, 1979		GPU responds to Notice of Violation
January 1980		Special Inquiry Group Report (Rogovin)
March 6, 1980		NRC issues order specifying management capability issues to be addressed in restart hearing (CLI-80-5)
March 24, 1980	Sixth draft of Keaten Report (B&W Ex. 354)	
March 25, 1980		GPU files suit against B&W
May 12, 1980	Seventh draft of Keaten Report (B&W Ex. 355)	
July 1980		Special Senate Investigation Report
December 12, 1980		GPU files tort claim against United States
December 15, 1980	Final Keaten Report (B&W Ex. 356)	

about the licensee's motive for not closing the power-operated relief valve (PORV) block valve and the accuracy of the licensee's response (dated December 5, 1979) to the NRC Notice of Violation regarding PORV leakage. The Commission and the parties to the restart proceeding were informed in BN-83-152 (October 3, 1983) that issues associated with this area would be explored as a part of the investigation of the Keaten Report. The specific evidence that raised these questions, as well as the particular questions of interest to the staff, was addressed in NUREG-1020LD, Section 10.4.1, and the November 7 memorandum. The staff's evaluation of the evidence compiled by OI on these issues is discussed in Section 8.3 of this report.

One of the issues that was identified by the staff in NUREG-1020LD, Section 10.2, and in the November 7 memorandum, related to possible improper conduct in connection with the input of K. P. Lucien of Energy Incorporated to the Keaten task force on the condensate and polisher systems. The staff's evaluation of the evidence compiled by OI on this issue is addressed in Section 8.4 of this report.

Another issue, identified by the staff in relation to the Keaten task force, dealt with statements by senior plant management to the Keaten task force regarding plant startup, resources, and management deficiencies. In NUREG-1020LD, Section 10.9, and in the November 7 memorandum, the staff discussed certain information that appeared to relate to one of the restart issues posed by the Commission: ". . . whether the relationship between Metropolitan Edison's corporate finance and technical departments is such as to prevent financial considerations from having an improper impact upon technical decisions." The Commission and the parties were informed in BN-83-152 that the issues associated with this area would be explored as a part of the investigation of the Keaten Report. The staff's evaluation of the evidence assembled by OI in this area is addressed in Section 8.5 of this report.

Finally, the Commission's list of integrity issues (January 20, 1984) included the question as to whether GPU provided the Keaten Report to the NRC on a timely basis. Information from OI's investigation that relates to this question is discussed in Section 8.6 of this report.

8.2 Evaluation of Changes in Draft Keaten Reports for Possible Improper Influence

8.2.1 Background

In comments on the GPU v. B&W lawsuit documents filed on July 1, 1983, intervenor Three Mile Island Alert analyzed various changes that had been made in consecutive drafts of the Keaten Report and alleged that upper management had improperly influenced the findings of the task force. After conducting its own review of the Keaten Report drafts, the staff asked OI to investigate "whether the process of review by management of the drafts of the investigators' report improperly influence that report and, if so, who was involved in such conduct." See OI Keaten Ex. 1; see also BN-83-117. The specific changes in the Keaten Report drafts that the staff believed raised an issue of possible improper influence were identified for OI by the staff in NUREG-1020LD, Section 10.2, and in a November 7, 1983, memorandum from H. R. Denton (NRR) to B. B. Hayes (OI).

8.2.2 Investigation Results

The OI investigations gathered information on the process through which the Keaten Report drafts were generated as well as on the specific changes made in the drafts (see Section 8.1, *supra*). As stated earlier, the evidence assembled by OI indicates that changes to the Keaten Report drafts were discussed and agreed upon by the task force (OI Keaten Ex. 4 at 13, 116). The witnesses interviewed by OI stated repeatedly and consistently that the charter of the task force was to find the facts and to report them (OI Keaten Ex. 4 at 27, 28, 120, 142, 296, 297; Ex. 7 at 39; Ex. 8 at 44, 47) and that the task force was not pressured to make particular findings or changes in the report (OI Keaten Ex. 4 at 193, 194, 296; Ex. 5 at 82, 109; Ex. 8 at 17; Ex. 16 at 180). Dieckamp was identified as the source of the "tell it like it is, just make sure that it's right approach" (OI Keaten Ex. 7 at 53). Keaten stated that he was instructed by Dieckamp "to make sure that the report reflected the views of the task force and nobody else" (OI Keaten Ex. 4 at 115, 116, 193, 194). He praised Dieckamp and Arnold for making it easy to carry out the investigation and to report the facts as the task force found them (OI Keaten Ex. 4 at 194, 300).

While substantive comments on certain drafts of the report were received from specific members of management (Dieckamp, Arnold) and from counsel for GPU in the GPU v. B&W litigation (R. Seltzer), R. W. Keaten denied that any change to the report had been made or information excluded in order to put management in a better light (OI Keaten Ex. 4 at 296, 297). According to Keaten, the task force was "repeatedly told not to make any changes to the report that we did not think were correct and accurately represented the opinions of the task force" (OI Keaten Ex. 4 at 296). He stated that the task force did not dilute or delete any criticisms of management that the task force considered factual and accurate (*Id.* at 286).

In its report on the results of its investigation, OI grouped the changes identified by the staff into eight separate areas. The same groupings are retained in the discussion of investigation results that follows (OI Keaten at 9).

(1) Changes in the Task Force Reports Relating to the Davis-Besse Incident and Previous Experiences at TMI-1

Several changes in the drafts to the Keaten Report relate either to the Davis-Besse incident or to previous experiences at TMI. Between the drafts of October 29 and November 28, 1979, a new section entitled "Effect of the Leak Location" was added to the discussion of the rationale to the responses of the control room and staff personnel. This new section then remains essentially unchanged through the final report of December 15, 1980. See OI Keaten at 15 (full text of the added section). Also between the drafts of October 29 and November 28, 1979, the following sentence is deleted from the second paragraph of the section entitled, "Knowledge of Relevant Previous Events": "There was a similar lack of emphasis in learning from previous TMI-1 events resulting in a burst rupture disc on the [reactor coolant drain tank]." Between the drafts of November 29, 1979, and March 24, 1980, a new sentence was added to the first paragraph of this section stating that "the technical staff of the NSSS vendor reviewed this transient [Davis-Besse] and recognized

its significance, but this information was not disseminated to other users." Finally, in the second paragraph of this section, the thought that if certain specific actions had been taken by the licensee "the operators might have had sufficient information to recognize the stuck valve" was changed between November 28, 1979, and March 24, 1980, to "the need for improved means for identifying a stuck open PORV might have been recognized."

In its memorandum of November 7, 1983, to OI, the staff stated that these changes appeared to represent a shifting of responsibility for the accident from the licensee to B&W. OI's investigation pursued the bases for these changes.

OI's investigation resulted in a conclusion that certain of the changes discussed above were influenced by GPU upper management (H. M. Dieckamp) and "possibly" by GPU's outside counsel (R. Seltzer) in the GPU v. B&W litigation.

The added section on the "Effect of the Leak Location" was introduced by Keaten with the unanimous agreement of the task force members as a result of a conversation he had with Dieckamp after the latter had reviewed an earlier draft of the report. According to Keaten, Dieckamp commented that the effect of the leak location had a significance that "didn't come out" in the draft report as it had in previous discussions between Keaten and Dieckamp. OI Keaten Ex. 4 at 98-100. Dieckamp recalled about this change that the first draft he saw did not "adequately reflect the unanticipated behavior of the plant during the accident. . ." (OI Keaten Ex. 16 at 63, 64). Keaten stated that he considered Dieckamp's comment valid. Keaten discussed it with the task force and wrote up the new section. It was included in the report after "[e]veryone there unanimously agreed that it was an improvement." OI Keaten Ex. 4 at 99, 100.

With respect to the deletion of the sentence concerning a "lack of emphasis in learning from previous TMI-1 events resulting in a burst rupture disc on the RCDT," no witness had a specific recollection as to the reason for the change. Keaten could not recall "anyone outside the task force ever commenting on that sentence" and he believed "it was strictly a decision by the task force to take it out." OI Keaten Ex. 4 at 109. Keaten recalled that the report already commented about the failure to use available information and that the specific incident in question was not really analogous to the accident of March 28, 1979 (Id. at 108-109).

As noted above, a new sentence was added in the draft of March 24, 1980, in the section on "Knowledge of Relevant Previous Events" that stated B&W had reviewed the Davis-Besse transient, but failed to disseminate the information to other users. The importance of the Davis-Besse incident was discussed with Keaten by Dieckamp and also by R. Seltzer.

Dieckamp acknowledged that he had discussed this portion of the report with Keaten (OI Keaten Ex. 16 at 63, 77). Dieckamp considered the Davis-Besse incident and its relationship to operator training and operator action "an important learning" and did not believe that it was inappropriate for him to assure that the Keaten Report included a discussion of the significance of Davis-Besse (Id. at 77).

Seltzer also emphasized the need "to focus clear[ly]" on the Davis-Besse event during a meeting he had with Keaten (OI Keaten Ex. 4 at 24). Keaten believed from a review of his appointment book that this meeting occurred on March 11, 1980 (*Id.* at 117-119). Keaten could not recall whether any particular changes in the report were made as a result of this comment by Seltzer, although he stated that it was "quite possible that we did discuss that item and discussed adding it to the report" (*Id.* at 225-226). The fact that this sentence first appeared in the March 24, 1980, draft of the report would tend to support this scenario.

The final change in this area concerned the possibility that a fuller analysis of a previous TMI transient could have assisted the operators on the day of the TMI-2 accident. Specifically, the phrase "the operators might have had sufficient information to recognize the stuck valve" was changed between November 28, 1979, and March 24, 1980, to "the need for improved means for identifying a stuck open PORV might have been recognized." Keaten could not recall who initiated this change. He did remember that there was a lot of discussion within the task force about the specific wording in this section because this was perceived "to be a very important section of the report" (*Id.* at 106).

(2) Changes in the Task Force Report Made Under the Subheading of "System Design Features"

In the draft report of November 28, 1979, the first paragraph of the section entitled "System Design Features" contains the statement that "[f]urther investigation is in progress" of problems with the condensate and feedwater systems. In the March 24, 1980, draft and later drafts, this sentence does not appear. In the memorandum of November 7, 1983, the staff identified the relevant questions as to whether management review resulted in any further investigation being halted and why or, if not, whether such an investigation was conducted and with what results.

The investigation by OI elicited information that the "further investigation," referred to above, was conducted. This work was characterized by Lucien as the performance of hardware inspections and the obtaining of test results. This followup work was conducted by Saunders of Energy Incorporated, after Lucien departed TMI for a new assignment on or about September 1, 1979. Lucien later incorporated information on the followup work into a subsequent draft of his report dated April 17, 1981. OI Keaten at 18; OI Keaten Ex. 42 at 2-3. See Sections 8.4 and 9, *infra*.

(3) Changes in the Task Force Report Made Under the Subheading of "Awareness of System Problems"

In the draft report of November 28, 1979, the second paragraph contains the statement that "[t]he task force plans additional investigation to clarify this situation" in reference to operators' suggestions for improvements vanishing into the system without feedback. In the March 24, 1980, draft and subsequent drafts, this sentence is deleted. In the November 7 memorandum, the staff asked whether management review had resulted in this additional investigation being terminated and why or, if not, whether such an investigation was conducted and with what results.

R. W. Keaten told OI that further investigation was conducted in this area. The task force talked to other people "to understand the suggestion system that was used, and what the problems were" (OI Keaten Ex. 4 at 136). They discovered that operators who made suggestions through the formal system were not getting timely feedback on the action taken, if any, and that many operators did not document their suggestions. As a result of this further investigation, the task force included in the final report "a very specific recommendation for a very easy-to-use system for working requests or suggestions with a guarantee that the user would get feedback." *Id.* Ex. 4 at 136, 143-144. In sum, the task force completed the additional investigation it considered necessary and made the decision itself not to pursue the matter further (*Id.* at 136-137).

(4) Changes in the Task Force Report Made Under the Subheading "Operator Training"

Two significant changes occurred in the section entitled "Operator Training." In the draft of March 24, 1980, the eighth paragraph of this section referred to the need for further investigation of "the adequacy of training resources, the need to expand the program to cover more of the plant staff, and special training needs for other members of the organization." In the draft of May 12, 1980, a sentence was added that states "[t]his investigation was deemed to fall outside the scope of the Task Force activities, and is being pursued by others." The "Roddis Report" is newly referenced in this draft. The staff's November 7 memorandum asked why and by whom was responsibility for further investigation in this area transferred from the Keaten task force to Roddis, what significance is there to the fact that the final report refers to an investigation that "is being pursued" but references a report dated 11 months earlier, who was Roddis, what did he investigate and what were his conclusions?

The second change in this section was the deletion of the seventh paragraph, which discussed new symptom-oriented procedures, between the draft of May 12, 1980, and the final report of December 15, 1980. A handwritten note in the margin of the March 24, 1980, draft recommends this deletion. In the November 7 memorandum, the staff identified questions, among others, about the author of the note and the reason for the decision.

OI elicited no information that further investigation in the training area was terminated as a result of management review of the Keaten Report draft. Keaten noted that "substantial aspects" of the task force report dealt with training. To go further than the task force had gone would have required substantial additional resources. In Keaten's words, "it was the decision of the task force that it was unnecessary for us to do it because these activities were already underway." He referred to three studies on training and pointed out that the Roddis Report was cited only as an example of the work being done outside the task force. OI Keaten Ex. 4 at 233-34; see also B&W Ex. 356 at 39. T. G. Broughton, a general participant to the task force activities, also worked closely with the Roddis committee (OI Keaten Ex. 4 at 235). To the best of Keaten's memory, the decision not to pursue the investigation of training issues

further was not by direction of upper management (Id. at 236). Similar accounts were given by Van Witbeck, Tsaggaris, and Long (see OI Keaten at 21).

Keaten said that the task force was aware that the Roddis Report had been issued and cited it only as an example of the work that was going on outside the task force. It was cited specifically because "there was a report on the street that we could reference." OI Keaten Ex. 4 at 234.

The Roddis Report ("Report of Ad-Hoc Advisory Committees as Personnel Selection and Training, Man-Machine Interface and Communications," January 1980) was obtained from GPU by OI and was reviewed by the staff. As a result of its review, the staff found no new information and/or new insights into the actions of individuals or systems in the general time frame of the TMI-2 accident. See OI Keaten Ex. 21.

(5) Changes in the Task Force Report Related to EFV-12A and B

Between the draft reports of October 29 and November 28, 1979, in the section on "Factors Leading to the Incorrect Status of EFV-12A and B," a statement that operating with the emergency feedwater valves closed was a violation of plant operating procedures and Technical Specifications is deleted. A similar statement in the second paragraph is made less clear. Instead, the task force report blames the procedures and Technical Specifications for a lack of clarity. The subheading "Surveillance Procedure" within this section is completely rewritten between the same two drafts. A different interpretation is given of the TS requirement and the conclusion that the Technical Specifications were violated is removed. Also, the statement that the "task force investigation into how these types of violations could occur in spite of the supposedly extensive review that surveillance procedures received has not yet been completed" is deleted. In its November 7 memorandum, the staff characterized these changes as "extremely significant" and asked who suggested them, when, and why.

The staff considered these changes significant because of the fact that the changes in the drafts of the Keaten Report made the report consistent with the position taken by Met-Ed in its response of December 5, 1979, to the Notice of Violation (NOV) of October 25, 1979.

Keaten confirmed that there was a connection between the changes and Met-Ed's response to the NOV. One of the general participants in the activities of the task force was E. Wallace; Wallace also had primary responsibility for drafting Met-Ed's response to the NOV. OI Keaten Ex. 19 at 9.

E. Wallace examined the licensing basis for the emergency feedwater system. Working with an attorney (J. Silberg) and an engineering consultant (E. Fuller), Wallace developed a response to this section of the NOV that took what Arnold described as a "very narrow legal interpretation" of the requirement in the Technical Specifications and concluded that the Technical Specifications had not been violated. OI Keaten Ex. 19 at 10, 153. This response was reviewed by Arnold and by

Dieckamp (OI Keaten Ex. 17 at 80; Ex. 16 at 129). The formal response to the NOV was signed by Arnold.

Keaten believed that Wallace had brought to the attention of the task force the argument being prepared for the response to the NOV. After reviewing the TS requirement itself more carefully, the task force concluded that the TS requirement was ambiguous and may not have been violated. OI Keaten Ex. 4 at 245-248; Ex. 19 at 134-135. It was clear to the task force, however, that the intent of the Technical Specifications was violated and the report was changed to reflect this conclusion (OI Keaten Ex. 4 at 242, 245, 246). Keaten stated that the task force arrived at an independent conclusion about the TS requirement rather than simply accepting the conclusion prepared for the response to the NOV (Id. at 247, 248). Wallace confirmed that he was the person who had convinced the task force members that the procedure in question was not a literal violation of the Technical Specifications (OI Keaten Ex. 19 at 154).

Keaten could not recall any comments by Arnold or Dieckamp on this section, although he thought it probable that he had discussed this subject matter with them (OI Keaten Ex. 4 at 256). Keaten, Long, and Arnold all denied that there was any attempt to dictate the contents of the task force report because of positions taken in responding to the NOV (Id. at 248, 249; Ex. 5 at 100, 101; Ex. 17 at 81).

(6) Changes in the "Conclusion" Section of the Task Force Report

Several changes are made in the "Conclusion" section of the Keaten Report drafts between the October 29, 1979, the November 28, 1979, and the March 24, 1980, versions of the report. The most significant change is the elimination, in the draft of March 24, 1980, of a conclusion that "the general operational condition appears to indicate a lack of management awareness of problems, an insufficiently stringent standard by which to evaluate operations, and/or a management philosophy which accepted this situation, at least in the short run." Instead, the draft of March 24, 1980, contains a statement that "the task force did not perform a thorough review of the role played by TMI management relative to the identified problems. . . ." The staff asked in the memorandum of November 7, 1983, at whose instance this change was made, why, and what were the circumstances.

OI concluded that its investigations "did not produce any testimony or documentary evidence linking this change in the draft reports to comments or actions by GPU upper management" (OI Keaten at 29). Keaten stated that the task force did not undertake a thorough review of the role of management in relation to the problems that had been identified because the management structure had changed so significantly.

So the task force members felt that with this total restructuring and with the tremendous addition of personnel, management level personnel and financial resources to the plants . . . to explore further what had been the problems from a management standpoint

back prior to the accident was really just wasted motion.

OI Keaten Ex. 4 at 261-262.

A similar statement was made by T. L. Van Witbeck, who recalled that the conclusion in the earlier draft was "what we felt was the case" but was not sufficiently substantiated. To get such substantiation, he said, would have required more time and resources than the task force had. OI Keaten Ex. 7 at 72, 73.

(7) Change in the "Recommendation" Section of the Task Force Report

Between the drafts of November 28, 1979, and March 24, 1980, the last sentence of the second item in the "General Recommendations" subsection is deleted. The sentence reads: "The standards and practices which led to deficiencies such as those uncovered in this investigation must be eliminated." In its November 7 memorandum, the staff asked at whose instance the deletion was made and why.

OI concluded from its investigation that "[n]o evidence was developed which indicated that this deletion was influenced by GPU/Met-Ed upper management" (OI Keaten at 30). Keaten had a recollection (about this deletion) that one or more members of the task force group felt that "the statement was a little bit too emotional in nature and didn't really add anything to the recommendation" (OI Keaten Ex. 4 at 284).

(8) Changes in the Task Force Report Regarding the PORV

A number of changes in the Keaten Report drafts relate to leakage from the pressurizer and violation of an emergency procedure regarding pressurizer system failure. In the draft of March 24, 1980, subsection "Previous Experience" in the section on "The Rationale for the Control Room and Staff Personnel Response," the statement appears in the third paragraph that "[a]t TMI, leaking pressurizer relief valves produced elevated discharge pipe temperatures before the event."

In the draft of May 12, 1980, the reference is changed to "leaking pressurizer safety valves." In the subsection "Use of Procedures" in the same section, the fifth paragraph changes between the drafts of October 29 and November 28, 1979. After a sentence stating that "[o]ne symptom of a leak was an indicated tailpipe temperature above 130°F," the statement that "[t]he plant had operated in violation of this requirement for an extended period prior to the accident" is changed to "[t]he plant had operated with higher discharge pipe temperatures for an extended period prior to the accident." This paragraph also contains the statement that operation in this mode without closing the block valve "was a conscious decision by the plant management." In the draft of May 12, 1980, this entire paragraph is deleted.

Additional changes appear in the section on "The Pressurizer Relief Valve Failure Mode." Between the drafts of November 28, 1979, and March 24,

1980, several references to planned or ongoing efforts to get additional information on the PORV and possible failure modes are deleted, including a statement that the task force's efforts in this area had "been encumbered by an inadequate availability of documents concerning the valve history." In the final report of December 15, 1980, this section is completely rewritten and new references are added to recently completed reports by Met-Ed. The most significant change is the statement that "more thorough investigation" had shown that one of the code safety valves, rather than the PORV, was leaking and caused the elevated tail-pipe temperatures.

In the November 7 memorandum, the staff asked who suggested these changes, when, and why. The staff noted a possible relationship between these changes and the positions taken by Met-Ed in its December 5, 1979, response to the NOV.

OI's investigation confirmed that there was a relationship between these changes and the Met-Ed response to the NOV. Keaten stated that the changes in this area were made primarily as a result of information brought to the attention of the task force by E. Wallace, who was preparing Met-Ed's response to the NOV. According to Keaten, Wallace "kept the task force informed of the results of this additional work that was done." OI Keaten Ex. 4 at 149. Among the information provided by Wallace was information that the control room operators had made a determination that one of the code safety valves was leaking and the PORV was not leaking. The task force did not review the documents supporting Wallace's findings: "We simply took his findings and used them" (*Id.* at 160). Both Wallace and Van Witbeck corroborated Keaten's account (OI Keaten Ex. 19 at 54-68, 84-86; Ex. 7 at 24-38). See Section 8.3 (concerning the accuracy and completeness of the information provided by Wallace).

8.2.3 Staff Findings on Changes in the Keaten Report Drafts

The issue identified by the staff in the memorandum of August 5, 1983, from W. J. Dircks (EDO) to B. B. Hayes (OI) was whether the process of review of the drafts of the Keaten Report by management resulted in a final product that was improperly influenced by management so as to reflect better on the licensee than would otherwise have been the case. The staff focused its inquiry on the October 29, 1979, draft and subsequent drafts because the evidence indicated that there had been no review by management of any drafts before that date. The specific changes in which the staff was interested were identified in NUREG-1020LD, Sections 10.2 and 10.4.1, and in the November 7 memorandum.

OI's investigation produced evidence that the only management officials who reviewed and provided substantive comments on the drafts of the Keaten Report were Dieckamp and Arnold (see OI Keaten Ex. 4 at 11-12, 26, 191-194, 285, 286). Dieckamp commented specifically on the Keaten Report sections concerning the effect of the leak location on operator response, the Davis-Besse incident, and operator training (*Id.* at 92; OI Keaten Ex. 16 at 61, 121). Arnold's comments were not identified as having related to any specific section, but it was clear that he had provided substantive comments on certain Keaten Report drafts (OI Keaten Ex. 4 at 285, 286). An attorney (R. Seltzer),

retained by the licensee in connection with its suit against B&W, also provided substantive comments on at least one draft of the Keaten Report. These comments related to the Davis-Besse incident and to contractual liability issues. Id. at 21-25, 279-283.

While other management officials were aware of the ongoing work of the task force (W. G. Kuhns, P. Clark), they did not provide substantive comments to the task force on the draft reports (see Id. at 16-17, 189-191, 294; OI Keaten Ex. 14 at 20-23, 27, 39, 71-73, 108-110; Ex. 18 at 9-10). Still other management officials presently associated with TMI-1 appear to have had no involvement with the Keaten task force reports (e.g., M. Ross, R. Wilson, H. Hukill) (see OI Keaten Ex. 4 at 184-186). The only other individual whom Keaten could recall as having reviewed and commented on the report was W. Lowe of Pickard, Lowe and Garick. Lowe reviewed and commented on the report at Keaten's request. Id. at 188, 189.

The evidence compiled by OI demonstrates the comments provided by H. M. Dieckamp and R. Seltzer did have the effect of influencing certain portions of the Keaten Report. The staff finds no basis in the record assembled by OI; however, to conclude that the influence that the comments by Dieckamp and Seltzer had improper influence on the Keaten Report. The statements by the task force members in which they were instructed not to include anything in the report that their findings did not support, stand uncontradicted. The specific comments by Dieckamp and Seltzer were discussed by the task force members and the changes that resulted were unanimously agreed upon.

The evidence compiled by OI also demonstrates that the content of the Keaten Report was influenced by information provided by Wallace as a result of his assignment to prepare Met-Ed's response to the NOV. In the case of changes to the section on "Factors Leading to the Incorrect Status of EFV-12A and B," the task force evaluated the requirement of the Technical Specifications in light of the information provided by Wallace, concluded that the TS requirement was ambiguous, and changed the report to reflect a conclusion that the intent (rather than the letter) of the TS requirement had been violated. In the case of changes to the report in relation to the PORV, the task force did not conduct an independent assessment but accepted at face value the findings represented to the task force by Wallace. The staff is aware of no evidence that either Wallace or the Keaten task force was under instructions from licensee management officials to conform the Keaten Report to Met-Ed's response to the NOV.

On the basis of the staff's review of the GPU v. B&W record and the evidence compiled by OI during its investigation, the staff concludes that the process of review of the drafts of the Keaten Report by management did not result in a final product that was improperly influenced to reflect better on the licensee than would otherwise have been the case. As detailed above, changes were made to the Keaten Report that, in some cases, resulted in a final report that reflected more favorably on the licensee. In certain specific instances (for example, changes in the task force report regarding the PORV) changes were made that were contrary to facts in the possession of the task force. The evidence does not support a conclusion, however, that such changes were the result of any influence on the task force by management.

8.3 Accuracy of Information Contained in Met-Ed's Response to the October 25, 1979, Notice of Violation

8.3.1 Background

A condition that existed at TMI-2 before the accident was leakage from the pressurizer to the drain tank either through the PORV or the code safety valves. The question of whether the licensee believed the leakage was a result of a defective PORV or a defective code safety valve was argued during the GPU v. B&W trial as it related to the appropriateness of the licensee's response to the leakage. After the accident, the licensee paid a civil penalty of \$155,000 based, in part, on not having followed procedures concerning closure of the PORV block valve. On the basis of its review of the lawsuit documents, the staff stated in NUREG-1020LD, Section 10.4.1, that the lawsuit documents provide evidence that different views on the source of the leakage and reasons for not closing the PORV block valve were stated by various individuals and groups within the licensee's organization at different times both before and after the accident.

The staff's review of the evidence available led it to refer the following issue for evaluation by OI: whether any false information was provided in the licensee's December 5, 1979, response to the NRC's October 25, 1979, Notice of Violation (NOV) concerning the licensee's failure to follow procedures, in light of the fact that the Keaten task force draft reports being circulated internally to upper management at the time of the licensee's response contained information in conflict with the licensee's response to the NOV. See NUREG-1020LD, Section 10.4.1. OI examined this issue as a part of its investigation of the Keaten Report.

8.3.2 Investigation Results

OI's investigation focused on two specific areas of the licensee's response to the NOV. In responding to Section 4A of the NOV concerning closure of the PORV block valve, the licensee stated:

Although this procedure was understood by the plant staff, it is not clearly written and does not reflect actual plant conditions. It will be changed. However, although Metropolitan Edison is concerned about the issue, there is no indication that this procedure or the history of PORV discharge line temperatures delayed recognition that the PORV had stuck open during the course of the accident. OI Keaten Ex. 22 at 34.

As requested by the staff's November 7 memorandum, OI examined the accuracy of the licensee's assertion that "there is no indication that this procedure or the history of PORV discharge line temperatures delayed recognition that the PORV had stuck open during the course of the accident." OI also examined the accuracy of that portion of licensee's response to the NOV that asserted that elevated relief valve discharge line temperatures "do not appear to have been the result of a leaking PORV" but rather were related to a leaking code safety relief valve. See Id. at 35, 36.

8.3.2.1 Delayed Recognition

OI found that Wallace had the lead responsibility in developing the licensee's response to the NOV. Wallace reported to Arnold in preparing a response for the latter's signature. OI Keaten at 37. OI concluded from its investigation as follows:

The testimony obtained during this investigation established that Met Ed's statement in their response to the NOV that . . . there is no indication that this procedure or the history of PORV discharge line temperatures delayed recognition that the PORV had stuck open during the course of the accident was contrary to information in their possession in the form of internal investigations and interviews under the supervisory control and/or cognizance of ARNOLD and WALLACE. Id. at 46.

The contrary information referred to by OI is detailed in its report. W. Zewe gave testimony before the President's Commission on the Accident at TMI that the relief valve temperatures had "always been greater than 130 degrees" because of known leakage through the PORV or a code safety valve. Internal investigative documents at GPU stated that "the temperature downstream of the primary relief valves was not considered to be abnormal since there was known leakage from the valves" causing elevated tailpipe temperatures and that "little significance was attributed to" a downstream tailpipe temperature of 230°F for this reason. These GPU documents suggested that operators may have become "desensitized" to abnormal conditions due in part to "high discharge pipe temperatures before the event." Deposition testimony by T. G. Broughton in the GPU v. B&W lawsuit explained that at least one operator had indicated after the accident that "his interpretation of the temperature downstream of the relief valve following the trip was that it was similar to the temperature which had existed downstream of the relief valve before the trip." Van Witbeck and Long both recalled that the shift supervisor (W. Zewe) had been influenced in diagnosing the significance of the elevated tailpipe by the fact that high temperatures were normal. OI Keaten at 38-42.

