



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

FEB 14 1985

Docket No. 50-440

MEMORANDUM FOR: David A. Ward, Chairman  
Advisory Committee for Reactor Safeguards

FROM: Thomas M. Novak, Assistant Director  
for Licensing  
Division of Licensing, NRR

SUBJECT: REPORT ON DESIGN/CONSTRUCTION QUALITY OF THE PERRY  
NUCLEAR POWER PLANT

During the 267<sup>th</sup> meeting of the Advisory Committee for Reactor Safeguards (ACRS) on July 8-10, 1982, the Committee requested a report from the NRC staff "which discusses design and construction problems, their dispositions and the overall effectiveness of the effort to assure appropriate quality." This request, documented in the ACRS letter to the NRC Chairman dated July 13, 1982, was prompted by adverse experience on the Perry project which resulted in a major restructuring of the applicant's (Cleveland Electric Illuminating Company or CEICO) quality assurance procedures, and the CEICO quality control and assurance organization.

The NRC Region III staff has prepared the report for NRR, Division of Licensing (Enclosure 1). In summary, Enclosure 1 details and assesses the CEICO quality assurance program performance from the year 1977 through to February 1985, concluding that the CEICO construction program quality at Perry has been acceptable and is being implemented effectively by CEICO.

In conjunction with the Enclosure 1 report is a partial initial decision issued by the Atomic Safety and Licensing Board (ASLB), dated December 2, 1983, (Enclosure 2) which further addresses the effectiveness of the quality assurance program at Perry. The ASLB decision pertains to the QA contention issue concerning the adequacy of the CEICO quality assurance program for the control of safety-related contractors at Perry. The ASLB concluded from the uncontradicted evidence presented at a hearing session in May 1983, that the CEICO quality assurance program has provided adequate overview and control of safety-related contractor activities at the Perry site; and that the CEICO program has prevented and will continue to prevent unsafe conditions at the plant:

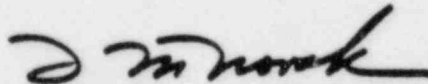
As of the date of this memorandum, construction of Perry, Unit 1 is approximately 97% complete and the plant is undergoing preoperational testing. A fuel load date in June 1985 is being targeted by CEICO for Unit 1.

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This report completes NRR action requested in Paragraph 4 (top of Page 2) of the ACRS letter to the NRC Chairman. It also completes all other requests cited in that letter. A previous report, dated May 23, 1983 addressed the staff action to resolve the turbine missile issue the resolution of which is document in Perry SER Supplement No. 3 (April 1983).

Should there be any questions or clarifications concerning the enclosed documents, please let me know.



Thomas M. Novak, Assistant Director  
for Licensing  
Division of Licensing

Enclosures: As stated

cc w/enclosures:

H. Denton, NRR  
H. Thompson, DL  
F. Miraglia, DL  
J. Taylor, IE  
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PERRY CONSTRUCTION QA REPORT

## I. Introduction

This report discusses construction activities and the implementation of the licensee's Quality Assurance program at the Perry Nuclear Power Plant since issuance of the Construction Permit by NRC to Cleveland Electric Illuminating Company (CEI) in May 1977. The report also describes the NRC inspection program at Perry, including staff findings of QA and construction deficiencies and the actions taken by the licensee to correct the deficiencies.

The Perry Nuclear Power Plant is being built by CEI on the shore of Lake Erie, near Perry, Ohio, east of Cleveland. CEI, which owns 31% of the plant, is co-constructor of the station with Kaiser Engineers. Gilbert Associates Inc. is the Architect-Engineer. Co-owners of the Perry plant as tenants in common are Duquesne Light Company, Ohio Edison Company, Pennsylvania Power Company, and Toledo Edison Company. These utilities, with CEI, collectively comprise the Central Area Power Coordination Group (CAPCO). CEI has authority and discretion for the management, operation and maintenance of Perry, and is authorized to act as agent for the CAPCO Group members in those areas, including the pursuit of required authorizations, permits and license amendments and orders from the NRC.

The Perry Nuclear Power Plant utilizes a General Electric Boiling Water Reactor of the BWR-6 generation for each unit. Similar BWRs are at Grand Gulf and Clinton. The reactor system is housed in a GE Mark III containment, which is a free-standing steel vessel supported by a steel lined reinforced concrete foundation mat. Unit 1 and the common

facilities required for operation of Unit 1 are presently about 96% complete. The licensee's projected fuel load date for Unit 1 is June 1985, with commercial operation scheduled for approximately six months later.

The CEI Quality Assurance organization is responsible for the establishment and implementation of the Construction QA Program. The Manager of Nuclear Quality Assurance, who reports to the Vice President-Nuclear Group, has the responsibility for establishing the QA program requirements, verifying implementation, and measuring the overall effectiveness of the program, and has the authority to stop unsatisfactory work and to prevent further processing, delivery, or installation of nonconforming materials.

CEI utilizes a multiple approach in its management's periodic assessment of its Quality Assurance Program, including the parts of the program responsible for assuring the quality of contractor performance and for finding and correcting deficiencies in the construction or installation of safety-related components and systems. The inputs from the assessments originate from the line functions through supervision, department managers, and group project management to the Chief Executive Officer. The site department managers of purchasing, engineering and quality assurance also provide inputs for the assessments.

There are three basic elements in the CEI Quality Assurance Program which apply directly to the control of contractor performance; (1) review of each contractor's in-place Quality Assurance Program and organization to

ensure that they meet the requirements of 10 CFR 50 Appendix B and are consistent with the utility's Quality Assurance Program, (2) auditing and surveillance to verify by planned, periodic examinations that the contractors are adequately implementing their Quality Assurance programs, and (3) requiring each contractor to implement those requirements in its Quality Assurance Program which ensure prompt corrective action for conditions adverse to quality. In the event that effective corrective actions are not promptly taken, the utility has the necessary provisions to require that the contractor(s) stop work until satisfactory resolution of conditions adverse to quality is attained. Since the start of construction, the utility has issued 36 stop work orders against site contractors; three of the stop work orders resulted from NRC inspections.

## II. Inspection and Enforcement History

Since issuance of the Construction Permit in May 1977, the NRC has conducted 153 inspections at the Perry site. To accomplish the inspection program, over 11,600 inspector-hours of direct inspection effort have been expended. 125 items of noncompliance have been identified by NRC inspectors at Perry, which is essentially average for construction sites in Region III. No orders have been issued to CEI and no fines have been imposed.

The following tables summarize the NRC inspection effort and findings at Perry since issuance of the construction permit. Significant perturbations in the inspector-hours listed and the noncompliances cited have been caused by the major findings in early 1978 which caused the site-wide stop

work in February 1978, the HQ IE Construction Appraisal Team inspection in 1983, which contributed eight noncompliances and almost 2000 inspector-hours to the statistics, and the recent NTOL status of the plant which has increased the relative NRC inspection frequency.

TABLE 1  
NRC INSPECTION

<u>Inspection Period</u>	<u>Inspections</u>	<u>Inspector- Hours</u>	<u>Non- compliances</u>	<u>Noncompliances/ Inspector-Hour</u>
1977 (post-CP)	4	190	8	0.042
1978	17	886	36	0.041
1979	12	477	9	0.019
1980	28	1420	18	0.013
1981	19	1926	21	0.011
1982	16	1444	2	0.001
1983	38	3940	27	0.007
1984*	19	1338	4	0.003
TOTAL	153	11,621	125	Avg 0.011

\*Reports issued by 10/31/84.

TABLE 2  
NONCOMPLIANCE DISTRIBUTION

<u>10 CFR 50 Appendix B Criterion</u>	<u>Cited Noncompliances (Percent)</u>
I. Organization	0.8
II. Quality Assurance Program	4.0
III. Design Control	6.4
IV. Procurement Document Control	0.8
V. Instructions, Procedures and Drawings	24.8
VI. Document Control	7.2
VII. Control of Purchased Material, Equipment, and Services	1.6
VIII. Identification and Control of Materials, Parts, and Components	1.6
IX. Control of Special Processes	8.8
X. Inspection	12.8
XI. Test Control	0.8
XII. Control of Measuring and Test Equipment	0.8
XIII. Handling, Storage and Shipping	7.2
XIV. Inspection, Test and Operating Status	0.8
XV. Nonconforming Materials, Parts, or Components	4.0
XVI. Corrective Action	11.2
XVII. Quality Assurance Records	5.6
XVIII. Audits	0.8
	<hr/>
TOTAL	100.0



In January and early February 1978, inspections by the NRC Region III staff at Perry found significant deficiencies in the Perry QA Program and site construction practices. An Immediate Action Letter dated February 8, 1978, which was issued by Region III because of those deficiencies, cited problems in the areas of concrete placement, storage of materials, fabrication and erection of piping, installation of embedments and structural steel, application of coating materials, and indoctrination and training of personnel. Most safety-related work on the site was stopped as a result of the Immediate Action Letter.

The utility took immediate, aggressive, actions to correct the deficiencies found during the Region III inspections. These actions included a complete rewrite of the Perry Quality Assurance Program, from the Corporate level to the detailed site work procedures; a restructuring of the QA organization, including the replacement of a number of management level personnel with more capable individuals; a major change in the site construction organization to provide more effective control of site contractors; and transfer of the engineering and scheduling functions and personnel from the corporate headquarters to the site.

During the same time period, Region III instituted an augmented inspection program for Perry, to review in detail the revised QA program, to assure that the requirements of the new program were effectively implemented and to assure that the construction which had been completed under the previous program was acceptable. The Region III inspections at Perry during the remainder of 1978 and the first half of 1979 included the detailed review of the revised QA program as well as verification, by

inspection of both in-process work and previously installed materials and components, that the new program requirements were being effectively implemented and that the work performed prior to implementation of the new program was acceptable. The inspection program was returned to a normal level in September 1979. Section 17.4 of the Perry SSER, NUREG-0887, Supplement No. 1, dated August 1982, discusses the major corrective actions taken by the Applicant in 1978, as well as the augmented inspection by NRC to review the corrective actions and to ensure that previous construction was acceptable.

Region III inspections since mid-1979 have resulted in the identification of additional noncompliances, some of which have been significant. None of the significant later noncompliances are considered to be derivative from the specific QA program deficiencies which caused the 1978 Immediate Action Letter. The number and type of noncompliances identified by Region III at Perry since 1978 have been normal for construction projects at the same stages of completion.

Major QA program implementation problems have been identified in two areas since the Immediate Action Letter of 1978; installation of the nuclear steam supply system by Newport News Industrial Corporation, and installation of safety-related electrical equipment by L. K. Comstock.

During a period of time from late 1978 to mid-1979, both licensee audits and Region III inspections showed many examples of unsatisfactory work by Newport News Industrial Corporation, the installation contractor for the nuclear steam supply system (NSSS) equipment. CEI stopped all work by

Newport News in December 1978, and allowed the work to resume only after assurances of cooperation by Newport News top management and replacement of the Newport News Perry site management. In September 1979, after additional problems similar to those encountered before, CEI cancelled the Newport News contracts for installation of the NSSS equipment.

In October 1979, CEI contracted with General Electric for the NSSS installation work. Subsequent Region III inspections of GE procedures, personnel qualifications, and work activities have not identified major problem areas with regard to the NSSS installation work done by GE. In addition, Region III and CEI inspections and audits have verified satisfactory correction of the identified deficiencies in the previously installed NSSS equipment.

Quality control problems associated with electrical installation were identified during a Region III investigation initiated in October 1981. The investigation identified items of noncompliance related to inadequate procedures and inspection activities, drawing errors, and deficiencies in the performance of audits and the handling of nonconformance reports. Taken individually, these findings did not represent significant problems in that they related primarily to programmatic or documentation inadequacies rather than to identified hardware deficiencies. However, collectively, they revealed significant deficiencies in the implementation of the electrical contractor's QA program in that problems were not being identified and corrected in a timely manner.

