UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
COMMONWEALTH EDISON COMPANY	)	Docket No. 50-454
	)	50-455
(Byron Station, Units 1 and 2)	)	

INTERVENORS' PROPOSED FINDINGS OF FACT AND CONCLUSIONS OF LAW ON QUALITY ASSURANCE/QUALITY CONTROL

1. Contention 1A asserts that Commonwealth Edison has been unable and unwilling to maintain an adequate quality assurance and quality control program to oversee construction and operation of the Byron site, and that as a result, there is no reasonable assurance that the plant can be operated safely.

2. Contention 1A reads as follows: Intervenors contend that Edison does not have the ability nor the willingness to comply with 10 CFR Part 50, Appendix B, to maintain a quality assurance and quality control program, and to observe on a continuing and adequate basis the applicable quality control and quality assurance criteria and plans adopted pursuant thereto, as is evidenced by Edison's and its architect-engineers' and its contractors' past history of non-compliance at all Edison plants (whether or not now operating). In addition, Applicant's quality assurance program does not require sufficient independence of the quality assurance functions from other functions within the Company.

3. For this contention, Intervenors presented Mr. Peter

Stomfay-Stitz, former Quality Assurance/Quality Control Materials Inspector at the Byron site for Blount Brothers; Mr. Michael Smith, former Quality Assurance inspector and auditor at the Byron site for Hunter Corporation; and Mr. Daniel Gallagher, former concrete batch plant operator at the Byron site for Blount Brothers. The Nuclear Regulatory Commission (NRC) Staff's witnesses were Mr. John Spraul, Quality Assurance Engineer in the Quality Assurance Branch in the Office of Inspection and Enforcement of the Nuclear Regulatory Commission and a panel consisting of Mr. Cordell Williams, Section Chief, Plant Systems Section of the Nuclear Regulatory Commission, Mr. Isa Yin, Senior Mechanical Engineer of the Nuclear Regulatory Commission, Mr. D.W. Hayes, Chief of the Reactor Project Section 1B, Division of Project and Resident Progams for Region III of the Nuclear Regulatory Commission, Mr. William Forney, Senior Resident Inspector of the Byron site for the Nuclear Regulatory Commission, and Mr. James Konklin, Chief of the Reactor Projects Section 1A, Division of Project and Residents Programs for Region III of the Nuclear Regulatory Commission. Applicant's witnesses were Mr. Louis Del George, Staff Assistant to the Assistant Vice President for Nuclear Engineering, Nuclear Fuel Services and Nuclear Licensing, Commonwealth Edison; Mr. Walter Shewski, Corporate Manager of Quality Assurance, Commonwealth Edison; Mr. Cordell Reed, Vice President of Nuclear Operations, Commonwealth Edison; Mr. Michael Stanish, Construction Quality Assurance Superintendent at Byron Station for Commonwealth Edison; Mr. Robert Querio, Station Superintendent for the Byron Station, Commonwealth Edison; Mr. John Mihovilovich, Lead Structural Engineer at Byron Station for

Commonwealth Edison; Mr. Richard Barnhart, Project Engineer at Byron Station for Blount Brothers; Mr. Donald Pope, batch plant operator at Byron Station for Blount Brothers; and Mr. Malcolm Somsag, Site Quality Assurance Supervisor at Byron site for Hunter Corporation. Mr. Marvin Tallent, Jr., Site Manager at Byron Station for the Pittsburgh Testing Laboratory; Mr. Joseph Johnson, Civil Supervisor-Quality Control at Byron site for the Pittsburgh Testing Laboratory; Mr. Lee Sues, assistant superintendent of maintenance and stores at Byron Station, Commonwealth Edison; and Mr. Kevin Connaughton, Resident Inspector, Projects Section 1B of the Office of Inspection and Enforcement, Region III of the Nuclear Regulatory Commission appeared as witnesses for Applicant and the Staff in the ATWS issue and/or rebuttal.