Wallace maintained that he had relied "very heavily" on statements made soon after the accident. OI Keaten Ex. 19 at 118-119. However, internal Met-Ed interviews with Zewe, shortly after the accident, show that Zewe was not alerted to trouble by the discharge pipe temperatures on March 28, 1979, because these temperatures had been running at around 190°F and the PORV had recently lifted. [When Zewe was interviewed by OI, he could not recall whether the high PORV discharge line temperatures delayed his recognition of the stuck-open PORV (OI Keaten Ex. 27 at 16).]

8.3.2.2 PORV Versus Code Safety Valve Leakage

One reason given in Met-Ed's response to the NOV for why Emergency Procedure 2202-1.5 had not been violated, in the licensee's view, was that the elevated relief valve discharge line temperatures were caused by a leaking code safety valve rather than the PORV. OI's investigation report states that Wallace's conclusions, ". . . do not appear to be supported by the weight of the facts

nor do they appear to be technically valid." OI further concluded that Met-Ed's argument "was contradictory to other important information that was in the possession of Met-Ed at the time the response was signed." OI Keaten at 60.

OI investigators examined each of the four bases cited by Wallace in support of his conclusion that leakage before the accident was known to be through a code safety valve rather than the PORV: (1) TMI-2 plan-of-the-day (POD) meeting computer printouts, (2) a TMI-2 work request to repair code safety valve RCRV-1A, (3) the multipoint strip recorder and (4) interviews of plant staff.

As to the POD meeting computer printouts, OI found that certain POD annotations referred to by Wallace do indicate the author felt that the code safety valve was leaking. These printouts, however, contain no information to indicate that the PORV was not leaking.

As to the work request for code safety valve RCRV-1A, the investigation confirmed that such a request had been prepared by E. Showalter. However, Showalter denied any first-hand knowledge that the code safety valve was leaking; he could not recall why he had initiated the work request.

Other evidence showed that the initiation of a work request may have been used at TMI-2 to determine the availability of a code safety valve. OI Keaten at 50. Therefore, the mere fact that a work request was prepared for the code safety valve does not necessarily mean that a determination had been made that a code safety valve was leaking.

As to the multipoint strip recorder, OI found that Wallace had no first-hand knowledge that anyone used the multipoint strip recorder to determine the source of pressurizer system leakage before the accident. J. M. Stubbs used data on upstream temperatures after the accident to conclude that one or both code safety valves were leaking and that the PORV was not leaking. The only individual known to have claimed that a preaccident determination had been made that a code safety valve was leaking and the PORV was not leaking was R. Sieglitz, Supervisor of Maintenance TMI-2. Sieglitz's testimony during the GPU v. B&W trial, based on downstream thermocouple temperatures, is not credible. The evidence (i.e., TDR-126* and NRR's analysis of TDR-126) showed that one cannot determine from downstream thermocouple temperatures alone which valve is leaking. OI Keaten at 54.

As to interviews with plant staff as a basis for the response to the NOV, OI found that G. P. Miller, former TMI Station Manager, W. Zewe, former TMI-2 Shift Supervisor, C. Faust, former TMI-2 Control Room Operator, and E. Frederick, former TMI-2 Control Room Operator, all thought that the PORV was leaking. The following excerpt from a transcription of a May 25, 1979, meeting (B&W Ex. 761 at 10) clearly indicates management's prior involvement in the decision to not follow the emergency procedure.

*TDR-126, "Investigation of TMI-2 Pressurizer PORV Discharge Pipe Temperature," February 28, 1980 (B&W Ex. 428) and NRR's technical evaluation of TDR-126 dated October 12, 1983.

MILLER: I want to discuss when we would shut that block valve on the electromatic and looking at the pressurizer system failure procedures, it says that we would shut it when, what, we had a leaking valve or an inoperable electromatic. Now, how do we authorize operating with a valve that is leaking in accordance with our procedure?

ZEWE: Says if the pressurizer boron concentration is changed.

MILLER: Symptoms of a leaking valve are given there. We knew the valve was leaking, I thought.

ZEWE: Oh yes.

Miller: It has nothing to do with this transient. This is what was brought up to me in the thing on Thursday, and that was that you have a procedure that says shut the valve when you have a problem with it. I explained that as not being one of the procedures that we had to follow that day, and in fact we were in the other procedures like I described earlier. Management-wise though we were operating the plant with this valve known to be leaking not using this procedure.

PORTER: Electromatic or code?

MILLER: Electromatic.

PORTER: We know that was leaking?

MILLER: I think we thought it was, whether we were right or wrong.

SEELINGER: Because of those 180, 190 degree temperatures?

MILLER: That's right. Let that go right there.

J. Logan, former plant manager, also gave testimony to the Kemeny Commission that there was leakage in one of the pressurizer relief valves but that he did not know which one of these valves (PORV and two code safety valves) was leaking. Wallace was unable to name anyone who had concluded that the PORV was not leaking. OI Keaten Ex. 19 at 45. He recalled that this conclusion was based on information provided by Stubbs. Stubbs, however, told OI that he did not recall talking to anyone who thought the PORV was not leaking and that he did not provide Wallace or anyone else with information from which such a conclusion could be drawn. OI Keaten at 57.

8.3.3 Staff Findings

As discussed above, the staff's review of the GPU v. B&W lawsuit documents led it to refer to OI questions concerning whether the licensee willfully violated Emergency Procedure 2202-1.5 and whether any false information was provided by the licensee in the licensee's response to Section 4A of the NOV. The staff concludes that the licensee did willfully violate the pertinent emergency procedure and that statements were made by the licensee in its response to the NOV that were neither accurate nor complete and that were contrary to other information in the possession of the licensee.

In its response to the NOV, the licensee stated that the elevated relief valve discharge line temperatures were caused by a leaking code safety valve rather than the PORV and implied that a determination to this effect had been made before the accident. Thus, the licensee argued, there was no violation of Emergency Procedure 2202-1.5.

The staff finds that the weight of the available evidence contradicts this position. Plant personnel, with only one identified exception, thought that the PORV was leaking or did not know which of the pressurizer valves was leaking. Wallace was unable to name anyone who had concluded that the PORV was not leaking. While Sieglitz claimed during testimony at the GPU v. B&W trial that such a preaccident determination had been made, this claim is not credible. Moreover, to the extent Sieglitz had made such a determination, he stated that he did not convey this information to anyone in operations nor to his supervisor, D. Shovlin. The only technical analysis of pressurizer leakage is postaccident and does not establish that the PORV was not leaking. Stubbins, who conducted this analysis, told OI that he did not recall talking to anyone who thought the PORV was not leaking before the accident and that he did not provide Wallace, or anyone else, with information from which such a conclusion could be drawn.

In the absence of convincing evidence that the licensee had determined before the accident that the PORV was not leaking and the statements by the Station Manager that they chose not to follow the procedure, the staff concludes that the licensee made a willful decision to violate Emergency Procedure 2202-1.5. Statements to this effect were made by plant operations personnel. See NUREG-1020LD, Section 10.4.1. The PORV block valve was not closed despite the presence of all of the symptoms detailed in the emergency procedure. In sum, plant personnel thought that the PORV was or might be leaking, saw symptoms that called for closure of the block valve to determine whether the PORV was leaking, and decided not to follow the procedure.

The licensee also stated in its response to the NOV that there is "no indication that this procedure or the history of the PORV discharge line temperatures delayed recognition that the PORV had stuck open during the course of the accident." The staff's review of the lawsuit documents led it to call into question the validity of this statement.

The staff had disagreed with this statement by the licensee when first made. In Appendix A to a January 23, 1980, letter (which transmitted the order imposing the proposed civil penalty) from the Director of the Office of Inspection and Enforcement to R. C. Arnold of Met-Ed, the staff stated:

The licensee also asserts that there is no indication that this procedure or the history of pilot-operated (electromatic) relief valve [PORV] discharge line temperature delayed recognition that the PORV had stuck open during the course of the accident. Shutting the relief isolation valve early in the accident could have prevented the accident entirely, reducing it to an operational transient. There is a clear indication that recognition of an open PORV was delayed in part by the past history of the discharge line temperature in that the Emergency Procedure had not been implemented. Much of the response of the licensee addressed those many valid technical reasons which should have prompted a review and revision to the applicable emergency procedure to make it appropriate to the existing plant conditions. Those revisions were not made, and therefore, the procedure was ignored rather than implemented.

The lawsuit documents and OI's investigation provided evidence that the licensee's statement was also at variance with information in the possession of the licensee at the time the statement was made. Specifically, the licensee knew, or should have known, of the following at the time it filed its response to the NOV:

- (1) W. Zewe's statement on March 30, 1979, that the relief valve discharge temperatures "didn't look abnormally high" at 228 to 230°F because "they had been running at 170 to 180 [°F] so I figured it was still warm from when it lifted"
- (2) a similar statement by W. Zewe on April 6, 1979, to a GPUSC investigative group
- (3) Zewe's testimony before the Kemeny Commission on May 30, 1979, that he did not close the PORV block valve despite the elevated PORV discharge temperature because leakage past the PORV or a code relief valve had caused the "normal" temperature to be elevated to 175 to 190°F
- (4) the statement in TDR-054 (at 7) that "little significance was attributed" to the elevated discharge line temperature because it had run "near 200°F prior to the transient"
- (5) a second statement in TDR-054 (at 14) that operators may have become "desensitized" to abnormal conditions due, in part, to high discharge pipe temperatures caused by leaking pressurizer relief valves before the event
- (6) a nearly identical statement as that to item 5 in the October 29, 1979, draft of the Keaten task force report

Wallace justified his conclusion that operators were not desensitized by elevated relief valve discharge line temperatures as follows:

Even if the valve had been 130 degrees normally, the impression I have is he still would have felt that was

just the piping system response to a valve that had opened and reclosed, rather than one that had stuck open. OI Keaten Ex. 19 at 110.

This is consistent with the statement to OI by Zewe that he could not say that temperature of 230°F would have seemed significant if the baseline for comparison had been 130°F instead of 180°F (OI Keaten Ex. 27 at 10, 15). It does not appear to be consistent, however, with the above-described statements by Zewe shortly after the accident.

On the basis of the information from the GPU v. B&W lawsuit documents and from OI's investigation, the staff concludes that the licensee's response to the NOV Section 4A was inaccurate and incomplete.

Whether or not it is ultimately determined that the PORV was leaking on March 28, 1979, the licensee's response to NOV Section 4A did not disclose, and failed to take into account, significant information that was contrary to the position taken by the licensee. This is the case both as to licensee's statements that operators were not desensitized by abnormal plant conditions and that elevated valve discharge line temperatures were the result of a leaking code safety valve, thus implying failure to close the PORV block valve was not a violation of the emergency procedure.

The staff also is concerned with one other aspect of the licensee's response to the NOV. OI's investigation of changes to the Keaten Report elicited information concerning the licensee's response to the NOV concerning violation of the surveillance procedure for the emergency feedwater valves. The licensee denied having violated the cited requirement of the Technical Specifications. The Keaten task force, having become aware through Wallace of the argument being made in the response to the NOV, examined the TS requirement, concluded that it was ambiguous, but also found it clear that the intent of the Technical Specifications had been violated by the licensee.

Wallace and Arnold both characterized the argument made in the response to the NOV as "narrow" and "legalistic." Dieckamp described the argument as "kind of thin." While there is no indication that the operations personnel responsible for implementing this TS requirement engaged in the kind of hairsplitting that is shown by the response to the NOV, this licensee and others should understand that the staff expects information submitted by licensees to be "full, complete, timely and accurate." See 49 FR 8583, 8588 (March 8, 1984). Where the intent of a TS requirement is clear, as even the licensee's own Keaten task force apparently found it, a response such as that provided by licensee to the NOV is less than complete and less than acceptable.

While Wallace was most closely involved in preparing the response to the NOV, the responsibility for the licensee's inaccurate and incomplete statements must be shouldered by R. C. Arnold, who reviewed and signed the submission to the NRC, and by H. M. Dieckamp, who reviewed the response before it was submitted and chose "not to intervene."

Wallace presently holds a position at GPU's Oyster Creek facility; he has no responsibility in connection with the restart or operation of TMI-1. Arnold presently holds a position with GPU that is not related to any nuclear facility; he has no responsibility in connection with the restart or operation of TMI-1. H. M. Dieckamp's involvement is evaluated in Section 13.2 of this report.

The significance of the licensee's inaccurate and incomplete statements in its response to the Notice of Violation to the overall assessment of management integrity is addressed in Section 13.0.

8.4 Keaten Task Force Use of the Lucien Report

8.4.1 Background

One of the concerns identified by the staff in NUREG-1020LD, Section 10.2, was associated with the development and eventual use by the Keaten task force of a technical report entitled "Loss of Feedwater Flow Leading to the Accident of March 28, 1979" (hereafter referred to as the Lucien Report). This report was prepared by K. P. Lucien of Energy Incorporated (EI) under contract to the licensee. Lucien's original draft report was forwarded by a handwritten, undated memorandum from Lucien to "Bob" (B&W Ex. 344). The memorandum contained the following statement: "This is the draft of my report on the polishing/condensate/air systems for the Investigative Task Force. Per our understanding with R. Keaten, please launder this to bring it into line with your perception of the forthcoming master task force report." OI Keaten Ex. 41.

The original staff concerns related to the Lucien Report may be summarized as follows:

- (1) Who was "Bob" and what was the "understanding" between Lucien and "Bob" concerning "laundering" Lucien's report for use in the Keaten Report?
- (2) Why did Keaten not include, or fully reflect, Lucien's findings in the Keaten Report? Did the Keaten task force conduct further inquiry into Lucien's findings and determine that there was no bases for some of the findings?
- (3) The final Keaten Report references a July 1980 revision to the Lucien Report. Are there significant changes between the original version of the Lucien Report and the referenced revision? If so, why were the changes made and who made them?

OI Keaten Ex. 20 at 16.

Investigation results and staff findings associated with questions 1 and 2 above are presented in this section of the report. The actual changes made to the Lucien Report, who made the changes and why (question 3) are discussed in detail in Section 9.0 of this report.

8.4.2 Investigation Results

The OI investigation determined that there were three versions of Lucien's report. The original document produced by Lucien was dated September 1, 1979 (OI Keaten Ex. 47). The first revision was made by Lucien following a meeting with three Met-Ed employees on December 3, 1979. As a result of an administrative error, this revision was also dated September 1, 1979 (OI Keaten Ex. 48). The final revision was made by Lucien after he received the results of the followup tests that were recommended in his initial report. This second revision, which served as his final report, was dated April 17, 1981 (OI Keaten Ex. 49).

As discussed in Section 9.2, the only people involved in physically modifying Lucien's report were Lucien himself and his immediate supervisor, T. L. Van Witbeck. Van Witbeck was also a member of the Keaten task force. No member of GPU upper management (Kuhns, Dieckamp, Arnold, or Clark) was involved in or influenced any of the changes to the Lucien Report.

The investigation identified the three individuals who were responsible for developing the section of the Keaten Report in which the Lucien Report is referenced as R. W. Keaten, Chairman of the task force; R. L. Long, task force member; and T. L. Van Witbeck, the senior EI resident at TMI.

Lucien stated during his interview with OI that his handwritten, undated memorandum to "Bob" (B&W Ex. 344) was sent to Long. Lucien recalled that he was directed by Van Witbeck to give Long his finished report. It was Lucien's understanding that Long was to receive all of the external reports that were being prepared as input to the Keaten Report and that Long's task was to extract their pertinent content for use in the body of the finished Keaten Report. Lucien understood that Long would not change or alter the technical content or findings of his report. Lucien indicated that his use of the term "launder" meant that Long should report the findings of the Lucien Report in a manner consistent with the written structure (style and format) of the finished Keaten Report. Lucien said the term "launder" was not meant to have any deceitful connotation. OI Keaten Ex. 42 at 3.

According to Long, it was his responsibility to receive GPU- and contractor-generated investigation reports and review them for pertinence to the task force activities. He said that he would review the reports for consistency with his understanding of the accident and would look for discrepancies between his understanding and the information reported. In such cases, he would raise questions to assure that what was to be reported was accurate. Long said that he did not go through all of the details and try to check everything that was done because there just was not time for that and his other tasks. OI Keaten Ex. 5 at 17.

Long stated that the initial draft of the Keaten Report (September 28, 1979) was prepared by Keaten. The initial draft was sketchy, and, according to Long, other members of the task force would rework the various sections, filling in the details. These revised sections would then be considered by the task force for inclusion in the task force report. OI Keaten Ex. 5 at 18, 19. According to Long, he and Van Witbeck were responsible for extracting the information from the Lucien Report that they thought pertinent to

the Keaten Report. Long could not recall which one of them actually did the writing to incorporate the information into the Keaten Report. Id. at 20.

Long confirmed Lucien's explanation of the use of the term "launder." Long stated that the note from Lucien simply meant that Long would extract pertinent information and clean up the language in terms of polishing it. Long was not supposed to change the content, but was to make the style consistent with other task force input. Although Long could not recall if he changed any of the technical content in Lucien's report, he thinks it would have been highly unlikely because he considered Lucien an "expert in that area." Id. at 20, 21.

Once the task force was formed, Long stated that he reported directly to Keaten on all task force matters. He did not have contact with Arnold or Dieckamp regarding task force issues. Long believes that Arnold and Dieckamp were kept informed of task force progress by Keaten. Id. at 13-15.

Van Witbeck said that he reported to TMI with a group of EI personnel 2 days after the accident. He was originally assigned to the Accident Assessment Group under Long and worked principally on the TMI-2 accident sequence of events. OI Keaten Ex. 7 at 13. Once Van Witbeck was assigned to the Keaten task force, most of his interface with GPU management was through Keaten and Long. Van Witbeck assigned Lucien the task of investigating the events leading up to the loss of feedwater flow at TMI-2 on March 28, 1979. Neither Keaten nor Long were involved in Van Witbeck's decision regarding the content or scope of the investigation. Id. at 5. Van Witbeck stated that the Lucien Report was intended to be a technical data report (TDR) that would be released to anybody that wanted to look at it. It was not prepared solely as input for the Keaten task force. Id. at 8. Lucien would inform Van Witbeck of any problems he found and Van Witbeck, in turn, would inform management. Van Witbeck said he met with Long a minimum of once a week and earlier (time frame not specified) with Arnold on a similar basis. Van Witbeck stated that management's only concern was when conclusions were not supported by facts. Id. at 11, 12. Van Witbeck recalls being told by Arnold that Arnold had read the Lucien Report and said, "I don't agree with this, I think it's not supported." Id. at 13, 14. It does not appear from Van Witbeck's statement that Arnold was referring to the entire Lucien Report; however, Van Witbeck could not recall the portion of Lucien's findings that Arnold thought were unsupported (Id. at 14). (As discussed later in this section, Arnold does not recall receiving or reading the Lucien Report itself.) Van Witbeck also stated that "Bob Long, Bob Keaten and Bob Arnold . . . on a variety of occasions told us to tell it like it is and not to be intimidated by anybody. When they came back and questioned they were just in general questioning from a technical viewpoint, not from any other viewpoint. They never told us to reword something to soften it, just to be sure that what we were saying was indeed what we could substantiate." Id. at 39 and 40.

Van Witbeck stated that he had given Lucien a free hand with the report. Van Witbeck said, when he first saw Lucien's report, there were portions that he wanted to strike from the report. He did not believe some of Lucien's conclusional comments were appropriate on the basis of the technical content. Van Witbeck was particularly concerned about Lucien's comments regarding TMI-2 startup and test. He and Lucien discussed these comments at length;

nonetheless, Van Witbeck left the comments in the report and circulated it for first review. Id. at 12. Van Witbeck stated that he later made some minor changes to the Lucien Report; however, before making the changes he discussed them with Lucien over the telephone. Van Witbeck could not recall the exact parts that he modified. Id. at 42. Van Witbeck believes--from conversations he had with Lucien--that if Lucien were to rewrite the report, Lucien probably would not include some of his original conclusions. Van Witbeck believes that Lucien agrees that some of these conclusions could not have been drawn from the information uncovered at the time. Id.

Van Witbeck further stated that neither he nor his staff were ever told by GPU to suppress or change something, if it was technically valid. He said they were directed to do just the opposite: ". . . don't hide, don't color, tell us what's wrong, we've had the accident, let's see if we can't get things cleared up." Id. at 13.

Keaten stated that the first draft of the task force report was written by him and was distributed to members of the task force for comment on September 28, 1979. OI Keaten Ex. 4 at 12, 13. No one from the task force was specifically assigned to review the Lucien report; however, Keaten stated that Van Witbeck tended to take the lead in factoring the Lucien information into the task force deliberations since Lucien worked for Van Witbeck (Id. at 35, 37).

Keaten stated that he met with Lucien, on occasion, to discuss findings but did not recall the specifics (Id. at 37). Keaten remembered two versions of Lucien's report; however, he did not realize until recently that two versions were dated September 1, 1979. He does not recall which one of the September 1, 1979, versions he read. Although Keaten read the Lucien report, he stated that he relied on Van Witbeck to factor that information into the task force report (Id. at 37-40, 78). Keaten believes that he must have had a copy of Lucien's original draft report when he dictated the first draft of the task force report because there was a level of detail in his first draft of the Keaten Report (September 28, 1979) that he could not have remembered (Id. at 81).

Keaten recalled that Arnold had wanted the task force to look into the way the secondary side of the plant was treated during construction, startup, and operation. Arnold wanted to know if it was considered a "poor cousin" (Id. at 62, 63). Keaten agreed that the Lucien Report was very critical of GPU (Id. at 69) and he was surprised and disturbed about some of the things Lucien had discovered about the secondary side of the plant: poor record-keeping, equipment that was originally installed and then disconnected, testing listed as significant to turnover of the plant that never got done, and a general indication that they were not "running a very tight ship." Id. at 86. Keaten stated that he was rather surprised because he knew some of the people involved and he considered them good. Yet, the implications were there that "the practices were sort of sloppy." Keaten's general reaction to the Lucien findings was that "it in fact confirmed what Mr. Arnold had been worried about: that it seemed likely that the primary side was getting good attention, but it appeared that that was happening because of all the nuclear-safety-related requirements; and that there was not adequate concern for QA being applied on the secondary side." Id. at 86, 87.

Keaten believes that he received information about Lucien's findings from Van Witbeck and discussed them with Arnold before he ever received Lucien's written report (Id. at 69). Although he discussed some of the findings with Arnold and probably Dieckamp, Keaten said he would be surprised if he would have sent them a copy of Lucien's report. Keaten felt that the charter of the task force was to take the information and condense it for top management to learn the necessary information without having to plow through the details. Id. at 69, 70.

In discussing what was important to Keaten with respect to Lucien's findings, Keaten stated that the emphasis was not on Lucien's report itself, but on the findings and the documentation of those findings. Keaten said that by the time the report came out, the task force was involved in other things that went beyond the initiating event. Keaten's explanation of how he put the Lucien Report into perspective was:

Keep in mind that although this was important, and it was sufficiently important that a summary of these findings--and I have to think it was a fairly decent summary[--]appeared in the task force report as one of the first sections and that section of the task force report is also credible. But it was even more urgent in our minds to understand why the accident had occurred. And most of these things although they are indicative of practices that should be corrected--I trust by now have been corrected--were not direct contributors to the accident. And so, while we did reflect that in the task force deliberations; and I do remember discussing this type of thing with Mr. Arnold, we would not have dwelt or met to the point that it interfered with the other activities. OI Keaten Ex. 4 at 71, 72.

During Keaten's deposition (January 7, 1982) in the GPU v. B&W lawsuit, he stated that some of the language in the Lucien Report did not belong in a professional report (Keaten at Dep. Tr. 420). During his interview with OI, Keaten confirmed that he thought in certain respects the Lucien Report was "unprofessional." Keaten said: "I was concerned that some of the language in there was a little emotional in content. I did not question the facts that are in the report. And in fact, many of those facts are reflected in the task force report." OI Keaten Ex. 4 at 41, 42. Keaten recalled that he discussed the unprofessional nature of portions of the Lucien Report with Van Witbeck after Lucien's final report (April 17, 1981) was received. He said that the discussion with Van Witbeck centered around whether to make the Lucien Report a GPU document (that is, a technical data report). Keaten stated that because of the language in the report, not the facts, he did not want to sign his approval to the document. Id. at 81, 82. The Lucien Report was accordingly not made a GPU technical data report.

The role of GPU upper-level management (W. G. Kuhns, H. M. Dieckamp, R. C. Arnold, and P. R. Clark) in changes to the Keaten Report is discussed in Section 8.2 of this report. OI did not question Kuhns about the Lucien Report; however, the report was discussed with Dieckamp, Arnold, and Clark.

Dieckamp, President and Director of GPU Corporation, stated that he knew Van Witbeck was on the Keaten task force and he also knew that before that Van Witbeck had worked on developing the TMI-2 accident sequence of events. Other than that, Dieckamp was not aware that EI was involved in the investigation of the loss of feedwater flow event that initiated the accident. OI Keaten Ex. 16 at 33, 34. Dieckamp stated that he had never seen the Lucien Report until the day before his interview with OI, and he had never discussed the contents of the report with anyone. Although he recalls discussions with Keaten about what conclusions were reached in this area, he did not have an understanding of the source of the information or who had done the investigation. Id. at 34, 38, 39. Dieckamp did not discuss with Arnold or Keaten where the recommendations came from. He was willing to accept that they were valid observations and recommendations from the task force, but he did not look beyond that to determine the source. Id. at 43, 44.

From the testimony provided by Arnold, it appears that his role in participating in this section of the Keaten Report was minimal. Arnold stated that he was provided oral reports periodically from E. G. Wallace on the progress of the various issues under review by GPU at the time, including those that were being covered by the Keaten task force. At various times he also would talk directly with Keaten and Long on specific areas in which the task force had been developing information. OI Keaten 17 at 23, 24. Arnold stated that he did not recall seeing a copy of the Lucien Report until he was preparing for his interview with OI (Id. at 39). Arnold was neither aware of Lucien being the one who was working on the loss of feedwater investigation nor does he believe that he was sent a copy of Lucien's report (Id. at 41).

From January 20, 1980, through the final publication of the Keaten Report on December 15, 1980, P. R. Clark served as Vice-President of Nuclear Activities for GPUSC (Arnold's deputy). Clark reported that he first became aware of the Keaten Report sometime in the summer or fall of 1980 (OI Keaten Ex. 18 at 5). Clark was neither responsible for overseeing the task force nor directing any task force activities (Id. at 6). Clark did not recall being familiar with or reading the Lucien Report (Id. at 19).

8.4.3 Staff Findings

The staff's first question about the Lucien Report concerned the identity of "Bob" in B&W 344 and the meaning of the term "launder" in that document. On the basis of the explanations provided by Lucien and "Bob" Long on the "launder" memorandum (see Section 8.4.2), coupled with the fact that there is no evidence to indicate that Long made any changes or modifications to the Lucien Report, the staff concludes that there was no improper intent or action on the part of either Lucien or Long related to this memorandum. The staff's second question about the Lucien Report concerned the incorporation of Lucien's findings into the Keaten Report. As discussed in Section 8.4.2, R. W. Keaten incorporated Lucien's findings in the initial draft of the Keaten Report. While Keaten could not recall if he had a copy of the Lucien Report at the time he dictated the draft task force report, the evidence would indicate that the Lucien Report was available for Keaten's use at the time.

A comparison of the September 28, 1979, Keaten Report draft with Lucien's original September 1, 1979, report shows that many of the factual items discussed in the Lucien Report are reflected in the draft of the Keaten Report. Some of the information is extremely detailed, such as the identification numbers of specific valves and pressure switches, test scenarios and results, and the identification of selected design and testing deficiencies. Compare, e.g., Keaten Report (10/28/79) with Lucien Report (09/01/79): at 5, 6 with A-3 through A-5 (newly established scenario); at 8 with C-11 (polisher bypass valve design deficiency); at 10 with C-5 (effect of hydraulic shock). Thus, the staff concludes there is a high probability that Keaten had available and used Lucien's original report of September 1, 1979, when he authored the first draft of the Keaten Report.

The Lucien Report identifies deficiencies in design, construction, testing, maintenance and operating practice associated with the instrument air, condensate polishing, and condensate systems at TMI-2. In some cases, these deficiencies are further broken down into numerous specific problems that are discussed in detail by Lucien. Several of Lucien's deficiencies are supported by factual evidence such as design documents and test records; however, many of the deficiencies are not supported by such evidence. These latter deficiencies appear to be general conclusions drawn by Lucien during his investigation. Examples of these types of conclusions would include the following extracts:

- (1) "Based upon observation of the extremely poor condition in which the regeneration station equipment has been maintained. . ."
- (2) ". . . the wide variation in settings indicates gross lack of system knowledge, attention, or both."
- (3) "The loop diagrams. . . contain technical errors that reflect a lack of total circuit comprehension."
- (4) "This review indicated that, while long-term reliability [of strip chart recorders] was generally very poor due to inadequate operating and maintenance practices . . ."

OI Keaten Ex. 47 at A-5, B-8, B-8, and B-12, respectively.

The first draft of the Keaten Report summarizes many of the major deficiencies in the Lucien Report that are supported by factual evidence. Compare, e.g., Keaten Report (10/28/79) with Lucien Report (09/01/79): at 3 with C-2, C-3 (computer and annunciator alarms inhibited, booster pump wiring error); 7, 8 with B-6 (modifications negated polishing system's ability to sustain loss of instrument air and loss of control power); 8 with C-11 (design deficiency not identified during construction testing or functional testing); 9 with C-9, C-20 (technical inadequacies and lack of review and approval of electrical test procedures). However, because these deficiencies are consolidated and summarized, the net effect is such that the numerous specific deficiencies associated with the operability of the condensate polishing and condensate systems are not fully brought to light. Moreover, the overall tone of the Keaten Report in this area is much less critical of the licensee and the licensee's contractors than the detailed writeup presented by Lucien.