As a result of the problems identified in the electrical contractor's QA program implementation, CEI suspended the pulling of safety-related cables by the electrical contractor in November 1981. A Confirmation of Action Letter on the matter was issued by Region III on November 18, 1981. Following additional NRC inspection, the electrical contractor was released by CEI to resume cable pulling in January 1982.

On February 10, 1982, Region III conducted a management meeting with CEI to discuss the electrical issues and to elicit the applicant's corrective action responses regarding the management of the licensee's QA program. CEI committed to take five broad actions to assess QA implementation at the site. These actions included an evaluation of each safety-related contractor, development of a corrective action program by the Construction Quality Section, a complete review of the nonconformance system, review of documentation and records associated with equipment installed by the electrical contractor, and a re-evaluation of safety-related electrical systems which had been turned over to the Nuclear Test Section.

On May 6, 1982, CEI reported that the five corrective and/or audit actions discussed above had been completed and evaluated by CEI management. On June 18, 1982, Region III conducted an Enforcement Conference with the licensee to discuss the regulatory significance and resolution of electrical issues. Region III followup and evaluation of corrective actions taken by the licensee and review of ongoing work since that time have verified the adequacy of CEI's actions, as noted in subsequent SALP reports, discussed below.

On March 4, 1982, the licensee imposed a stop work on cable pulling in the control room area because of coordination problems among the several contractors working in that area. That stop work order, which did not involve NRC findings, was released by CEI on March 30, 1982, after the coordination problems were corrected. The NRC resident inspector monitored the stop work and the corrective actions as a routine inspection activity.

During a Region III inspection in January 1981, a number of deficiencies in the work being performed by the site safety-related coatings contractor were identified. A stop work was imposed by CEI on the coatings contractor prior to the conclusion of the Region III inspection on January 23, 1981. On January 28, Region III issued a Confirmatory Action Letter on the matter. Following further inspections and review of corrective actions by Region III, the stop work in the coatings area was released in mid-February 1981.

In addition to the stop work orders imposed as a result of the February 8, 1978 Immediate Action Letter and the other stop work orders discussed above, the licensee has imposed 33 stop work orders on site contractors since the beginning of 1978. None of those 33 resulted from NRC findings, but were based on problems identified by the audit and inspection activities of the licensee's QA program. Stop work orders in specific areas are a standard construction management tool used to exact full cooperation from site contractors.

A special Region III construction team inspection was conducted in July and August 1982. The team spent 464 inspector-hours in assessing certain aspects of the quality assurance and construction activities at the Perry site. The scope of the assessment included audits of the quality assurance program interfaces and overview, corrective action systems, design change control, material traceability of installed structures and components, in-process inspections, and effectiveness of quality control inspectors. The regional team concluded that the applicant's quality assurance program appeared to be satisfactory.

A subsequent "self-initiated" evaluation which was performed by the licensee in accordance with guidelines of the Institute of Nuclear Power Operations (INPO), and which was done by a team including outside consultants as well as applicant and A-E personnel, also found the QA program to be generally satisfactory.

During August and September 1983, the NRC's Office of Inspection and Enforcement (IE) conducted a Construction Appraisal Team (CAT) inspection at the Perry site. The purpose of the CAT inspection was to evaluate management control of construction activities and the quality of construction. The appraisal involved close to 2000 on-site inspector-hours and consisted of a detailed inspection of selected hardware, a comprehensive review of selected portions of CEI's QA Program, examination of records and procedures, observation of work activities and interviews with management and other personnel.

The IE CAT inspection identified construction or QA deficiencies in a number of areas; however, the CAT report noted that many of these were "typical problems experienced at other facilities." The Construction Appraisal Team also noted "a quality conscious attitude throughout" the Perry project organization, and found that "an aggressive attitude in the identification of problems was demonstrated through the applicant's project organization, and was further reflected by the amount of applicant's management involvement at the PNPP site." The regional office subsequently issued eight items of noncompliance to CEI based upon the CAT inspection. None of the items were found to warrant escalated enforcement action.

During August and September 1984, the Office of Inspection and Enforcement (IE) conducted an Integrated Design Inspection (IDI) at the Perry site. The purpose of the IDI was to review the adequacy of design details as a means of measuring how well the design process has functioned. The inspection involved approximately 2200 inspector-hours, split on an 80%/20% basis between the architect-engineer's office and the site. The inspection consisted of detailed examination of design, design bases, design procedures, records, and systems as installed at the plant. The IDI identified significant systematic weaknesses with respect to pipe stress analyses, accounting for voltage drops, circuit breaker and fuse sizing, and analyses of area temperature profiles. None of the identified deficiencies, either collectively or individually, are such that the overall adequacy of the Perry plant design is called into question, pending satisfactory resolution of the items identified in the inspection report. The IDI team will follow-up to ensure correction of all deficiencies and unresolved items identified in the IDI.

The performance of CEI at Perry has been evaluated four times by means of the SALP (Systematic Assessment of Licensee Performance) program. The SALP program was established to improve the NRC regulatory process by evaluating the performance of licensees and license applicants so as to provide for more efficient allocation of NRC resources. The program involves an integrated subjective assessment of the applicant by NRC management utilizing inputs from regional inspectors and appropriate HQ personnel. For facilities under construction, such as Perry, the SALP evaluations and the related management meetings with the applicant are heavily oriented toward construction practices and construction quality assurance.

The first Perry SALP addressed performance during the period from July 1, 1979 to June 30, 1980. A management meeting was held with the applicant on October 1, 1980 to discuss the results of the SALP evaluation. The major observations of the meeting were that the noncompliance history of the applicant during the assessment period was not of significant regulatory concern, that the number and severity of noncompliances were average relative to other comparable construction sites in Region III, and that proper management controls, communications and interfaces, supervisory reviews, record control systems, and personnel attitudes were in place. Increased NRC attention was not recommended for any areas evaluated.

The second Perry SALP covered CEI's performance during the period from July 1, 1980 to September 30, 1981. The management meeting with the applicant was held on April 2, 1982. The SALP report conclusions were



generally positive, except in the electrical area, where the applicant's performance was rated below average. Increased CEI management attention and increased NRC inspection were recommended for the electrical area. The deficiencies identified in the electrical work activities during this evaluation period, and the applicant's corrective actions, are discussed above.

The third Perry SALP addressed CEI's performance during the period from October 1, 1981 through September 30, 1982. The management meeting with the applicant was held on January 14, 1983. Ratings in all areas of construction except the electrical area were such as to indicate either the same or reduced NRC inspection effort. The electrical area was not rated for the evaluation period since all of the NRC findings had been factored into the previous SALP assessment, and review of the applicant's corrective actions with regard to the findings had not yet been completed. As an overall conclusion, the third SALP report stated that the applicant's Quality Assurance Program appeared to be adequate.

The fourth, and most recent, SALP evaluation covered the period from October 1, 1982 through December 31, 1983. The management meeting to discuss the results with the applicant was held on April 10, 1984. The ratings in all areas, including the electrical area, were such as to involve either the same or reduced future NRC inspection effort as a recommendation. The regional management position, as stated in the transmittal letter for the SALP report was that "overall regulatory performance of Cleveland Electric Illuminating Company at the Perry facility continued at a satisfactory level during the assessment period."

### III. Conclusion

Overall, Region III finds the construction program quality at Perry to be acceptable. Regional and IE inspections have indicated that the applicant is responsive to facility construction needs and recognizes the necessity for continuous management attention to assure quality performance. The Quality Assurance program is comprehensive and is being effectively implemented.

Region III will continue inspection activities as required to ensure that the applicant is implementing effective programs for reviewing and auditing the performance of the site contractors, for evaluating that performance to detect negative trends and for requiring appropriate corrective actions for identified deficiencies.

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UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

OFFICE OF THE  
DOCKETING CLERK  
BRANCH

ATOMIC SAFETY AND LICENSING BOARD

Before Administrative Judges:

SERVED DEC 5 1983

Peter B. Bloch, Chairman  
Dr. Jerry R. Kline  
Mr. Glenn O. Bright

In the Matter of

ASLB Docket No. 81-457-04 OL

CLEVELAND ELECTRIC ILLUMINATING  
COMPANY, et. al.

Docket Nos. 50-440-OL  
50-441-OL

(Perry Nuclear Power Plant, Units 1 & 2)

December 2, 1983

PARTIAL INITIAL DECISION  
(Quality Assurance Contention)

This partial initial decision decides the remaining aspect of a quality assurance contention, portions of which survived summary disposition.<sup>1</sup> The parties are Cleveland Electric Illuminating Company, et al. (applicant or CEI), Sunflower Alliance Inc., et al. (Sunflower), Ohio Citizens for Responsible Energy (OCRE) and the Staff of the Nuclear Regulatory Commission (staff).

The genuine issues of fact set for trial were:

The existence, cause, severity, duration and extent of an alleged instance in which applicant's quality assurance program failed by not properly controlling its electrical contractors.

<sup>1</sup> Summary Disposition was Denied in LBP 82-114, 16 NRC 1909 (1982) and this result was reconfirmed in LBP 83-3, 17 NRC 59 (1983). In LBP-83-74, 17 NRC \_\_\_\_\_ (November 10, 1983), we resolved aspects of this contention resulting from our reopening of the record to receive evidence about two issues. See LBP 83-52, 17 NRC \_\_\_\_\_ (1983). In LBP 83-\_\_\_\_\_, 17 NRC \_\_\_\_\_ (August 30, 1983) we resolved two procedural matters raised by Sunflower Alliance Inc., et al. (Sunflower).

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Whether the alleged deficiencies in properly controlling electrical contractors extend to the proper control of other contractors.

Whether deficiencies in the control of contractor activities have resulted in unsafe conditions at Perry.

Whether applicant has an adequate system for periodically reviewing its program for assuring the quality of contractor performance and ascertaining and correcting deficiencies that have arisen, particularly in systems essential to safe plant operation.<sup>2</sup>

These were the only issues of fact set for trial following a period of very broad discovery rights.<sup>3</sup> Consequently, these issues examine applicant's quality assurance program in the context of a "worst case".<sup>4</sup>

During the public hearing on this issue, held May 24-27, special attention was paid to the findings of the NRC's staff (staff) in Report 81-19, September 24, 1982. It was Report 81-19 that caused us to deny staff's motion for summary disposition. At the hearing, the Board attempted to assure that every important question raised in that report was pursued in sufficient depth so that our record would be complete. In addition, the Board attempted to assist intervenors, who were without

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<sup>2</sup> LBP 82-114, 16 NRC 1909 (1982) at 1917.

<sup>3</sup> LBP 82-15, 15 NRC 555 (1982) at 564.

<sup>4</sup> On November 25, 1983, OCRE informed the Board chairman that it was preparing a motion to reopen the record on quality assurance, based on newspaper reports of improper discharges of quality assurance personnel. The issuance of this decision does not prejudice the merits of the motion for reconsideration. It merely resolves the issues that were fully tried and were currently before us. Should new evidence cast doubt on our conclusions, the conclusions may be revised.

counsel, by reasonably pursuing each problem with which intervenors were concerned.

We are convinced, after reviewing the proposed findings of the parties and considering the entire record, that there are no quality assurance deficiencies that seriously call into question applicant's ability to control its electrical contractor, its commitment to the quality of its plant, or the safety of any plant component. We consider Report 81-19 to have been cautious and carefully prepared. The staff witnesses impressed us by their candor and their concern with the safety of this plant. Similarly, we were impressed by the knowledge and candor of applicant's witnesses, Mr. Murray R. Edelman and Mr. Gary R. Leidich.