EDISON'S COMPLIANCE WITH NRC REGULATIONS IN GENERAL

4. Since 1974, Commonwealth Edison has compiled a consistent record of non-compliance with NRC regulations at its nuclear power plants, both those in operation and those under construction. Mr. Louis Del George, Staff Assistant to the Assistant Vice President for Nuclear Engineering, Nuclear Fuel Services and Nuclear Licensing, testified that Edison had incurred $320,000 in fines from the NRC between 1974 and 1982. (Del George, Applicant Prepared Testimony, 12.) On cross-examination by Intervenors, however Mr. Del George admitted that he had not included $220,000 in proposed fines levied in 1983 alone. (Del George, p.2346.)

5. In December, 1974, the NRC fined Edison $25,000 for 18

violations of NRC regulations at Dresden Station. The violations involved 1) the release of approximately 1,100 gallons of laundry water, 2) deficiencies in following rad-waste procedures and 2) deficiencies in implementing new security procedures (Del George, Appendix to Testimony, p.1.)

6. In October, 1975, the NRC fined Edison $25,000 for violations of NRC regulations at Quad Cities Station. The violations involved an error in control rod withdrawal which caused fuel damage, and deficiencies in implementation of the new station security plan. (Del George, Appendix, pp.1-2.)

7. In May, 1976, the NRC fined Edison $13,000 when an employee received excessive radiation exposure upon entering a high radiation area without taking proper precautions. (Del George, Appendix, p.2.)

8. In September, 1977, the NRC fined Edison $21,000 for the draining of the pressurizer at the Zion Station. (Del George, Appendix, p.3.)

9. In March, 1978, the NRC fined Edison $21,000 for seven items of non-compliance at Dresden. These incidents took place between October, 1977 and January, 1978. (Del George, Appendix, p.3.)

10. In 1980-82, Edison was denied access to low level radioactive waste burial sites on eight occasions, and was fined on three occasions by the NRC for a total of $9,000. The first of these incidents for which Edison was fined occurred in

February, 1980, when Edison was fined $4,000 as a result of high radioactive reading found on the underside of a trailer which was used to transport waste to the Richland, Washington burial site. In May, 1980, Edison was fined $4,000 for a defective closure on a rod waste shipping container which was delivered to the Richland burial site. In February, 1982, Edison was fined $1,000 when free standing water was found in a shipping cask which was shipped to the Barnwell, South Carolina burial site. (Del George, Prepared Testimony, pp.22-23.)

11. In October, 1980, the NRC proposed a $40,000 fine on Edison as a result of inattentive operators at Dresden Station. Edison paid an $18,000 fine in a compromise with the NRC. (Del George, Appendix, p.4.)

12. In March, 1981, the NRC fined Edison $80,000 when two contractor employees at Dresden Station received excessive radiation exposure because of a failure of Station personnel to oversee their work. (Del George, Appendix, p.5.)

13. In July, 1982, the NRC fined Edison $100,000 for conditions at the Zion Station which allowed an employee to enter a high radiation area without taking proper precautions. As a result, the employee received excessive radioactive exposure. (Del George, Appendix, p.5.)

14. In February, 1983, the NRC fined Edison $20,000 when an instrument vent valve was left open at Dresden Station. (Del George, Appendix, p.6.)

15. The amount of fines incurred by Edison has increased over the years since 1974. For the period 1974 to 1978, Edison was fined $105,000 by the NRC. For the period 1979 to 1982, Edison was fined $207,000 by the NRC. Finally, in February of this year alone, the NRC proposed fines against Edison totalling $220,000. (Del George, p.2346.)

16. In addition to these fines, the NRC has uncovered additional severe problems with quality assurance programs at other Edison stations. The Board finds that this not only reflects Edison's disregard for the requirements of 10 CFR 50, Appendix B, but is also directly relevant to Edison's performance at Byron, because the same quality assurance program with implemetning procedures is applicable to all of Edison's nuclear power plants, whether under construction or in operation. (Shewski, Prepared Testimony, p. 8.)

17. In February, 1983, the NRC proposed to fine Edison for the use of valve guides of insufficient quality in safety-related electronic relief valves. (Shewski, pp.2489-90.) The substandard valve guides had caused at least two valve failures in 1977 and 1978 at Edison plants. (Hayes, p.3857.)