For example, the Lucien Report identifies significant problems associated with pre-turnover testing of the condensate polisher and condensate systems. In addition to identifying technical inadequacies in selected procedures, Lucien implies that test records may have been falsified. The Keaten Report summary identifies only technical inadequacies in electrical test procedures. B&W 347 at 9. The conclusions and recommendations sections of the initial Keaten draft provided little additional information on specific problem areas:

As-built plant systems and components showed significant discrepancies with design requirements even in safety related systems. B&W 347 at 42, 43.

The general condition of the secondary side of the plant should be thoroughly reviewed by a careful inspection of the plant and comparison to the design requirements. In the case of TMI-1 a review of a selected sample of the systems may be adequate if severe deficiencies are not found. For TMI-2 the entire BOP plant [balance of plant] should be carefully inspected prior to restart. B&W 347 at 48.

R. Keaten stated that he did not have a problem with accepting deficiencies reported by Lucien that were supported by factual evidence (OI Keaten Ex. 4 at 41-42). Keaten believes that the Lucien Report findings are presented in the Keaten Report in a "fair and balanced manner" (Id. at 71).^{*} Keaten also stated that while he thought the Lucien findings were important, he was more interested in understanding why the accident occurred. Keaten believed that many of the practices identified by Lucien needed to be corrected, but, in his view, they were not direct contributors to the accident; therefore, the task force did not concentrate their efforts in this area. Id. at 71. According to Keaten, if something was considered outside the scope of the task force, he would not have a problem with the deficiency being noted in the technical report; however, he may not have included it in the task force report. Id. at 59, 60.

The OI investigation produced evidence that Keaten's initial writeup associated with the Lucien findings may have been modified to some extent by Long and Van Witbeck. Several changes occurred to this section between Keaten's initial draft of September 28, 1979, and the final task force report dated December 15, 1980. The majority of changes appeared to be the result of incorporating the followup test results and evaluations that were originally recommended by Lucien or repackaging (editing) Keaten's original writeup. While some of Keaten's original information is deleted in the final

^{*}The staff notes that during investigative interviews with T. M. Hawkins and I. D. Porter, they stated that not all of the detailed findings of the Lucien Report were carried forward to the Keaten Report. However, it is not clear from their brief statements whether or not they disagreed with Keaten's description of his treatment of the Lucien findings as "fair and balanced." OI Lucien Ex. 2 at 77; Ex. 4 at 30; see Section 9.2 (for discussion of role played by Hawkins and Porter in changes to Lucien Report).

version (e.g., reference to technical inadequacies in electrical test procedures), the conclusions and recommendations section of the Keaten Report are markedly strengthened with respect to problem identification and resolution for the secondary plant.

Attempts to determine the exact nature of the initiating event led to the discovery of (1) undocumented and in some cases apparently erroneous modifications to secondary system components, (2) system and component operating problems which should have been detected and corrected during initial plant startup, and (3) substandard practices in modifications to electrical circuitry. OI Keaten Ex. 13 at 30.

The General condition of the as-built secondary side of the plant should be verified by a careful review of design requirements and a detailed comparison of the entire BOP to those requirements. As built drawings and associated documents should be verified and procedures and practices for control of all future changes should assure that these drawings/documents are kept current. Specific problems identified in this report (e.g., in Section A.2, A.3, C.5, & F.2) and others identified by the BOP review should be corrected prior to the restart of Unit 2. Id. at 43.

In summary, the staff concludes that the initial incorporation of Lucien's findings into the Keaten Report did not entirely reflect the inadequacies that were identified by Lucien in the condensate polishing and condensate systems, particularly with respect to the startup test deficiencies. While the later drafts of this section of the Keaten Report do not go back and pick up any of the deficiencies that were not originally incorporated by Keaten, the conclusions and recommendations sections of the Keaten Report are markedly strengthened with respect to problem identification and resolution for the secondary side of the plant. Furthermore, the OI investigation did not produce evidence that would indicate the actions or motives of R. W. Keaten, R. L. Long, or T. L. Van Witbeck were improper with respect to the incorporation of Lucien's findings into the Keaten Report.

The overall role of GPU upper management (W.G. Kuhns, H. M. Dieckamp, R. C. Arnold, P. R. Clark) in influencing changes to the Keaten Report is evaluated in Section 8.2 of this report. The OI investigation did produce evidence that Arnold and Dieckamp were briefed by Keaten regarding the results of Lucien's findings and that they did provide comments on the Keaten Report drafts; however, there is no evidence to indicate that their comments affected the section of the Keaten Report in which Lucien's findings are described.

On the basis of the staff's review of the GPU v. B&W lawsuit record and the evidence compiled by OI during its investigation, the staff concludes that the process by which the Lucien Report findings were incorporated into the Keaten Report did not involve improper influence by GPU management.

8.5 Financial/Technical Interface

8.5.1 Background

The staff identified financial/technical interface in NUREG-1020LD, Section 10.9, as one of the areas in which the GPU v. B&W lawsuit documents raised sufficient questions to require further inquiry. Financial/technical interface was raised as an issue in the restart proceeding by the Commission as issue (6) in CLI-80-5: "whether the relationship between Metropolitan Edison's corporate finance and technical departments is such as to prevent financial considerations from having an improper impact upon technical decisions." The ASLB specifically addressed the question whether the licensee prevented "financial considerations from having an improper impact upon technical decisions." See 14 NRC 381, 518 (1981). After hearing evidence on this issue, the ASLB concluded that "the licensee's organizational framework and its practice of committing substantial resources to its nuclear business provides reasonable assurance that the relationship between its corporate finance and technical departments is such as to prevent financial considerations from having an improper impact upon technical decisions" (Id.). This conclusion was consistent with staff testimony that there was no indication of undue influence of financial considerations on TMI operation before the accident (see NUREG-0680, Supp. 1 at 26). The ASLB also heard evidence on the relationship between proposed budget cuts in the maintenance area at TMI-1 and management attitude toward safety, ultimately finding in the licensee's favor on this issue [See 14 NRC 381, 493-94 (1981)].

Several specific items were cited by the staff in NUREG-1020LD, Section 10.9, as relevant to the financial/technical interface question: (1) maintenance staffing, particularly as to preventive maintenance; (2) pace of plant startup; and (3) disposition of a recommendation concerning an automatic bypass in the condensate polisher system. While no separate investigation in these areas was requested, the staff asked OI "to focus on the comments of senior plant management relating to maintenance, plant startup, and the condensate polisher at TMI-2, and to management deficiencies generally, as it conducts its investigation into the Keaten Investigation." NUREG-1020LD, Section 10.9, at 10-23.

8.5.2 Investigation Results

The OI investigation of the Keaten Report has provided some additional information relevant to the financial/technical interface issue.

A major issue identified by the Keaten task force was the adequacy of the resources that were available to address problems. Keaten expressed the matter in this way: "the people that we had interviewed and talked with were honest and sincere people that were trying to do a very difficult job and that they just didn't have the resources to do it with." OI Keaten Ex. 4 at 259. As a result of these findings, the Keaten task force identified as its first recommendation the need to increase resources (Id.).

The resource limitation manifested itself on the secondary side of the plant. Keaten stated that one of the issues Arnold asked the task force to look into was whether the secondary side of the plant was being treated as "the poor cousin." Id. at 62. The task force found that the secondary side "really

wasn't getting everything that it needed" (Id. at 63). Keaten described himself as "surprised" and "disturbed" at some of the things that were found by Energy Incorporated concerning the secondary side (Id. at 86). His reaction was that Arnold's concerns had been confirmed in that "there was not adequate concern for [quality assurance] being applied on the secondary side" (Id. at 86, 87). When asked about Miller's description of the ground rules under which he was operating ("If it wasn't safety-required, or didn't degrade the ability of the plant to run 100 percent power, it wasn't a necessary change. . ."), Keaten said the task force interpreted this as an expression that additional resources were needed (Id. at 273).*

Keaten was asked about the comments of J. Logan concerning preventive maintenance. Keaten said there was "considerable concern on the part of the task force about the situation with preventive maintenance." Id. at 277. The task force found that corrective maintenance needs were so demanding that not enough resources were left available for an adequate preventive maintenance program (Id. at 277, 278). The recommendation of the task force for more resources was based, in part, on this finding (Id. at 278). Since then, the allocations for staff and dollars for maintenance activities "increased enormously" and the preventive maintenance and corrective maintenance functions are performed by separate staffs (Id.). While Keaten had only limited knowledge of the present situation, he believed that the concerns raised to and by the task force in this area had been satisfied (Id. at 279).

The Keaten task force also attempted to explore the issue of pace of plant startup. Despite some statements by persons interviewed by the task force that the plant had been rushed to startup, Keaten said that the feedback to the task force "without exception" was that the pace of startup was not too fast in order to be safe (Id. at 238, 239). For example, G. Kunder told the task force in an interview that the pace of startup was "too fast for the resources that we had available" (B&W 347M at 14) and that he "wouldn't operate the plant, knowing what I know now" (Id. at 25-26). He also stated that "the unit was deemed safe to operate" but "there were some operational problems involved that made the unit less reliable" (Id. at 14, 25). He later added that he believed management "viewed the unit as safe and ready to operate" (Id. at 25). Kuhns told OI that, from his information, "there was no management pressure to force that unit into service" (OI Keaten Ex. 14 at 62). Dieckamp said that no one had ever come to him in the context of plant startup and said "what we're doing is unsafe" (OI Keaten Ex. 16 at 162).

Van Witbeck said that the task force was told of feelings by people in the startup group that management had decided "that the startup on Unit 2 would not cost as much as the one on Unit 1 and that the budgetary screws were held tight on those folks" (OI Keaten Ex. 7 at 80, 81). He believed that the startup personnel felt "they did the best job they could in the budget and in the time frame they were allocated to do the job" (Id. at 36, 37).

*Keaten told OI that the task force did not specifically pursue the question of who told G. Miller what the "ground rules" were. To the best of Keaten's understanding, "it was something that had been communicated either directly or indirectly to [Miller] by the Metropolitan Edison management." OI Keaten Ex. 4 at 288.

Another specific area cited in NUREG-1020LD as relevant to financial/technical interface was the failure to install a bypass to the condensate polisher system. Keaten said that he had discussed that specific matter with Arnold in the context of the task force's recommendation that additional resources were needed. He pointed out that there were technical obstacles to automating the condensate bypass line as had been suggested. Keaten was satisfied as a result of the task force's investigation that a technical judgment had been made at the time not to take the recommended action. OI Keaten Ex. 4 at 138, 139. See also letter dated October 14, 1983, from H. M. Dieckamp to the Commission, enclosing Response of GPU Nuclear Corporation to the Public Version of the NRC staff's Report on "GPU v. B&W Lawsuit Review and Its Effect on TMI-1" (NUREG-1020). Whether or not there were valid technical reasons for rejecting the suggestions by operators for an automatic bypass, however, is not significant. The fact that such suggestions were made was symptomatic of a system that was not functioning as the operators expected. Lucien's finding, as discussed in Sections 8.4 and 9, were construed by Keaten as an indication that the secondary side of the plant was not getting the resources it needed. See, e.g., OI Keaten Ex. 4 at 63.

The staff also stated in NUREG-1020LD that financial considerations may have been involved in the decisions to violate the procedure specifying block valve closure for a leaking PORV and to adopt a leak rate calculation procedure by a temporary change notice that was later found by the NRC to be a violation. These specific areas were not pursued by the OI investigation.

8.5.3 Staff Findings

The financial/technical interface issue was raised by the staff in NUREG-1020LD because the GPU v. B&W lawsuit documents contained certain information that appeared material to CLI-80-5 issue (6) and that appeared to contradict the staff's testimony, relied upon by the ASLB, that there was no indication of undue influence of financial considerations on TMI operation before the accident. The evidence from the GPU v. B&W lawsuit documents and from the OI investigation suggests that insufficient resources had been made available at TMI-2, particularly with respect to the secondary side of the plant. This conclusion is at variance with the staff's testimony cited above.

The ASLB's resolution of CLI-80-5 issue (6) was based on a wide range of evidence, including the licensee's emphasis on safety, its budgeting process, the history of resource commitment by GPUN as compared with the nuclear industry average, and the increased resources applied by GPUN in 1980 and 1981 over previous years (14 NRC at 514-518). The ASLB concluded that "Licensee's organizational framework and its practice of committing substantial resources to its nuclear business provides reasonable assurance that the relationship between its corporate finance and technical departments is such as to prevent financial considerations from being an improper impact upon technical decisions" (Id. at 518).

While the information discussed above from the GPU v. B&W lawsuit documents and the OI investigation of the Keaten Report is not consistent with the unqualified statement by the staff that there was "no indication" of undue influence of financial considerations on TMI operation before the accident, the staff finds that there is no need to seek the reopening of this issue in

the restart proceeding. The ASLB's decision recited and relied on substantial evidence in addition to the particular piece of staff testimony now called into question. Much of that evidence focused on the time frame since the accident rather than the preaccident period to which the particular staff testimony was directed. Under these circumstances, the information now available on the financial/technical interface issue is not considered by the staff to have the potential to change the result reached by the ASLB in this issue. Thus, the staff does not consider it necessary or appropriate to reopen the evidentiary record on this issue.

6.6 Reportability of the Keaten Report

8.6.1 Background

The final Keaten Report (dated December 15, 1980) was provided to the NRC on November 2, 1981, after Commissioner Gilinsky requested that the licensee produce the report. In its January 20, 1984, list of integrity issues, the Commission included the issue of whether the licensee provided the Keaten Report on a timely basis.

8.6.2 Investigation Results

During OI's interview of Keaten, he was asked whether he had any understanding that the task force might come upon information that the licensee would be required to report to the NRC. Keaten said that he was aware of the general requirements for reportability. Keaten stated that the question of reportability of the task force report had not been considered by him and he could not recall "ever being a part of any discussion where that issue ever came up." OI Keaten Ex. 4 at 88, 89, 289. He also stated, however, that he had "a nagging memory that reportability did come up" (*Id.* at 88, 89). Keaten said that since Wallace, the manager of pressurizer water reactor (PWR) licensing, was one of the participants in the investigation, Keaten "probably would have relied upon on him to be sensitive to reportability needs" (*Id.* at 89).

Kuhns told OI that he did not know why the Keaten Report had not been made available to the NRC sooner than it had been. He described the failure to provide the report earlier as "more of an oversight than anything else" and "nothing deliberate" (OI Keaten Ex. 9 at 62).

OI also questioned GPU senior management about whether it had originally been intended that the Keaten Report would be released to the public. In a July 23, 1979, memorandum from R. W. Keaten to J. Herbein (B&W 342), the expectation was expressed that the report "will undoubtedly be published and will be closely scrutinized by the NRC, the public, and perhaps the courts . . ." During a November 28, 1983, meeting of the Commission, Dieckamp stated that the report had not been "designed as a document for external distribution." Arnold explained that while the Keaten Report was not being developed for the purpose of providing it to the NRC, he understood from the outset that it would most likely become a public document and/or be provided to the NRC. OI Keaten Ex. 19 at 13. Similar statements were made by Dieckamp (OI Keaten Ex. 16 at 24, 26-27, 30-33) and by Kuhns (OI Keaten Ex. 14 at 28, 32, 34).

8.6.3 Staff Findings

As stated above, the issue of whether the licensee failed to meet an obligation to report the Keaten Report to the NRC was raised by the Commission's January 20, 1984, list of integrity issues. The staff is not aware of any specific reporting requirement in the regulations or in the facility license or Technical Specifications that would impose an obligation to report the Keaten Report. The question that remains, then, is whether the licensee's board notification obligations under Duke Power Company (William B. McGuire Nuclear Station, Units 1 and 2), ALAB-143, 6 AEC 623 (1973), and other cases, would encompass the Keaten Report.

The various drafts of the Keaten Report came to the staff's attention through the staff's review of the GPU v. B&W lawsuit documents. As a part of its review of the lawsuit documents during the summer of 1983, the staff reviewed the Keaten Report and its drafts to determine whether they contained information relevant and material to any of the issues involved in the restart proceeding. The staff concluded that the Keaten Report drafts and certain information provided to the Keaten task force were relevant and material to the issue of management integrity. See NUREG-1020LD, Section 10.9. At the same time; however, the staff concluded that none of the information in the Keaten Report was relevant and material to any of the other design, emergency planning, or management-related issues in the restart proceeding.

As the ASLAD recently noted, "[w]hat began as an inquiry into primarily licensee's technical capability and resources has evolved--as a necessary consequence of those developments--into a search for answers to questions concerning the 'integrity' of business management as well" [ALAB-772, 19 NRC _____, slip op. at 10, 11 (May 24, 1984) (footnote omitted)]. Management integrity, as such, was not an issue in the restart proceeding in December 1980 when the final Keaten Report was approved by the task force. Given the evolving nature of the management "integrity" issue in this proceeding and the lack of relevant and material new technical information in the final Keaten Report (see NUREG-1020LD Sections 3 through 9), the staff concludes that the licensee did not have an obligation to provide the Keaten Report.

With respect to the other issue explored by OI concerning the November 28, 1983, statement by Dieckamp that the Keaten Report had not been designed for external distribution, the staff does not believe that OI produced any evidence that the statement was inaccurate or was intended to mislead the Commission.

8.7 Conclusion

The staff's assessment of certain information from the GPU v. B&W lawsuit record led the staff to request that OI conduct an investigation of the licensee's internal investigation of the March 28, 1979, accident for any improper conduct in relation to the investigation and the development of the report of the investigation (the Keaten Report). On May 18, 1984, the Director of OI forwarded to the EDO and the Commission its report, entitled "General Public Utilities - Alleged Improper Influence by GPU Upper Management Causing Changes To Be Made to Its Internal TMI-2 Accident Review Report."

The staff has reviewed OI's report and its exhibits; the results of the staff's review are documented in the foregoing subsections of Section 8. The principal conclusions drawn by the staff, as discussed above, are

- (1) that the process of review of the drafts of the Keaten Report by management did not result in a final product that was improperly influenced so as to reflect better on the licensee than would otherwise have been the case (see Section 8.2)
- (2) that statements were made by the licensee in its December 15, 1979, response to the October 25, 1979, Notice of Violation that were neither complete nor accurate and that were contrary to other information in the possession of the licensee (see Section 8.3)
- (3) that there was no improper conduct in connection with the investigation and report of K. Lucien concerning the loss of feedwater flow leading to the accident or the incorporation of Lucien's input into the Keaten Report (see Section 8.4)
- (4) that evidence from the GPU v. B&W lawsuit documents and from the OI investigation of the Keaten Report concerning the financial/technical interface issue is at variance with the staff's testimony that there was no indication of undue influence of financial considerations on TMI operation before the accident (see Section 8.5)
- (5) that the the licensee was under no obligation to provide the final Keaten Report to the NRC until requested in November 1981 (see Section 8.6)

For the reasons discussed above, the conclusions concerning inaccurate and incomplete statements (see Section 8.3) are material to the staff's overall assessment of management integrity and will be addressed in Section 13.0.

9.0 CHANGES TO THE LUCIEN REPORT

9.i Background

As discussed in Section 8.4, one of the concerns identified by the staff in NUREG-1020LD, Section 10.2, was associated with the development and eventual use by the Keaten task force of a technical report entitled "Loss of Feed-water Flow Leading to the Accident of March 28, 1979" (hereafter referred to as the Lucien Report). This report was prepared by K. P. Lucien of Energy Incorporated (EI) under contract to the licensee. Lucien's original draft report was forwarded by a handwritten, undated memorandum from Lucien to "Bob" (B&W Ex. 344). This memorandum contained the following statement: "This is the draft of my report on the polishing/condensate/air systems for the Investigative Task Force. Per our understanding with R. Keaten, please launder this to bring it into line with your perception of the forthcoming master task force report."

In a memorandum from H. R. Denton (NRR) to B. B. Hayes (OI) dated November 7, 1983, the staff identified specific questions that should be answered concerning issues identified in NUREG-1020LD. The relevant questions pertaining to the relationship between the Lucien and the Keaten Reports were stated as follows:

1. Was there an understanding among K. LUCIEN, R. KEATEN and 'Bob' concerning 'laundering' of the Energy Inc. technical input to the Keaten task force? On what basis did K. LUCIEN believe there was such an understanding? Who was 'Bob'?
2. Why did R. KEATEN not include or fully reflect in the task force reports significant technical information concerning deficiencies in the condensate polisher and the manner and environment in which it was tested? Did the Keaten task force conduct further inquiry and conclude that K. LUCIEN'S suggestion that credit was taken for preservice testing which was not done as stated? If not, why not?
3. Where is the August 1, 1979 [July 1980] 'final' revision of the Energy Inc. report referred to as Reference 1 in B&W 356? Are there significant changes between the original version tendered to GPU (B&W 343) and that document? Who made any revision and were they made at GPU's request?

Memorandum from H. R. Denton to B. B. Hayes dated November 7, 1983, at 16.

Questions 1 and 2 above are discussed in Section 8.4 of this report. The investigation results and the staff's findings presented in this section deal only with changes made to the Lucien Report and the motive for those changes (question 3 above).

OI's investigation into the Keaten Report matters is contained in the report entitled, "General Public Utilities Nuclear/Alleged Improper Influence by GPU Management Causing Changes To Be Made to its Internal TMI-2 Accident Review Report" (I-83-012), dated May 18, 1984 (OI Keaten). That investigation determined that the original Lucien Report underwent subsequent changes that resulted in some of the information critical of the licensee's startup and test program being modified. The investigation also determined that these changes were not the result of corporate influence but, rather, that the changes did occur after members of the site startup and test group met with Lucien. Further inquiry into the circumstances surrounding the changes to the Lucien Report itself are documented in a separate OI investigation report (Q-1-84-006) entitled, "General Public Utilities Nuclear/Possible Improper Influence Exerted on Contractor to Change Report Critical of the Licensee," dated May 4, 1984 (OI Lucien).

9.2 Investigation Results

In June 1979, K. P. Lucien, an employee of EI, was assigned to TMI-2 under contract with GPU. T. L. Van Witbeck (the senior EI resident at TMI) was Lucien's immediate supervisor and served as a member of the Keaten task force. It was Van Witbeck who gave Lucien the assignment to investigate the factors that led up to the loss of feedwater at TMI-2 on March 28, 1979. OI Lucien Ex. 1 at 1.

As a consultant to the task force, Lucien worked independently of other task force members. Lucien met with Keaten and others only for periodic progress reports during June through August 1979. During the time he was conducting his investigation, Lucien stated that no one attempted to influence his investigation in any manner. Early in the investigation, Lucien told Keaten that on the basis of what he had found to date, his final report could be very critical. According to Lucien, Keaten had told him emphatically to report things as he saw them. Id. at 1, 2.

On or about September 1, 1979, Lucien left TMI-2 for a new assignment with EI in California. When he departed, his investigation was complete and his report was in its final stage of typing. Lucien left instructions with a junior engineer at EI to proofread the report when it was received from the typing pool, to provide a copy to R. L. Long ("Bob"), to put a copy in the files kept by EI on GPU's behalf, and not to disseminate the report to anyone else. Id. at 3.

Sometime after September 1, 1979, Lucien received a copy of his report in the mail. Lucien proofread the report and sent it back to EI. Lucien identified the report entitled "Loss of Feedwater Flow Leading to the Accident of March 28, 1979," dated September 1, 1979, as this report (OI Keaten Ex. 47). Lucien stated that this version of the report was meant to be his final product. The report did identify additional areas that warranted further investigation; however, Lucien did not know if these areas would be followed up or not. Id. at 2.

Lucien's report identified deficiencies in many areas and was critical of the startup and test program at TMI-2. His report (1) implied that test records for balance-of-plant (BOP) equipment may have been falsified, (2) identified problems with certain test procedures that would prevent testing from being accomplished if the procedures were followed as written, (3) identified concerns about the piecemeal approach to prestartup testing, and (4) identified hardware deficiencies in as-built systems, that is, wiring errors and other problems that would have precluded the systems from operating as designed. OI Lucien Ex. 6 at 1.

J. Barton had been the Start-Up Manager for TMI-2 until November 1978 when he was reassigned as Project Site Manager at Forked River, New Jersey. Barton returned to TMI-2 at the end of May 1979 to work in the area of radioactive waste management and plant cleanup. During the summer of 1979, Barton heard that Van Witbeck was having a report written that addressed the startup and testing of the emergency feedwater system. Barton requested a copy of the report from Van Witbeck. Barton was concerned about the accuracy of the report since he had been in charge of the test program during that time. OI Keaten Ex. 43 at 1.

Barton stated that during a cursory review of the Lucien Report, he discovered several statements concerning the content and scope of the test program that he thought were inaccurate. According to Barton, he asked three individuals who were involved in the TMI-2 startup and test program at the time to take an in-depth look at the report. These individuals were: T. M. Hawkins, formerly Assistant Superintendent of Start-Up and Test for GPUSC; I. D. Porter, formerly Lead Instrumentation and Control (I&C) Engineer for Start-Up and Test for GPUSC; and S. Kakarla, formerly with United Engineering and Constructors (UE&C) Start-Up and Test Department. Id. at 1.

Following their review, Barton recalled that Porter, Hawkins, and Kakarla told him there were several areas in the Lucien Report with which they disagreed. Barton does not think he discussed the specific points of disagreement with them, but suggested that a meeting be set up with EI to discuss the points of disagreement. Following this conversation, Barton apparently had no further involvement with either Porter, Hawkins, Kakarla, Van Witbeck, or Lucien regarding the Lucien Report. Id. at 1, 2.

According to Hawkins and Porter, they were not directed by Barton to provide any written comments on the report. They believed that Barton thought the Lucien Report was not very factual and they should take a look at it (OI Keaten Ex. 44 at 8; Ex. 45 at 6). On the basis of the review by Hawkins, Porter, and Kakarla, Porter stated that he called Van Witbeck and requested that he arrange a meeting with Lucien to discuss some inaccuracies in the report (OI Keaten Ex. 44 at 9).

Lucien stated that sometime before December 1, 1979, Van Witbeck called him and told him that certain plant personnel wanted "to take issue" with him about his report and Van Witbeck asked Lucien if he was prepared to defend its contents. Lucien replied that he was, and on or about December 1, 1979, he returned to TMI. OI Lucien Ex. 1 at 3.

On December 3, 1979, Lucien attended a meeting with Van Witbeck, Hawkins, Porter, Kakarla, and J. Birt (another EI employee). According to Lucien,

Hawkins and Porter were the most vocal participants at the meeting and both indicated that they did not like some of the implications in his report. Lucien said that Kakarla did not have much to say at the meeting. Id. at 4. Lucien stated that Hawkins, Porter, and Kakarla attempted to get him to shift some of the inferred blame away from the startup group for problems identified in the report. Lucien believed that these individuals felt personally taken to task (by his report) for problems that they thought were beyond their control. Id. at 9.

Lucien stated that many changes were discussed during the meeting; however, only 10 changes were actually made by him as a result of the meeting. These changes were provided by Lucien to Van Witbeck in the form of four handwritten pages of revisions to be incorporated into Lucien's report of September 1, 1979. Id. Encl. 5.

Lucien's reasons for making the changes may be summarized as follows:

- (1) During his investigation, certain test records were not available but were later found by Hawkins, Porter, and Kakarla.
- (2) During the writing of his report, Lucien used certain derogatory words or phrases that he could not technically defend.
- (3) During the meeting of December 3, 1979, Lucien was informed that certain pretest inspection (grooming) efforts were standard operating practice, done without documentation, at TMI-2. On the basis of that practice, Lucien concluded that the tests, identified in his report as not being possible to complete in one day, as the test records indicated, could possibly have been completed in one day and that poor recordkeeping related to pretest grooming efforts may have been the issue.
- (4) During the meeting, Lucien was informed that the inadequacies identified in the report associated with GPUSC Start-Up and Test not reviewing and approving electrical test procedures performed by UE&C were a "management policy" and not a shortcoming on their part as startup engineers.

Id. at 4-9.

Van Witbeck took Lucien's revisions and had them incorporated into the report; however, as a result of an administrative error, the report cover sheet was not changed. Thus, the version of the report containing the changes made as result of the meeting of December 3, 1979, also bears the date of September 1, 1979 (OI Keaten Ex. 48). OI Keaten Ex. 7 at 21, 22.

There was also one additional revision to the Lucien Report. Sometime in 1979 or 1980, Lucien became aware that J. Saunders (EI) was assigned some of the followup work that Lucien had recommended in his original report. Lucien characterized this work as primarily hardware inspections and obtaining test results and not necessarily increasing the scope of the investigation. As this work was completed, Saunders provided the results to Lucien. Lucien later incorporated some of these findings in the final revision dated April 17, 1981 (OI Keaten Ex. 49). OI Lucien Ex. 1 at 2. All but one of the changes that Lucien made to his report as a result of the meeting held

on December 3, 1979, were carried forwarded into his final report. No additional changes significant to the OI investigation were identified in Lucien's final revision of April 17, 1981. OI Keaten at 66, 67.

Two of the individuals identified as having been involved in changes to the Lucien Report that occurred as a result of the meeting of December 3, 1979, are currently in key management positions with respect to the safe operation of TMI-1. Hawkins is currently the Manager of Start-Up and Test for TMI-1, and Porter is currently Hawkins' assistant. On the basis of the events discussed above, a separate investigation was conducted by OI in coordination with the Division of Human Factors Safety, NRR, to obtain additional information clarifying the involvement of Hawkins and Porter in changes to the Lucien Report. Specifically, the second investigation was aimed at determining if Hawkins and Porter were involved in efforts to change the Lucien Report in order to shift blame from the GPU Start-Up and Test Group or to "cover up" their individual responsibilities for the deficiencies identified in the Lucien Report. OI Lucien at 1, 2.