The construction of Perry is a massive task. We are not surprised that applicant's quality assurance program has detected thousands of non-conformances that have arisen during construction. Nor are we surprised that one of the construction contractors has had problems, including problems in hiring enough quality assurance inspectors and the training of electrical craft personnel. However, we are reassured that applicant has a quality assurance program that alerted it to most of the L.K. Comstock problems. We also are reassured that the staff has conducted an investigation that identified further problems that needed correction and that applicant was responsive to the staff's findings. There is no indication that there are serious problems that have escaped detection or are not being carefully tracked and resolved.

Intervenor OCRE is concerned about the large number of deficiencies being discovered by applicant. However, we have no reason to believe

that the number of deficiencies is abnormal or is indicative of sloppy craftsmanship or of a safety problem in the plant.

OCRE also is concerned that applicant has violated 10 CFR Part 50, Appendix B, Criterion XVI because it has not "promptly identified and corrected" nonconformances. This concern arises because some of applicant's non-conformance reports have taken long periods of time to resolve. For example, twelve reports (only some of which may have been related to Comstock) have been left open for over four years.<sup>5</sup>

We conclude, however, that it is reasonable to expect that applicant would have varying success in the speed of resolving the large number of deficiencies involved. The test of whether matters are being resolved so slowly as to violate regulatory requirements is a test of reasonableness. In this instance, the test has been met; each time intervenor inquired into an apparently lengthy delay, applicant demonstrated that the delay in resolving the matter did not have safety significance.

Although we may have wished for prompter action in resolving non-conformances in some instances, we are convinced that there have been no inordinate delays and that the safety of the plant has not been compromised by delays. Whatever regulatory violations have occurred

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<sup>5</sup> Tr. 1164.

have been comparatively minor in nature and do not merit the denial or conditioning of a license.<sup>6</sup>

In reviewing the proposed findings of the parties, we found that applicant's position was closest to our own and that its findings would help us to explain our personal conclusions about the quality assurance contention. Consequently, in the remainder of this Initial Decision, we use applicant's filing freely, without quotation or attribution, altering it to fit our own style and beliefs.

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<sup>6</sup> Although there are some regulatory requirements, essential to safety, whose violation may require denial of a license, there are other requirements that do not have major safety significance and whose breach does not require denial of a license. Compare Vermont Yankee Nuclear Power Corporation (Vermont Yankee Nuclear Power Station), ALAB-138, 6 AEC 520, 528-29 (1973) and Maine Yankee Atomic Power Company (Maine Yankee Atomic Power Station), ALAB-161, 5 AEC 1003, 1010 (1973) to Consolidated Edison Company of New York (Indian Point Station, Unit No. 2), ALAB-188, 7 AEC 323, 333-34 (1974) ("Whether licensing can be authorized in the light of existing deficiencies obviously depends on the significance of the deficiencies."). We reject the impractical proposition that any minor violation of quality assurance regulations, regardless of whether the violation calls plant safety seriously into question, would call for denial of a license. We do not believe the Commission intended that fallible human beings, who must administer  
(Footnote Continued)

I. Overview of Issue No. 3

A. Sequence Leading to Issues of Material Fact

Applicant filed its operating license application for Perry on June 26, 1980. In February 1981, the NRC published a Federal Register Notice of "Receipt of Application for Facility Operating Licenses, Consideration of Issuance of Facility Operating Licenses, and Opportunity for Hearing."<sup>7</sup> This notice provided an opportunity for any person whose interest might be affected by the proceeding to request a hearing and file a petition for leave to intervene. Several intervenor groups and individuals filed petitions in response to the Federal Register notice.

By order dated April 9, 1981,<sup>8</sup> the Board made initial determinations concerning party status and scheduled a special prehearing conference pursuant to 10 CFR § 2.751a. The Board convened a special prehearing conference in Painesville, Ohio on June 2-3, 1981, and thereafter issued a special prehearing conference order on party status, contentions and discovery.<sup>9</sup>

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(Footnote Continued)

quality assurance programs, would be held to such an impractical standard.

<sup>7</sup> 46 Fed. Reg. 12372 (February 13, 1981).

<sup>8</sup> Memorandum and Order (Scheduling Prehearing Conference Regarding Petitions for Intervention), LBP-81-24, 14 NRC 235 (1981).

<sup>9</sup> Special Prehearing Conference Memorandum and Order Concerning Party Status, Motions to Dismiss and to Stay, the Admissibility of Contentions, and the Adoption of Special Discovery Procedures, LBP-81-24, 14 NRC 175 (1981).



Intervenors Sunflower Alliance Inc. et al. (Sunflower) and Ohio Citizens for Responsible Energy (OCRE) have litigated Issue No. 3. Although Sunflower is the designated lead intervenor for Issue No. 3,<sup>10</sup> OCRE has also been involved actively.

As originally admitted by the Board, Issue No. 3 stated:

Applicant has an inadequate quality assurance program that has caused or is continuing to cause unsafe construction.

We defined this issue as being limited to a stop work order issued by applicant and to a related NRC immediate action letter, both of which were issued in February 1978, and to corrective action and any remedial deficiencies related thereto.<sup>11</sup> Despite the limited scope of the issue, in the interest of full disclosure the Board accorded the intervenors broad discovery concerning applicant's quality assurance program.<sup>12</sup>

On October 29, 1982, the staff filed a Motion For Summary Disposition of Issue No. 3. The affidavit supporting the staff's motion stated that applicant had adequately addressed deficiencies relating to the February 1978 stop work order, and that there were no residual QA

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<sup>10</sup> Id., 14 NRC at 231; see Memorandum and Order (Concerning Procedural Motions), dated September 17, 1982.

<sup>11</sup> LBP-81-24, 14 NRC at 209-212; Memorandum and Order Concerning the Status of Ashtabula County and Objections to the Special Prehearing Conference Order, LBP-81-35, 14 NRC 682, 687 (1981).

<sup>12</sup> See Memorandum and Order (Concerning Late-Filed Contentions: Quality Assurance, Hydrogen Explosion, and Need for Increased Safety of Control System Equipment), LBP-82-15, 15 NRC 555, 556, 564 (1982).

deficiencies of a serious nature.<sup>13</sup> After considering the filings of the parties, we granted in part the staff's summary disposition motion.

In our summary disposition decision, we indicated that we were concerned with apparent deficiencies in applicant's control of the electrical contractor subsequent to the 1978 stop work order. This concern stemmed from our review of an NRC investigation report and notice of violation arising from an investigation of the electrical area initiated by NRC in October 1981,<sup>14</sup> and related findings in an NRC Systematic Assessment of Licensee Performance (SALP) report dated July 13, 1982.<sup>15</sup> In order to consider the significance of some of the unrebutted factual findings in Report No. 81-19 and the SALP report, we admitted for trial the following genuine issues of material fact:

The existence, cause, severity, duration and extent of an alleged instance in which applicant's quality assurance program failed by not properly controlling its electrical contractors.

Whether the alleged deficiencies in properly controlling electrical contractors extend to the proper control of other contractors.

Whether deficiencies in the control of contractor activities have resulted in unsafe conditions at Perry.

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13 Affidavit of James E. Konklin and Cordell C. Williams in Support of Summary Disposition of Issue No. 3, dated October 22, 1982.

14 See letter dated September 27, 1982, James Keppler (NRC) to Daiwyn Davidson (applicant), enclosing Notice of Violation (September 24, 1982) and Investigation Report 50-440/81-19(EIS); 50-441/81-19(EIS) (Report No. 81-19) (Licensing Board Ex. 3).

15 Memorandum and Order (Concerning Summary Disposition: Quality Assurance, Corbicula and Scram Discharge Volume Contentions), dated December 22, 1982, at 7-9.

Whether applicant has an adequate system for periodically reviewing its program for assuring the quality of contractor performance and ascertaining and correcting deficiencies that have arisen, particularly in systems essential to safe plant operation.<sup>16</sup>

By admitting these four issues, we were required to explore fully the implications of the staff's electrical investigation and findings, and to determine independently whether any significant deficiencies in applicant's QA program were indicated by applicant's performance in the electrical area.

In our Memorandum and Order (Reconsideration: Quality Assurance), dated January 28, 1983, in which we declined to reconsider our December 22, 1982 Memorandum and Order admitting the four issues of fact, we reemphasized that our primary concern was with applicant's QA overview program as applied to Comstock. We noted that we would only consider other specific nonconformances if we found that management's role in QA has been sufficiently suspect to require that we descend to that further level of detail.<sup>17</sup>

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<sup>16</sup> Id. at 9-10.

<sup>17</sup> Memorandum and Order (Reconsideration: Quality Assurance), dated January 28, 1983, at 9; see also Tr. 1465.

## B. Prefiled Testimony and Evidentiary Hearing

Pursuant to our Memorandum and Order (Procedural Matters Affecting the Hearing) of April 18, 1983, direct testimony was filed on May 2, 1983, by applicant<sup>18</sup> and the staff.<sup>19</sup> Neither Sunflower nor OCRE filed testimony or presented witnesses on Issue #3.

As indicated in applicant's prefiled testimony, Mr. Edelman is applicant's Vice President, Nuclear Group. As such, he has the overall management responsibility for the Perry Project. The various Perry Project department managers, including the QA manager, report to Mr. Edelman. He has worked at Perry since 1972 in various management capacities. Mr. Edelman was the Perry QA Manager from 1978 to 1981, and in that capacity was responsible for applicant's QA Management response to the February 1978 stop work order.<sup>20</sup> Mr. Leidich, who is an electrical engineer by degree and training, has worked at Perry since 1975 in various quality assurance and engineering supervisory positions. Mr. Leidich also is currently serving as Secretary of the Nuclear Power Engineering Committee (NPEC) of the Institute of Electrical and

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<sup>18</sup> "Applicants' Testimony of Murray R. Edelman and Gary R. Leidich on the Cleveland Electric Illuminating Company's Quality Assurance Program for Control of Safety-Related Contractors At Perry Nuclear Power Plant (Issue #3)," dated May 2, 1983, following Tr. 1031 (hereinafter Edelman/Leidich Testimony).

<sup>19</sup> "Testimony of NRC Region III on the Quality Assurance Issues of Fact Contained in the Licensing Board's Order of December 22, 1982," dated May 2, 1983, following Tr. 1568 (testimony of James E. Konklin, Cordell C. Williams, George F. Maxwell, and Max L. Gildner, hereinafter Konklin et al. Testimony).

<sup>20</sup> Edelman/Leidich Testimony at 2-3, 7-8.

Electronic Engineers (IEEE), and has participated in developing nuclear electrical standards for IEEE.<sup>21</sup>

In their prefiled testimony, Messrs. Edelman and Leidich provided a general description of the staffing and organization of applicant's QA program, an explanation of the procedures followed in applicant's QA overview of contractors, and a discussion of the application and findings of applicant's QA program in the electrical area. In response to a request by the Board,<sup>22</sup> applicant's direct testimony concerning the electrical area was supplemented at the hearing by Mr. Leidich, who presented a detailed month-by-month historical description of applicant's QA overview of Comstock.<sup>23</sup>

The staff witness panel included four NRC regional inspectors, each of whom has had NRC inspection experience at Perry.<sup>24</sup> Mr. James E. Konklin, the lead panel member, is Chief of a Reactor Projects Section in NRC's Region III office, and is responsible for coordinating and controlling the NRC's inspection and enforcement activities at Perry. Mr. Cordell C. Williams, Chief of the Region III Plant Systems Section, supervises electrical NRC inspections at Perry and was directly involved in the electrical investigation, conducted between October 27, 1981 and

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<sup>21</sup> Edelman/Leidich Testimony at 3-5.

<sup>22</sup> Tr. 1006 (Board).

<sup>23</sup> Tr. 1491-1543 (Leidich); see Section III B. infra.

<sup>24</sup> Konklin et al. Testimony at 2-3.

March 19, 1982.<sup>25</sup> His name appears on Report No. 81-19 as one of the principal reviewers of that document.<sup>26</sup> Mr. George F. Maxwell, currently an NRC Senior Resident Inspector at the Shearon Harris site, was a Region III Quality Assurance Specialist for Construction from 1977 to 1980 and performed ten inspections at Perry during that period. Mr. Max L. Gildner has been the NRC's Resident Inspector at Perry since 1981.