18. In spite of notification of this problem from Edison's own Engineering Department in January, 1979 and April, 1981, Edison failed to take adequate corrective measures to preclude their continued use. (Hayes, p.3857, Shewski, pp.2490-91.) This was the result of both stations' failure to maintain an up-to-date safety classification system. (Hayes, p.3856.) As a result

of the NRC's concern over Edison's failure to take corrective action, the NRC increased the fine by 25% due to the duration of the violation. (Shewski, p.2491.)

19. Reactor trip breakers were not included within Edison's maintenance program, and that they therefore failed to receive maintenance commensurate with their safety-related classification. (Connaughton, pp.4085-86.) As a result, a trip breaker failed to function properly six times at the Zion Station. (Connaughton, pp.4016, 4044.) The Board finds that this oversight resulted from the failure of the recommendation of the breakers' manufacturer to be transmitted down to the station level, and is identical in nature to the recent accident at the Salem nuclear plant.

20. As a result of non-compliance with NRC regulations in 1977 and 1978 at the Dresden Station, in December 1977, the NRC increased its inspection frequency to weekly inspections in Edison's three operating nuclear facilities. (Del George, Prepared Testiminy, p.16.) The non-compliance included findings that both backup generators were inoperative, that there was a valve error in the reactor's backup system, and of errors in testing for maintenance. (Del George, Exhibit 1, p.4.)

21. As a result of allegations made by former guards at the Quad Cities Station that they were told not to report certain security violations, the NRC found certain activities of Edison to be in non-compliance with NRC requirements. The allegations and subsequent investigation also resulted in the criminal

indictment of Edison and certain of its employees in March, 1980. (Del George, Prepared Testimony, pp.19-21; Del George, Exhibit 1, pp.4-5.)

22. As a result of allegations made by an employee of Zack Company concerning the heating, ventilation and air conditioning system at the LaSalle site, the NRC delayed issuance of a full power an operating license for that plant. (Reed, p.2602; Hayes, p.3838.) A limitation remained in effect until Edison completed an independent design review of the heating, ventilation and air conditioning system. (Reed, p.2602.)

23. In February, 1983, the NRC proposed to fine Edison $60,000 because the Phillips-Getchow Company was not performing their QA/QC functions at the Braidwood plant. (Del George, pp.2463-64.) Edison had found deficiencies in Phillips-Getchow's QA program in July, 1980, June, 1981 and March, 1982, but continued to allow Phillips-Getchow to install safety-related equipment at Braidwood. (Shewski, pp.2479-80.) In fact, the identical problems with the bolting of the steam generator had been previously identified at the Byron site. (Hayes, p.3634-35.) The NRC had originally characterized this failure of the QA program at both Byron and Braidwood as a "breakdown." (Hayes, pp.3634-35.) Edison failed to act for over two years, even though they were required by 10 CFR 50.55(e) to submit a notification report to the NRC within 24 hours after the July, 1980 audit. (Del George, pp.2480-81.)

24. Fines against Edison continue to be imposed by Region III (Stipulation of May 26, 1983, Record at ____).

CONTRACTORS AT BYRON

25. QA responsibilities are divided between Edison and Edison's vendors and contractors with the NRC overseeing the entire structure. Edison, however, retains all ultimate responsibility for QA. The QA progams of each contractor and vendor, then plays a "front line role" in QA. (10 CFR 50, Appendix B, Section 1; Shewski, p.2370; Forney, pp.3692-93.)

26. Edison has experienced significant problems with contractors who do safety-related work at the Byron site. In fact, the NRC conducted a special safety audit of the Byron site and issued I & E Report 82-05, which found areas of non-compliance in eight of the 10 or 11 contractors inspected. (Forney, pp.3832-33.) Five of those contactors were specifically cited with non-compliance for failure to adequately audit. (Forney, p.3875.) This suggests to the Board that QA problems are pervasive throughout the entire program of construction at Byron, and that non-compliances that have been unearthed are only the tip of the iceberg.