According to Porter, he was not pleased with the Lucien Report. Porter was concerned that Lucien conducted the investigation and drew conclusions about the Start-Up and Test Department, as a whole, and the people involved without ever talking to them. Porter also believed there was additional information available that was not taken into consideration by Lucien. This information included (1) additional test records, (2) additional testing performed by Multi-Amp Testing Service Corporation, (3) additional information regarding the bases for instrumentation set points, and (4) postaccident modifications that were performed on some equipment before Lucien's investigation. OI Lucien Ex. 4 at 12, 13. Porter testified that his only motive for wanting to meet with Lucien was to point out errors in the report and to make Lucien aware of the additional information that may not have been considered (Id. at 27). Porter was not concerned that he would be held personally responsible for the problems identified in the Lucien Report (Id. at 23, 24). Porter had no personal responsibility for any of the testing addressed within the scope of the Lucien Report (Id. at 7-9). When questioned regarding Lucien's statement "that the Met-Ed people who attended the meeting were trying to get him to shift some of the blame away from the Start-Up Group," Porter stated that his intent was to point out to Lucien the additional information and mistakes in the report. He thought that if Lucien really understood the program and became familiar with the rest of the records maybe Lucien would have a different opinion. Id. at 27, 28. Porter testified that following the meeting with Lucien there was no followup on his part to determine what action was taken by Lucien (Id. at 29). Porter had not seen the revised Lucien Report until a few days before his initial OI interview in February 1984 (Id. at 25).

Hawkins testified that his purpose in wanting to meet with Lucien in December 1979 was to point out additional information that was available even though it did not appear to have been taken into consideration by Lucien (OI Lucien Ex. 2 at 50-52). Hawkins admitted that he did take Lucien's comments personally and professionally. Hawkins felt that Lucien formed his negative opinions about the startup test program without all the facts and without talking to anyone involved. Id. at 59. Hawkins stated that he did not have a problem with Lucien having found mistakes. Mistakes were made and Hawkins

did not try to convince Lucien otherwise. Hawkins said, "Our big problem was that he made us to be a bunch of sleazy, slippery test organization that was just running rampant without any programs or policies." Id. at 60.

When questioned as to whether his meeting with Lucien was motivated by the fact that he was concerned that he would be blamed for the problems identified by Lucien, Hawkins said that he was not concerned with that. The Start-Up Group previously identified many problems that were documented and routed to upper management personnel. The program was run in accordance with the original policies set up and approved by management. Id. at 64-68. The specific component tests, with which Lucien had found fault, were principally within the scope of responsibility of UE&C. Thus, in accordance with approved policy, Hawkins was not responsible for reviewing those contractor's tests (Id. at 93). Hawkins portrayed Lucien as having an arrogant attitude at the December 3rd meeting and believes that Lucien was offended by their comments on the report because they appeared to challenge Lucien's integrity and professionalism. Id. at 88.

Hawkins' testimony confirmed Porter's; there was no followup on their meeting with Lucien. When Lucien left the meeting, Hawkins was not aware of what Lucien intended to do about their comments. Hawkins did not know until shortly before his interview with OI that Lucien had revised the report based on the meeting. Id. at 69. Hawkins did not disagree with all of Lucien's findings; in fact, according to Hawkins, changes were made to the startup and test program as a result of problems identified by Lucien (Id. at 60, 85, 86).

9.3 Staff Findings

The OI investigation produced evidence that there were actually three versions of the Lucien Report. The original document produced by Lucien is dated September 1, 1979 (OI Keaten Ex. 47). The first revision was made by Lucien following a meeting with three Met-Ed employees on December 3, 1979. As a result of an administrative error, this revision is also dated September 1, 1979 (OI Keaten Ex. 48). The second revision also was made by Lucien after he received the followup test results that were recommended in his initial report. This second revision serves as the final report and is dated April 17, 1981 (OI Keaten Ex. 49).

The reference to a July 1980 version of the Lucien Report in the final Keaten Report was apparently an error. Since the final version of the Lucien Report post-dated the final Keaten Report, it appears that the subsequent revision referenced in the Keaten Report was actually Lucien's first revision dated September 1, 1979 (OI Keaten Ex. 48). OI Keaten at 66.

Changes did take place in the Lucien Report between the original version and the first revision dated September 1, 1979. The net result of these changes "softened" or "watered down" some of Lucien's original criticisms of the way testing was performed by the TMI-2 startup and test organization. It is significant to note, however, that the tone and substance of the revised Lucien Report is still very critical of the startup and test organization and the operability of the condensate polishing and condensate systems. The OI investigation identified the three Met-Ed employees who were instrumental in bringing about those changes as T. Hawkins, I. Porter, and S. Kakarla (OI

Keaten at 67). Hawkins is currently the Manager of Start-Up and Test for TMI-1. Before commercial operation of TMI-2, Hawkins was the Assistant Test Superintendent for TMI-2 Start-Up and Test. OI Lucien Ex. 2 at 4, 20. Porter is currently Start-Up and Test Manager for TMI-1 (Hawkins' assistant). Before commercial operation of TMI-2, Porter was Lead I&C and Electrical Engineer for TMI-2 Start-Up and Test. OI Keaten Ex. 44 at 3, 4. Kakarla is currently employed by UE&C and is no longer associated with TMI. From April 1970 until June 1978, Kakarla was assigned to the UE&C Start-Up and Test Department at TMI-2. At the time Kakarla reviewed the Lucien Report and met with Lucien on December 3, 1979, Kakarla was employed as a Senior Engineer with Met-Ed. OI Keaten Ex. 46 at 3.

Because Hawkins and Porter are currently in key management positions with respect to the safe operation of TMI-1, the staff review of changes to the Lucien Report concentrated on the motivation of Hawkins and Porter in meeting with Lucien on December 3, 1979. Specifically, the staff sought to determine whether Hawkins and Porter were involved in an attempt to make changes to the Lucien Report in order to try to improperly shift blame away from the Start-Up and Test Group or to cover up their responsibility for the problems identified by Lucien. OI Lucien Ex. 6 at 2.

Hawkins was upset with the opinionated nature of the Lucien Report. Hawkins admitted that he took Lucien's negative comments about the startup and test program personally and professionally. OI Lucien Ex. 2 at 59. Hawkins felt that Lucien had many misconceptions about the startup and test program because of the way he had conducted his investigation (OI Keaten Ex. 45 at 6, 7). Because Lucien had conducted his investigation without talking to the people who were involved in the startup and test program, Hawkins was aware of additional information that did not appear to have been considered by Lucien in developing the report (OI Lucien Ex. 2 at 50, 52). Hawkins believed that if Lucien had talked to the people involved in the program, he would have discovered the additional information (Id. at 45).

Hawkins stated that his purpose in meeting with Lucien on December 3, 1979, was to point out to Lucien additional test records and other information were available and to clear up what Hawkins believed were misconceptions on Lucien's part about the policies and procedures that were in effect during the startup and test phase at TMI-2 (OI Keaten Ex. 45 at 13, 23-25). Hawkins was not concerned that he would be held personally responsible for the deficiencies identified in the Lucien Report (OI Lucien Ex. 2 at 68, 80). The problems associated with component testing, which were pointed out by Lucien, were not his responsibility. Component testing was the responsibility of UE&C. Hawkins was responsible for system level functional testing. He was not charged with reviewing test records or actual testing performed by UE&C. Id. at 26-37, 93. On the basis of a review of the test procedure and test manual identified by Hawkins, it has been established that his responsibilities were to implement those policies and procedures. OI Lucien Ex. 6 at 3.

During Hawkins' meeting with Lucien, Hawkins discussed the additional information with Lucien as well as identifying some of the additional test records available to support his contention that some of the allegations made by Lucien were not based on all of the available facts (OI Lucien Ex. 2 at 79).

87). Hawkins did not dispute the fact that there were acknowledged deficiencies in hardware and in the startup and test program that did not preclude these deficiencies from occurring. Testimony provided by Lucien and the limited number of changes that were made to the report following the meeting indicate that there was no dispute between Hawkins and Lucien on factual issues. OI Lucien Ex. 1 at 4-8; Ex. 2 at 52, 53, 64.

Following their meeting, Hawkins did not attempt to contact Lucien again or to follow up in any manner to determine what action, if any, Lucien had taken as a result of his comments. Hawkins was not aware, until preparing for the interview with OI, that Lucien had revised his report as a result of their meeting. OI Lucien Ex. 2 at 83; Keaten Ex. 45 at 26.

Hawkins' explanation of the circumstances that led up to his meeting with Lucien is credible. On the basis of the items that were discussed at the meeting and the changes that resulted, coupled with Lucien's explanation of why the changes were made, the staff finds that the evidence does not support a finding of improper motivation or influence on the part of Hawkins. Much of the testimony presented by Porter confirmed what Hawkins had stated. Porter was not involved in any of the testing that was called into question by Lucien (OI Lucien Ex. 4 at 7). Nevertheless, Porter was aware of additional information and test records that led Porter to believe Lucien had not identified all of the facts before reaching his conclusions. Porter's motive for wanting to meet with Lucien was to bring this information to Lucien's attention. Id. at 12, 13. Porter believed that once Lucien talked with them and they were able to clear up some of the misconceptions and present Lucien with additional test records and other information, Lucien's opinion may have changed (Id. at 24, 28). Porter also confirmed that there was no attempt on the part of Met-Ed to rewrite Lucien's report. They would present him with those facts and let Lucien make up his own mind. Id. at 36.

Porter's testimony substantiated Hawkins' statements that there was no follow up with Lucien or any other individual after the December 3, 1979, meeting (Id. at 28, 29). Porter also was not aware that Lucien had revised the report following the meeting, until he was preparing for his interview with OI (Id. at 25).

Porter's explanation of the circumstances leading up to the meeting with Lucien is essentially the same as Hawkins' explanation. The staff finds no reason to disbelieve Porter's statement that there was no motive of personal concern on his part in terms of being held accountable for any of the problems identified by Lucien. The facts identified in the OI investigation support a finding of no improper influence or motivation on the part of Porter.

Kakarla's principal purpose for wanting to meet with Lucien was to assure that Lucien understood the sequence of testing that was approved at the time the testing was accomplished and to assure that Lucien was aware of some of the postaccident modifications that had been made to the condensate pump and condensate booster pump breakers (OI Keaten Ex. 46 at 6, 10). According to Lucien, Kakarla's role in the meeting was minor (OI Lucien Ex. 1 at 4). Kakarla confirmed that Hawkins and Porter did not try to get Lucien to change his report (OI Ex. 46 at 10, 15). Kakarla stated that they only brought

facts to Lucien's attention. It was up to Lucien to take the comments or not (Id. at 16). Kakarla also confirmed that the only time the meeting became "heated" was when Hawkins and Porter thought some of the editorial comments written by Lucien were not supported by facts (Id. at 29).

In summary, on the basis of the evidence presented in OI's investigation of changes to the Lucien Report, the staff concludes that the circumstances and events surrounding the December 3, 1979, meeting and the resultant changes to Lucien's original September 1, 1979, draft report do not raise questions concerning the integrity of Hawkins, Porter, or Kakarla. In addition, these changes were made by Lucien as a direct result of his meeting with Hawkins, Porter, and Kakarla. None of the individuals involved were instructed by GPU or Met-Ed management to make these modifications and there is no evidence that any member of GPU or Met-Ed management was involved in seeking modifications to the Lucien Report.

10.0 ALLEGED HARASSMENT OF PARKS, KING, AND GISCHEL

10.1 Background

The Energy Reorganization Act of 1974 (42 U.S.C 5851) and the Code of Federal Regulations, Title 10, Section 50.7 (10 CFR 50.7), protect employees who raise issues of health and safety. It came to the attention of the NRC that the possibility existed that three employees who raised such concerns (R. D. Parks, L. King, and E. Gischel), may in fact have been victims of harassment, intimidation, or retaliation for having engaged in protected activities related to cleanup operations at TMI-2. These individuals raised health and safety concerns primarily related to the refurbishment of the TMI-2 polar crane. Parks, a Bechtel employee, was placed on leave of absence with pay and prohibited entry to the jobsite by Bechtel. King was fired from his position as TMI-2 Site Operations Director. Gischel, TMI-2 Plant Engineering Director, was allegedly harassed about taking a neuropsychological examination. Each of these individuals had complaints that will be dealt with separately in this report.

OI was asked to conduct an investigation into these matters.

10.2 Investigation Results

10.2.1 R. D. Parks Investigation Results

R. D. Parks was hired on May 24, 1982, by Bechtel North American Power Corporation (Bechtel) as a Senior Startup Engineer in the Startup Engineering Department at the TMI jobsite (May 18, 1984, OI Report Ex. 102 at 1). Parks was assigned as an Operations Engineer in the Site Operations (SO) Department, headed by King*, who appointed Parks as the primary SO Department representative on the Test Working Group (TWG). OI found that "Parks' duties included oversight and review of plant modification and new systems, and interfacing with task groups to ensure compliance with standards, operational capabilities, and NRC rules. . . . Parks' selection by King for this work involved, King states, 'Parks integrity.'" Id.

Beginning in November 1982, site operations participated in the interdepartmental group (Head Lift Task Force) responsible for planning the removal of the reactor vessel head. The polar crane project completion was on the critical path for removal of the reactor vessel head. A question arose as to whether the polar crane, having been turned over to Bechtel for repair, was a project requiring SO's overview in the process of repair (Id.).

*A combined GPUN and Bechtel organization was functioning to support TMI-2 cleanup operations. The Site Operations Department reported to Director TMI-2, a Bechtel employee (B. Kanga).

In February 1983, NRC approval was sought to use the polar crane to verify the radiation level under the reactor head. Because of engineering deficiencies, Parks and other members of the SO Department had objections to using the polar crane. Parks refused to approve the proposed licensee safety evaluation report (SER). Id.

On February 11, 1983, King and Gischel had a meeting with B. Kanga to discuss approval of the recently drafted polar crane SER. King and Gischel stated that they had significant problems with the whole polar crane program and also refused to approve the SER. September 1, 1983, OI Report Attachment D-2 at 18.

As a result of raising his concerns about the polar crane, Parks was requested to attend a meeting on February 22, 1983, with Kanga. Parks asked King to go with him. Id. at 21. During this meeting Parks again outlined his concerns about the polar crane (Id.). These safety concerns were first raised by Parks in November of 1982 (Id. at 4).

Parks felt he was discriminated against in his employment because he had raised these safety concerns. Parks outlined his complaints to the Department of Labor (DOL). May 18, 1984, OI Report Ex. 102 at 2.

Parks had four specific complaints of harassment:

1. On February 23, 1983, he was informed he had been relieved of his duties as Alternate Startup and Test Supervisor at TMI-Unit 2.
2. On March 14, 1983, he was interrogated by a Bechtel executive and an internal auditor as part of an investigation into violations of alleged employee conflict-of-interest standards.
3. On March 17, 1983, he was replaced as the primary SO Department representative on the T&G for the Reactor Building Polar Crane Project.
4. On March 24, 1983, he was placed on leave of absence with pay and prohibited entry to the jobsite without permission from Bechtel. Id.

Parks felt that the harassment began as early as January 1983 when T. Morris, the Acting Chairman of the Head Lift Task Force, said after a meeting that Parks should be counseled for his negative attitude (September 1, 1983, OI Report Attachment D-2 at 8). On February 18, 1983, E. Kitler, Supervisor of Startup and Test, advised Parks that upper management was upset with him and they had asked Kitler what had to be done to get Parks transferred off the site. Immediately after this conversation, Parks met with King and Kitler and repeated the statements that had been made to him. Id. at 20.

At a widely attended meeting, held on February 23, 1983, to discuss the Polar Crane Refurbishment and Test Program, Parks stated that as alternate Startup and Test Supervisor, he was still responsible to identify potential quality

assurance deficiencies. At this point J. Thiesing, Manager of Recovery Programs, informed Parks that he no longer had to worry about that. A memorandum had just been issued appointing a new alternate, thus relieving Parks. May 18, 1984, OI Report 102 at 3.

On March 14, 1983, Parks attended a meeting with his administrative supervisor, R. Wheeler, and L. Hoffman of the Bechtel Internal Auditing Group (September 1, 1983, OI Report Attachment D-2 at 47). Wheeler was from Bechtel's Gaithersburg (Maryland) Office. Parks asked if he could have a copy of their notes after the interview was over. Wheeler and Hoffman replied that he could not, stating that this was not Bechtel procedure. Parks said it was not his procedure to talk one on two, especially in light of the recent threats he had received (*Id.* at 48). Parks wanted an impartial witness present. Later on March 14, 1983, Parks was interrogated with M. Kobi of Bechtel present as an impartial witness. Parks said that the main topic of discussion was his alleged involvement with Quiltec (a consulting firm engaged in nuclear industry support in which King was president). Parks stated that he had no involvement with Quiltec, other than a peripheral contact through his friendship with King. He explained finding an onsite typist for King to do some after-hours typing for Quiltec. Parks said that Kobi later remarked that the way the meeting was handled was "not the Bechtel way" and that he too felt Parks was "being set up." May 18, 1984, OI Report Ex. 102 at 5.

During the course of the DOL investigation, C. Hrbac, a Chemical Engineer employed by GPUN, "stated his belief that the full-scale investigation of Parks for his alleged connection with Quiltech [sic] was an act of intimidation against Parks." (*Id.* at 6).

Parks met again with Hoffman and Wheeler (March 15, 1983), but this time the meeting included C. Sanford, a corporate Vice-President from Bechtel's Gaithersburg Office. During this meeting, Parks told Sanford as many of his safety concerns and the threats made against him as he could remember. September 1, 1983, OI Report Attachment D-2 at 49. According to Parks, Sanford "did not appear to be interested. . . . Sanford did state that Bechtel does not tolerate intimidation of its employees." *Id.* During the meeting, Sanford accused Parks of aiding and abetting King's efforts to steal GPU employees for personal gain. Sanford added that he had not set a date to pass judgment on the issue, but Parks could be fired for his alleged involvement. *Id.* at 50.

Parks delivered a letter to Sanford on March 16, 1983, through Kanga's office, concerning their discussion. The letter stated that Parks shared management's concerns regarding conflict of interest and that Parks had not sought or received any financial gain from Quiltec and that he pledged he would not. Parks asked for some written description of employee standards on conflict of interest since he had not received any indoctrination program when hired. Parks offered to reconsider his safety concerns if Bechtel would explain in writing why he was mistaken. Finally, Parks asked for a written pledge that the intimidations cease. September 1, 1983, OI Report Attachment D-2 Ex. 1.

Kanga called Parks to his office on March 17, 1983, for a meeting that lasted 2 1/2 hours, concerning the letter to Sanford. Parks told Kanga that he had still not received a satisfactory response to his concerns about the polar crane. Kanga warned Parks not to state his concerns publicly. September 1, 1983, OI Report Attachment D-2 at 51. Parks said "he [Kanga] said that once before things had gotten much worse for an employee who had tried that and was 'humiliated.' He [Kanga] said it could be as long as two weeks before any decision was reached on me [Parks] about Quiltec" (Id.). Kanga told Parks that Parks had put Bechtel in a bad light with a client and, therefore, Parks stood a good chance of getting fired (Id.).

Later on the afternoon of March 17th, Parks was called back to Kanga's office for a meeting that included J. Chwastyk, GPUN's Manager of Operations at TMI-2. During this meeting, Parks received a memorandum dated March 17, 1983, from Chwastyk, informing him that, effective immediately, he would be replaced as the primary site operations member on the TWG for the reactor building polar crane project. Id. at 52.

Bechtel representatives from the Gaithersburg Office visited Parks on March 22, 1983, to report that Parks had been exonerated on the Quiltec matter and that he could remain at TMI as long as he wished. Further, these representatives assured Parks that no "further reprisals" would occur and asked for a list of his safety concerns. May 18, 1984, OI Report Ex. 102 at 8.

According to Parks, just after this meeting on March 22, 1983, Kanga asked him to report to his office where Wheeler (Bechtel's Chief Startup Engineer and Park's supervisor) and a public relations officer, Bedell, were present. At this meeting, Bedell asked Parks if he had a news conference scheduled for the next day; Parks confirmed that he did and that he was filing a Department of Labor (DOL) complaint. This was his first disclosure of that fact to Bechtel. Id. at 8.

On March 23, 1983, Parks held a press conference and released his affidavit concerning the polar crane and related safety concerns. On March 24th, Parks was sent a letter from Wheeler in which Wheeler acknowledged being informed of Parks' DOL complaint about harassment and intimidation and denied its occurrence (Id. at 8, 9).

The letter also stated: "In order to insulate you from even the appearance of such conduct and to assure the continued effectiveness of all personnel at the site, we are placing you on an indefinite leave of absence with pay, effective immediately, until we have had the opportunity to review this matter further." Id. at 9.

In his presentation to the DOL, Bechtel's attorney said:

Parks made grave accusations concerning the professional competence and integrity of several of his coworkers and colleagues at TMI. . . . these accusations to public news media. . . have caused severe harm to the individuals involved. . . . Parks had lost his ability to function as a member of a professional organization on this project. Id.

The DOL investigator took note of the fact that before the beginning of the polar crane controversy and Parks' involvement therein, Parks had received a performance evaluation on August 27, 1982, indicating he met or exceeded all job requirements. Among the "exceeds" categories were job knowledge, flexibility, cooperation, client relations, initiative, and problem analysis. Overall he was rated "Exceeds Requirements." Id. at 1.

The DOL investigation found (1) the four claimed discriminatory actions occurred over a 4-week period between February 23 and March 24, 1983, and (2) the four actions were progressive in nature:

[L]osing his voice and input as alternate startup and test supervisor for the entire Unit [2]; being subjected to an examination involving the West Coast main office internal audit staff over a seemingly minor infraction of a work conflict rule he had not been made aware of; being dropped as the Site Operations lead man on the Test Working Group for the very project he was most concerned about; and finally being suspended from his job, albeit with pay, the day following his filing of his whistleblower complaint and his press conference on the event. Id. at 11.

DOL found that there existed "such a concentration of complaints to authority and of claimed discriminatory actions, of such immediacy of occurrence, and of such cumulativeness of impact that in reality most of the aspects of the complaint were related to most of the aspects of discrimination. The necessary causal connections are of a network nature." Id.

Further, DOL found that the timing of Parks' suspension, a day after his public filing of the complaint about the polar crane and related safety issues, was a clear instance of causal connection. "Mr. Gischel's description of the large staff meeting to decide on a reaction to Parks' complaint, ranging from firing to suspension, shows that the fact that the complaint was filed is at least a factor in the suspension from duty that was announced that day." Id. at 13.

About March 23, 1983, after Parks had filed his DOL complaint and publicly stated his concerns about the polar crane, Arnold (President, GPUN) called a meeting attended by Kanga (Director TMI-2, Bechtel), Barton (GPUN), other Bechtel people, and the entire senior staff of the integrated GPUN/Bechtel management team--about 25 to 30 people. During this meeting, Barton became angry and recommended firing Parks. A discussion was held about restricting Parks' activities; they decided, during the meeting, to suspend Parks with pay. Id. at 9; Id. Ex. B-2 at 5.

On the basis of its investigation, DOL recommended that Parks be granted relief and that Bechtel take remedial action consisting of the following:

1. Refraining from taking any actions which prevent Mr. Parks from engaging in activities protected by the law.

2. Reinstatement of Mr. Parks to his position and duties as they existed prior to February 23, 1983.
3. Expunging from all Bechtel records and files of any references characterizing Mr. Parks' actions or behavior as being inappropriate in this matter.
4. The payment of all costs and expenses (including attorney's fees) reasonably incurred by Mr. Parks in connection with the bringing of his complaint.

Id. at 13.

10.2.2 L. King Investigation Results

L. King was employed at GPUN as the Plant Operations Director beginning in 1980. On July 23, 1981, King and associates (B. J. Slone, J. M. Hoade who is King's stepson, and G. King who is King's wife) incorporated in Virginia a corporation called Quiltec, Inc. At the time of incorporation, Slone and King worked at TMI for GPU; however, on June 7, 1982, Slone began working for Quiltec. Later in 1982, two other GPUN employees, Herlihy and Rekart, went to work for Quiltec, on October 4 and 11, 1982, respectively (May 18, 1984, OI Report Ex. 60 at 2).

Quiltec provided engineering services to nuclear power plants. Its initial contract was with Long Island Lighting at the Shoreham Nuclear Station (Id. Ex. 62 at 4-5). On October 28 and 29, 1982, J. Chwastyk, Manager of Plant Operations at TMI-2, went to the Beaver Valley Nuclear Power Plant as a representative of Quiltec (at the direction of King) and made a presentation with Hoade of available Quiltec services (Id. Ex. 61 at 35-40).

On November 12, 1982, K. Lionarons (a GPUN employee) told King that he was sick of working at TMI and wanted to get out. During that conversation, King indicated the possibility of working for Quiltec either with Slone at Shoreham or at Beaver Valley (Id. Ex. 65 at 19); King outlined to Lionarons the various benefits, pension plans, and other aspects of employment with Quiltec. King additionally told Lionarons that there was much overtime at Shoreham and there was also the possibility of working in a coal plant in Florida for Quiltec (Id. at 21). In December 1982, King called Lionarons--who then was working directly for King--into his office and asked if he was interested in doing some work in Louisiana. Soon after this conversation, King arranged for Lionarons to travel as a representative of Quiltec and to go to a meeting with representatives of various firms in New Jersey (Id. at 22, 23). Soon after returning from the meeting in New Jersey, Lionarons submitted his resignation to GPUN (Id. at 24). After submitting his resignation and giving his 2-week notice, Lionarons performed work for Quiltec while remaining on the GPU payroll at TMI (Id. at 25). Lionarons also submitted his expenses for this work to Quiltec at King's instruction (Id. at 27).

On November 15, 1982, W. Austin, a senior engineer at TMI-2, happened to hear that Slone, Rekart, and Herlihy were working at the Shoreham Nuclear Power Plant. At that time however, Austin had no knowledge that these three men

were associated with Quiltec. When Austin returned to TMI, he passed this information on to his boss D. Buchanan (Id. Ex. 63 at 8, 9). During a New Year's Eve party at Reckart's home (December 31, 1982), Buchanan (TMI-2 Manager of Site Engineering) was told by Reckart that he, King, Slone, and Herlihy were all involved with Quiltec (Id. Ex. 64 at 34). Buchanan made a conscious decision not to pass the information on to his supervisor J. Thiesing (Manager TMI-2 Recovery Program and a Bechtel employee) because Buchanan felt the working relationship between the Site Operations and the Recovery Program people was difficult enough and he did not want to make matters worse (Id. Ex. 64 at 36).

During the second half of 1982, Thiesing heard rumors that Slone, when he left GPUN, was going to take a job associated with King in some sort of business arrangement (Id. Ex. 66 at 4). When Herlihy left GPU and refused to say where he was going, it was rumored that he was going to join Slone in a business venture that involved King. Id. at 4, 5. Shortly after Herlihy left, T. Rekart was transferred at King's request from Site Engineering working for Thiesing to Plant Engineering working for King. About a month later, Rekart resigned from GPUN (Id. at 5). At about this same point in time, King requested the transfer of Lionarons from Site Engineering to Plant Engineering. Shortly after his reassignment, Lionarons submitted his resignation to GPUN. Rumors existed that Lionarons also might be going to work for Slone and Herlihy in the business in which King allegedly had an interest (Id. at 5, 6).

On February 2 or 3, 1983, Thiesing went on a business trip with Austin. During this trip, Austin expressed his concern that Rekart had taken a job in an organization in which King had an interest. Austin felt this presented a serious problem because GPUN was losing engineering talent to an organization that King may be involved with. Austin felt management should take some action (Id. at 6, 7). Thiesing, however, still felt the stories about King were rumor (Id. at 7). Nonetheless, he promised Austin that he would look into the situation and get back to him (Id. at 8).

On February 7, 1983, King sent P. Clark (Vice-President, GPUN) a handwritten note asking for a meeting to discuss King's concerns about operations at TMI-2 (Id. Ex. 67). Clark met with King several times during the previous 6 months on various matters of concern to King (Id. Ex. 68 at 31). Clark checked with R. C. Arnold and B. Kanga and became aware of the fact that some of the staff at TMI-2 were raising issues regarding the polar crane and its load testing (Id. at 36). When King met with Clark, King did not raise any safety issues. He was interested in discussing other positions within GPUN because he was unhappy with the way things were going at TMI-2 and he felt he might want to take another job (Id. at 38).

About the middle of February 1983, Thiesing requested that the Bechtel procurement office in Gaithersburg, run a vendor information and qualification survey on Quiltec. On February 22, the Bechtel procurement office informed Thiesing that the president of Quiltec was L. King, the vice-president was B. Slone, the business agent and treasurer was J. Hoade, and that a Mrs. King also was an officer of the corporation. Id. Ex. 66 at 19-21.

J. Buhl, Bechtel's Project Procurement Officer, said he did not feel it was appropriate for Bechtel procurement to do a background investigation on a firm for determining a conflict of interest (Id. Ex. 72 at 24, 25).

H. Bruner, Thiesing's supervisor within Bechtel, did not feel Thiesing had violated any Bechtel policy or procedure since in the normal course of events in Thiesing's position in the integrated organization, he would have been the best person to have transmitted the information discovered about King to GPUN (Id. Ex. 74 at 12-15).

Thiesing subsequently informed Barton about King's involvement with Quiltec. Id. Ex. 40 at 14. On February 24, Barton and Thiesing had a discussion with Kanga about the King/Quiltec situation. Thiesing then had no further involvement with the King/Quiltec affair (Id. Ex. 66 at 26, 27).

Barton contacted GPUN's attorney, J. Wilson, to discuss King's possible conflict of interest (Id. Ex. 40 at 15). Kanga instructed Barton to notify either Arnold or Clark of the Quiltec issue (Id. Ex. 18 at 6).