The staff's prefiled testimony summarized the results of NRC inspections performed at Perry since 1978. The testimony provided details of the staff's 1981-82 investigation and findings and discussed the applicant's corrective action in response to Report No. 81-19.

The Board received limited appearances on May 23, 1983, and May 31, 1983,<sup>27</sup> and conducted an evidentiary hearing on May 24-27, 1983, in Painesville, Ohio. We received a site tour of electrical and other areas on June 1, 1983.

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<sup>25</sup> Tr. 1572 (Williams).

<sup>26</sup> Board Ex. 3, Report No. 81-19, at 1; see Tr. 1626 (Williams).

<sup>27</sup> We also granted an unscheduled limited appearance on May 24, 1983. Tr. 1134-36.

C. Governing Standards

Applicant's QA program for safety-related work is governed by the criteria in 10 CFR Part 50, Appendix B, of the Nuclear Regulatory Commission's regulations, and by various industry codes and standards.<sup>28</sup> In deciding the issues of material fact we have particularly considered 10 CFR Part 50, Appendix B, Criterion II (Quality Assurance Program),<sup>29</sup> and Criterion XVI (Corrective Action).<sup>30</sup> We are not aware of any Commission regulatory guidance elaborating upon Criterion XVI's requirement that adverse conditions and nonconformances be "promptly

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<sup>28</sup> Edelman/Leidich Testimony at 12, Attachment 3.

<sup>29</sup> See Memorandum and Order, dated December 22, 1982, supra n.10, at 5. In that decision, we referenced what we view to be the relevant portions of Criterion II, namely:

The quality assurance program shall provide control over activities affecting the quality of the identified structures, systems, and components, to an extent consistent with their importance to safety. . . . The applicant shall regularly review the status and adequacy of the quality assurance program. Management of other organizations participating in the quality assurance program shall regularly review the status and adequacy of that part of the quality assurance program which they are executing.

<sup>30</sup> Criterion XVI states:

Measures shall be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances are promptly identified and corrected.. In the case of significant conditions adverse to quality, the measures shall assure that the cause of the condition is determined and corrective action taken to preclude repetition. The identification of the significant condition adverse to quality, the cause of the condition, and the corrective action taken shall be documented and reported to appropriate levels of management.

identified and corrected," and the parties have identified none.<sup>31</sup> In the absence of such directly applicable guidance, we reject OCRE's suggestion that 10 CFR Part II, Appendix C, "General Policy and Procedure for NRC Enforcement Actions," is directly helpful to us in interpreting this language.

In the context of the serious problems addressed in Appendix C, "prompt" may be defined as "immediate." However, this use of language in Appendix C is consistent with our view that we should apply a reasonableness test to determine what is "prompt." If a deficiency is serious, particularly if it has immediate implications for ongoing construction, it must be remedied immediately. On the other hand, less serious deficiencies or minor deficiencies in written procedures may be resolved "promptly" in a matter of days or months.

Furthermore, in reviewing a very large number of deficiencies, a reasonableness standard considers the possibility that there will be some laggards in the race to resolution. Providing the laggards do not themselves constitute serious problems, their existence merely confirms the bureaucratic principle that institutions are unable to resolve everything immediately. Small numbers of relatively unimportant laggards are not of themselves a cause of serious concern.

In addition, we note that intervenors are required to do more than simply cite deficiency reports (applicant's or staff's) in support of their quality assurance contention. The number of deficiency reports is

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<sup>31</sup> See Tr. 1399-1400, 1594-99.



an ambiguous measure of the success of a QA program. A low number of findings may indicate either an inactive QA program or a very effective one that prevents recurring difficulties. Likewise, a large number of findings may indicate that a QA program is active or that it has failed to prevent the recurrence of deficiencies.<sup>32</sup> Furthermore, were we to pay excess attention to the number of deficiencies, by itself, we might "create an adverse incentive for reporting deficiencies; and this incentive could seriously impact safety."<sup>33</sup>

## II. Relationship Between Applicant and Comstock

Applicant presented extensive testimony about its QA overview of Comstock. Some of the testimony described the characteristics of applicant's QA overview program for controlling safety-related contractors, including Comstock and others. Applicant also gave specific testimony on how their overview program covered the electrical area. This included a detailed review of the major QA findings against Comstock and the corrective actions taken by the contractor.

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<sup>32</sup> LBP-81-24, 14 NRC at 211.

<sup>33</sup> Id.

A. Applicant's General Program

Applicant manages the Perry Project through its Project Organization, consisting of all applicant and consultant<sup>34</sup> personnel at the Perry site. There are now approximately 650 applicant and 700 consultant personnel. Contractors are not part of the Project Organization.<sup>35</sup>

Applicant consolidated its entire project organization at the Perry site in 1978 as part of a major corrective action program put into effect following the 1978 stop work order.<sup>36</sup> The Board finds that the post-1978 management changes, devised by the applicant and the staff, reflect significant organizational improvements.

Mr. Edelman presides over the Project Organization.<sup>37</sup> In this role, he has ultimate project responsibility for the quality assurance program. Mr. Edelman testified as to the close organizational and working relationship between his office and those of other senior applicant executives, including the President. Executive communications were formalized as part of applicant's corrective action following the February 1978 stop work order. Applicant instituted formal monthly

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<sup>34</sup> The consultants provide specific expertise or short-term support to applicant. They are "integrated" into the Project Organization. Edelman/Leidich Testimony at 11.

<sup>35</sup> Edelman/Leidich Testimony at 7.

<sup>36</sup> Edelman/Leidich Testimony at 8-9, 15-16.

<sup>37</sup> A number of applicant's project management officials (including Mr. Edelman) have significant prior project QA experience. Edelman/Leidich Testimony at 10-11.

vice-president meetings and quarterly management meetings with applicant's Chief Executive Officer and President. In addition, applicant established a special QA advisory group which assists Mr. Edelman on key program issues.<sup>38</sup> Also, since 1978 the Perry Quality Assurance Manual has contained a policy statement signed by applicant's President, which describes and commits applicant to a strong, independent QA program for Perry.<sup>39</sup>

The Board concludes from this uncontradicted evidence that applicant's most senior management has been thoroughly involved in the management of the Perry Project, and in particular the quality assurance program. We believe that this type of senior management involvement is a prerequisite to the successful implementation of a nuclear quality assurance program.

Applicant's direct testimony described the organization and staffing of the Perry Quality Assurance Department, the QA systems used by applicant for controlling contractors, and the applicant's management tools used for periodically reviewing the effectiveness of the QA program.<sup>40</sup>

Applicant's Nuclear Quality Assurance Department is headed by the QA Department Manager. He reports to the Vice President, Nuclear Group (Mr. Edelman) and has organizational status and authority equal to that

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<sup>38</sup> Edelman/Leidich Testimony at 7-8, 15-16, 23-24.

<sup>39</sup> Edelman/Leidich Testimony at 14, Attachment 3.

<sup>40</sup> Edelman/Leidich Testimony at 8-15, Attachment 2.

of the managers of the construction, engineering, and operations departments. Under the QA Manager are various QA sections headed by applicant's general supervisors. One of these is the Construction Quality Section (CQS), which has the direct responsibility for QA control of construction contractors such as Comstock. CQS is divided by discipline into four units, one of which is the CQS electrical unit. Separate from CQS is the Quality Auditing Unit, which is responsible for internal audits of the Project Organization as well as contractor audits.<sup>41</sup>

Since 1978 applicant's QA Department has grown from fewer than 50 to approximately 200 personnel. The CQS electrical unit has grown from two in 1977 to 12 currently. Applicant's personnel perform "second-line" surveillance and inspection. "First-line" inspection is performed by the contractors' QA/QC personnel, who currently number in excess of 300. Applicant's QA force has been increased when construction activities have increased. Applicant presented uncontradicted evidence that Perry has one of the largest nuclear plant QA departments in the country, and that as of June 1982 it had the best (lowest) ratio of craft to quality assurance/quality control (QC) personnel of any plant under construction.<sup>42</sup> The QA staff has a large number of certified inspectors and auditors. The rate of turnover of personnel has been low. Mr. Edelman attributed this to applicant's

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<sup>41</sup> Edelman/Leidich Testimony at 8, 16, 18-19, Attachment 2.

<sup>42</sup> Edelman/Leidich Testimony at 9, 17; Tr. 1045-54, 1215-17 (Edelman).

salary structure, to training and promotion of inspectors, and to applicant's success in attracting experienced personnel with local ties.<sup>43</sup> The Board was favorably impressed with the evidence applicant presented regarding applicant's overall QA staffing and organization.

Applicant's QA oversight of individual safety-related contractors begins with detailed reviews of the contractor's written QA program and procedures, which must conform to applicant's QA program. The contractor's program must be approved by applicant before safety-related construction can commence. During construction, applicant continues to review and approve all changes to the contractor's program and procedures.<sup>44</sup>

Applicant's daily oversight of the contractor's QA/QC program implementation is the responsibility of inspectors and quality engineers (QEs) in the Construction Quality Section. The inspectors and QEs are organized by contractor areas, with a responsible QE and supporting inspection staff assigned to each contractor. The inspectors spend 85 to 90 percent of their time in the field overseeing and inspecting the contractor's QA/QC work. The extent of field surveillance and inspection is intended to be related to the safety significance of the activity, the level of construction activity, previous contractor performance, and the extent to which a new type of work or procedure is involved. The inspection results are reviewed by the responsible QE,

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<sup>43</sup> Edelman/Leidich Testimony at 9-10, 19.

<sup>44</sup> Edelman/Leidich Testimony at 13, 19-20.

who also performs "process audits" in specified areas, as well as other ongoing QA program and procedure reviews. The responsible QE participates with a design engineer and contractor administrator on a "contract team," which meets regularly to review the status of the contractor's program.<sup>45</sup>

Applicant's QA program uses formal documentation/close-out mechanisms, including nonconformance reports (NRs), observation/surveillance or audit action requests (ARs),<sup>46</sup> corrective action requests (CARs),<sup>47</sup> and stop work notifications (SWNs). Each is recorded by the initiating inspector or auditor, and tracked through the system until close-out. Each applicant and contractor NR is entered into a central, computerized NR tracking system and monitored by an NR coordinator in applicant's QA Department. Applicant's testimony documented the number of NRs, ARs, CARs, and SWNs issued to date in the

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<sup>45</sup> Edelman/Leidich Testimony at 9, 16-19, 22; Tr. 1077-83, 1118 (Leidich and Edelman).

<sup>46</sup> When applicant QA personnel identified programmatic or procedural deficiencies not involving plant "hardware," these are documented by COS personnel as observation or surveillance ARs, or by the Quality Auditing Unit as audit ARs. The Quality Auditing Unit is responsible for the tracking and follow-up of all ARs. A computerized tracking system is used for this purpose. Each Unit is responsible for closing out ARs which it generates. Edelman/Leidich Testimony at 21.

<sup>47</sup> If in reviewing an AR the unit that generated it determines that a serious programmatic problem is involved, that unit changes the AR to a CAR. The purpose of the CAR is to assure that the problem receives increased management attention. All open CARs are identified to applicant's managers and the Vice President, Nuclear Group, on a monthly basis. Edelman/Leidich Testimony at 21.

electrical area, and the total number of such documents issued to all safety-related contractors.<sup>48</sup>

Applicant uses a number of different periodic review mechanisms to overview its formal daily inspection and corrective action program. COS prepares monthly performance analysis reports (PARs) discussing individual contractor performance. These are based on quantitative information collected by the responsible QEs. Significant PAR information is passed up applicant's management chain.<sup>49</sup>

Of central importance to applicant's QA overview program are quarterly reports<sup>50</sup> prepared by the QA Department manager. These reports, which were a response to applicant's 1978 QA difficulties, provide summaries of contractor QA performance for the quarter. The reports are reviewed at quarterly Chief Executive meetings.<sup>51</sup>

The Quality Assurance Advisory Committee (QAAC), composed of senior CEI managers, the corporate QA managers for applicant's consultants, and an outside QA consultant, separately reviews site QA reports and conducts first-hand reviews as part of applicant's overview program.