27. The Board finds that the work of Systems Control Corp. at the Byron Site has been distinguished by shoddy work and inadequate QA/QC, and that Edison has repeatedly failed to take corrective action to remedy these problems. In May, 1977, Edison conducted an audit of Systems Control, a supplier of main control

board panels, cable trays and supports and instrument racks at the Byron site, and found major deficiencies with their QA program. (Shewski, p.2503.) First, it was discovered that there was no documented evidence that System Control had conducted any "receiving, in-process or final inspections." (Shewski, p.2504.) Second, the audit could "find no evidence of training for inspection testing and auditing personnel." (Shewski, p.2505.) Third, the audit "found no evidence of review and acceptance of the people who were supplying equipment to Systems Control by Systems Control." (Shewski, p.2505.) Fourth, it was "found that Systems Control corporation failed to perform one of their own scheduled audits, "which was to have taken place in January, 1977." (Shewski, p.2505-06.) As a result, Edison issued a stop work order in May, 1977 but was lifted on June 10, 1977. (Shewski, p.2506.)

28. In March, 1978, Edison conducted an inspection of Systems Control main control board panels on site and found three non-conformances in a single panel. (Shewski, p.2507.) Additional problems with Systems Control's work was found in a September, 1978 Edison audit. (Shewski, p.2507.) In an August, 1979 surveillance, Edison noted a lack of inspections by Systems Control and found their welds to be of questionable quality. (Shewski, p.2507.)

29. These problems with Systems Control, however, continued until they were uncovered in NRC Report 80-04, issued in May, 1980. (Shewski, p.2508.) This NRC inspection was initiated as a result of allegations made by a Systems Control employee.

(Williams, p.3844.) In this inspection, the NRC discovered that in spite of Edison's knowledge of System Control's three year history of serious deficiences in its QA program and specific knowledge of problems with welds in each type of safety-related equipment supplied by them, Edison had waived final inspection of safety-related main control boards made by Systems Control. (Williams, p.3845-46, 3848; Shewski, p.2508.) These panels were installed and later found to require extensive repairs. At one point, between 40-60% of the welds were found to be unacceptable. (Williams, p.3845; Shewski, p.2509.) In fact, the 80-04 findings are still not completely closed with respect to the seismic capability of the panels. In the event of a seismic event, these faulty welds could crack which could cause the reactor operator to lose control of the reactor. (Hayes, p.3849.)

30. Report 80-04 also stated that Systems Control had falsified audit reports, that the QA/QC manager and other personnel were not qualified to hold their positions, and that Systems Control's QA/QC organization did not have adequate independence from production. (Shewski, p.2509, Williams, p.3844-3851.) At the time of the hearing, the charge of falsification of data was still an open item, under investigation by the Justice Department. (Hayes, p.3851.)

31. The Board finds that Edison has been aware of a series of extremely serious deficiencies on the part of Hatfield Electric Company that spans the entire time period that has been working at the Byron site. (Shewski, p.2495.) The NRC conducted inspections of Hatfield's work in 1978, 1979 and 1980 which

uncovered significant deficiencies. The 1979 inspection was initiated in response to allegations made by a former Hatfield employee. (Shewski, p.2496.)

32. First, NRC Report 78-07 cited Edison with a deficiency because Hatfield's QA program did not define the criteria to be used to define inspections. (Hayes, p.3645.)

33. Second, NRC Report 79-18 cited Edison with two infractions. In the first instance, Hatfield failed to establish an adequate program to ensure that in concrete expansion anchors were inspected, and in the second instance, Hatfield failed to use the program did exist. (Hayes, p. 3649-90.)

34. Third, Report 80-25 indictated that a cable entrance frame had been "designed without engineering approval, built without approved QA programs, and purchased and installed without QA approval." (Shewski, p.2497, Hayes, pp.3694-95.) The report also identified problems regarding cable separation, deviation from cable routing specifications, nonconforming welds, the storage of cables and the failure to seal cable ends. (Hayes, pp.3694-98.) The problems identified were of such gravity that the NRC considered citing Edison with a Level III offense and did issued an immediate action letter. (Hayes, p.3695; Williams, pp.3697-98.) An immediate action letter is only used in the case of problems so serious that they cannot wait to go through the normal process of documenting findings and waiting for the applicant's response. (Williams, pp. 3697-98.)

35. In spite of its continued awareness of these problems,

Edison did not issue a stop work order against Hatfield until the end of 1980 or the first part of 1981. (Shewski, p.2497.) At the time of this hearing, all of Hatfield's electrical work at Byron was being reinspected. (Shewski, p.2382.)