Arnold became aware of King's connection with Quiltec on February 24th when Clark told him about the information that he had received from Barton. Arnold then called Barton and directed him to meet with King and J. Troebliker, Acting Manager of Resources, and obtain King's response to two questions (Id. Ex. 15 at 5-7). Barton and Troebliker met with King late on the afternoon of February 24. In response to these questions, King said that he was involved with an outside engineering consulting company and that the company had hired people previously employed with GPUN. On the basis of his answers to these questions, King was immediately placed on suspension without pay. Barton asked King to surrender his badge and escorted him to the north gate off the TMI site. Id. Ex. 40 at 6, 7; see also Id. Ex. 15 at 7, 8.

Arnold felt that King's suspension, on the spot, was appropriate because of the seriousness of the offense in that he had violated the most fundamental obligation he had to the company--protection of the resources given to King's care. As a result of violating this trust, Arnold felt King should be immediately suspended. Id. Ex. 16 at 111, 112.

Arnold based the accountability of King on three main points: (1) the GPUN conflict-of-interest policy statement (which has subsequently been made more explicit as a result of the King incident), (2) King's responsibility to develop staff and make productive utilization of the resources available to him, and (3) King's disregard of the importance of GPUN having a highly trained, technically competent staff (Id. Ex. 16 at 115-118). King said that Barton told him on February 24 that the investigation of Quiltec would be handled separately from any safety concerns King was raising (Id. Ex. 84 at 28). King expressed an unwillingness to meet with Clark on February 25th because he was suspended without pay (Id. Ex. 68 at 48, 49). On February 25, 1983, Arnold and Clark decided that King's suspension would be with pay to make certain that King would bring any safety concerns he had to GPUN's attention. The meeting on King's safety concerns took place later that day (Id. at 50).

On February 28, Arnold sent a letter to King inquiring why he did not inform GPUN of his association with Quiltec and asking further about Quiltec

employment of former GPUN employees. King, in a letter dated March 9, 1983, stated: "As Quiltec, Inc. was set up, it specifically did not solicit engagements which could create a conflict of interest for me, nor did Quiltec, Inc. solicit the employment of G.P.U. Nuclear Corporation employees. Several employees of G.P.U. Nuclear Corporation, knowing Mr. Slone was a consultant to the nuclear industry, contacted him for employment, including Mr. Rekart and Mr. Herlihy. Under these circumstances I saw no conflict of interest." Id. Ex. 60 at 3.

King did not feel he was improperly recruiting GPUN employees because the individuals in question approached either him or Slone about employment; therefore, King did not feel he had done any improper recruiting (Id. Ex. 84 at 112). Both Herlihy and Rekart confirmed that they sought out employment with Quiltec by contacting Slone themselves (Id. Ex. 85 Attachments B-2, B-4). Also Lionarons approached King (November of 1982) to complain about what he viewed as lack of progress on TMI and the fact that he was sick of working there. Lionarons told King he would like to get out. According to Lionarons, it was not until this point in time that he was aware of how much involvement King had with Quiltec (Id. Ex. 65 at 19).

After receiving King's March 9 response to his questions on Quiltec, Arnold, in an attempt to determine who within the TMI-2 organization management structure was aware of King's association with Quiltec, talked to Austin, Buchanan, and Chwastyk. Chwastyk did not disclose to Arnold that he had traveled to the Beaver Valley Plant as a representative of Quiltec (Id. Ex. 89 at 68, 69).

Arnold contacted M. Pollack, Vice-President with the Long Island Lighting Company at the Shoreham Nuclear Station, and discussed the situation involving Quiltec. It became clear to Arnold that Quiltec had arranged the employment of at least two GPUN employees at Shoreham before these employees informed GPUN that they were going to resign (Id. Ex. 16 at 121).

On March 16, 1983, Arnold wrote to King:

As a result of your failure to inform GPUN of your position as President of Quiltech [sic], Inc. and the fact that Quiltech [sic] has hired at least two GPUN employees from GPUN, your employment with GPUN is being terminated as of March 23, 1983.

The date of termination has been set on the basis that you will continue to cooperate in the company's review of the concerns you have expressed regarding potential safety issues at TMI-2. Id. Ex. 58.

Arnold stated that he did not understand the depth of the disagreement between various members of the TMI-2 staff and he did not reflect in any prolonged way as to whether or not the suspension of King would be misunderstood by members of the organization as being retaliation or harassment of King because of his concern about safety issues (Id. Ex. 16 at 126, 127).

10.2.3 E. Gischel Investigation Results

E. Gischel, the GPUN Plant Engineering Director at TMI-2, reported directly to the Site Operations Director, L. King (September 1, 1983, OI Report Attachment D-5 at 1). In June 1982, Gischel suffered a stroke that kept him out of work until October. The stroke affected his vision and short-term memory (Id. at 6). As a result of the stroke, Gischel, on the recommendation of a friend, began consulting with Dr. W. Jenkins, a psychologist employed by an organization called Corporate Stress Control Services, Inc., in Middletown, Pennsylvania (May 18, 1984, OI Report at 14). Gischel had his first appointment with Dr. Jenkins on October 12, 1982 (Id. Ex. 3 at 12). During this visit, Gischel was told by Dr. Jenkins to take a neuropsychological examination so that the doctor could fully evaluate his condition (Id. at 13). Gischel told Dr. Jenkins that he thought it was a good idea, but wanted to discuss it with his wife (Id. at 14). Gischel signed a release on October 26, 1982, for Dr. Jenkins to submit information to Dr. Gordon who would perform the neuropsychological evaluation scheduled for December 13, 1982 (Id. at 18).

On November 18, 1982, Dr. I. Imber of Reading, Pennsylvania, performed a company annual physical on Gischel. Gischel was found fit for work (Id. Ex. 7).

As a result of a visit to the emergency room on December 6, 1982, because of dizziness, Gischel was referred to Dr. R. Jones who was an internist. Dr. Jones treated Gischel for hypertension (Id. Ex. 6 at 1).

On January 15, 1983, Dr. Jenkins found that Gischel did not take the neuropsychological examination that had been scheduled for December 13th (Id. Ex. 3 at 18). During a mid-January 1983 telephone conversation, Dr. Jenkins told Gischel that he felt GPUN should be brought into the discussions regarding the neuropsychological examination (Id. Ex. 14 at 1). On February 2, 1983, Dr. Jenkins again told Gischel that he should take the neuropsychological examination. Gischel said he would if GPUN requested it and paid for it (Id. Ex. 3 at 19). During this conversation Dr. Jenkins told Gischel that if GPUN was asked to pay for the examination, they then would know that Stress Control wanted Gischel to take the examination. Dr. Jenkins got the feeling that Gischel felt the information about his attendance at the clinic had already been divulged to GPUN (Id. at 20).

Because of Mr. Gischel's continued refusal to take the neuropsychological examination, Dr. Jenkins decided to contact his supervisor in New York, Dr. Howard Glazer, who suggested a letter be sent to Gischel (Id. Ex. 3 at 21, 22). On February 10, 1983, Dr. Jenkins wrote Gischel a letter urging him to take the neuropsychological examination. Dr. Jenkins asked Gischel to make a decision and notify the doctor's office within 2 weeks (Id. Ex. 8).

On approximately February 15, 1983, Dr. Glazer advised T. Meyers (the GPUN Director of Human Resources) of his continuing concern about an employee's unwillingness to comply with the request for a neuropsychological evaluation and of Dr. Jenkins' concern that under the circumstances, this employee should not retain his unescorted access (Id. Ex. 11 at 38, 39). Meyers

called Dr. Glazer back and identified the employee as Gischel; Dr. Glazer confirmed that Gischel was the person (Id. at 39).

Gischel spoke with Dr. Jenkins (on approximately February 17) about the February 10th letter. Dr. Jenkins again told Gischel that it was important he have the test done and that, if he should refuse to take the test, Dr. Jenkins would be forced to notify GPUN (Id. Ex. 2 at 11).

During a visit on February 28, 1983, Dr. Jones strongly urged Gischel to take the neuropsychological examination (Id. Ex. 6 at 2).

On March 9, 1983, Dr. Glazer told Meyers, in their third conversation, that Gischel was not making progress towards taking the neuropsychological examination. Meyers indicated that he would discuss the matter with Arnold, the President of GPUN, because of the sensitive nature of the activities at Three Mile Island (Id. Ex. 13 at 16). After he had been apprised of the situation by Meyers, Arnold asked that Stress Control contact him personally (Id. Ex. 15 at 57, 58).

On or before March 16, Arnold talked to Dr. Glazer about Gischel's medical condition (Id. Ex. 9 at 24, 25). Arnold, after this discussion with Dr. Glazer, agreed that Gischel needed the neuropsychological examination (Id. Ex. 16 at 36). A meeting was later held on March 16, 1983, between Arnold, Kanga, and Gischel to tell Gischel that GPUN would make the arrangements for him to take the neuropsychological examination, which GPUN would pay for. During this meeting, Arnold told Gischel that perhaps it would be necessary to make a temporary adjustment in his work assignment, although GPUN had no intention of putting Gischel on a leave of absence or ending his employment (Id. Ex. 15 at 68, 69). Gischel reluctantly agreed to take the examination (Id. at 71). (This conversation took place before Parks' press conference of March 23, 1983, concerning the polar crane and related safety issues in which Gischel and King are identified as supporters of Parks' concerns.)

On March 28, 1983, Gischel sent a letter to Arnold telling him that his personal physician, Dr. Jones, saw no value in Gischel taking the neuropsychological examination. Gischel requested the examination be cancelled, unless it was a condition of his continued employment at GPUN (Id. Ex. 20). Arnold and Gischel met to discuss this letter on March 29. According to Gischel:

[Arnold] glossed over whether the evaluation is a condition of my employment. He said he didn't like to think of it in those terms. . . . Mr. Arnold told me that he did not have any problems with someone besides Dr. Gordon conducting the evaluation, but there had to be some assurance that whoever did the job was qualified. I stated that he should state the necessary qualifications standards and I would seek a highly-qualified professional who meets them. I told Mr. Arnold that I would base my selection on professional competence and independence from GPUN. Mr. Arnold said he would get back to me, perhaps by Monday, April 4th. Id. Ex. 1 at 19.

Arnold wrote a memorandum, April 4, 1983, to Gischel outlining the three qualifications necessary for an individual to administer and interpret the neuropsychological evaluation that "the Company has requested that you take." Id. Ex. 21. On April 13, 1983, Gischel sent a memorandum to Arnold telling him that he had discontinued his efforts to locate an independent professional to administer the neuropsychological evaluation because Arnold had not notified him that the examination was a condition of employment as Gischel had requested in his memorandum of March 28, 1983 (Id. Ex. 22). On April 14, Arnold sent Gischel a letter telling him that "I have decided that having the evaluation is a condition for continuation of your present assignment" (Id. Ex. 23 at 2).

In an attempt to resolve the matter of the neuropsychological examination, Arnold had W. Gifford, GPUN Vice-President for Communications, talk to Gischel. With Gischel's permission, Gifford then talked to Dr. Jones in an attempt to resolve the matter (Id. Ex. 16 at 51). However, despite these efforts, Arnold and Gischel continued to disagree on how to resolve the matter of the neuropsychological examination (Id. at 52, 53).

Arnold perceived himself as confronted with a dilemma: Dr. Jones was saying Gischel was basically fit to return to duty and the doctors at Stress Control were saying it was extremely important for Gischel to take this neuropsychological examination because they felt he was a danger to himself and others. Arnold therefore stated that he thought of the examination as a third party evaluation that would, in essence, be the tie breaker (Id. at 44, 45).

Until April 25, 1983, Gischel continued to believe that Arnold would accept a letter from his doctor "attesting to my suitability to work in my present position," if the letter adequately addressed the issues (Id. Ex. 14 at 2). As a result of his conversations with Gischel and Dr. Jones, Gifford drafted a letter for Arnold's signature to Dr. Jones (Id. Ex. 27). This letter outlined GPUN's concern with respect to Gischel's stroke as follows:

- a. Identification of any physiological, psychological or other effects which have implications as to Ed's ability to perform his normal work assignments.
 - b. That the physiological or psychological impact of extended work hours, possible emergency stresses and highly technical supervisory tasks (as Ed's position would normally involve at various times) are likely to result in adverse effects either to Ed or to the performance of those tasks.
 - c. Whether there is a need to adjust Ed's work assignments until he has achieved full recovery to facilitate the attainment of that full recovery.
 - d. Whether there is any likelihood of memory loss, vision limitations or present or potential impairment of the mental processes involved with assimilating, understanding and acting upon written and oral communication or susceptibility to confusion. This also should relate to information received by Ed, either visually or orally, prior to the stroke.
- Id. at 2.

Because Arnold and Gifford would not be available later on April 25, Arnold asked J. Wilson, an attorney for GPUN, to take the draft letter to Gischel for his review, comment, and acceptance (Id. Ex. 28 at 4). According to Wilson, "Mr. Gischel took the letter and requested some time in order to read it, and said he would get back to me." Id. Later during the evening of April 25, Gischel called Wilson and made a connection between testifying at Congressman Udall's Hearings the next day and taking of the neuropsychological examination. Wilson indicated to Gischel that it was inappropriate to link the two together--they should not be tied together (Id. at 16). In a later conversation, Wilson advised Arnold of this. According to Mr. Wilson, "Mr. Arnold was explicit that I should make certain that Mr. Gischel understands that whether or not this is agreed to, if Mr. Gischel felt a need to testify or go to the Udall hearing, that he should do so. Because there was no connection between what we were trying to accomplish and that hearing." Id. Wilson again explained this to Gischel, who said he understood (Id.).

Dr. Jones wrote to Arnold on April 25, 1983, and said:

[The] only defect I have found is also the visual field deficit. Specifically, I have noted no difficulties in assimilating visual or oral communication (nor would any be expected), language, memory, psychological or other mental status abnormalities. His hypertension has been under excellent control on medications. I have discussed Ed's case with the neurologist in Lebanon, [Pennsylvania,] and from a medical standpoint, no further evaluation has been deemed necessary. Id. Ex. 29.

Although the record is not clear as to when Arnold received this letter, it does not appear that the letter was in W. Kuhns' (Chairman of the Board, GPU) possession at the time of the April 27, 1983, GPU Board of Directors meeting (Id. Ex. 31 at 8). Also, because Arnold was out of town on April 25 and 26, it is unlikely that he received Dr. Jones' letter on either of those days (Id. Ex. 28 at 7).

Gischel made a presentation to the GPU Board of Directors at their April 27 meeting. As a result of the presentation, Kuhns was bothered by the fact that the Stress Control doctors had talked to GPUN before they had notified Gischel that they were going to do so. Kuhns thought this was a breach of privacy by Stress Control relative to Gischel. Id. Ex. 31 at 6.

Even though he was bothered by this breach of privacy, during the Board meeting on April 27, Kuhns told the Board and Gischel:

[We] felt we had a problem, that we had been advised that he might have a psychological, physiological impairment as a result of his stroke that might evidence itself in ways that could compromise his ability to carry out his sensitive duties with GPU Nuclear, and that we felt we had to resolve that. . . . This is not a condition of employment, Mr. Gischel. We are not saying you have to take this test or you can't work with us. We are saying you have to take the test in order to stay in the spot you are in. We

are making it a condition of that job. We are not saying that you are going to lose your job with the System, or that we are going to cut your salary or deprive you of your benefits or anything like that. We urged him-I urged him to take the test at that meeting. I said: We've got a problem with it, Mr. Gischel, and you, I hope, understand that we have been advised that you have a condition that reflects on your ability to perform your job. In our responsibility for the safety of this operation, we have to respond to that. And we ask you to take the test. And he finally said to me at the meeting: Okay, I will take the test if you, meaning me, pick the doctor or pick the expert. I said I would do that. Id. at 8, 9.

As a result of the April 27 meeting, Kuhns contacted Dr. H. Prystowski, head of the Hershey Medical Center, to seek his advice. Dr. Prystowski recommended Dr. Gordon at Johns Hopkins, Baltimore, Maryland, who had no apparent relationship to the doctor recommended at the University of Pennsylvania, although he had the same surname. Id. at 9, 10. Gischel wrote a memorandum on May 12, 1983, to Kuhns. Gischel said he was attempting to make arrangements to take the evaluation as required, but he felt that he was being threatened by Kuhns and that Kuhns was engaging in retaliatory actions against him. Id. Ex. 32.

On May 19, Kuhns wrote a letter to Gischel giving a chronology of Gischel's illness and subsequent dealings with Stress Control. Kuhns also outlined Gischel's unwillingness to take the neuropsychological examination. In the letter Kuhns told Gischel:

I am again informing you that the company's receipt of assurance that your state of recovery is consistent with your job requirements is a condition of continuance in your current assignment. If we cannot be provided with reasonable assurance, you will be assigned to another job in GPU Nuclear, in the TMI area, and at your current salary until your recovery is effectively complete. As Mr. Arnold has stated, the company will cover all expenses for this evaluation. Id. Ex. 33 at 19, 2.

Also on May 19, 1983, Kuhns wrote another letter to Gischel in which he took issue with Gischel's allegations in his May 12 letter to Kuhns that Kuhns had engaged in harassment. Kuhns reiterates his thought that the taking of the neuropsychological examination was "not a condition of employment [but] it certainly was understood to be a condition precedent to your present assignment." Id. Ex. 34.

On June 17, 1983, in a memorandum to Kuhns, Gischel requested a transfer to the Reading, Pennsylvania, office (Id. Ex. 35). Gischel's transfer to Reading became effective July 1, 1983 (Id. Ex. 14 at 8).

Gischel raised several other issues, besides the issue of the neuropsychological examination, that he claimed were indicative of management attempts to harass, intimidate, or take retaliation against him for his efforts to

raise concerns about the Polar Crane Refurbishment Program. Among these were the manpower, overtime, and contractor issues; the PER-8 account issue; the weekly manpower report issue; and the placement of windows in doors at the site operations office issue. May 18, 1984, OI Report at 47, 50, 52, 54 (respectively). The staff will evaluate each of these issues in turn.

(1) Manpower Overtime and Contractor Issues

On March 24, 1983, Gischel discussed with J. J. Barton (Deputy Director TMI-2) the need for additional manpower in Plant Engineering (Id. Ex. 2 at 9). Gischel put his request in writing in a memorandum to Barton dated March 29, 1983, in which he proposed:

1. Bring in temporary (contractor) personnel of the appropriate caliber to work independently to dispose of the present backlog of important tasks. I have identified this need previously as one Fire Protection, one I & C [Instrumentation and Control]; one HVAC [heating, ventilation, and air conditioning] and three less experienced Mechanical engineers.
2. Concurrently review Plant Engineering's long term manpower needs as the department work load comes into sharper focus as the new UWI [Unit Work Instruction] program matures.

Id. Ex. 38.

Gischel received a response, dated April 1, 1983, in which Barton said he agreed to the hiring of a fire protection engineer, but would like to discuss alternate solutions to Gischel's other proposals. Barton felt that Gischel was wrong because by eliminating the two employees who performed the majority of overtime showed that the other employees were engaging less than 1 hour per day overtime. Id. Ex. 39. Gischel viewed Barton's response as abusive in nature and felt it questioned his dedication and his staff's dedication to working overtime (Id. Ex. 2 at 10).

Gischel stated that there was some connection between his safety concerns about the polar crane refurbishment program and an alleged reduction in his staff. Barton authorized overtime for Gischel's engineers, which Gischel refused to use. Barton also authorized Gischel additional billets in the Plant Engineering Department in the spring of 1983. Id. Ex. 40 at 66. Barton felt that he had authorized people for Gischel above and beyond his normal allocation. Therefore, Barton saw no deliberate attempt to reduce Gischel's staff. Id.

However, as a result of Gischel's allegation, Barton looked into the Plant Engineering workload more closely. He discovered when checking gate logs, that some of Gischel's engineers were not working a full 8-hour day. Barton confronted Gischel with these findings and told him he had better become a better manager and insist on 8 hours work for 8 hours pay. Id. at 67. It should be noted that R. P. Warren (Systems

Engineering Supervisor for TMI-2 Plant Engineering) recalled that Barton was critical of Plant Engineering work production at TMI-2 even before Gischel arrived at TMI-2 (Id. Ex. 41).

(2) PER-8 Account Issue

On March 25, 1983, Gischel was absent from work for 4 hours to take care of a motor vehicle transaction. He requested to be put in a category of time called PER-8 time, which is a time code for granting paid time off for personal business. Id. Ex. 14 at 10. Gischel received a call from Barton's secretary on March 30, 1983, advising him that Barton would not approve as PER-8 time the 4 hours on his time sheet for the previous Friday (Id.). Barton and Gischel discussed the use of his PER-8 account time during a telephone conversation on March 31, 1983. Barton advised Gischel that it was his policy that the PER-8 account number should not be used except for certain very narrow definitions that Barton would identify. Gischel advised him that he had amassed a huge amount of unpaid overtime during his first year with GPU and he viewed this "bank" of time as being in his PER-8 account (Id. at 11).

On May 3, 1983, Gischel met with J. Troebliker (TMI Area Manager-Human Resources) and L. Whiter (Payroll Administrator at TMI) to discuss the rules for using the PER-8 account number. Gischel came away with the clear interpretation that his view of personal time off for personal business was correct (Id.).

Barton felt that time off to change your automobile registration was not the type of personal time he would authorize GPUN to pay for. Rather, it should be used when an employee has an emergency at home or has a late afternoon doctor's appointment and will not be able to return to work during normal working hours. The employee's supervisor can use the PER-8 account as a way to grant them time off (Id. Ex. 40 at 69). Barton viewed PER-8 as a kind of "perk above and beyond" normal vacation time provided an employee (Id.). Barton felt that the kind of leave Gischel was attempting to use was not the type that he would approve for anybody; therefore, he did not view himself as "picking out Gischel" by not approving Gischel's PER-8 time (Id. at 70).

There is nothing in the record to dispute Barton's statement that he would not approve this type of absence as PER-8 time for any employee. In a May 6, 1983, memorandum documenting the May 3 meeting with Gischel, J. Troebliker said that there is no such thing as storing unpaid overtime in a bank as Gischel seemed to think there was. Additionally the memorandum stated that the granting of PER-8 time is strictly at the discretion of the employee's supervisor. The statements contained in this May 6 memorandum would seem to support Barton's position. Id. Ex. 45.

(3) Weekly Manpower Report Issue

On or about May 2, 1983, Barton asked plant engineering to submit weekly manpower reports to improve the productivity in Plant Engineering. As part of this report, Barton asked Gischel to report on the status of

activities going on with respect to recruiting and the filling of vacant positions (Id. Ex. 40 at 72). Barton said the use of these reports was not exclusive to Plant Engineering; he had used them previously in areas that he felt showed lack of adequate performance. In fact, Barton stated that he requested these reports from various departments frequently (Id.).

R. P. Warren (Gischel's assistant) wrote Gischel a memorandum on June 9, 1983, in which he stated that he felt Plant Engineering had been singled out for the additional assignment of providing these weekly manpower reports (Id. Ex. 47). Gischel wrote Barton a memorandum on June 10, 1983, in which he stated that unless he heard otherwise from Barton, Plant Engineering would unilaterally discontinue submission of weekly activity reports effective June 13, 1983 (Id. Ex. 46). Barton chose not to press the issue.

(4) Windows in Doors at Site Operations Office Issue

Gischel felt that placing windows in the doors at the site operations offices was done by Barton as a means to harass Gischel by trying to stir up his employees. Gischel found the episode to be particularly disruptive because of the distraction the windows created in the employees work environment. To the best of his knowledge, Gischel felt his were the only office doors at TMI-2 to be modified by the addition of windows (Id. Ex. 14 at 12, 13). Barton claimed that the windows were put in these doors as a safety precaution. Barton said that an employee was injured when she was attempting to go through a door that had no window in it (Id. Ex. 50, 51). As a result of that accident, Barton called the Safety Director and made him aware of the unsafe situation. It was the Safety Director's decision to put windows in these office doors (Id. Ex. 40 at 75, 76).

10.3 Staff Findings

10.3.1 R.D. Parks Staff Findings

The staff concludes that Parks was, in fact, harassed by management officials of Bechtel with the knowledge of GPUN. The staff finds, consistent with the DOL findings, that

- (1) The removal by Thiesing of Parks as alternate startup and test supervisor at TMI-2 on February 23, 1983, was inappropriate.
- (2) Although there may have been, initially, a valid reason for Bechtel to investigate allegations that Parks might have been involved with Quiltec, because of his friendship and close working relationship with King, the March 14, 1983, interrogation of Parks by Wheeler, his administrative supervisor, and Hoffman, Bechtel internal affairs, was improper and constituted intimidation of Parks.

- (3) The removal by Kanga (Director, TMI-2) of Parks on March 17, 1983, as the primary SO Department representative on the TWG for the reactor building polar crane project was improper.
- (4) The action by Wheeler on March 24, 1983, placing Parks on leave of absence with pay and prohibiting his entry to the job site without permission from Bechtel was improper.

DOL was primarily concerned with correcting the harm that had befallen Parks, so their investigation went only as far as they felt was necessary to determine that Park's employer, Bechtel, had improperly discriminated against him for having raised concerns about the safety of the polar crane project. Once they reached that determination, they directed remedial action satisfactory to Parks. There was no DOL judgment issued and Bechtel did not appeal the Compliance Officer's findings or directed remedial action. Parks and Bechtel reached a mutually amicable agreement to return Parks to full-time work with the company on August 4, 1984. As a result, Parks subsequently withdrew his complaint before the Department of Labor.* NRC's review of this matter has led to additional findings which extend beyond those of DOL and bear on the integrity of GPUN management:

- (1) The comments by Barton (GPUN), during a GPUN and Bechtel management meeting, threatening to fire or suspend Parks for having publicly aired his allegations were improper.
- (2) The comments to Parks by Kanga, threatening him not to publicly state his concerns about the polar crane and telling him that another employee who had tried to publicly state his safety concerns had been humiliated, clearly represented harassment.
- (3) Kanga told Parks that he had put Bechtel in a bad light with a client (presumably by raising safety concerns about the crane) and stood a good chance of being fired. This, in the staff's view, was a clear threat of retaliation.

*Pursuant to 10 CFR 50.54(f), the licensee was formally requested on June 14, 1984, to provide information concerning, among other things, its own investigation of Parks' allegations of harassment. The licensee's response in a letter dated June 26, 1984, advised that Bechtel was performing its own inquiry and that Stier (the licensee's investigator of other aspects of Parks' allegations), therefore, did not investigate this matter. In a letter dated July 5, 1984, from K. P. Richardson (counsel for Bechtel on the Parks matter) to R. C. DeYoung (NRC), several unsupported claims were made by Richardson concerning his determination that Parks' allegations of harassment were without merit. No documentation or evidence, beyond that already available to the staff, was provided by Richardson (i.e., counsel for Parks' letter of August 4, 1983, to the Honorable John Earman, Administrative Law Judge, DOL, with similar letters to Congressman Udall and NRC Chairman Palladino). If such documentation or evidence exists, it has not been provided; therefore, the staff is unable to evaluate these unsupported claims of Bechtel's counsel.

The Commission's regulations (10 CFR 50.7) establish that GPUN has a derivative responsibility for the acts of its contractor (Bechtel) in the harassment and intimidation of Parks as a result of his raising health and safety concerns. The staff also finds that GPUN had a direct responsibility for the acts of harassment on the part of Barton and Kanga (a Bechtel employee and Director of TMI-2 for GPUN as part of the combined management organization). Parks' allegations of harassment were not investigated by the licensee and are not addressed in the Stier Report (November 16, 1983, Vol. III, Harassment Allegations). Harassment of Parks raises questions concerning management's integrity which are addressed in Section 13.0.

10.3.2 L. King Staff Findings

After reviewing the information contained in the OI Report on King's involvement with Quiltec and reviewing the manner in which GPUN dealt with King as a result of his involvement with Quiltec, the staff concludes that there was no harassment, intimidation, or retaliation directed at King as a result of his having raised safety concerns relative to the polar crane refurbishment program.

King's involvement with the polar crane and his related safety concerns did not begin until some time in January 1983. King's involvement was primarily because Parks, one of the SO employees working for King, raised concerns about the polar crane refurbishment program as early as October 1982. Therefore, the staff believes that King's involvement with the safety concerns originated with Parks' request that he attend a meeting with Kanga, which was a direct result of Parks' refusal to approve use of the polar crane.

However, King's involvement with Quiltec began with the incorporation of Quiltec in July 1981--a full year and a half before the polar crane controversy. Quiltec began employing people to work at other nuclear power plants in June of 1982. Herlihy, Rekart, and Lionarons were recruited from September 1982 through the end of January 1983. King's involvement in getting Chwastyk to Beaver Valley as a representative of Quiltec occurred in October of 1982. Most of King's involvement with Quiltec and Quiltec's hiring of GPUN employees occurred well before his suspension and removal from GPUN and considerably before his involvement with the polar crane controversy. The staff additionally concludes, however, that GPU could have resolved certain aspects of the King/Quiltec affair in a more professional manner. For example, Arnold admitted that at the time of King's suspension, GPUN did not have any written policy for handling disciplinary action against exempt employees. Since King's suspension, however, GPUN has formalized a policy where supervisors or managers are to discuss matters of suspension with senior management before taking any action. Arnold feels that this is essentially the manner in which the King case was handled (OI Report May 18, 1984, Ex. 16 at 106-108). Initially, King was suspended on the spot and walked off the TMI site as a direct result of answering only two questions posed to him by Barton--the staff believes this was a severe action. Although King was placed in a suspended-with-pay status the day after the initial suspension by Barton, the staff believes that should have occurred on February 24. Such a suspension with pay would have more equitably allowed King to begin preparing his response to GPUN's charges about his alleged involvement with Quiltec.

The staff concludes that GPUN was very concerned about the safety issues raised by King as indicated by Clark meeting with King to discuss concerns about the polar crane the day after King's suspension. Clark avoided any discussions with King about the Quiltec controversy. Arnold took it upon himself to be responsible for resolving the King/Quiltec matter because he felt the need to be deliberative and methodical because King had been involved in raising safety issues. Arnold knew that there had been disagreements between King and others in the weeks before King's suspension.