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48 Edelman/Leidich Testimony at 20-21; Tr. 1076-77, 1116-22 (Leidich and Edelman).

49 Edelman/Leidich Testimony at 23; Konklin et al. Testimony at 20-21.

50 Assessment of Quality Assurance Program Effectiveness for the Perry Nuclear Power Plant, First Quarter 1979 - First Quarter 1983 (Licensing Board Ex. 2), identified at Tr. 1256, received at Tr. 1259.

51 Edelman/Leidich Testimony at 16, 24; Tr. 1074-75; Konklin et al. Testimony at 21.

The QAAC then consults with and advises applicant's Vice President, Nuclear Group, regarding its findings.<sup>52</sup> Mr. Maxwell of the staff indicated that the QAAC was not established in response to an NRC requirement; however, he believes that the committee has been beneficial to the Project.<sup>53</sup>

Another aspect of applicant's QA overview is its formal auditing program. Applicant created the Quality Auditing Unit in 1980 as an independent QA Department unit reporting directly to the QA Department Manager. This replaced the former auditing arrangement, under which audits were performed by the COS QEs, along with their other responsibilities. The auditing unit conducts annual audits of safety-related contractors, as well as periodic internal audits of the Project Organization's QA program implementation.<sup>54</sup>

These reviews collectively constitute applicant's periodic review system. Applicant emphasized that its overview mechanisms are not intended to substitute for the formal inspection and corrective action system (i.e. the NR/AR/CAR/SWN system). Further, applicant stressed that periodic QA reports are principally for highlighting problem areas, rather than for detailing program areas that are working well.

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<sup>52</sup> Edelman/Leidich Testimony at 16, 24; Konklin et al. Testimony at 22.

<sup>53</sup> Tr. 1781-83 (Maxwell).

<sup>54</sup> Edelman/Leidich Testimony at 18-19, 25.



In response to a Board inquiry, Mr. Leidich illustrated how applicant's QA process is applied, using the example of electrical cable pulling. The first step described was the pre-pull walkdown inspection of the cable tray or duct bank. Its purpose is to examine for any obstructions that might damage the cable during the pull. In addition to the contractor's pre-pull inspection, applicant may formally identify to the contractor a mandatory hold or witness point to enable applicant's QA/QC personnel to perform a second line inspection prior to cable pulling.<sup>55</sup> The contractor must perform 100% coverage of all cable pulling activities. If the pull is complex, applicant would also perform surveillance over all pulling activity. This decision would be made by the QE, and would be reviewed by his QA management, including in some cases the QA Department Manager. Both the contractor's and applicant's inspectors prepare inspection reports of their activities, and formally document any deficiencies that are found. That documentation is then reviewed by applicant's QE, and ultimately becomes part of the project's permanent quality records. The QE then prepares reports, generally on a weekly basis, of the status of cable installation activities, including performance evaluations of the contractor. These reports go to the CQS supervisor and then to the QA

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<sup>55</sup> See e.g., Tr. 1509 (Leidich).

Department Manager. Information in these reports then is conveyed to senior management through the previously described reporting system.<sup>56</sup>

For each of the inspection steps, there are detailed work and inspection procedures. These procedures receive thorough reviews by applicant design and quality engineers prior to being accepted for use. The individual inspectors are responsible for documenting compliance with applicable work and inspection procedures.<sup>57</sup>

During the actual cable pull, dynamometers are attached to the cable. These register cable tension during the pull and are read by inspection personnel to assure that the tension is within pre-specified limits. Although the manufacturers' engineering values for cable tensions are conservative<sup>58</sup> any overtensioning is documented on an NR, which then receives engineering review. If over-tensioning occurs, the design engineer may direct that the cables be scrapped or may determine that the cable may be used as is. To determine that a cable may be used as is, a design engineer may perform additional calculations or may consult with the manufacturer concerning the need for additional tests.<sup>59</sup>

Mr. Leidich also described post-pulling inspections. These include meggering tests performed by the contractor's inspectors. Their purpose

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56 Tr. 1085-89, 1096-97 (Leidich).

57 Tr. 1094-96, 1099 (Leidich).

58 Tr. 1097-1104 (Leidich).

59 Tr. 1107-08 (Leidich).

is to measure for possible cable insulation deficiencies that may have been caused by faulty pulling procedures. After the completion of these tests, the cable is turned over to applicant's inspectors, who perform a review of all documentation. This assures that any deficiencies are properly identified and corrected prior to turnover. At the completion of this second level of review, applicant's nuclear test section performs another review of the cable system, which may include another meggering test. This would be followed by preoperational testing.<sup>60</sup>

In addition, cable pulling is covered by applicant's formal audit program. Audits are performed at least annually and may be performed more often in specified areas, particularly when there is a concern over contractor performance. There may also be increased auditing when a new work activity begins. Audit checklists are used by the auditors, with input from the quality and design engineers.<sup>61</sup>

The staff's direct testimony described the staff's construction inspection program for Perry, and provided a summary of the staff's inspection findings since the beginning of the project. The NRC reviews Applicant's written QA program and procedures, as well as those of the contractors. The staff observes, on a sampling basis, the construction and QA activities at the site. This is followed by a review of QA records. The staff's inspections are intended to assure that the Perry QA program is identifying and requiring correction of significant

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60 Tr. 1104-07 (Leidich).

61 Tr. 1089-93 (Leidich).

deficiencies.<sup>62</sup> In addition to the staff's routine inspection program, the staff evaluates and investigates allegations and performs special team inspections by regional or headquarter groups such as the Regional Construction Assessment Team (CAT) review performed at Perry in July and August 1982.<sup>63</sup>

From July 1978 to April 1983, the staff spent over 6000 inspector hours on inspections at Perry. The staff conducted 95 inspections and identified 64 noncompliances. There were 13 noncompliances issued in the electrical area. The total number of noncompliances at Perry was average for construction sites in Region III. The noncompliances identified were not serious, as defined under NRC enforcement policy guidelines. During this period, the staff issued no enforcement orders and imposed no fines.<sup>64</sup> The NRC's 1982 CAT investigation required 464 inspector-hours and included, among other things, a review of applicant's QA overview program, corrective action systems, in-process inspections, and inspector effectiveness. The CAT review concluded that applicant's QA program appeared to be satisfactory.<sup>65</sup> Three NRC Systematic Assessment of Licensee Performance (SALP) reports, covering July 1979 through September 1982, made similar findings about the

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62 Konklin et al. Testimony at 4-5.

63 Konklin et al. Testimony at 5-6.

64 Konklin et al. Testimony at 6-7, 9.

65 Konklin et al. Testimony at 10.

it does not believe there has been a loss of control of Comstock or other site contractors by applicant.<sup>70</sup>

The Board has considered the evidence presented<sup>71</sup> concerning the effectiveness of applicant's general QA overview program. Based on this evidence, we find applicant's general program to be an acceptable one. We conclude that applicant's program is comprehensive and provides appropriate assurance that significant construction deficiencies have been and will be identified and corrected, thereby minimizing the likelihood of unsafe conditions at the plant.

B. Chronology of Applicant's Electrical QA Program

Applicant's prefiled testimony summarized applicant's initial selection and QA review of Comstock in 1977, and then discussed

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(Footnote Continued)

<sup>69</sup> Konklin et al. Testimony at 20-24. The staff's testimony discussed the applicant's "self-initiated" Institute of Nuclear Power Operations (INPO) evaluation, which found applicant's QA overview program to be satisfactory. Konklin et al. Testimony at 24, 26. At the hearing Mr. Edelman explained the scope of the INPO review, which evaluated applicant's QA program as well as other areas of the project. Applicant entered INPO QA findings on applicant's AR tracking system to assure proper close-out of the programmatic and procedural findings in the Report. Tr. 1260-65, 1400-06, 1485-86 (Edelman).

<sup>70</sup> Konklin et al. Testimony at 10-14, 25-26.

<sup>71</sup> Sections III.B., IV and V infra focus on the specific application of the program with respect to Comstock.

applicant's principal QA findings against Comstock, and corrective action taken, since the time Comstock began its work at Perry.<sup>72</sup> At the commencement of the hearing, the Board requested a more detailed "play-by-play" discussion of applicant's overview program in the electrical area.<sup>73</sup>

Applicant answered the Board's request with a detailed presentation by Mr. Leidich.<sup>74</sup> In response to our recommendation,<sup>75</sup> applicant's proposed findings of fact and conclusions of law provided a matrix listing some of the major areas covered by Mr. Leidich's presentation, with accompanying record citations. The matrix summarizes by quarter the number of applicant audits, applicant and Comstock stop work orders, and NRC inspections in the electrical area, and records Comstock QA and craft levels, and selected electrical construction completion levels discussed by Mr. Leidich. Although Mr. Leidich's presentation was prepared on short notice, it provided relevant information that we believe adds weight to applicant's and staff's other testimony. As the matrix reflects, Mr. Leidich documented frequent applicant audits and NRC inspections of the electrical area before and after the staff's 1981-82 investigation. As of September 1981 (i.e., just prior to the

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72 Edelman/Leidich Testimony at 26-32.

73 Tr. 1006-08 (Board).

74 Tr. 1489-1551 (Leidich).

75 Tr. 1490 (Board).

commencement of the NRC's 1981-82 investigation), applicant had already conducted 46 audits of Comstock.<sup>76</sup>

After the initial preparation, in 1974 and 1975, of the specification for the electrical work at Perry, including an "attachment specification" describing electrical QA requirements, applicant in 1976 prepared a prospective bidders list with input from applicant's QA Department. Applicant held meetings with prospective bidders in 1976 and early 1977, and established a qualified bidders list in March 1977. Later in 1977 applicant conducted contractor interviews and site visits and reviewed contractor proposals. In October 1977 applicant conducted a pre-award QA survey of Comstock at Comstock's corporate headquarters, and at the Fermi 2 nuclear site in Michigan where Comstock was performing electrical work, including quality assurance.<sup>77</sup> Applicant awarded Comstock the electrical contract in November 1977.<sup>78</sup>

Applicant's post-award QA review of Comstock procedures began in December 1977. Between December 1977 and October 1978, applicant and Comstock developed Comstock's program and procedures. No safety-related installation work was performed during this period.<sup>79</sup> Applicant's

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76 Tr. 1539 (Leidich).

77 Tr. 1286, 1491-93 (Leidich).

78 Originally, Comstock was to perform the electrical and QA work, and the major part of the construction as part of a joint venture. The joint venture was dissolved in mid-1980. See Edeiman/Leidich Testimony at 25-26.

79 Tr. 1493-98 (Leidich).

February 1978 stop work order had no direct effect on Comstock since Comstock was not performing work in the field; however, applicant did upgrade the electrical QA attachment specification as part of applicant's overall corrective action program following the stop work order.<sup>80</sup>

In October 1978, Comstock commenced its first safety-related activity with the installation of duct banks and manholes.<sup>81</sup> As summarized in applicant's prefiled testimony, safety-related work performed until mid-1980 in the electrical area was primarily underground cable ductwork, cable tray hanger installation, and field placement of equipment. Few complex electrical installations were completed during this period. For example, less than 1 percent of the safety-related conduit had been installed as of mid-1980.<sup>82</sup>

Mr. Leidich's presentation provided details which demonstrated to the Board that applicant was providing close QA overview of Comstock's activities during this 1978-1980 period.<sup>83</sup> In 1979 alone, applicant conducted 13 audits of Comstock covering numerous aspects of Comstock's program.<sup>84</sup> This suggests to the Board close involvement in Comstock's activities by applicant. In 1978, 1979, and the first half of 1980,

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80 Tr. 1495 (Edelman).