36. Fourth, NRC Report 82-04 found that Hatfield had a conflict between its QA and production sections; the NRC required Hatfield's QA Manager to report to the company president, rather than a vice-president (Stanish, p.2628.) The report also found that Hatfield and another contractor, Johnson Controls, were running QA programs other than those reflected in their paperwork. (Stanish, p.2630.)

37. In addition, the NRC is presently investigating allegations of three persons regarding deficiencies in Hatfield's work. The allegations are wide ranging, involving deficiencies in the "areas of records, QC inspector qualification and certification, handware design and drawing control, corrective action, housekeeping and inspector independence." Some of these allegations were received as long ago as August, 1982 and still have not been investigated by Region III. (Forney, Prepared Testimony, p.6.)

38. The Board finds that Edison has experienced repeated QA/QC problems with Reliable Sheet Metal, "a contractor responsible for installation inspection of safety-related heating, ventilating and air conditioning systems/components [HVAC]." (Shewski, p.2511.) In 1978, NRC Report 78-07 stated that Reliable had failed to prescribe the experience required for its QA inspection personnel. (Shewski, p.2511.) Therefore, Edison

can offer no reasonable assurance that Reliable's QA personnel were qualified and that their work was adequately inspected.

39. Finally, in September, 1982, Edison issued a stop work order because Reliable was not adequately performing its QA inspections. (Shewski, pp.2513-14.) The Board, however, finds that it was reckless and irresponsible for Edison to trust Reliable, the source of these problems, to conduct the reinspection of its own work, even subject to an over-inspection by a testing agency. (Shewski, p.2514.)

40. The Board also finds that Edison's handling Reliable's QA/QC problems has been duplicitous. Although Edison has emphatically insisted that it would not lift the stop work order issued to Reliable, Edison failed to even attempt to rebut the charge tht it intends to ask the NRC for a variance so that testing of the HVAC system can be diverted until after fuel is loaded at the Byron plant. (Shewski, p.2591-92.)

41. The Board accepts as fact the following allegations made by Mr. Michael Smith, former QA auditor at the Byron site for Hunter Corporation. Hunter Corporation is a contractor responsible for installing pipe supporting. (Smith, Prepared Testimony, p.2.) The Board finds that Edison and the Staff have failed to meet their burden to refute these well-founded charges which expose serious and pervasive problems with Hunter's QA/QC program during the time of Mr. Smith's employment, from November 1978 to January 1980. (Smith, Prepared Testimony, p.1.) First, Hunter production workers were under pressure to work quickly,

and as a result were doing shoddy work. (Smith, Prepared Testimony, pp.21-22.)

42. Second, as later confirmed by a Region III inspection, Hunter lacked a prescribed program for hanger inspection. (Yin, p.3677.) Inspectors lacked a specific hanger inspection checklist, which would have allowed them to perform adequate inspections. (Yin, p.3676.) Inspectors, along with production workers, were neither adequately trained nor even aware of the Sargent & Lundy manual M-916, which set out the allowable tolerance ranges for the placement of pipe supports. (Smith, Prepared Testimony, pp.31-32.) Although the M-916 was "incorporated" by Hunter into its manual in December 1977, welding inspectors did not receive training regarding its specifications until November 1979, and the Board believes that it was only done then as a direct result of Mr. Smith's audit known as 059-3. (Smith, pp. 3450-51.)

43. Third, on at least 10 occasions, pipe support weld inspections were documented when in fact they had never been performed. (Smith, Prepared Testimony, p.15; Smith, p.3429.) In such instances, Hunter's QC inspector, Mr. Frank McGhee would initial the inspection reports even though there was no record that anyone had ever performed the inspections. (Smith, Prepared Testimony, p. 15; stipulation of testimony of Mr. Zeise, R at ___).

44. Fourth, even when audits were actually performed, Mr. Smith was sometimes instructed not to include in his final reports problems that he had discovered on the purported excuse

that the problem would be caught later on. (Smith, Prepared Testimony, pp.22-23.) These problems included instances in which either su,ports were lacking proper documentation, or documentation existed for non-existent supports. (Smith, Prepared Testimony, p.23). Such incidents were frequent, on the order of once or twice a week. (Smith, p.3447.) In Hunter's audit 059-3, which was performed by Mr. Smith, only one of the five hanger supports inspected had full, correct and complete documentation. (Smith, p. 3447.)