Additionally, Arnold expressed concern because Thiesing brought forth the information on King's involvement with Quiltec; Arnold knew of the personality conflict between King and Thiesing. The staff notes that although Bruner, Thiesing's supervisor at Bechtel, did not feel that Thiesing had violated any Bechtel policy or procedure in the way he conducted his private procurement investigation of King, Arnold disagreed.

In his testimony, Thiesing made much of the fact that he did not want to make anyone in upper management aware of the rumors he had heard about King's involvement with an outside consulting firm because he did not feel the rumors were true. Although Thiesing and King were on the same administrative level in the integrated Bechtel/GPUN organization, the staff feels Thiesing's action in conducting a private procurement investigation was an attempt by Thiesing to harass King.

There is no question that the timing of King's suspension and ultimate removal was poor. This was acknowledged even by Kuhns (*Id.* 31 at 44). However, Arnold and other company officials testified that they saw no connection between King's raising of safety concerns and his suspension and ultimate removal from GPUN for his Quiltec activities.

In its investigation of King's allegations, DOL concluded that GPUN had a long standing policy of strictly limiting recruiting of employees from other companies with which they did business and, equally as strenuously, protecting their own employees from outside recruitment. DOL presented several examples of letters sent by GPUN to other companies in the nuclear field protesting their attempts to recruit GPUN employees (*Id.* Ex. 85 Attachment D-7). Therefore, DOL made the point, and the staff agrees, that the serious manner in which GPUN dealt with King for his recruiting of GPUN employees was totally consistent with existing GPUN practice.

It was equally clear to the staff from reviewing the OI information that no one in a senior management position at TMI-2 had any knowledge of King's involvement with Quiltec until immediately before his February 24, 1983, suspension from GPUN. Once senior management officials became aware of King's involvement, they acted quickly and in a manner they perceived to be fair and equitable.

The staff concludes that King was properly suspended and removed from his duties at GPUN as a result of his involvement with Quiltec. The staff concludes that King was not improperly harassed, intimidated, or retaliated against for any of his involvement with the polar crane safety-related issues.

10.3.3 E. Gischel Staff Findings

The staff finds that Gischel's complaints on the manpower, overtime, and contractor issues; the PER-8 account issue; the weekly manpower report issue; and the placement of windows in doors at the site operations office issue are without merit. It appears that Barton had a longstanding problem with the work production levels in the Plant Engineering Department that predated Gischel's arrival on the scene. In relation to the PER-8 account, it would appear that Barton's interpretation of the proper usage of this time category is more accurate than Gischel's. Regarding the weekly manpower reports, Gischel unilaterally decided to stop sending them. Barton did not agree with Gischel's decision to stop sending the reports because Barton felt they still had a use (*Id.* at 73). However, Barton knew that Gischel was in a sensitive situation and, even though he felt these reports served a proper purpose, he relented and did not pursue the matter with Gischel (*Id.* at 74). The modifications to the office doors, as outlined above, was clearly a matter of employee health and safety. The staff concludes that these four issues do not indicate harassment, intimidation, or retaliation toward Gischel on the part of management.

The issue concerning a neuropsychological examination for Gischel presented more difficult questions in determining whether or not any individual management official employed by GPUN had acted to intimidate or harass Gischel for raising concerns about the safety of the polar crane operation.

At the time Gischel returned to work in October of 1982 after having suffered a stroke in June of 1982, GPUN had no guidelines for determining when an employee who had suffered an injury or a serious medical disability off site was fit to return for duty. Gischel was allowed to return to work without having a medical examination to determine his ability to perform the full range of his duties as Plant Engineering Director at TMI-2. Gischel was allowed to begin working part time and to begin assuming his duties as he felt comfortable with them.

On November 18, 1982, Gischel had his periodic medical examination performed by Dr. I. Imber of Reading, Pennsylvania, and was found fit for work. On December 6, 1982, when Gischel visited the emergency room because of dizziness, he met Dr. R. Jones, who continued to treat him during the period of the polar crane controversy. Dr. Jones confirmed that Gischel had lost the right field of vision in each eye as a result of the stroke and also diagnosed Gischel as suffering from hypertension. During the time of Gischel's recovery, particularly the spring of 1983, he was intimately involved in raising safety concerns relative to the refurbishment of the polar crane. During that same period of time, the question of the neuropsychological examination for Gischel continued to grow in importance with various management officials.

As stated in Section 10.2.3 of this report, Gischel began consulting with Dr. W. Jenkins at Stress Control, Inc. It was Dr. Jenkins' opinion that to fully evaluate Gischel's condition would require Gischel to take the neuropsychological examination. Gischel was reluctant to do this and, as a result, he never did take the examination.

On the basis of the evidence developed, the staff concludes that the licensee's reason for attempting to get Gischel to take the neuropsychological examination was the concern on the part of many officials with GPUN that Gischel was in fact having serious physical problems, which potentially presented a danger to both himself and other GPUN employees at the TMI site. For example, Dr. Jenkins reported that Gischel had "receptive language function problems" (i.e., when something was said to him he may not be able to understand it completely) (May 18, 1984, OI Report Ex. 3 at 46, 47). Dr. Glazer felt that Gischel was certainly not safe to himself, or to other people around him, in unescorted areas of the plant (Id. Ex. 11 at 25, 26).

The OI Report focused on the fact that Dr. Glazer was concerned about Gischel's unescorted access status. However, Gischel had not been inside the plant-security boundary since June of 1982 when he had the stroke. In essence, he had voluntarily let his access authorization expire and made no attempt to renew it. Id. Ex. 16 at 26, 27. Arnold felt from his personal observations that Gischel had a hard time reading and, on the basis of his conversations with Gischel, had a hard time understanding. Arnold was not alone among management employees of GPUN in his concerns about Gischel's physical condition. Gifford testified that one day he was standing on the side of the road at the site, Gischel almost ran over him with his car. As a result of this near accident, Gifford said he sensed that Gischel never saw him and he perceived this to be a visual problem of Gischel's.

Evidence shows that GPUN was aware of the conflicting opinions of Dr. Jones and the doctors of Stress Control concerning Gischel's fitness to resume his duties. However, Dr. Jones' diagnosis of loss of vision and hypertension appears consistent with the concerns of Dr. Jenkins and Dr. Glazer. No evidence was developed to indicate whether or not Dr. Jones had knowledge of the work environment or job-related stress involved with Gischel's position. The doctors of Stress Control, however, because of their involvement with GPUN as an advisor to the company, were clearly knowledgeable of the work environment and job-related stress. The staff concludes that it is reasonable, under these circumstances, for the licensee to rely on the medical advice of the Stress Control doctors.

Gischel felt that Arnold had threatened him on April 22, 1983, regarding his attendance at the Udall Hearings. However, the staff finds that it was Gischel who raised the issue about his testimony to Congress. During his meeting with Gifford, Gischel stated that he had not been invited to testify at the hearings scheduled for April 26. Gifford clearly explained to Gischel that he did not see any connection between the neuropsychological examination and Gischel's testimony before the Udall Committee.

As discussed in Section 10.2.3, throughout the entire case involving the neuropsychological examination, it was Gischel who continued to change the ground rules and the format for his taking the neuropsychological examination. Gischel would set certain conditions and then he would not meet them, or he would accuse GPUN of not meeting them. Gischel scheduled the examination several times for himself and then cancelled or did not show up. Even Dr. Jones, early in February, suggested very strongly to Gischel that he should simply take the examination and get it over with (Id. Ex. 6 at 2).

As of July 1, 1983, Gischel still had not taken the examination and had not lost any salary. Ultimately, Gischel's apparent fear of the examination was so great that he requested a transfer to Reading, Pennsylvania. GPUN granted his request and he was transferred to Reading effective July 1, 1983.

The staff concludes that there was no intimidation, harassment, or retaliation against Gischel for his refusal to take the neuropsychological examination and that the taking of the examination, itself, was not harassment. The staff believes that GPU felt that Gischel had a serious medical problem that had to be dealt with before they could decide if Gischel was able to resume the full range of his duties as Plant Engineering Director at TMI.

10.3.4 Overview

As discussed in Section 10.3.1, the harassment of Parks raises questions concerning management integrity. These matters are addressed in Section 13.0.

The staff also finds that there was a lack of knowledge of GPUN company policy protecting GPUN employees, as well as contractor or subcontractor employees, from harassment and intimidation for engaging in activities protected by law and the Commission's regulations (i.e., Energy Reorganization Act, Section 210 and 10 CFR 50.7). On the basis of their individual involvement, it appears that corporate management was sensitive to and knowledgeable of their responsibilities to protect employees from harassment and intimidation; however, this does not appear to be the case for senior managers or employees of GPUN, nor for some corporate managers, senior managers, and employees of GPUN's contractor (Bechtel). GPUN's policies in this area are evaluated as part of the staff's overall position on management integrity in Section 13.0.

11.0 CHANGE OF OPERATOR TESTIMONY

11.1 Background

During the NRC staff's review of the GPU v. B&W lawsuit record, it was determined that the trial testimony of W. H. Zewe (former TMI-2 Shift Supervisor) and E. R. Frederick (former TMI-2 CRO) differed significantly from previous statements made by Zewe, Frederick, and C. C. Faust (former TMI-2 CRO) concerning the issue of whether or not full-flow high pressure injection (HPI) had been manually initiated on the morning of the accident when the last two reactor coolant pumps were shut down (at 0541 on March 28, 1979).

During the first days and months following the accident, Zewe, Faust, and Frederick were repeatedly interviewed by the NRC and GPU investigators in order to develop an understanding of the accident and a documented sequence of events (SOE). Appearing before the Plant Operating Review Committee (PORC) in mid-May 1979, the operators insisted that full-flow HPI was manually initiated when the reactor coolant pumps were secured at 0541. At the trial, Zewe testified that the PORC modified the SOE to include this event based on the agreement of all three operators (Zewe, Frederick, and Faust) (Zewe at Trial Tr. 2759-2763). In a taped interview with GPU investigators on May 25, 1979, Zewe discussed the countdown that was performed as Frederick secured the reactor coolant pumps and Faust initiated HPI (B&W 5000CC). In addition, during separate interviews before NRC investigators, Faust and Zewe stated that HPI was manually actuated when the reactor coolant pumps were secured (B&W 5006AA and B&W 271 at 30, respectively). At a meeting with the Advisory Committee on Reactor Safeguards (ACRS) on July 15, 1979, Zewe stated that HPI was manually initiated when the last two reactor coolant pumps were secured (Zewe at Trial Test. 2756).

GPU's Annotated Sequence of Events dated February 6, 1981 (GPU 2079), contains the following entry at time 0541:37: "The operator manually initiated the Safety Injection portion of Engineered Safety Feature trains A and B to supply additional cooling water to the reactor core." The references provided for this entry were given as (1) T. L. Van Witbeck memorandum regarding TMI-2 operating staff and the PORC SOE review meeting, (2) TMI staff interview conducted by Met-Ed/GPU with E. Frederick, dated March 20 and April 6, 1979, and (3) TMI staff interview conducted by NRC with Frederick, dated April 23, 1979. GPU 2079 at 8, 41, 42. None of the other accident investigation chronologies list HPI actuation on or about 0541 (see IE Bulletin 79-05A; IE Investigative Report, NUREG-0600; the Electric Power Research Institute's "Analysis of TMI Unit 2 Accident;" the Rogovin Report, "TMI Report to the Commissioners and to the Public;" B&W's "Annotated Sequence of Events;" and B&W's "Final Report of the TMI-2 Occurrence").

In his opening statement at the trial on November 1, 1982, R. B. Fisk, the attorney for B&W, emphasized the GPU SOE conclusion that HPI had been initiated at 0541. Had it remained on, he argued, core damage would not have

occurred. Thus, Fisk concluded that Met-Ed was negligent by turning off the HPI pumps. Fisk further argued that the "mystery man," who turned the pumps off, could not have been a B&W employee; thus, B&W was not responsible for the core damage. Fisk at Trial Test. 159.

During the trial, the testimony of Zewe and Frederick changed from their previous accounts of HPI actuation. Zewe testified that he remembered only one manual full-flow actuation of HPI, which occurred at about 0720 (Zewe at Trial Test. 2170). Frederick testified that HPI could not have been actuated at full flow at 0541 (Frederick at Trial Test. 3499). Frederick's testimony was based on his understanding of the effect on makeup tank (MUT) level when HPI is initiated. Frederick's expert testimony on this subject was subsequently eroded under cross-examination by B&W attorneys. Thus, because of the importance of this issue to the trial, EDS Nuclear, Inc., was contracted to perform an analysis designed to determine whether HPI actuation occurred at TMI-2 at or about 0541 (OI Testimony Change Ex. 36 at 18). The results of the EDS analysis were presented at the trial by J. H. Holderness. The EDS analysis concluded that full HPI injection at or about 0541 did not occur (Holderness at Trial Test. 5636).*

Following the lawsuit settlement, GPU contracted B&W to perform an independent analysis of this issue. The B&W report entitled "Response to GPUN Questions Concerning HPI Actuation at TMI-2 About 5:41 a.m. on March 28, 1979," was forwarded to H. R. Denton (NRR) by E. Blake (Counsel for GPUN) by letter dated September 15, 1983. The B&W analysis concluded that the reactor coolant system (RCS) experienced a significant cooldown during the period 0534 to 0605. The evaluation concluded that, during the period 0534 to 0540, the cooldown was most likely caused by a combination of emergency feedwater (EFW) flow and partial HPI flow and that between 0540 to 0605 the cooldown was caused primarily as a result of EFW flow. The report also concluded that full HPI actuation did not occur at the time the last two reactor coolant pumps were tripped (0541). B&W Analysis at 54.

With the assistance of EG&G Idaho, the staff independently evaluated the possibility of HPI actuation at 0541 and performed a review of the EDS and B&W analyses. On the basis of these analyses, it is the staff's conclusion that actuation of HPI immediately after the last reactor coolant pumps were tripped at 0541 is extremely unlikely. The analyses showed that RCS cooldown occurred between 0534 and 0605 and that partial actuation of HPI for a short period (about 6 minutes), beginning about 0534, was possible. However, it is not possible to conclusively affirm or reject limited HPI actuation immediately before 0541. See memorandum from H. R. Denton (NRR) to B. B. Hayes (OI) dated April 24, 1984. The results of the staff's evaluation are consistent with the sequence of events described in NUREG-0600.

In a letter dated August 23, 1983, from E. Blake (Counsel for GPUN) to H. R. Denton (NRR) the licensee forwarded a brief prepared by the law firm of

*NRR staff note: Because of the time constraints placed upon EDS to perform the analysis, EDS examined only makeup tank level behavior around 0541 to determine if the response exhibited characteristics of HPI actuation. The EDS report did not address actuation at any other time, and it did not examine other data which might be affected by HPI actuation.

Kaye, Scholer, Fierman, Hayes, and Handler (Kaye-Scholer). The brief entitled, "Memorandum on the 5:41 HPI Actuation 'Mystery Man' Issue," provided Kaye-Scholer's analysis of the key documents associated with the HPI actuation issue and the rationale for why the trial testimony of Zewe and Frederick differed from accounts they had provided during earlier testimony, depositions, and interviews. Following the September 1983 publication of NUREG-1020, the licensee provided its response to the public version of the document in a letter dated October 14, 1983, from H. Dieckamp (GPU) to the NRC Commissioners. With respect to the staff concerns regarding the 0541 HPI actuation issue, the licensee's position may be summarized as follows:

- (1) "The official GPU chronology of the accident sequence was compiled with the assistance of a reputable technical consulting firm, and was based on extensive analysis of the accident data as well as the statements made by Met-Ed personnel to NRC and GPU investigators. The specific inclusion of an HPI actuation at 0541 was predicated solely on the statements made by two of the control room operators present at the time and was so identified in the chronology." Dieckamp letter at 21.
- (2) "The evidence adduced at trial was not a change in position by GPU management but a reflection of further technical study in order to refute the now disproven, spurious trial argument raised by B&W's counsel." Id. at 23.
- (3) The licensee used these statements and its counsel's brief, in part, to argue that "when measured against the development of objective facts from detailed technical analyses and from the accident data, the fact that two of the operators' earlier recollections of manual actuation was incorrect is fully understandable." Id. 25.

While the staff considered the statements made by the licensee in its August 23 and October 14, 1983, submittals, neither fully answered the staff's management integrity concerns expressed in the limited distribution version of NUREG-1020. These issues were specifically identified as follows in Section 10.7 of NUREG-1020LD:

- (1) whether the control room operators who had made previous statements concerning the 0541 HPI actuation had misrepresented the facts either when they originally said that such an action occurred or when they later said that such an actuation had not occurred
- (2) if the latter, whether any improper influence was brought to bear on the control room operators in connection with their testimony at trial
- (3) whether licensee's reversal of position concerning an actuation of HPI at 0541 was improperly motivated by financial considerations arising from the GPU v. B&W lawsuit

- (4) whether the licensee had an obligation to report and failed to report to the NRC the modification in its chronology of the accident sequence

The staff recognized that possible explanations for GPU's reversal of position on the question of a 0541 manual HPI initiation could include the difficulty of recall in a stressful situation with a reasonable, honest effort at presenting the facts as well as wrongful conduct. Nevertheless, the staff believed that an attempt to find answers to the questions identified above should be undertaken. Thus, in a memorandum, dated November 7, 1983, from H. R. Denton (NRR) to B. B. Hayes (OI), the staff requested that OI investigate the matters discussed in questions 1 through 3 above. November 7, 1983, memorandum at 28-29. A more comprehensive background on this issue is discussed in Sections 3.1 and 10.7 of NUREG-1020LD.

11.2 Investigation Results

The OI investigation developed testimony corroborating the fact that the control room personnel at the time of the accident* (Zewe, Faust and Frederick) insisted on including a manual HPI actuation at 0541 in the GPU sequence of events. According to T. L. Van Witbeck, one of the principal authors of GPU's "Annotated Sequence of Events" (GPU Ex. 2079), the operators "were adamant with regard to the initiation of safety injection on or about this particular time The operators insisted that they had done this at that time. We had no information which supported that and I frankly was in charge of the accident assessment side and I said all right, we cannot prove it and we cannot disprove it, we will put it in; and we put it in. I felt they were incorrect at the time." OI Testimony Change Ex. 22 at 18.

According to R. C. Arnold, "the technical people that were looking at the objective data were generally of the opinion that the actuation had not occurred, that the operators were in error in their recollections." However, Arnold further explained that this one issue should not be taken out of context, there were a number of issues where the recollection of operators were different from the technical people that were performing the analyses from objective data. OI Testimony Change Ex. 26 at 15.

The law firm of Kaye-Scholer was retained by GPU to represent GPU in its suit against B&W. J. Liberman of the law firm Bishop, Liberman and Cook, (General Counsel for the licensee) acted as the point of contact between GPU and Kaye-Scholer for all trial matters (OI Testimony Change Ex. 36 at 5, 6). D. Klingsberg, a partner in the law firm of Kaye-Scholer, was in charge of the lawsuit (Id. at 4). Klingsberg stated that he made the decisions on strategy and tactics without consultation with either GPU or Liberman (Id. at 6).

*F. Schiemann was the TMI-2 Shift Foreman at the time of the accident. However, he was not involved in the review of the SOE or other matters involving the 0541 HPI actuation, thus, no interview of Schiemann was conducted by OI.

According to testimony presented by W. G. Kuhns and H. M. Dieckamp, they had little involvement in the actual conduct of the trial. Kuhns, although initially involved in selecting Kaye-Scholer to try the case, had no involvement in the actual trial up to the point of possible settlement and was not aware at that time of any change in testimony by the operators (OI Testimony Change Ex. 41 at 5, 6, 8). Dieckamp stated that his main source of information during the trial was the New York Times. He received copies of the transcripts, but did not read them (OI Testimony Change Ex. 27 at 10). Arnold stated that he was not directly involved in any of the trial strategy although he did provide comments on the draft complaint against B&W and did serve as a principal witness during the trial. He was not involved in the selection of Frederick as an expert witness and he was not involved in the preparation of either Frederick or Zewe for their testimony. OI Testimony Change Ex. 26 at 19, 32, 46.

P. R. Clark testified that he had no involvement in the litigation effort against B&W (OI Testimony Change Ex. 28 at 5). H. D. Hukill stated that he had no responsibilities in connection with the lawsuit and did not have any discussions with any of the control room personnel regarding their testimony (OI Testimony Change Ex. 43 at 1).

R. C. Seltzer, also a partner with Kaye-Scholer, and A. MacDonald, an Associate with Kaye-Scholer, worked with Klingsberg on the litigation. Seltzer represented Frederick and assisted, in varying degrees, in the deposition preparation of each of the other operators (Id.). Klingsberg represented Zewe at his deposition; MacDonald represented Faust and F. Schiemann during their depositions and assisted Klingsberg during Zewe's deposition (OI Testimony Change Ex. 36 at 9 and Ex. 39 at 7).

D. E. Taylor, President of Taylor Associates, Inc., a firm specializing in technical litigation support, was retained by Kaye-Scholer. On at least two occasions, Taylor and MacDonald met with Zewe, Faust, Schiemann, and Frederick in an attempt to assemble the best collective recollection the operators had of the events (OI Testimony Change Ex. 38 at 16).

According to Klingsberg, Seltzer, and Taylor, the issue of HPI actuation at 0541 did not become a factor in the trial until Fisk raised the issue in his opening remarks at the trial (OI Testimony Change Ex. 36 at 7, Ex. 37 at 7 and Ex. 39 at 17). Kaye-Scholer's attorneys had no discussions with GPU before the trial regarding a position on the 0541 actuation (OI Testimony Change Ex. 37 at 20, 21). After Fisk raised the issue of the "mystery man," Klingsberg contacted Liberman and Arnold to obtain engineering assistance from GPU (OI Testimony Change Ex. 36 at 18, 19). Engineering assistance was requested in order to perform an analysis to determine whether or not there had been an actuation of HPI at 0541 based on recorded plant data rather than operators' recollections (OI Testimony Change Ex. 37 at 22). According to Klingsberg, this work was initiated by T. G. Broughton with the assistance of some other individuals in Parsippany, New Jersey (OI Testimony Change Ex. 36 at 18, 19). Seltzer stated that Broughton's study concluded that full manual actuation of HPI at 0541 was not possible (OI Testimony Change Ex. 37 at 23).

During Zewe's interview with OI on May 10, 1984, Zewe stated that after Fisk raised the "mystery man" argument, the preparation for his trial testimony became quite extensive. Zewe recalled MacDonald and Taylor presenting him with charts involving MUT levels and other data and being asked to evaluate whether or not HPI had actuated at 0541. Zewe stated that as a result of his trial preparation, he was "totally convinced" that HPI had not been actuated at 0541. OI Testimony Change Ex. 21 at 45, 55. Zewe stated that he had not been interviewed by anyone in GPU management with regard to his deposition or trial testimony (Id. at 52, 53).

Frederick was selected by Kaye-Scholer's attorneys to testify as to why there had not been an HPI actuation at 0541 to the best of his recollection and to provide expert testimony as to why the performance of the MUT level at 0541 was inconsistent with HPI actuation (OI Testimony Change Ex. 37 at 24). Frederick was selected to provide the expert testimony because he was particularly articulate and was familiar with teaching nuclear power plant functions (Id. at 29). During his trial preparation, Seltzer recalled that Frederick worked with GPU technical personnel (Broughton's analysis group) in preparing for his expert testimony. However, Seltzer stated that he believes Frederick was already convinced that the 0541 HPI actuation did not occur and that his work with the GPU technical personnel reinforced that belief. Id. at 23-25.

During his trial testimony, Frederick stated that he recalled only one full manual HPI actuation on the morning of the accident and that occurred about the time the site emergency was declared (0650). Frederick also testified that on the bases of his review of the charts depicting what was happening with MUT level on the morning of the accident and his knowledge of how the MUT level reacted when HPI was actuated, HPI was not actuated at 0541 on the morning of the accident. In making this assertion, Frederick relied on data that showed a decreasing MUT level at 0541, which would be impossible if HPI were actuated according to Frederick. Frederick said that if HPI had been actuated, a check valve in the MUT suction line would have shut and precluded any further level drop in the MUT. He stated that he had seen the MUT level stop decreasing on initiation of HPI on many occasions. OI Testimony Change at 19.

During cross-examination by Fisk, Frederick was questioned concerning an analysis performed by B&W, which showed that MUT level was also decreasing between 0718 and 0725. This period included the manual actuation of HPI at 0720 that was confirmed by the control room computer. Frederick refused to accept the B&W analysis as being correct because he believed it was impossible to have a declining MUT level and HPI actuation. B&W agreed to provide the reactimeter data on which its analysis was based to allow GPU to perform its own analysis of the data. As a result, Frederick did not testify further on this issue. OI Testimony Change at 20. According to Frederick, he had no contact or interviews with GPU management during the time between his deposition and the trial (OI Testimony Change Ex. 20 at 80). The OI investigation identifies contradictory testimony and statements by Frederick concerning his involvement in the inclusion of HPI actuation at 0541 in the licensee's SOE. The staff's position on this matter is discussed in Section 11.3. See OI Testimony Change at 4.

When Fisk cross-examined Frederick on the MUT level at 0720, which contradicted Frederick's explanation of how the system reacted during HPI actuation, Kaye-Scholer decided that it would no longer be sufficient to rely on GPU's internal expertise; thus, EDS Nuclear, Inc., was contracted to perform a study of the 0541 HPI actuation. Seltzer could not recall the details of the arrangement but believed that Kaye-Scholer must have gotten clearance from GPU management to contract for the study because of the cost. OI Testimony Change at 24. Klingsberg stated that he made the decision to bring in EDS to perform the independent analysis (OI Testimony Change Ex. 36 at 17, 18). J. H. Holderness, an employee of EDS, presented the results of the EDS analysis at the trial on January 3, 1983. No further testimony by the operators concerning HPI actuation at 0541 occurred.

The lawsuit was settled out of court on January 24, 1983, 12 weeks after the trial began. As a result, the issue of HPI actuation at 0541 was not resolved before the trial was terminated.

As discussed in Section 11.1, following the trial, Klingsberg authored a document entitled, "Memorandum on the 5:41 HPI Actuation 'Mystery Man' Issue," dated August 16, 1983. According to Klingsberg, he prepared the document at the request of Liberman. The purpose of the memorandum was to summarize the testimony regarding the HPI actuation/"mystery man" issue. This was one of several memoranda that were prepared to respond to inquiries from various parties and individuals regarding issues in the trial. OI Testimony Change Ex. 36 at 67, 68. This document was submitted to the NRC by the law firm of Shaw-Pittman on August 23, 1983. A corrected copy of the document was sent by Shaw-Pittman on August 25, 1983. As submitted, there was no indication in the original cover letter regarding whether or not the document was being sent to the NRC on behalf of GPUN. During Arnold's interview with OI on May 31, 1984, he was questioned regarding this document. Arnold recalled receiving a copy of the document but did not recall having any input in preparing the document. He believed that it was GPU management (Kuhns and/or Dieckamp) that decided and perhaps even initiated the idea of having Kaye-Scholer set forth the background on the HPI actuation and what was done to support the testimony that was presented on behalf of the company at the GPU v. B&W trial. OI Testimony Change Ex. 26 at 36, 43, 45. Arnold said the document was not sent to the NRC to notify it of an official change in position by the company. Instead, Arnold believes that there were a number of inquiries outside of the NRC regarding the "mystery man" issue and that it would be desirable for the attorneys who had represented the company in the lawsuit to tell the NRC "here is what took place, as we understood it." Id. at 43.

11.3 Staff Findings

On the bases of the EDS and B&W analyses and its own analysis, the staff finds that full manual HPI actuation at 0541 is extremely unlikely. The difference between the licensee's SOE and the staff's chronology of the accident, with respect to the HPI at 0541, was known to the staff at the time the SOE was submitted, as was the basis for its inclusion (i.e., operators' recollections of events). The fact that the licensee at some later time refutes the operators' recollections, does not impose a reporting requirement on the licensee because the NRC was already aware of the difference and concluded that it was not material.

The staff finds that the operators' earlier statements above led to the inclusion of HPI actuation at 0541 in the licensee's Sequence of Events. However, on the basis of the OI investigation, the staff does not find any evidence of intentional misrepresentation of the facts by these operators concerning HPI actuation at 0541.

The staff finds that Frederick and Zewe did change their trial testimony concerning HPI actuation at 0541. Faust did not testify at trial and maintained, during his OI interview, his recollection that HPI actuation at 0541 had occurred. However, on the basis of a subsequent analysis, Faust stated that his recollection may be wrong.

No evidence was developed by OI that would indicate any improper activity or coercion by GPUN or Kaye-Scholer with respect to operators' change in testimony concerning HPI actuation at 0541. In fact, little or no contact occurred between the operators and GPU or GPUN management concerning issues involved in the trial. Preparation of witnesses was the responsibility of Kaye-Scholer. Presentation of technical data to a prospective witness, which differs from his earlier statements or recollections, is not improper and is not a form of coercion.

The OI investigation identified conflicting testimony and statements by Frederick concerning his involvement in the inclusion of HPI actuation at 0541 in the licensee's SOE. Whether Frederick was silent and never challenged the inclusion of HPI actuation at 0541, as he testified during the OI investigation and trial, or whether he insisted on including HPI actuation at 0541, as circumstantial evidence and testimony of others indicates, cannot be resolved on the basis of the evidence developed by OI, to date. Currently, Frederick is assigned full time to training in preparation for taking an NRC Senior Reactor Operator (SRO) re-examination for Instructor Certification on TMI-1 on August 6, 1984 (he failed an NRC examination in March 1984). He is currently a licensed SRO on TMI-2 and is the Supervisor of Licensed Operator Training for TMI-1 and TMI-2. By letter dated May 30, 1984, from H. R. Denton, Frederick was informed of ongoing NRC investigation concerning his involvement in TMI-2 leak rate testing and was requested to submit specific information pursuant to 10 CFR 55.10(b). The staff will resolve its leak rate testing and HPI testimony concerns regarding Frederick before making a decision to approve him as an instructor for TMI-1. Because of these concerns, the staff will withhold its TMI-1 Instructor Certification such that the licensee can assign Frederick no duties associated with TMI-1 licensed operator training until these issues are resolved. This decision will be made in concert with the staff's determination of whether to suspend, modify, or revoke Frederick's current TMI-2 SRO license. These issues are being handled separately from TMI-1 restart.