81 Tr. 1497-98 (Leidich).

82 Attachment A.

83 Tr. 1497-1510 (Leidich).

84 Tr. 1500-06 (Leidich).



applicant was identifying deficiencies and achieving corrective action with regard to Comstock's QC staffing, electrical cable separation criteria, timeliness of audit close-outs, the need for procedure clarifications, and other areas.<sup>85</sup> The evidence indicates that applicant was adequately aware of Comstock's activities during this period.

Applicant testified that as the more complex electrical installation work increased in the last half of 1980, applicant shifted the emphasis of its QA overview from program and procedure development and review, to surveillance of procedure implementation and field installation activities. During this time, applicant documented Comstock conduit installation problems and took corrective action. Comstock increased and better defined its in-process inspections, and applicant stepped up its installation surveillance.<sup>86</sup> With the benefit of this intensified QA/QC effort, applicant identified a trend of Comstock misinterpretations of drawings and specifications and directed corrective action, including increased craft training.<sup>87</sup>

In September 1980, as a result of an internal CAR, Comstock began an extensive program for upgraded craft training, which has continued to the present. Also in the last half of 1980, applicant continued to

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<sup>85</sup> Tr. 1497-1512(Leidich).

<sup>86</sup> Edelman/Leidich Testimony at 27.

<sup>87</sup> Edelman/Leidich Testimony at 27-28.

press Comstock to increase its QA/QC staffing for upcoming work.<sup>88</sup> In October 1980,<sup>89</sup> applicant met with the President of Comstock and discussed the importance of hiring additional QA/QC staff.<sup>90</sup> Mr. Leidich testified that there was a substantial industry shortage of qualified electrical inspectors in 1980 and 1981, and that Comstock was actively recruiting for inspectors during that period.<sup>91</sup> In November 1980, applicant participated in Comstock craft training sessions. In December applicant audited Comstock's craft training program and identified areas for improvement.<sup>92</sup>

Comstock did increase its QA/QC staff throughout 1981 in response to CEI's requests; in addition, applicant increased its field surveillance and conducted additional audits of Comstock's surveillance activities and nonconformance system. Mr. Leidich discussed ten applicant audits of Comstock that were conducted in 1981 prior to the commencement of the NRC's 1981-82 investigation. In addition to

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<sup>88</sup> Mr. Leidich testified that although the inspector/craft ratios were satisfactory in late 1980 and early 1981, applicant was "trying to get the contractor out in front of the installation" in anticipation of 1981 installation activities. Tr. 1512-13, 1519 (Leidich). See Tr. 1620 (Williams).

<sup>89</sup> Memorandum and Order (Concerning Scheduling), September 16, 1982, at 3; Tr. 1868-72.

<sup>90</sup> Tr. 1511-13 (Leidich).

<sup>91</sup> Tr. 1513-14, 1521-22 (Leidich); Edelman/Leidich Testimony at 28. See Tr. 1645-46, 1855-56 (Williams).

<sup>92</sup> Tr. 1514-15 (Leidich).

addressing Comstock's surveillance and NR system, applicant's audits of Comstock reviewed such areas as inspector qualifications, certifications and training; Comstock internal auditing; corrective action documentation; craft training; and the overall implementation of Comstock's QA program. Applicant was identifying procedural deficiencies, and corrective action was being implemented.<sup>93</sup>

Based on the foregoing, the Board concludes that Applicants' QA program was actively overseeing Comstock's QA program for the period prior to the commencement of the NRC Staff's 1981-82 investigation. Applicant was identifying deficiencies and requiring appropriate corrective action. Almost all the deficiencies appear to be procedural and not to be significant construction errors. Applicant apparently reported to the NRC and adopted appropriate remedial actions for each instance where items of potential safety significance were detected.<sup>94</sup>

Although intervenors had an opportunity to undertake broad discovery and to cross-examine applicant on its testimony, they have not

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<sup>93</sup> Tr. 1518-27 (Leidich); Edelman/Leidich Testimony at 29. In August 1981, at the beginning of its cable termination activities, Comstock itself issued several internal stop work orders as a result of procedural difficulties with the terminations. Tr. 1525 (Leidich).

<sup>94</sup> Applicant filed 10 C.F.R. § 50.55(e) reports in January 1980 (cable tray and conduit hanger gusset plates), Tr. 1506-07; September 1981 (cable tray splice bolt torquing requirements), Tr. 1525-26; October 1981 (cable tray mounting devices), Tr. 1527; and December 1981 (attachment welds on safety-related switch gear), Tr. 1528-29 (Leidich); see Tr. 1543-48 (Leidich).

raised any doubts about the handling of individual deficiencies and have given no specific reasons for doubting the adequacy of the overall pattern of quality assurance activities. There is no reason to believe that the quality assurance program ever was inadequate to detect and correct unsafe conditions.

In November 1981, applicant ordered that Comstock stop safety-related cable pulling. Applicant's witnesses testified that the stop work notification was issued because of the accumulation of Comstock procedural deficiencies and because of concerns raised by a joint NRC/CEI observation at the beginning of safety-related power duct bank cable pulling.<sup>95</sup> Applicant required Comstock to review thoroughly its safety-related cable pulling program and procedures before it lifted the stop work order in January 1982.<sup>96</sup> Applicant subsequently issued stop work notifications against Comstock in December 1981, regarding electrical terminations; in February 1982, regarding techniques for nondestructively examining welds; and in March 1982, regarding potential flammability of motor control center materials.<sup>97</sup>

Mr. Leidich discussed 20 applicant audits of Comstock in 1982. These covered a variety of areas, such as cable tray and conduit installation; raceway separation criteria; corrective actions on cable

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<sup>95</sup> Edelman/Leidich Testimony at 29; Tr. 1527-28 (Leidich).

<sup>96</sup> Edelman/Leidich Testimony at 29; Tr. 1532 (Leidich).

<sup>97</sup> Tr. 1529, 1532, 1534-35 (Leidich).

pulling; document control; storage and maintenance; applicant's annual 18-criteria audit under 10 C.F.R. Part 50, Appendix B criteria; and a follow-up audit to the 18-criteria audit.<sup>98</sup> In addition, applicant issued five corrective action requests to Comstock during 1982.<sup>99</sup>

In 1982 applicant also established a hold point for closeouts of all Comstock NRs,<sup>100</sup> requiring Comstock, prior to closing out any NR, to formally notify applicant QA/QC personnel, who would then review the proposed close-out.<sup>101</sup> In June 1982, as part of Comstock's significant steps to upgrade training, Comstock held craft training workshops in conjunction with the National Electrical Contractors Association and the International Brotherhood of Electrical Workers. The workshops emphasized conduit installation and cable pulling requirements and reviewed applicable QA requirements.<sup>102</sup> Between January 1981 and July 1982 Comstock gave approximately 15,000 person-hours of training to its

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98 Tr. 1534-41 (Leidich).

99 Tr. 1532-33, 1535, 1538-39 (Leidich).

100 Tr. 1540 (Leidich).

101 See TR. 1085 (Leidich).

102 Edelman/Leidich Testimony at 32; Tr. 1537 (Leidich).

craft and QA/QC personnel.<sup>103</sup> Applicant's QA overview continued on an intensive basis in early 1983.<sup>104</sup>

The Board concludes that applicant conducted an intensive QA overview of Comstock from late 1981 through early 1983, and that applicant adequately controlled Comstock's work. Applicant conducted a steady stream of reviews, including at least 25 audits; and took significant corrective action steps during this period, including issuing four stop work notifications against Comstock. There is evidence demonstrating that Comstock undertook major corrective action in response to applicant's involvement, particularly in the area of QA/QC staffing, and QA/QC and craft training. We note that Comstock's QA/QC staff almost doubled in this period, and that the current ratio of craft to QA/QC is approximately 3 to 1, which indicates close Comstock QA/QC coverage of the work in progress.<sup>105</sup>

### III. Timeliness of Corrective Action

The Board received evidence concerning the close-outs of NRs, ARs and CARs. This was an item of initial concern to us in light of statements in Report No. 81-19 and the July 13, 1982 NRC SALP Report which suggested that electrical problems at Perry were not being

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<sup>103</sup> Edelman/Leidich Testimony at 28; Tr. 1538 (Leidich).

<sup>104</sup> Tr. 1541-42 (Leidich).

<sup>105</sup> Attachment A.

promptly identified and corrected. Preliminary findings from the Staff's 1982 SALP Report stated:

Taken individually these findings may not represent major problems, but collectively they reveal deficiencies in the implementation of the quality assurance program in that problems are not identified and corrected in a timely manner.<sup>106</sup>

Thereafter, the Staff's September 27, 1982 letter transmitting Report No. 81-19 to applicant stated:

We are concerned that even though your continuing assessment of the electrical contractor's performance showed degradation of the quality assurance program, you failed to investigate in a prompt manner the elements contributing to the poor performance and require adequate corrective action to upgrade the program.<sup>107</sup>

Specifically with respect to applicant's corrective action system, Report No. 81-19 at pages 92-93 discussed a staff review of Comstock responsiveness to applicant audit findings issued between November 1978 and December 1981. That review disclosed "what appeared to be L. K. Comstock's poor performance in closing out applicant audit findings."<sup>108</sup>

Applicant and staff presented extensive testimony concerning the timeliness of Comstock's corrective action in response to NRs, ARs, and CARs issued in the electrical area.

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<sup>106</sup> SALP 2 Report at 7 (emphasis added). See Memorandum and Order dated December 22, 1982, supra n. 10, at 8.

<sup>107</sup> Licensing Board Ex. 3, NRC letter to applicant dated September 27, 1982, at 1 (emphasis added).

<sup>108</sup> Licensing Board Ex. 3, Report No. 81-19, at 93.

With respect to nonconformances, applicant's prefiled testimony indicated that applicant and Comstock have issued approximately 2000 NRs in the electrical area.<sup>109</sup> Mr. Edelman testified that 240 of the NRs are still open.<sup>110</sup> NRs must be resolved before the plant can go into operation; however, applicant's practice has been to attempt to obtain disposition of NRs within 30 days and to track the status of all nonconforming conditions open longer than 30 days.<sup>111</sup>

Mr. Edelman testified that the timeliness of corrective action implementation depends, in part, on factors such as the type and phase of construction in the area and the projected time for turnover of the item involved.<sup>112</sup> Mr. Edelman stated that the most important QA consideration with respect to open NRs is to have an adequate system to track and identify the status of every NR, and that applicant's NR tracking system accomplishes that purpose.<sup>113</sup> Mr. Edelman also

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109 Edelman/Leidich Testimony at 20.

110 Tr. 1356-57 (Edelman).

111 Tr. 1162-63 (Edelman). The 30 day time for "disposition" refers to review by the design engineer and a decision as to the appropriate type of corrective action to be implemented, rather than to the contractor's final implementation of the specified corrective action. Tr. 1167-69 (Edelman).

112 Tr. 1163-64 (Edelman). See p. 21, supra.

113 Tr. 1162-64 (Edelman).



presented uncontradicted testimony that applicant's reviews and audits have not identified an undue delay in the close-out of NRs.<sup>114</sup>

No timeliness problems in connection with the close-outs of NRs were cited by staff witnesses. Mr. Konklin testified that in order to apply the timeliness requirements of 10 C.F.R. Part 50, Appendix B, Criteria XVI, a judgment must be made based on a number of considerations, such as the type of item, the significance of the deficiency, the stage of construction, whether the item would become inaccessible due to construction in the near future, and the hold points that might be involved in the work.<sup>115</sup> Mr. Maxwell testified that IEEE-336 requires applicant to resolve unsatisfactory conditions before operating a system.<sup>116</sup>

Based on the evidence, it is clear to the Board that the close-out of NRs has not been a problem. The intervenors have not raised any serious doubts about the adequacy of the closeout systems. The Board is entirely satisfied that applicant's system is closely tracking the status of NRs at Perry, and that nonconformances are being properly closed out in a manner consistent with their safety significance.

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114 Tr. 1164-66, 1168-69 (Edelman).

115 Tr. 1596 (Konklin).

116 Tr. 1597 (Maxwell).

The Board and intervenors also inquired extensively into whether Comstock has corrected applicant ARs and CARs on a timely basis.<sup>117</sup> At the hearing, Sunflower's representative and the Board asked applicant's witnesses to address the statements in Report No. 81-19 regarding Comstock's apparent lack of timeliness in responding to applicant audit findings.<sup>118</sup> Messrs. Edelman and Leidich agreed with the Staff's finding at page 93 of Report No. 81-19 that there were excessive open ARs against Comstock as of the time the staff's review was conducted.<sup>119</sup> However, applicant had issued a number of CARs and an SWN to Comstock for lack of responsiveness to applicant audit findings.<sup>120</sup> Mr. Edelman and Mr. Leidich also testified that applicant had recognized underlying problems such as Comstock's QA/QC staffing and training, and that applicant took significant steps to address these areas.<sup>121</sup> We have previously concluded that a significant improvement in Comstock QA/QC

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<sup>117</sup> ARs and CARs involve procedural or programmatic deficiencies not involving plant "hardware." A CAR is essentially an escalated AR. See n. 43, supra; Tr. 1279 (Leidich); 1312-14 (Board); and 1371 (Edelman).

<sup>118</sup> Tr. 1274 (Licensing Board); Tr. 1363 (Hubbard).

<sup>119</sup> Tr. 1278-79, 1363-64 (Leidich); Tr. 1371 (Edelman).

<sup>120</sup> Tr. 1371 (Edelman). See Tr. 1308-11, 1507 (March 1980 CAR); Tr. 1527 (November 1981 SWN); Tr. 1535 (April 1982 CAR); Tr. 1374-75, 1538 (August 1982 CAR) (Leidich).

<sup>121</sup> Tr. 1272-79 (Edelman/Leidich); pp. 35-36, supra.

staffing and training has indeed been accomplished.<sup>122</sup> Mr. Leidich testified that applicant saw improvements in some areas covered by its audit findings and that in other areas there were lingering problems.<sup>123</sup> Mr. Edelman testified that applicant continues to take any action (e.g. upgrading an AR to a CAR or issuing a SWN) it believes is required to get responsiveness from the contractor.<sup>124</sup>

The uncontradicted evidence is that open ARs and CARs are not a current problem with respect to Comstock.<sup>125</sup> Applicant's prefiled testimony stated that applicant has issued 267 ARs against Comstock.<sup>126</sup> Although there was no evidence as to the precise number of current open ARs, Mr. Leidich testified that the long-standing "problem" ARs against Comstock have now been closed out. As to CARs, as of the time of the hearing, applicant had issued 18 CARs against Comstock. Only two of these (both of which were issued in 1983) remained open as of the hearing.<sup>127</sup> Since the time of the NRC's 1981-82 investigation, applicant has requested Comstock to respond to all ARs and CARs within

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122 pp. 39-40, supra; see Tr. 1369-70 (Leidich).

123 Tr. 1279 (Leidich).

124 Tr. 1371 (Edelman). See, e.g. Edelman/Leidich Testimony at 33 (discussing applicant's responses to Comstock's final inspection backlog).

125 Tr. 1366-68 (Leidich).

126 Edelman/Leidich Testimony at 21.

127 Tr. 1867-68 (Silberg).

five days with an appropriate plan and response schedule, which Comstock has done.<sup>128</sup>

There was testimony by applicant that the acceptable time for closing out ARs depends again on the circumstances.<sup>129</sup> The Board agrees. The fact that an AR is still open does not necessarily mean the contractor has taken no action. Applicant may still be reviewing the contractor's response, or applicant may have a concern over a particular aspect of the response.<sup>130</sup> Further, the mere existence of an open AR cannot be equated to a safety problem. These matters must be examined in context. We would be concerned if it appeared that applicant was not adequately monitoring the safety significance<sup>131</sup> and status of ARs; however, the record indicates otherwise. Applicant's procedural system,<sup>132</sup> and its use of this system to correct problems, in our view reflect a proper degree of involvement and control. Intervenors have not indicated any evidence that casts doubt on this conclusion.

Two overall conclusions follow from the evidence. First, applicant's NR system has achieved the timely identification and correction of nonconforming conditions in the electrical area. Physical

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128 Tr. 1375-76 (Leidich).

129 Tr. 1290-91 (Leidich).

130 Tr. 1391, 1394 (Edelman).

131 Tr. 1313 (Board).

132 (See n. 42 supra).

conditions of potential safety consequence are being identified and corrected under the formal NR system. Second, applicant's AR/CAR system has also achieved the proper degree of corrective action. ARs have been identifying procedural and programmatic deficiencies as they have arisen. Although Comstock has not always fully addressed applicant's ARs on a timely basis, when tardiness has occurred applicant has escalated ARs to CARs to resolve the issue at hand. Applicant created the CAR system for just such a purpose. At the hearing it did not appear to the Board that AR/CAR escalation has been improper or gives rise to any safety concerns.<sup>133</sup> Applicant has not hesitated to use CARs, or SWNs, when such escalated corrective action has been appropriate. Moreover, there is no evidence that failures by Comstock to address applicant ARs on a timely basis have resulted in unsafe conditions at the plant.

#### IV. Significance of Report No. 81-19 Findings

Report No. 81-19 indicates that on October 27, 1981, Individual A made six allegations to Region III concerning specific aspects of Comstock's activities at Perry. The individual asserted that electrical inspectors had been "intimidated" during a meeting, and also alleged that certain procedural violations had occurred in the areas of conduit installation, cable pulling, electrical penetrations, and motor control

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<sup>133</sup> Tr. 1314 (Board).

center storage.<sup>134</sup> The staff conducted a thorough investigation and did not substantiate Individual A's allegations.

Because of the staff's overall responsibility for overseeing the quality of construction, its investigation of allegations about Comstock was expanded into a detailed inspection of electrical hardware procurement, drawing control, electrical cable tray installation, electrical and instrumentation hanger installation, and installed switchgear. Between October 27, 1981 and March 19, 1982, six staff representatives spent a total of 711 hours<sup>135</sup> on the staff's investigation and inspection of the electrical area.<sup>136</sup> In the course of its inspections the staff identified nine items of noncompliance<sup>137</sup> and a number of unresolved or open issues. The noncompliances, most of which were procedural,<sup>138</sup> were assigned comparatively low (Level IV or

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<sup>134</sup> Board Ex. 3, Report No. 81-19, at 6-29.

<sup>135</sup> Based on our familiarity with other staff investigations and inspections, and on the Staff's figures concerning the total inspector hours expended to date at Perry, we conclude that the Comstock investigation represented a significant commitment of the Staff's time and resources. This is relevant in measuring the significance of the Staff's findings, since we would normally expect an investigation of this magnitude to identify at least some areas of deficiencies.

<sup>136</sup> Board Ex. 3, Report No. 81-19, at 2. See Konklin et al. Testimony at 12.

<sup>137</sup> Board Ex. 3, Notice of Violation.

<sup>138</sup> Id.; See Konklin et al. Testimony at 12-13; Edelman/Leidich Testimony at 30.

V) severity levels.<sup>139</sup> The inspections identified no significant "hardware" deficiencies. The staff concluded that the noncompliances did not merit a monetary penalty.<sup>140</sup>

The staff's testimony at the hearing was that the electrical construction difficulties identified at Perry "are not very unusual" within Region III.<sup>141</sup> Mr. Williams noted in response to a Board inquiry that nuclear electrical work is "particularly complex," that there are "many attributes that require inspection," and that "there are many opportunities for error to occur."<sup>142</sup> His overall assessment was that, considering the extent of the areas examined, the items of noncompliance reflected in Report No. 81-19 involved "perturbations within what was essentially a sound system."<sup>143</sup> While in the earlier stage of the investigation the staff raised questions concerning Comstock, and urged applicant to stop Comstock's cable pulling activities, the staff ultimately found that "the great majority of the documentation and the effort was acceptable."<sup>144</sup>

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139 Board Ex. 3, Notice of Violation; Konklin et al. Testimony at 13; Tr. 1812-13 (Williams).

140 Tr. 1774 (Williams); see Tr. 1817-18 (Williams).

141 Tr. 1794 (Konklin and Williams); see n. 62.

142 Tr. 1796 (Williams).

143 Tr. 1699 (Williams).

144 Id.

We do not believe, based on our review of Report No. 81-19 and the uncontradicted evidence presented at the hearing, that the noncompliances in the Notice of Violation raise serious safety concerns. We inquired about cable separation criteria violations (there were eight found by the Staff) and learned that such violations are not uncommon. Mr. Leidich, who is quite familiar with the IEEE standards and industry practice in this regard,<sup>145</sup> testified that "[i]t is clearly not unusual to see that kind of situation, not only at the Perry project but at any project in the United States."<sup>146</sup> Mr. Williams confirmed Mr. Leidich's explanation and conclusions. He stated that "[t]he experiences at Perry in the area of electrical separation have not been unlike those that we have had at every other site in the region over the last 13 years that I have been in Region III." Mr. Williams testified that he was "certain that most of the work was done correctly."<sup>147</sup>

Similar testimony was given regarding the cable pulling program. The Board asked whether there was any reason to believe that cable pulls were completed by Comstock without adequate testing. Mr. Williams replied that the chance was "very, very small, if in fact it existed at

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145 Tr. 1544-51 (Leidich); p. 9 supra.

146 Tr. 1549 (Leidich).

147 Tr. 1647-56 (Williams).



all."<sup>148</sup> Mr. Leidich testified, without contradiction, that cable over-tensioning is not uncommon, particularly where cable is being pulled around a bend.<sup>149</sup> The Board discussed with staff witnesses the various procedures used for testing safety-related cable, and inquired into the engineering reviews and dispositions that have been used at Perry when cable over-tensioning has occurred. We were particularly interested in use-as-is and scrap dispositions. The staff testified that it closely reviews use-as-is dispositions.<sup>150</sup> Mr. Gildner described an instance in which a large safety-related cable had been over-tensioned. Although it passed subsequent engineering tests, it was nevertheless scrapped. Mr. Gildner's conclusion from this and similar episodes was that "this Licensee does tend to take the conservative approach."

We reviewed with witnesses the sequence leading to applicant's November 1981 SWN against Comstock's cable pulling program, discussed at pages 13-15 of Report No. 81-19. Applicant's lead electrical QE, and Region III personnel, were jointly observing a duct bank cable pull. They noted deficiencies in the procedures being followed and applicant issued an SWN which required Comstock to completely review its cable

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148 Tr. 1632 (Board, Williams).

149 Tr. 1354 (Leidich).

150 Tr. 1633-44 (Board, Williams, Maxwell).

procedure.<sup>151</sup> Although we do not take lightly the mistakes Comstock made,<sup>152</sup> at the same time we recognize that the incident occurred at the beginning of a new phase of Comstock's work -- power cable pulling through safety-related duct banks.<sup>153</sup> These were not recurring problems. The Board concludes that applicant's QA/QC personnel and the staff jointly identified Comstock's difficulties, including both inspection and craft training deficiencies, at the beginning of the work activity. This indicates that applicant was controlling its contractor and was receptive to staff suggestions. The fact that the staff was also present does not cause us to draw adverse inferences regarding applicant's overview of Comstock.<sup>154</sup>

Inquiry by the Board into other technical areas discussed in Report No. 81-19 also failed to disclose serious problems. Mr. Williams testified that noncompliance 5(a)(2) of the Notice of Violation, involving motor control centers, was a procedural problem, "easily corrected," and not surprising. The staff finds "problems like this one at all of our plants when they are at this stage of construction."<sup>155</sup>

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151 See p. 37, supra.