12.0 LEGAL STANDARDS

The purpose of this section is to discuss the standards for judging licensee's management integrity. These standards will be applied in evaluating the relevant information and arriving at a staff position in Section 13 of this report.

The question of what legal standards are applicable in an evaluation of management integrity was addressed recently in the TMI-1 Restart proceeding by the ASLAB. See Metropolitan Edison Co. (Three Mile Island Nuclear Station, Unit 1), ALAB-772, 19 NRC ____, slip op. at 10-14 (May 24, 1984); see also Houston Lighting and Power Co. (South Texas Project Units 1 and 2), LBP-84-13, 19 NRC ____, slip op. at 7-25 (March 14, 1984). The ASLAB observed that the Commission had directed the ASLB in the TMI-1 restart proceeding to "apply its own judgment in developing the record and forming its conclusions" on the management issues identified by the Commission despite the acknowledged lack of standards for nuclear power plant management and operation. ALAB-772, supra, slip op. at 11. The ASLAB also noted, however, that several Commission precedents "provide valuable aid for grasping the slippery concept of management competence." Id., slip op. at 14.

The ASLAB equated the term "character" in Section 182a of the Atomic Energy Act, 42 U.S.C. 2232(a), with "management integrity" as that concept has been applied in the restart proceeding. "Evaluation of character," stated the ASLAB, "always involves consideration of largely subjective factors." Id., slip op. at 12. Several NRC cases that provided "guideposts" in evaluating "character" or "management integrity" were cited by the ASLAB. Id., slip op. at 13.¹

On the basis of the staff's review of the applicable caselaw, the staff concludes that the finding that must be made under the AEA relative to a licensee's or applicant's character is to determine whether, based on the totality of relevant circumstances, the licensee or applicant has demonstrated "a willingness and propensity, or lack thereof, to observe the

¹ No specific NRC regulation addresses the "character" qualification of section 182a of the Atomic Energy Act. The NRC is different in this respect from the Federal Communications Commission, which implements the character requirement in its authorizing statute (47 U.S.C. 224(b)) through a specific regulation requiring that an applicant make a "satisfactory showing" that it is "of good character." See 47 CFR 73.24.

Commission's health and safety standards."² While the term "character" may include a wide variety of distinctive qualities and traits, the character attributes with which the NRC is concerned are those which have a rational connection to its regulatory responsibilities.

NRC cases addressing management character are not common; one must go back to the early 1960's to find any NRC case in which a license was revoked or a renewal request denied for reasons that appear related to character.³ Some useful precedents, however, are provided by caselaw from other regulatory agencies.

As shown by the cases cited by the ASLAB and by other NRC caselaw, many individual factors have been examined in relation to character. These include, for example, candor and truthfulness,⁴ attitude toward responsibilities, and compliance with legal requirements. See, e.g., Consumer Power Co. (Midland Plant, Units 1 and 2), CLI-83-2, 17 NRC 69, 70 (1983) ("Not only are material false statements and omissions punishable under Sections 234 and 186 of the Atomic Energy Act, but deliberate planning for such statements or concerns on the part of applicants or licensees would be evidence of bad character that could warrant adverse licensing action even where those plans are not carried to fruition."); Houston Lighting and Power Co. (South Texas Project, Units 1 and 2), CLI-80-32, 12 NRC 281 (1980) (Commission cited the history of the South Texas project--"at least 12 separate NRC investigations over a 2 1/2 year period, resulting in conferences with the licensee, several prior items of noncompliance, a deviation, five immediate action letters, and [now] substantial allegations of harassment, intimidation and threats directed to QA/QC personnel and apparent false statements in the FSAR"--as relevant to the basic competence and character of the applicant); Coastwise Marine Disposal Co., 1 AEC 581 (1960), affirmed, 1 AEC 619 (1961) (Commission

² See South Texas, LBP-84-13, *supra*, slip op. at 15-16; Konigsberg v. State Bar, 353 U.S. 252, 262-263 (1956); Schwartz v. Board of Bar Examiners of New Mexico, 353 U.S. 232, 239 (1956) (a state may require character traits of an attorney which have a rational connection to an applicant's fitness to practice law.)

³ See Hamlin Testing Laboratories, Inc., 2 AEC 423 (1964), affirmed sub nom., Hamlin Testing Laboratories, Inc. v. AEC, 357 F.2d 632 (6th Cir. 1966); Coastwise Marine Disposal Co., 1 AEC 581 (1960), affirmed, 1 AEC 619 (1961); X-Ray Engineering Co., 1 AEC 466 (1960).

⁴ As the ASLAB noted in South Texas, LBP-84-13, *supra*, "it is clear that truthfulness contemplates not only false or misleading statements but the completeness or comprehensiveness of information provided by an applicant to the Commission." Slip op. at 16-17 (citations omitted). The ASLAB also emphasized the Commission's citation in CLI-80-32 of "cases suggesting that willful misrepresentations to the Commission, or representations made with disregard for their truth, could be grounds, without more, for license denial." *Id.*, slip op. at 23 (footnote omitted).

revoked license based on repeated violations of license terms and willful false statements demonstrating "unfitness" to continue as a licensee); X-Ray Engineering Co., 1 AEC 466 (1960) (Commission revoked license based on repeated and willful violations of license, numerous uncorrected noncompliances and willful false statements); Hamlin Laboratories, 2 AEC 423 (1960) (Commission denied renewal application citing pattern of untruthful reports and continued willful violations of license requirements); Consumers Power Co. (Midland Plant, Units 1 and 2), ALAB-691, 16 NRC 897 (1982) (statement by Appeal Board that intentional withholding of relevant and material information might call into question an applicant's character); Pacific Gas and Electric Co. (Diablo Canyon Nuclear Power Plant, Units 1 and 2), CLI-82-1, 15 NRC 225, 227 (1982) (Commission directed issuance of notice of violation for material false statements and noted apparent lack of attention by applicant to its responsibilities concerning communication of information); South Texas, LBP-84-13, *supra* (ASLB scrutinizes, among other things, applicant's record of compliance, its response to noncompliances and, "most importantly," its candor and truthfulness); Niagara Mohawk Power Corp. (Nine Mile Point Nuclear Station), 45 FR 80334-80336 (December 4, 1980) and 46 FR 20341-20342 (April 3, 1981) (NRC staff issued and later withdrew show cause order where submittal of false statements was not made with intent to deceive and appropriate corrective action was taken); Metropolitan Edison Co. (Three Mile Island Nuclear Station, Unit No. 1), ALAB-738, 18 NRC 177 (1983) (ASLAB granted motion to reopen on issues related to management integrity based on alleged violations of technical specifications, noncompliance with proper operating procedures and destruction and falsification of records); Metropolitan Edison Co. (Three Mile Island Nuclear Station, Unit No. 1), 14 NRC 381 (1981) and 16 NRC 281 (1982), remanded in part, ALAB-772, 19 NRC ____ (May 24, 1984) (ASLB addressed management attitude toward certain incidents of cheating on operator qualification examinations as a factor relevant to management integrity).

The evaluation of an applicant's or licensee's character is based on consideration of all of the relevant circumstances. In general, no single factor or trait relevant to character is a *per se* bar to the issuance or retention of a license. For example, evidence of a poor compliance record must be evaluated in conjunction with subsequent corrective actions.⁵ The FCC has held that even criminal misconduct may be outweighed by the long-standing "uncommonly good" and "meritorious" record of an applicant.⁶

⁵ Virginia Electric and Power Co. (North Anna Nuclear Power Station, Units 1 and 2), LBP-77-68, 6 NRC 1127, 1150-1151 (1977), reaffirmed, LBP-78-10, 7 NRC 295, affirmed, ALAB-491, 8 NRC 245 (1978); Consumers Power Co. (Midland Plant, Units 1 and 2), ALAB-106, 6 AEC 182, 183-184 (1973).

⁶ See Westinghouse Broadcasting Co., 44 F.C.C. 2778, 2780 (1962); General Electric Co., 45 F.C.C. 1592, 1594-1596 (1964).

Reorganization of management in an attempt to address problems which have been identified may be a relevant mitigating factor.⁷ In the case of judging the character of a corporation, removal of an individual responsible for misconduct may leave corporate character intact.⁸ Indeed, the willingness of a company to remove top management officials who are or may be involved in wrongdoing reflects well on the sincerity of management in correcting deficiencies.⁹

As the ASLB in the South Texas proceeding recently noted in regard to corporate character:

A change in corporate character can change an applicant's character, as can education and experience. . . . [I]f an applicant, whose character may have been unsatisfactory in the past, demonstrates a reformed and adequate present character, then we may find that there is reasonable assurance that it will observe the Commission's health and safety standards. LBP-84-13, supra, slip op. at 22-23.

The rationale for this is expressed well in Armored Carrier Corp. v. United States, 260 F. Supp. 612 (E.D.N.Y. 1966), affirmed, 386 U.S. 778, rehearing denied, 389 U.S. 924 (1967):

The argument that past willful violations should, per se, bar a grant of authority in the present and for the future is one that looks backward and appears transfixed. Examination of the past should only be useful in assessing the prospective conduct of the applicant.

Only in extraordinary circumstances may an applicant's conduct be so opprobrious as to render the applicant unfit per se. For example, where the particular facts demonstrated that the misconduct in question consisted of willful deception of the agency on a grand scale or corrupt practices, an applicant's character may be tainted beyond redemption. See, e.g.,

⁷ North Anna, supra, 6 NRC 1127; Consumers Power Co. (Midland Plant, Units 1 and 2), LBP-74-71, 8 AEC 584 (1974), affirmed in pertinent part, ALAB-283, 2 NRC 11 (1975).

⁸ See, e.g., Niagara Mohawk Power Corp. (Nine Mile Point Nuclear Station) Orders at 45 FR 80334-80336 (Dec. 4, 1980) and 46 FR 20341-20342 (April 3, 1981); cf. TMI-1, ALAB-772, supra, slip op. at 24 n. 17, 42-43, 59 (unnecessary to address sanctions where involved personnel are no longer employed or used in sensitive positions).

⁹ See, e.g., RKO General, Inc., 78 F.C.C. 2d 1 at 110 (1980).

Continental Broadcasting v. F.C.C., 439 F.2d 580 (D.C. Cir.) cert. denied, 403 U.S. 909 (1971) (139 spurious documents submitted to Commission by station manager); Public Service Television, Inc. v. F.C.C., 317 F.2d 900 (D.C. Cir. 1962) (applicant tried, in prior proceeding for license for same channel, to corruptly influence the hearing official). In these extreme cases, the evaluation of character, and whether it could be redeemed, focused on specific individuals, rather than a corporate entity. Assumedly, personnel changes can always cure defects in corporate character.

Absent such egregious misbehavior, even where an applicant has engaged in willful misconduct, it has been held that an agency does not abuse its discretion in granting a license upon determining that the applicant's conduct (and character) has improved so as now to be in compliance with regulatory requirements. See, e.g., Central Florida Enterprise Inc. v. F.C.C., 683 F.2d 503 (D.C. Cir. 1982) (license renewed despite willful violation of Commission rule); Cumberland Broadcasting Corp. v. F.C.C., 647 F.2d 1341 (D.C. Cir. 1980) (license granted despite applicant acquiescence in attorney misconduct); Kidd v. F.C.C., 302 F.2d 873 (D. C. Cir. 1962) (construction permit granted despite applicant's knowing and willful violations, misrepresentations, and concealments in conducting test operations); Bray Lines, Inc. v. United States, 353 F. Supp. 1240 (W. D. Okla.), affirmed 414 U.S. 802 (1973) (carrier authorized to transport explosives despite its having been held in contempt and punished for violating court order); Slay Transportation Co. v. United States, 353 F. Supp. 555 (E.D. Mo. 1973) (carrier issued certificate despite engaging in illegal tacking operation); Armored Carrier Corp. v. United States, 260 F. Supp. 612 (E.D.N.Y. 1966), affirmed 386 U.S. 778, rehearing denied, 389 U.S. 924 (1967) (carrier authorized to deliver in certain counties despite its previous unauthorized deliveries in same counties); cf. Midland, ALAB-106, supra; North Anna, LBP-77-68, supra; Shearon Harris, LBP-79-19, supra.

The question of individual versus organizational character was addressed by the ASLB in the recent South Texas decision. LBP-84-13, supra, slip op. at 24-25. While noting that organizations necessarily conduct their activities through individuals,¹⁰ the ASLB stated that the failure of one or more individuals to demonstrate adequate character does not per se indicate a lack of organizational character. The ASLB also stated that "only a limited group of corporate employees may truly be regarded as exercising a sufficient degree of responsibility so as to be deemed to affect an organization's character." The ASLB concluded as follows:

[W]e must therefore evaluate such factors as the role of particular individuals in the organization, the responsibilities which they exercise, the seriousness and frequency

¹⁰ A licensee cannot avoid responsibility for violations by its agents or employees. See Atlantic Research Corporation, CLI-80-7, 11 NRC 413, 422 (1980); 49 FR 8583, 8589 (March 8, 1984) ("Generally, however, licensees are held responsible for the acts of their employees.")

of any deficiencies attributable to them, and the steps taken by the organization when deficiencies are discovered. Our final judgment . . . must balance all of these factors.

Another Federal agency has summarized the character inquiry in a way that applies equally well to the NRC licensing process:

The determination as to whether an applicant has sustained its burden of establishing its fitness must be made upon a full consideration of the nature and extent of the violation committed by applicant, the mitigating circumstances, if any, shown to exist and to have existed, whether applicant's conduct represents a flagrant and persistent disregard of the provisions of the act and of its certificates, whether applicant has made a sincere effort to correct past mistakes, [and] whether applicant is willing and able to comport in the future with the statute and the applicable rules and regulations of the Commission.¹¹

In sum, the NRC is authorized by the Atomic Energy Act to assess the character (or management integrity) of an applicant or licensee in determining whether a license should be issued or retained. This assessment has included an evaluation of specific factors which bear a rational relationship to an applicant's or licensee's ability to carry out faithfully the responsibilities imposed by the license and regulations. Among the factors which have been evaluated by this agency are candor and truthfulness, management attitude, and the record of compliance with legal requirements. A determination concerning an applicant's or licensee's character is subjective and judgmental, and is based on the totality of circumstances. The inquiry is compounded, and difficult to answer, when the licensee (or applicant) is a corporation and where the question is the extent to which past acts of responsible individuals reflect on current acceptability. The assessment of character is part of the NRC's overall evaluation of whether there is reasonable assurance that the facility can be operated without undue risk to the health and safety of the public. This determination may in particular circumstances result in the denial of a license application or the suspension or revocation of a license.

¹¹ Miller Transfer and Rigging Co., Extension of Metal Lathes, 125 M.C.C. 538, 543-544 (1976).

13.0 STAFF POSITION ON MANAGEMENT INTEGRITY

The staff informed the Commission on April 18, 1983, that the staff found it necessary to revalidate its position on licensee's management integrity (see memoranda, dated May 19, 1983 and July 15, 1983, from the Executive Director of Operations, W. J. Dircks, to the Commission). In Sections 4.0 through 11.0, the staff has reviewed the evidence on each of the subjects previously identified by the staff as relevant and material to management integrity. For the majority of the matters previously evaluated, the staff found that they did not raise questions concerning management integrity. However, in several of the detailed sections, matters have been identified that impact negatively on GPUN's corporate character. These negative matters are evaluated individually and collectively in reaching a staff position on whether GPUN's character (i.e., management integrity) provides reasonable assurance that the licensee can and will protect public health and safety. Section 13.0 evaluates these matters in conjunction with the legal standards discussed in Section 12.0. The discussion in this section is divided into the staff's position on corporate integrity and on individual integrity.

13.1 Staff Position on Corporate Integrity

As discussed in Section 12.0, the development of a staff position on management integrity requires an evaluation that balances such factors as the nature and seriousness of past performance failures, the positions of responsible individuals within the licensee's organization, the remedial actions taken to provide reasonable assurance of satisfactory future performance, and, where available, information concerning the success or failure of the remedial actions taken.

A significant change in the licensee's corporate organization became effective on January 1, 1982. The staff's evaluation of licensee's management integrity must, therefore, evaluate the effect that the formation of GPUN has had on the licensee's performance. Accordingly, the staff divides its discussion of improper activities related to management integrity into Met-Ed events and GPUN events.

13.1.1 Matters Relating to Met-Ed Management Integrity

The staff will first consider Met-Ed's responsibility for improper acts individually and then will consider whether a pattern emerges when these acts are considered collectively. The following four matters are considered relevant and material to the staff's finding on management integrity within the Metropolitan-Edison Company:

- (1) TMI-2 leak rate falsification (see Section 5.2)
- (2) preaccident training irregularities and postaccident cheating (see Sections 7.3.1 and 7.3.2)

- (3) false certification to NRC of Floyd's requalification program participation and management coverup (Section 7.3.2)
- (4) lack of accuracy and completeness in the licensee's responses to NRC's Notice of Violation (Section 8.3.3)

The staff concludes that these four matters involved Met-Ed senior management (in some cases corporate management) and that the actions of the individuals involved included negligence with respect to their responsibilities, careless disregard of their responsibilities, and an attempt to cover up an individual's act that demonstrated deliberate disregard of responsibility on the part of that individual. These events are discussed individually and then an overall staff conclusion is presented.

TMI-2 Leak Rate Falsification

The staff finds, in Section 5.2.3, that the following facts are supported by the NRC's investigation (i.e., both IE in 1980 and OI in 1983-1984) and by the prosecuting attorney's Statement of Fact read into the record as a part of the U.S. v. Met-Ed trial settlement:

- (1) Some operators willfully violated procedures and attempted to manipulate leak rate test results by the addition of hydrogen and/or water to the makeup tank. These operators were motivated to do so as a result of indirect pressure from management and/or a desire by individual operators to obtain satisfactory leak rate test results.
- (2) The identified leak rate increased as a result of leakage through the pressurizer relief valves, and it became more difficult for the operators to obtain satisfactory leak rate test results. First-line supervision (i.e., shift foremen and shift supervisors) were knowledgeable of the difficulties operators were experiencing in obtaining satisfactory test results for unidentified reactor coolant pressure boundary leakage on TMI-2. Because of the difficulty in obtaining satisfactory results, the control room operators would run leak rate tests frequently and also would discard those results that indicated unacceptable leak rates. It was not uncommon to run the test several times on the same shift.
- (3) Operators regarded the leak rate test as unreliable and ineffective for determining actual unidentified leak rate. The test procedure developed by the licensee was ineffective in demonstrating conformance with requirements of the Technical Specifications.

The staff also finds that the licensee should have made a Board notification concerning the licensee's investigation into the Hartman allegations (the Faegre & Benson Report) as new information relevant and material to issues pending in the TMI-1 restart proceeding.

These facts support the staff's conclusion that first-line supervision and possibly middle management was directly involved in leak rate falsification at TMI-2. The staff also concludes that Met-Ed was responsible for improper

leak rate testing as well as for the poor attitudes of operators and first-line supervisors toward this test.

Preaccident Training Irregularities and Postaccident Cheating

During the period of late 1975 through April 1976, some off-shift licensed operators (among whom were the station manager and TMI-1 and -2 plant managers) failed to meet requalification program requirements. These requirements related to frequency of watch standing and attendance at scheduled training lectures. Additional evidence exists in the preaccident time frame that demonstrates poor implementation of the requalification training program and a poor attitude on the part of shift operators toward this program.

The instances of cheating on NRC examinations as well as on operator requalification program examinations, during the postaccident period, is evidence that the poor attitude toward requalification training continued. Management personnel were directly involved in cheating (i.e., supervisor of operations for TMI-2, shift supervisors and foremen).

The staff finds that the licensee's preaccident requalification training program was deficient; it failed to meet NRC requirements; and management failed to notify NRC of these deficiencies and failures to meet NRC requirements. The staff is not primarily concerned, at this late date, with possible violations of NRC requalification training requirements in 1975 through 1978. However, the staff is concerned that these deficiencies and failures indicate a poor attitude and disregard on the part of management at that time for their responsibilities and that this same management held responsible positions vis-a-vis TMI-1 operations in the postaccident period. The postaccident occurrence of cheating on requalification program examinations is evidence of a poor attitude on the part of some managers and licensed operators toward their responsibilities. Management is clearly responsible for establishing programs and exemplifying, through leadership, a positive attitude, which will, in turn, create a good attitude on the part of operators toward their responsibilities. The staff concludes that Met-Ed as a result of negligence failed to fulfill their responsibility.

False Certification and Management Involvement in the Coverup of Cheating

The staff finds (see Section 7.2.3) that licensee management knew of, and subsequently covered up, Floyd's cheating on his requalification program examination and that the licensee knowingly made a false certification to the NRC of Floyd's satisfactory completion of his requalification program requirements.

In July 1979 the licensee discovered that the TMI-2 Supervisor of Operations (Floyd) submitted answers to questions in his annual requalification examination that were written by another operator. Floyd was recently indicted in connection with this episode. Miller advised Herbein by a handwritten memorandum dated July 3, 1979, that "Floyd just handed in his overdue FSR exams," that he failed two sections, and that "one exam is not in his handwriting." Miller confirmed that he wrote the memorandum and discussed it with Herbein.

Senior Met-Ed management (Miller, Zechman, et al.), at the direction of corporate management (Herbein), conducted an investigation into the Floyd cheating event and recognized its relationship to Floyd's NRC license requirements. Met-Ed management (Miller and Herbein) discussed the issue of Floyd's certification of completion of NRC requalification program requirements following their investigation. Herbein told Miller to clear the certification letter with counsel before submitting it to the NRC. Miller's memorandum of July 27, 1979, to counsel highlighted the "hand-writing problem" (i.e., that portions of Floyd's examination were written by another individual) and stated that this section of the examination was not being mentioned in the draft certification letter; a copy of the draft was attached. The actual certification letter was submitted to the NRC on August 3, 1979. It certified the successful completion of Floyd's accelerated requalification program requirements. On August 8, 1979, Miller advised Arnold, by letter, of the results of his investigation into the Floyd incident and recommended that Floyd be suspended. Floyd's cheating was not reported to the NRC for 2 years, when Arnold brought the matter to the attention of the NRC after an NRC investigation (July 1981, HQS-81-003) was initiated into other instances of cheating on an NRC-administered examination. As a result of the reopened proceeding on cheating, the ASLB made a recommendation that OI investigate the licensee's false material statement concerning Floyd's certification. Subsequent to the OI investigation IE concluded that a willful material false statement had been made and a civil penalty of \$100,000 was proposed by the Director, IE.

The staff concludes that licensee management covered up Floyd's cheating and made a subsequent false certification to the NRC and that these acts demonstrate a deliberate disregard of management responsibilities.

Accuracy and Completeness of Licensee Response to the NOV

The staff finds (see Section 8.3.3) that the licensee's response to the NRC's Notice of Violation (NOV) is inaccurate and incomplete in two areas and is questionable in a third area. The staff finds the licensee's response, which stated that the operators were not desensitized to high tail pipe temperatures before the accident, is inaccurate and incomplete. The licensee's response ignored the statements of the operators themselves following the accident, did not consider the contrary conclusions reached by other members of the licensee's organization, and was based on their postaccident analysis of tail pipe temperature data.

The second area concerns the licensee's rationale for his assertion that the procedure for a leaking power-operated relief valve was not violated. This rationale is contrary to statements made by the TMI-2 Unit Superintendent and Station Superintendent as well as other licensed operators. These individuals were responsible for carrying out the procedure. The licensee's position that a preaccident determination had been made that a code safety valve and not the power-operated relief valve (PORV) was leaking is not supported by the evidence. To the contrary, it appears there was considerable doubt as to which valve was leaking before the accident. An after-the-fact, technical analysis showing that a safety valve was leaking and the PORV was not, even if correct, does not alter the fact that the operators and management did not know which valve was leaking and consciously chose not to follow the applicable procedure.

The third area in which the response to the NOV raises questions about the licensee's attitude toward its regulatory responsibilities concerns the isolation of the emergency feedwater system during the performance of surveillance testing. The licensee's response indicated that this is not a violation of the Technical Specifications. The Keaten task force concluded that the isolation of the emergency feedwater system was clearly a violation of the intent of the Technical Specifications even though the wording in the Technical Specifications may be ambiguous and subject to interpretation. The licensee's response to the NOV did not indicate a violation of intent; the licensee took the position that there was no violation. NRC expects licensees to operate their facilities safely and to operate them within the intent, as well as the letter, of the license and not to utilize ambiguous words to justify improper acts.

These inaccurate, incomplete, and questionable statements in the licensee's response to the NOV raise serious questions about the staff's ability to rely on statements made by Met-Ed. The NOV response was prepared by the Manager of Licensing for TMI, was signed by a Vice-President of the company, and was reviewed by the President of GPU before it was issued to the NRC.

13.1.2 Staff Conclusion on Met-Ed Management Integrity

Metropolitan-Edison Company clearly bears the responsibility for these improper acts on the part of first-line supervisors, senior managers, and corporate officers within the company and within the company's support organization, GPU Service Company. The four events discussed above, taken individually, raise serious questions about management's character and willingness to fulfill its responsibilities as an NRC licensee. Evaluated collectively, the four matters indicate: a pattern of poor attitude toward training responsibilities and leak rate testing requirements, a failure to provide accurate and complete statements to the NRC, an unwillingness to admit violations of NRC requirements and a failure to promptly report cheating and its subsequent coverup. This pattern of activity on the part of the Met-Ed, had it been known at the time, would likely have resulted in a conclusion by the staff that the licensee had not met the standard of reasonable assurance of no undue risk to public health and safety. However, these matters, or the significant facts concerning these matters, were not known to the NRC staff during the ASLB's proceeding on TMI-1 restart.

13.1.3 Events Relating to GPUN Management Integrity

Effective on January 1, 1982, the nuclear-related operations of GPU were re-organized under GPUN. As the successor to Met-Ed, GPUN must bear the responsibility for the improper activities discussed above. Two additional events have occurred since the formation of GPUN that must also be considered material to GPUN's management integrity:

- (1) harassment of Parks and the failure to implement adequate procedures to assure the protection of both GPUN and contractor employees from acts of discrimination for raising issues of public health and safety (Sections 10.3.1 and 10.3.4)

- (2) GPUN's failure to provide BETA, RHR, and Faegre & Benson Reports in a timely manner (Sections 5.7 and 6.3)

Harassment of Parks

The staff finds (see Section 10.3.1) that GPUN is responsible for the harassment of Parks by Bechtel. This finding is based on not only a derived responsibility because Bechtel is a subcontractor to GPUN but is also based on a direct responsibility on the part of GPUN because of the unique Bechtel/GPUN management team at TMI-2 at the time Parks raised his safety concerns. However, the staff finds that the two other individuals who raised safety concerns about the polar crane in conjunction with Parks and who were GPUN employees, were not harassed. The record developed by OI supports a finding that GPUN corporate management was sensitive to its responsibilities for protecting these employees.

Reportability Issues

The staff finds (see Sections 5.7 and 6.3) that the licensee failed to provide BETA, RHR, and Faegre & Benson Reports in a timely manner.

13.1.4 Staff Conclusion on GPUN Management Integrity

In summary, the staff finds that GPUN bears successor responsibility for the following improper activities of Met-Ed:

- (1) TMI-2 leak rate falsification and failure to report the Faegre & Benson report
- (2) preaccident training irregularities and postaccident cheating
- (3) false certification to NRC of Floyd's requalification program participation and management coverup thereof
- (4) lack of accuracy and completeness in the licensee's response to the NOV

The staff finds further that GPUN bears responsibility for the harassment of Parks and the failure to report the BETA, RHR, and Faegre & Benson Reports. As discussed in Section 12, however, the evaluation of management integrity does not involve a mere litany of past wrongdoing. The staff must also assess the licensee's remedial actions, balance the improper activities in light of such remedial action and subsequent performance, and determine whether all of the circumstances taken together permit a conclusion that there is reasonable assurance of no undue risk to public health and safety.

The improper activities for which GPUN holds successor responsibility include several serious matters that weigh heavily against the licensee. Leak rate falsification and postaccident cheating on operator examinations, both of which undermine the ability of the NRC to regulate licensed activities, were the result of an atmosphere or attitude for which management was responsible. The false certification and the associated coverup and the inaccurate and incomplete response to the NOV are graver still, indicating that Met-Ed was unable or unwilling to communicate truthfully and candidly with the NRC. All of these activities occurred prior to the formation of GPUN. Since then, the

events relating to the harassment of Parks and the failure to report the BETA, RHR, and Faegre & Benson* Reports pose questions about the adequacy of licensee's implementation of Commission requirements. These latter events, in the staff's view, are clearly different in nature and degree from the Met-Ed activities discussed above and do not raise programmatic concerns as to possible widespread implementation deficiencies.