152 Tr. 1661 (Board, Williams).

153 Tr. 1276, 1283.

154 Tr. 1659-60 (Williams).

155 Tr. 1695-1701 (Williams).

One of the NRC noncompliance findings, 2(a)<sup>156</sup>, relating to an alleged violation of the 270° conduit bend criteria, apparently involved an error of interpretation on the part of the staff.<sup>157</sup>

In our review of Report No. 81-19 prior to the hearing, we were particularly concerned over statements at pages 94-95, to the effect that applicant had failed to exercise overview and control of Comstock in 1981, and that "CEI had failed to identify the findings of this investigation independent of the NRC." The staff's conclusion in Report No. 81-19 was based on its review of various applicant overview documents showing repeated months of below standard performance by Comstock in 1981.<sup>158</sup>

We stated, at the summary disposition stage, that we could draw no meaningful inferences from applicant's below standard ratings of Comstock without a better understanding of applicant's overview program and its implementation. In light of our findings and conclusions regarding applicant's and Comstock's programs, set forth in previous sections of this opinion, we no longer retain a serious concern. In a more perfect world, problems between a licensee and a contractor would be more quickly remedied. However, we have no reason to believe that there are any safety problems at Perry as the result of this

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<sup>156</sup> Board Ex. 3, Notice of Violation at 2.

<sup>157</sup> Tr. 1668, 1778 (Williams).

<sup>158</sup> Board Ex. 3, Report No. 81-19, at 95.

less-than-desireable period for correction. Consequently, we conclude applicant's overview and control of Comstock prior to the Staff's 1981-82 investigation was adequate. Although the Staff has indicated in Report No. 81-19 and SALP 2, as well as in testimony,<sup>159</sup> that Comstock's problems seemed unduly persistent, applicant in its performance ratings of Comstock and its stepped-up audits and surveillance of the contractor, recognized the problems and took adequate corrective action.

Applicant's and staff's prefiled testimony set forth persuasive evidence concerning applicant's positive attitude and actions in responding to the findings of the staff's 1981-82 investigation.<sup>160</sup> Mr. Williams testified that "in nearly every instance, in fact all instances that I can recall, an appropriate corrective action was initiated upon notification by me and/or my inspectors on site."<sup>161</sup> He also testified, in response to a question from OCRE's representative regarding the February 10, 1982 meeting between applicant and Region III on preliminary findings from the Staff's investigation, that

The Licensee's -- I suppose we are talking about his attitude, if you will, was one of cooperation. He demonstrated professional competence. He demonstrated general willingness to get on with correcting the issues that we mutually agreed needed correcting. He demonstrated a willingness to assist the regulator, to the extent that it was possible, in establishing the status of his activities and by that I simply mean, they were willing to provide

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<sup>159</sup> See, e.g., Tr. 1623-24, 1656, 1817 (Williams).

<sup>160</sup> See e.g., Edelman/Leidich Testimony at 30-32; Konklin et al. testimony at 15-20.

<sup>161</sup> Tr. 1587 (Williams).

all records and as many bodies as we need to track through their system to get things in order.

As I have indicated before--and perhaps others of this panel have been a benefactor of that to the extent they allowed you to come onto the site and plow through all of the records--it is an open book. By my experience, and I participated in a number of these, that rarely happens.<sup>162</sup>

The Board concludes from the foregoing that the staff's 1981-82 investigation and inspections disclosed no serious inadequacies in applicant's QA/QC overview and control of Comstock. The noncompliances the staff found were largely procedural. None revealed unsafe conditions in the electrical area. Many of the difficulties were associated with the first phase of a major new work activity, where "start-up" deficiencies may be more likely.

Most of the staff's findings represented problems that are seen at other nuclear plants at similar stages of construction. Moreover, the staff's investigation and inspections were broad in scope and did not, considering their extent, find a disproportionate number of noncompliances. Of the noncompliances found, all were of a relatively low severity level. Applicant's and Comstock's corrective actions were responsive to the staff findings, sometimes exceeding the strict bounds of the staff's findings. In short, applicant has withstood not only the Staff's thoroughgoing scrutiny, but our own.

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<sup>162</sup> Tr. 1769-71 (Williams). See 1861-62 (Gildner).

V. Miscellaneous -- Issuance of Partial Initial Decision

The Board has determined that this Partial Initial Decision should be issued prior to the completion of evidentiary hearings on other issues and that the Partial Initial Decision should be made immediately effective for purposes of appellate review.

The Board's authority in this regard is based on the NRC's Rules of Practice. Appendix A to 10 C.F.R. Part 2 authorizes the Board to hear issues separately and issue separate decisions in those separate hearings.

The Commission or the Atomic Safety and Licensing Board may consider on their own initiative, or a party may request the Commission or the board to consider, a particular issue or issues separately from, and prior to, other issues relating to the effect of the construction and/or operation of the facility upon the public health and safety, the common defense and security, and the environment or in regard to anti-trust considerations. If the Commission or the board determines that a separate hearing should be held, the notice of hearing or other appropriate notice will state the time and place of the separate hearing on such issue or issues. The board designated to conduct the hearing will issue an initial decision, if deemed appropriate, which will be dispositive of the issue(s) considered at the hearing, in the absence of an appeal or Commission or Appeal Board review pursuant to §§ 2.760 and 2.762, before the hearing and consideration of, the remaining issues in the proceeding.

The Appeal Board has held that a licensing board action is

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<sup>163</sup> 10 C.F.R. Part 2, App. A, §I(c)(1)(emphasis added).

appealable if it "disposes of at least a major segment of the case."<sup>164</sup>

There can be no dispute that Issue #3 is a major segment of the case.

Licensing boards in other proceedings have routinely made partial initial decisions immediately effective,<sup>165</sup> and Appeal Boards have routinely taken jurisdiction over exceptions filed from partial initial decisions.<sup>166</sup> While the Appeal Board might defer briefing of an appeal "so as to avoid piecemeal or concurrent review,"<sup>167</sup> that is a choice which rests with the Appeal Board based on its control of its docket and need not affect this Board's actions.

<sup>164</sup> Toledo Edison Co. (Davis-Besse Nuclear Power Station), ALAB-300, 2 N.R.C. 752, 758 (1975). See also, Wisconsin Electric Power Co. (Point Beach Nuclear Plant, Unit 1), ALAB-696, 16 N.R.C. \_\_\_\_\_, slip op. at 16 (October 1, 1982); Louisiana Power & Light Co. (Waterford Steam Electric Station, Unit 3), ALAB-690, 16 N.R.C. \_\_\_\_\_, slip op. at 3 (September 7, 1982); Nuclear Engineering Co., (Sheffield, Ill., Low-Level Radioactive Waste Disposal Site), ALAB-606, 12 N.R.C. 156, 160 (1980).

<sup>165</sup> See, e.g., Union Electric Co. (Callaway Plant, Unit 1), Partial Initial Decision, LBP-82-\_\_\_\_\_, 16 N.R.C. \_\_\_\_\_ (December 13, 1982); Louisiana Power & Light Co. (Waterford Steam Electric Station, Unit 3), Partial Initial Decision, LBP-82-\_\_\_\_\_, 16 N.R.C. \_\_\_\_\_ (November 3, 1982); South Carolina Electric & Gas Co. (Virgil C. Summer Nuclear Station, Unit 1), LBP-82-55, 16 N.R.C. 225 (1982); Southern California Edison Co. (San Onofre Nuclear Generating Station, Units 2 and 3), LBP-82-3, 15 N.R.C. 61 (1982).

<sup>166</sup> See, e.g., Philadelphia Electric Co. (Limerick Generating Station, Units 1 and 2), ALAB-726, 17 N.R.C. \_\_\_\_\_ (May 2, 1983); Consumers Power Co. (Big Rock Point Nuclear Plant), ALAB-725, 17 N.R.C. \_\_\_\_\_ (April 27, 1983).

<sup>167</sup> Limerick, slip op. at 7, n. 9.

The Board is, of course, aware of an unpublished Appeal Board order in Consumers Power Co. (Big Rock Point Nuclear Plant), dated October 4, 1982, in which the Appeal Board stated that the Big Rock proceeding, involving a spent fuel pool license application, did not appear to warrant more than one initial decision. Three partial initial decisions had already issued and the Appeal Board anticipated more. The Appeal Board also deferred briefs on exceptions to one of the decisions and tolled the time for filing exceptions on others. The Big Rock order is not applicable here. Apart from the legal principle that unpublished decisions are not generally to be relied upon,<sup>168</sup> the Appeal Board in Big Rock was simply observing that in the particular facts involved, numerous partial initial decisions were not warranted. The Appeal Board recognized that "sound management of some proceedings requires the issuance of more than one initial decision" and that NRC regulations "do not preclude the issuance of partial initial decisions."<sup>169</sup> The only criterion stated by the Appeal Board was that partial initial decisions "should dispose of a major segment of the case."<sup>170</sup> Since the quality assurance issue is "a major segment of [this] case" and since a timely

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<sup>168</sup> Pacific Gas and Electric Co. (Diablo Canyon Nuclear Power Plant, Units 1 and 2), ALAB-592, 11 N.R.C. 744, 745 (1980) See also, Cincinnati Gas and Electric Co. (Wm H. Zimmer Nuclear Power Station, Unit 1), LBP-82-47, 15 N.R.C. 1538, 1547 (1982) (unpublished order given no weight).

<sup>169</sup> Order at 2.

<sup>170</sup> Id.



appeal decision might avoid an unnecessary delay in this proceeding should more hearings on quality assurance be necessary, we believe that a partial initial decision is appropriate here.

#### VI. Conclusion

The uncontradicted evidence is that applicant's quality assurance program has provided adequate overview and control of Comstock's activities at Perry, and that applicant's program has prevented, and will continue to prevent, unsafe conditions at the plant. We therefore conclude that there is no serious safety issue that requires us to undertake further inquiry into applicant's QA control of Comstock or other safety-related contractors at Perry.

#### O R D E R

For all the foregoing reasons and based on consideration of the entire record in this matter, it is this 2nd day of December 1983

#### ORDERED:

1. The sole remaining issues of material fact admitted under Issue #3 in this proceeding, concerning the adequacy of applicant's quality assurance program for the control of safety-related contractors at Perry, are found to be without merit and are dismissed.
2. Pursuant to 10 CFR § 2.760(a) this is a partial initial decision that will constitute final action of the Commission forty-five

(45) days from the date of issuance unless exceptions are taken pursuant to § 2.762 or the Commission directs that the record be certified to it.

3. Exceptions to this decision or designated portions thereof may be filed with the Commission, in the form required by § 2.762(a), within ten (10) days after service of this decision.

4. To pursue an appeal, briefs in support of a party's objection also must be filed, within thirty (30) days after filing the exceptions (or forty days in the case of the staff of the Nuclear Regulatory Commission). The brief must comply with the requirements of § 2.762.

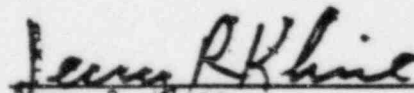
5. Within thirty (30) days of the service of the brief of the appellant (40 days for the staff), parties may file opposing or supporting briefs or supporting briefs that comply with the requirements of § 2.762(c).

6. Filings that do not comply with the rules governing appeals may be stricken.

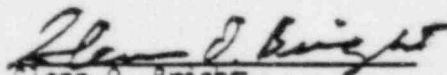
THE ATOMIC SAFETY  
AND LICENSING BOARD



Peter B. Bloch, Chairman  
ADMINISTRATIVE JUDGE



Harry R. Aline  
ADMINISTRATIVE JUDGE



Glenn O. Bright  
ADMINISTRATIVE JUDGE