These improper activities must be evaluated in conjunction with the licensee's remedial actions and subsequent performance. The staff views the reorganization and consolidation of GPU's nuclear activities into GPUN as a significant remedial action which has improved the licensee's performance. See the staff's January 3, 1984, memorandum to the Commission. A further reorganization plan was submitted by the licensee on June 10, 1983 which involved:

- (1) realignment of personnel so as to minimize involvement at TMI-1 of personnel who had preaccident involvement at TMI-2
- (2) full-time, on-shift operational QA coverage by degreed engineers
- (3) realignment of functions within the office of the president of GPUN

On November 10, 1983, the licensee announced that this reorganization plan had been implemented and that:

- (1) three outside directors would be added to the GPUN Board of Directors and would also make up a separately staffed and funded Nuclear Safety and Compliance Committee (NSCC).**
- (2) R. C. Arnold had resigned as president of GPUN
- (3) P. R. Clark, Sr., had become president of GPUN
- (4) E. E. Kintner had replaced Clark as Executive Vice-President of GPUN

Also, weighing in favor of the licensee are remedial actions taken as a result of past improper activities (see Sections 4.0 through 11.0) and past deficiencies (see generally, TMI-1 Restart SER and Supplements 1 through 4). For example:

- o management initiative in seeking outside review of its activities (BETA Report)
- o personal involvement of top management in interviewing and ensuring that licensed operators understand that cheating is a grave violation of corporate policy and will not be tolerated

*The Faegre & Benson Report was initially withheld by Met-Ed; however, subsequent reporting by GPUN was not timely.

**By letter dated June 29, 1984, the licensee reported that the NSCC is in place and beginning to function.

- c establishment of 1 week out of 6 weeks dedicated to training, which in conjunction with a six-shift rotation, resolves the concerns identified in the Knoll and Book memoranda
- o changes in training program content, structure, and policy, with substantial additional resources dedicated to the effective implementation of the training program
- o initiation of an independent evaluation of operator attitudes (RHR Report) and effective implementation of programs responsive to operator concerns such as the abnormal transient operational guidelines (ATOG) procedure review, development, and implementation (The staff evaluated, at the point of delivery, the classroom and simulator training on the ATOG emergency procedures and found it to be effective.)
- o major improvement in the effectiveness of the startup and test program for TMI-1, which was based, in part, on the Lucien Report findings and recommendations
- o effective implementation of many of the recommendations from the Keaten Report which are evidenced by the substantial improvement in licensee regulatory performance, the Rickover evaluation* of licensee performance, and the Institute of Nuclear Power Operations (INPO) evaluation of TMI performance
- o The myriad of facility design changes and modifications that have been engineered and implemented by the licensee to correct specific deficiencies identified by the various investigations into the TMI-2 accident. (The staff acknowledges that many of these corrective actions were required by NRC, however, the fact that a change was required by NRC does not detract from the thoroughness or quality of the licensee's engineering and implementation of such requirements, nor is the licensee's completion record significantly different from that of other utilities.)

The staff also weighs in the licensee's favor the record of performance it has demonstrated since the formation of GPUN in 1982. The staff's Systematic Assessment of Licensee Performance (SALP) for the licensee for the periods October 1, 1981, through September 30, 1982, and October 1, 1982, through January 31, 1984, have been very favorable. The staff concluded in its SALP report on the period October 1, 1981, through September 30, 1982, that:

Overall, we find your performance of licensed activities indicates a high degree of management attention and involvement and that it is aggressive and oriented toward nuclear safety, with adequate application of resources.

Seven of the ten functional areas evaluated were assessed as Category 1 (high level of performance); the remaining three functional areas were rated as Category 2 (satisfactory performance).

*"An Assessment of the GPU Nuclear Corporation Organization and Senior Management and Its Competence to Operate TMI-1;" Admiral H. G. Rickover, USN; November 19, 1983.

The results of the most recent SALP assessment, for the period October 1, 1982, through January 31, 1984, were summarized by the staff as follows:

Overall, this assessment found that the licensee is continuing to devote considerable resources to improve performance in all areas of the organization. Management attention in identifying and correcting weaknesses is apparent from licensee initiatives noted in the various areas reviewed. Management's commitment to safety is also apparent from their extensive commitment to personnel training, the continuing efforts to staff the organization with highly technical, competent personnel, and the implementation of a stringent policy regarding procedural adherence.

The staff rated the licensee's performance in the following areas as Category 1: radiological controls, maintenance, preoperational/surveillance testing, fire protection and housekeeping, emergency preparedness, security and safeguards, and quality assurance/control. The other areas evaluated were rated as Category 2: plant operations; design, engineering and modifications; and licensing activities.

The ability of any agency to regulate licensed activities depends on the accuracy and completeness of a licensee's reports and the licensee's willingness to discover potential public health and safety issues. This is particularly true when regulating a complex technical area involving numerous scientific and engineering disciplines. Current GPUN policy and practice with respect to accuracy and completeness of reports to NRC, in light of past Met-Ed failures, is critical to the staff's overall evaluation of management integrity. Similarly, GPUN policies that protect employees from harassment are a measure of the company's willingness to discover and openly address potential public health and safety issues. Documentation and response to NRC's questions that establish GPUN's policies in these areas were provided under oath by P. R. Clark, President of GPUN. See P. R. Clark letter to D. Eisenhut, Director, Division of Licensing, NRR, dated June 29, 1984, with attached response to NRC questions. GPUN policy is to "assure absolute openness of information availability and exchange within GPUN so as to assure that all information which might affect safety of nuclear activities is available to responsible company officials" and to "[p]rovide information in a timely and trustworthy manner on the activities and operations of TMI-1 and TMI-2 and Oyster Creek to the various publics of GPU; i.e., public officials, the media, the general public, employees, share holders and governmental agencies" (Id. at 2). There are similar strong policy statements in recent letters to all GPUN employees engaged in nuclear activities. For example, P. Clark's letter of December 8, 1983, emphasized "the need to have full and open communications, both within the company, and between us and our regulators," and his letter of February 27, 1984, which stated ". . . in addition to identifying issues internally, we will keep the NRC fully informed of problems, difficulties and questions."

The staff finds that these policies are clear and that they reflect GPUN's understanding of their responsibilities to communicate accurately and completely with NRC. The staff also believes that a sincere effort to promulgate these policies has been made by the President of GPUN.

The staff concluded in Section 10.3.1 that GPUN failed in its responsibility to protect Parks, a contractor employee, from discrimination (i.e., harassment) for raising safety concerns. The staff also concluded in Section 10.3.4 that GPUN policies which protect GPUN and contractor employees from harassment were not understood by some senior GPUN managers nor its contractor (Bechtel). GPUN admitted that they did not review or investigate the relationship between Parks and his employer, Bechtel, as it related to the questioning of Parks by Bechtel employees or Parks' supervisor. *Id.* at 6. The Stier Report (May 18, 1984, OI Report Ex. 102), although it does review two of Parks complaints in Volume 4, is incomplete in its review of Park's allegation of harassment. The staff concludes that GPUN abdicated its responsibility to investigate Parks allegation of harassment and ensure appropriate remedial measures. The staff finds, however, that the deficiencies exhibited in the Parks matter were isolated occurrences and are not programmatic in nature. In this SER, the staff investigated three other allegations of discrimination against GPUN employees who had raised safety concerns. In each of those three cases (Hartman, Gischel, King), the staff found the allegations to be without merit and that GPUN had acted properly in its dealings with these employees.

In reviewing the attachment to GPUN's June 29, 1984 letter, it is clear that corporate management has promulgated policies designed to protect employees who raise safety concerns, whether they are GPUN or contractor employees. In particular, the "lessons learned" from the Stier Report (Attachment 6) highlights its current view of how employees raising safety concerns are to be treated. "Where differences of opinions arise, such differences must be recognized and resolved on their merits in a cooperative manner. They must not be characterized or treated as differences due to their organizational background or personality conflict." Additionally, GPUN has a strong written commitment to deal appropriately with employees or contractors who discriminate against employees for engaging in activities covered by 10 CFR 50.7.

Finally, and most importantly, the staff finds that the individuals currently responsible for the leadership of GPUN were not implicated in past wrongdoing on the part of Met-Ed and have made a major contribution to the improved performance of GPUN. This finding is discussed in detail for each current GPUN official involved or potentially implicated in any of these matters in Section 13.2.

Based on all of the information reviewed by the staff and balancing the past improper activities of the licensee against its subsequent record of remedial actions and performance, as well as the record of current senior management of the licensee, the staff concludes that there is reasonable assurance that GPUN can and will conduct its licensed activities in accordance with regulatory requirements and that GPUN can and will operate TMI-1 without undue risk to the health and safety of the public.

13.2 Staff Position on Individual Integrity

In addition to evaluating the activities discussed in Sections 4.0 through 11.0 to arrive at a position on corporate character or integrity, the staff has considered the implications of those activities in terms of the fitness

of particular individuals to hold responsible positions related to NRC-licensed activities. The staff emphasizes that its assessment of the "managerial integrity" of the individuals addressed in this section does not reflect a judgment about the personal morals or ethics of any individual. The staff's assessment of individual "managerial integrity" is, instead, a subjective decision by the staff as to whether there is reasonable assurance that GPUN can and will meet its regulatory responsibilities with the particular individual in a position related to those responsibilities.

Individuals are obviously responsible for activities in which they have had direct involvement. An individual's position in the management structure, however, may also result in responsibility for activities within his supervision. Depending on the particular circumstances, an individual in a senior corporate management position may be deemed responsible in some part for a wide range of corporate activities in which the individual played no direct role.

13.2.1 Current GPU/GPUN/TMI-1 Management

As discussed in Section 13.1, the staff has concluded that improper activities by Met-Ed in four areas raise serious integrity questions. Individuals currently with GPUN, who held management positions within Met-Ed or GPUSC, may be responsible for these improper acts. This responsibility may involve either an active role in commission of the event or a supervisory role with respect to the acts of subordinates. Current GPUN management who previously held management positions within Met-Ed or GPUSC and who may be held responsible for improper acts of Met-Ed are the following:

- W. G. Kuhns, Chairman of the Board and Chief Executive Officer, GPU
- H. M. Dieckamp, President GPU
- P. R. Clark, Sr., President GPUN
- R. L. Long, Vice-President Nuclear Assurance, GPUN
- H. D. Hukill, Vice-President TMI-1, GPUN
- M. Ross, Operations Manager, TMI-1, GPUN
- J. J. Colitz, Plant Engineering Director, TMI-1, GPUN
- B. Mehler, Manager Radwaste Operations, TMI, GPUN

Table 13.1 indicates the involvement of these individuals in Met-Ed and GPUN events that could reasonably be considered to relate to their managerial integrity. While the staff does not find that the GPUN events (i.e., harassment of Parks and failure to provide RHR, BETA, and Faegre & Benson Reports in a timely manner) are significant factors in evaluating GPUN's management integrity, it has included these events for the purpose of assessing events that may be considered by others to be more significant.

W. G. Kuhns

The staff finds that Kuhns had no personal involvement in any of the events which raised questions concerning Met-Ed or GPUN management integrity. As Chairman and Chief Executive Officer of the Board of Directors of GPU and a Director of GPUN, Mr. Kuhns must shoulder some portion of the responsibility for the improper activities of GPU's subsidiaries, Met-Ed, GPUSC, and GPUN. As discussed in Section 13.1 above, however, the staff has concluded

Table 13.1 Individual integrity of current GPU of GPUN officers and employees

Name & Position	Events						Conclusion
	TMI-2 Leak rate	Pre- & Post-Accident Training	False Certification & Management Coverup	Complete & Accurate NOV Response	Timely Provision of BETA/RHR Reports	Harassment of Parks	
W. G. Kuhns CEO GPU	-	-	-	-	-	-	No Personal Involvement
H. M. Dieckamp Pres. GPU	-	-	-	Yes	-	-	Personal Involvement Not Improper
P. R. Clark, Sr. Pres. GPUN	-	-	-	-	Yes	-	Personal Involvement Not Improper
R. L. Long V.P. Nuclear Assurance	-	Yes	-	-	-	-	Personal Involvement Not Improper
H. D. Hukill, Jr. V.P. TMI-1	-	-	-	-	Yes	-	Personal Involvement Not Improper
M. Ross Mgr. Operations TMI-1	Yes	Yes	-	-	-	-	Personal Involvement Not improper
J. Colitz Eng. Dir. TMI-1	-	Yes	-	-	-	-	Personal Involvement Not Improper
B. Mehler Manager, Radwaste Operations TMI	Yes*	-	-	-	-	-	Insufficient Evidence

*Hartman ECP allegation included.

YES = Individual directly involved or implicated

- = Individual not involved

that GPU/GPUN has by its performance (i.e., the creation of GPU Nuclear Corporation and its improved regulatory performance as demonstrated by past two SALP reports) demonstrated a sincere and successful effort to correct for past mistakes. Kuhns' personal efforts and success at augmenting the board of directors with individuals of recognized nuclear experience and integrity is a further indication of his positive actions to assure that GPU and GPUN meet their public health and safety responsibilities. For the reasons discussed, the staff revalidates its position with respect to Kuhns and concludes that there is reasonable assurance that GPUN can and will meet its regulatory responsibilities with Kuhns in a management position related to those responsibilities with no undue risk to public health and safety.

H. M. Dieckamp

The staff found, in Section 8.3, that Dieckamp was involved in review of the licensee's response to the Notice of Violation. Dieckamp stated that he thought the NOV response that isolation of the emergency feedwater system was not a violation of the Technical Specifications was "kind of thin," however, he chose not to intervene. Evidence was not developed that would indicate Dieckamp's involvement in reviewing the response to the NOV was improper nor was any evidence developed which would indicate Dieckamp had personal knowledge that the response was inaccurate, incomplete or contrary to conclusions reached by others within Met-Ed or GPUSC. The staff finds that Dieckamp's involvement in the licensee's response to the NOV was not improper and that he had no involvement in any of the other events which raise questions concerning management integrity. However, Dieckamp bears responsibility for the action of his subordinates and companies over which he had direct supervisory responsibility. As discussed in Section 13.1 above, the staff concluded that a pattern of improper acts by Met-Ed in 1981 and before are so serious with respect to licensee's character, that the staff would likely have concluded that reasonable assurance of no undue risk to public health and safety was not provided. It follows, therefore, that Dieckamp had not met his responsibilities in 1981 and before that time.

The staff's evaluation of Dieckamp's managerial integrity must be based on a consideration of all of the relevant circumstances. Additional relevant circumstances in this instance are: The creation of GPUN to address past problems on the part of Met-Ed, the reassignment to non-nuclear activities of company officers responsible for past Met-Ed actions, and most important, the current conduct and performance of GPUN. Clearly, examination of past conduct of Met-Ed is relevant in assessing the prospective conduct of GPUN. However, since GPUN has been in existence since January 1982, GPUN's conduct is more relevant and, therefore, should be given more weight. The staff found in Section 13.1 that GPUN performance did not raise questions concerning corporate integrity and that regulatory performance had substantially improved over that of Met-Ed. In balancing these relevant factors and considering that Dieckamp was not personally involved in improper activities, the staff finds that the weight of evidence supports revalidation of its position--there is reasonable assurance that GPUN can and will meet its regulatory responsibility with no undue risk to public health and safety with Dieckamp in a management position related to those responsibilities.

P. R. Clark, Sr.

P. R. Clark joined GPU Service Corporation as Vice-President Nuclear Activities on January 20, 1980. He became the Executive Vice-President, GPUN on January 1, 1982, when that corporation was formed. Clark was essentially the Deputy to Arnold for all nuclear activities. On November 25, 1983, Clark became President of GPUN.

Clark testified that while he was Deputy to Arnold, areas of concentration were established in which he or Arnold would take lead responsibility in day-to-day oversight of different aspects of the company's operations (see OI Keaten Ex. 18 at 5). Before the licensee's proposal of June 10, 1983, to separate individuals associated with TMI-2 prior to the accident from any responsibilities with TMI-1, Clark's responsibilities were largely concerned with the Oyster Creek Nuclear Power Plant and Arnold concentrated on TMI-1 and -2. The evidence developed during the various OI investigations into matters that raised questions concerning Met-Ed management integrity would support this division of responsibility within the President's Office of GPUN and the working relationship that existed between Arnold and Clark. Clark was employed by GPUSC at the time of the cheating incidents (discussed in Sections 7.2 and 13.1); however, the facts have established that Arnold and Hukill, to their credit, became personally involved in the licensee's investigation and followup actions. No evidence was developed that would implicate Clark in any activities associated with the cheating events. Similarly, Clark was a vice-president in GPUSC, at the time various Keaten draft reports were forwarded for management review. No evidence was developed during the OI investigation of the Keaten matter that would indicate Clark was involved in any improper activities or had more than a peripheral role in review of the Keaten Report. The prosecuting attorney's Statement of Facts explicitly cleared Clark of any involvement in the TMI-2 leak rate issue. As discussed in Sections 5.7 and 6.3, the staff finds that the RHR and BETA and Faegre & Benson reportability issues are not significant factors in evaluating GPUN management integrity; rather, they indicate a failure to implement adequate procedures to ensure review of information for reportability. Thus, responsibility, if any, on the part of Clark would be limited to the corporation's failure after November 25, 1983, to adopt procedures to ensure the timely review and determination of information reportability. The staff finds, therefore, that Clark was not involved in any improper activities (Section 13.1 above). The staff concludes that GPUN can and will meet its regulatory responsibilities with no undue risk to public health and safety with Clark in a management position related to those responsibilities.

R. L. Long

R. L. Long was appointed Director of Training and Education and Acting Director of Nuclear Assurance on approximately February 1, 1980. On April 1, 1982, following the formation of GPUN, he became Vice-President of Nuclear Assurance.

The occurrences of cheating on NRC and licensee examinations, discussed in Section 7.2, are relevant and material to Long's managerial integrity. As discussed in Section 8.2, Long was also a member of the Keaten task force and was directly involved in review and comment on drafts of the licensee's

internal investigation into the TMI-2 accident (i.e., Keaten Report). The staff found, however, that there was no improper activity on the part of the members of the Keaten task force nor was there any improper involvement on their part in the preparation of the licensee's response to the NOV (Section 8.3). The staff finds, therefore, that Long had no involvement in the inaccurate and incomplete statements made in response to the NRC Notice of Violation nor did he have any involvement in the other events that raise questions about management integrity, as discussed in Section 13.1.

The staff finds that Long did not have a personal involvement in cheating on NRC or licensee-administered examinations nor did he have direct responsibility for the poor attitude of operators toward their requalification program training requirements. The staff believes that this poor attitude on the part of operators was developed over a period of time and had its origins in the preaccident time frame. The licensee's actions to reorganize the Training Department and to learn from its past mistakes and to assess the practices of others (e.g., Roddis task force) is indicative of a sincere effort to improve the quality of the training program. Long's responsibilities included implementation of these initiatives to improve the quality of the licensee training efforts. With the exception of the examination process itself, the ASLAB has concluded that the licensee's training programs meet NRC's requirements. The ASLAB reopened the record on a narrowly defined issue concerning any impacts the cheating events may have on expert testimony presented during the ALAB hearing on the quality of the training program. The Boards found and the staff continues to agree that the remedial actions taken by the licensee to upgrade the examination process are proper and are responsive to prevent instances of cheating in the future.

The following factors are significant in evaluating Long's managerial integrity: his responsibility for cheating which occurred on licensee and NRC examinations, his role in implementing remedial actions for the overall training program (which the staff finds was a good faith effort on the part of the licensee to remedy past training deficiencies), the remedial actions directed by Long to preclude instances of cheating on future examinations, and, most importantly, the quality of the current training program that has been implemented under Long's direction. On balance, the staff finds that the quality of the current training program, as discussed in Section 7.3, outweighs the instances of cheating that occurred early in Long's tenure as Director of Training and Education. The staff concludes that there is reasonable assurance that GPUN can and will meet its regulatory responsibilities with no undue risk to public health and safety with Long in a management position related to those responsibilities.

H. D. Hukill, Jr.

H. D. Hukill reported to the Three Mile Island Station in June of 1980 and became Vice-President of TMI-1 in September 1980. Hukill was involved in two events that raised questions concerning corporate management integrity (see Section 13.1). These events are the licensee's investigation and followup action concerning cheating that occurred on licensee- and NRC-administered examinations and the licensee's failure to provide to NRC, in a timely manner, the RHR and BETA Reports. The staff finds that Hukill's involvement in these events was not improper. Hukill made a valuable con-

tribution to the licensee's investigation by demonstrating to his staff that he was determined to correct the problem. The failure on his part to see the investigation through to the very end and his admission to being naive concerning cheating do not imply improper conduct (see PID, July 27, 1982 at ¶2269-2270, 2396). The record of investigation developed by OI supports a conclusion that Hukill felt the BETA and RHR Reports reflected positively on GPUN management initiative and that he volunteered these reports to the NRC on April 22, 1983. The staff finds these actions reflect favorably on Hukill's attitude and approach to responsibilities. The staff finds that there is no evidence in the various OI investigations related to Met-Ed or GPUN management integrity that would raise any questions on the part of a reasonable person as to Hukill's managerial integrity. The staff concludes that there is reasonable assurance that GPUN can and will meet its regulatory responsibilities with no undue risk to public health and safety with Hukill in a management position related to those responsibilities.

M. J. Ross

M. J. Ross is the Manager of Plant Operations for TMI-1 and has held that position since April of 1978. Before that time, he was a shift supervisor. Ross was alleged to have been involved in improper activities associated with the review of NRC examinations and possibly involved in cheating. An extensive record was developed during the reopened hearing on cheating concerning the charges against Ross. The Board found that the charges against Ross were unfounded. Similarly, the Appeal Board, after conducting its own extensive review and analysis of the record, concurred with the ASLB finding.

For the reasons discussed in Section 5.2, the staff concluded that no evidence exists to indicate that Ross was personally involved in leak rate testing. No testimony was given, during TMI-1 leak rate investigation or during the IE interviews as part of the TMI-2 leak rate investigation, to implicate Ross in actual wrongdoing or in pressuring operators to obtain acceptable leak rate test results. The contrast between the performance of leak rate testing on TMI-1 and TMI-2 and Ross' direct responsibility for the activities at TMI-1, reflect positively on Ross' management ability. The staff finds, therefore, that Ross' activities associated with leak rate testing were not improper.

One could argue that as Manager of Operations for TMI-1, Ross must bear some of the responsibility for the poor attitude on the part of subordinate licensed operators toward their requalification training program requirements. The occurrence of cheating on licensee and NRC examinations by licensed operators is, in the staff's opinion, reflective of a poor attitude on the part of operators. However, the responsibility for development of the training program and its implementation rests with others. Further, given the existence of widespread problems with respect to operator training before the accident, continuing implementation deficiencies in the postaccident training program, and the failure of Met-Ed to implement adequate training policy and programs, the staff believes it would be improper and unfair to hold Ross accountable for acts of cheating on the part of his subordinates during the postaccident period.

The staff concludes that there is reasonable assurance that GPUN can and will meet its regulatory responsibilities with no undue risk to public health and safety with Ross in a management position related to those responsibilities.

J. J. Colitz

J. J. Colitz is presently Director Plant Engineering, TMI-1. Colitz was the Superintendent of TMI-1 from early 1975 through March 1977 when he left to take a position with Met-Ed in Reading, Pennsylvania.

Colitz received his senior reactor operator's license on February 23, 1974; this license was renewed on February 23, 1976. Thus, he was a licensed, off-shift senior reactor operator at the time of the Tsaggaris memorandum, discussed in Section 7.1. During his OI interview on March 6, 1984, Colitz stated that he did not have time to attend lectures because of his workload as plant superintendent. Instead, he did makeup lessons (see OI Report 1-84-004, Ex. 11 at 1). The staff finds that Colitz may have failed to meet 50% lecture attendance for the FSR portion of his requalification program requirements (see Section 7.1). Colitz stated to OI that, after the Tsaggaris memorandum, he did not renew his operators license. However, his license had just been renewed 2 months before the Tsaggaris memorandum. The staff could find no record that his license was dropped after the Tsaggaris memorandum. Under similar circumstances, however, G. Miller's (Station Superintendent, Unit 2) license was dropped in October 1976. It appears likely that Colitz's license was allowed to drop at the same time as Miller's license. Based on the passage of time, the staff places no particular significance on Colitz's statement that he did not seek to renew his operator's license following the Tsaggaris memorandum.

The following matters are relevant to a staff position on Colitz's managerial integrity: lack of hard evidence of personal failure to meet NRC requirements, no evidence of poor attitude on the part of TMI-1 shift operators during his tenure as station manager, and circumstances of other, higher priority demands on his time. Considering these factors, the staff concludes that there is no basis for other than a positive finding with respect to Colitz's managerial integrity.

The staff concludes that there is reasonable assurance that GPUN can and will meet its regulatory responsibilities with no undue risk to public health and safety with Colitz in a management position related to those responsibilities.

B. Mehler

The staff found in Section 5.3 that there was insufficient evidence to conclude that B. Mehler was involved in improper activities (i.e. violations of NRC requirements) during a reactor startup on April 23, 1978, as alleged by Hartman. Mehler was a dual-licensed SRO and Shift Supervisor before the TMI-2 accident and, thus, is involved in the TMI-2 leak rate matters. However, the staff is not aware of the evidence developed by the Department of Justice during its TMI-2 leak rate case that would implicate specific shift supervisors in improper acts. The staff finds, therefore, that there is insufficient evidence to implicate Mehler in improper acts.

The staff did not develop a record to evaluate these isolated events in light of subsequent performance. However, it is the licensee's responsibility to evaluate on a continuing basis the performance of its employees. The recent promotion of Mehler to Manager of Radwaste Operations by GPUN and the current record of GPUN's own performance is evidence that such a record, if developed, would likely be positive.

The staff concludes that there is reasonable assurance that GPUN can and will meet its regulatory responsibilities with no undue risk to the public health and safety with Mehler in a management position related to those responsibilities.

13.2.2 Past Met-Ed/GPUSC/GPUN Management

Past Met-Ed or GPUSC managers who were either responsible for or involved in events that call to question the management integrity of Met-Ed are

- R. C. Arnold, Vice-President, GPUSC
- J. Herbein, Vice-President, Metropolitan Edison
- G. Miller, Station Manager, TMI, Met-Ed
- E. Wallace, Manager of Licensing, TMI, GPUSC
- J. Floyd, Supervisor Operations, TMI-2, Met-Ed
- W. Zewe, Shift Supervisor, TMI, Met-Ed
- G. Kunder, Superintendent, Technical Support, TMI-2, Met-Ed (12-78 to accident)
- J. Seelinger, Superintendent, Technical Support, TMI-2, Met-Ed (1-77 to 11-78)

Table 13.2 indicates the involvement of these individuals in Met-Ed events.

The staff reaches no conclusion at this time on the managerial integrity of individuals who no longer hold management positions with GPUN. It is the staff's position, and an essential part of the staff's ability to revalidate its position on licensee's management integrity, that GPUN must obtain staff review and approval on a case-by-case basis prior to the assignment of any of these individuals (*i.e.*, R. C. Arnold, J. Herbein, G. Miller, W. Zewe, J. Seelinger, and J. Floyd) to responsible management positions associated with supervision of operations or maintenance of NRC licensed facilities. The staff will consider these individuals' past Met-Ed, GPUSC and/or GPUN performance, as well as any relevant current performance, in reaching a decision on any such request. For two individuals (*i.e.*, E. Wallace and G. Kunder) the staff finds that their current positions are not related to a TMI-1 restart decision.

13.3 Staff Position on Revalidation of Management Integrity

Based on all of the information reviewed by the staff and balancing the past improper activities of the licensee against its subsequent record of remedial actions and performance, as well as the record of current senior management of the licensee, the staff concludes that there is reasonable assurance that GPUN can and will conduct its licensed activities in accordance with regulatory requirements and that GPUN can and will operate TMI-1 without undue risk to the health and safety of the public. The staff, therefore, revalidates its position on licensee's management integrity.

Table 13.2 Involvement of individuals in Met-Ed events

Name & Position	Events						Conclusion
	TMI-2 Leakrate	Pre- & Post-Accident Training	False Certification & Management Coverup	Complete & Accurate NOV Response	Timely Provisions of BETA/RHR Faegre & Benson Reports	Harassment of Parks	
R. C. Arnold V.P. GPU SC/ Pres. GPUN	-	-	Yes	Yes	Yes	Yes	None*
J. Herbein V.P. Met-Ed	Yes	Yes	Yes	-	-	-	None*
G. Miller Station Mgr., TMI	Yes	Yes	Yes	-	-	-	None*
J. Floyd Supervisor Operations TMI-2	Yes	Yes	Yes	-	-	-	None*
W. Zewe Shift Supervisor, TMI	Yes	-	-	-	-	-	None*
J. Seelinger Sup. Tech Support, TMI-2	Yes	-	-	-	-	-	None*
G. Kunder Sup. Tech Support, TMI-2	Yes	-	-	-	-	-	None*
E. Wallace Mgr. TMI Licensing	-	-	-	Yes	-	-	None*

*The staff draws no conclusion as to the individual's managerial integrity because the individual is no longer employed by the licensee or is no longer directly involved in operation or licensing of TMI-1.

Yes = Individual directly involved or implicated

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13 SUPPLEMENTARY NOTES

14 ABSTRACT (200 words or less)

Supplement 5 to the Safety Evaluation Report (SER) on TMI-1 Restart documents the review by the Nuclear Regulatory Commission (NRC) staff of nine investigations conducted by the NRC Office of Investigations into matters identified as relevant and material to an evaluation of the licensee's "management integrity." The staff has included, as part of its evaluation, materials from its review of the GPU v. B&W lawsuit record (NUREG-1020LD, "GPU v. B&W Lawsuit Review and Its Effect on TMI-1") as well as other relevant materials developed since the close of the record in the TMI-1 Restart proceeding. In developing its position on General Public Utilities Nuclear Corporation's character (i.e., management integrity), the staff evaluated matters that cast doubt on the licensee's character, individually and collectively; considered the remedial actions taken by the licensee; and balanced past improper conduct of the licensee against its subsequent record of remedial actions and performance and record of current senior management of the licensee. The staff concluded that, while the past improper conduct was grave, the remedial actions taken, the subsequent record of performance, and the record of current senior management support a finding that GPUN can and will operate TMI-1 without undue risk to the health and safety of the public.

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