45. Fifth, Mr. Smith was instructed not to perform a thorough audit of the authorized nuclear inspector (ANI), and, under no circumstances, to tell him that anything he did was wrong. (Smith, Prepared Testimony, p.16.) These instructions came from Mr. Malcolm Somsag, Hunter's Site QA Supervisor at Byron, and were relayed by Mr. Michael Zeise, Hunter's Lead Auditor. (Smith, Prepared Testimony, p.17.)

46. Sixth, Mr. Smith was instructed "to stay out of sight" when the NRC personnel were on site, and to answer only "yes" or "no" if they were to ask him any questions. (Smith, Prepared Testimony, p.39.) There instructions came from Mr. Somsag and his assistant, Mr. Art Simon. (Smith, Prepared Testimony, pp. 39-40.)

47. Seventh, Mr. Smith's audit reports were often changed by Mr. Somsag, both substantively and stylistically, in a manner which lessened the impact of the audits by giving those audited more leeway, and by deleting many critical passages. (Smith,

Prepared Testimony, p.28.) Although Mr. Somsag denies this charge, specifically in regard to Audit 059-3, the Board finds that his testimony is fatally undermined by his inability to produce Mr. Smith's written drafts of the report. (Somsag, pp. 2891-92.) Mr. Somsag's testimony is compromised further by the fact that in his original testimony he asserted that Hunter procedures did not require the drafts to be retained in files. (Somsag, p.2892.) In fact, the procedures, which were written by Mr. Somsag, do require such retention, and Mr. Somsag subsequently deleted that assertion from his testimony. (Somsag, pp.2892-93.)

48. NRC inspections have also discovered additional deficiencies that further undermine confidence in the Hunter QA program. First, NRC Report 80-05 disclosed that Hunter had no program for timely inspections of piping suspension system components. (Yin, p.3797.)

49. Second, NRC Report 81-09 stated that although Hunter had now established a program for such inspections, that program was not being implemented in the Unit I Containment area. (Yin, pp.3795-97.) This report also stated that field changes were being made in the installation of hanging pipe supports before such changes were approved, even though such a shortcut was against regulations. (Stanish, p. 2659.)

50. Third, NRC Report 80-24 found that Hunter workers had bent anchor bolts, without documenting the action, in order to accommodate the diesel generator in Unit 2. (Stanish, pp.2653-

55.) This non-compliance was neither discovered nor reported by Edison, and was discovered by Region III just before the bolts were to be grouted over. (Stanish, pp.2653, 2655.) The NRC inspectors then went over the same piece of equipment in Unit 1 and found that the bolts had been similarly bent and grouted without being inspected. (Stanish, pp.2655, 2657.) It was necessary to replace the bolts in each unit. (Stanish, p.2657.) The Board finds that if it had not been for the completely fortuitous discovery of this problem by NRC inspectors, it would not have been uncovered by contractor inspections or audits, Edison inspection or audits, or review of pertinent documents by Region III, or in any other way during any routine or special inspection.

51. The Board finds that Edison and the Staff have failed to meet their burden to refute the serious allegations of Mr. Daniel Gallagher, former batch plant operator at the Byron site for Blount Brothers, and we therefore accept them as fact. Mr. Gallagher is an experienced batch plant operator who has been mixing concrete for seven years. (Gallagher, p.3543.) His allegations span the period of Mr. Gallagher's employment with Blount, from August 1975 to November 1977 and from February 1978 to June 1979, and identify serious deficiencies in Blount's QA/QC program and cast grave doubt on the competency of the safety-related concrete which Blount produced. (Gallagher, Prepared Testimony, p.1.) First, Blount was under tremendous pressure from Edison to increase concrete production. (Gallagher, Exhibit 1, p.3) Mr. Gunnar Sorenson, Edison's superintendant at the

Byron site, along with other Edison personnel, would often reprimand Gallagher's supervisor for failure to meet production goals. (Gallagher, Prepared Testimony, p.10; Gallagher, Exhibit 1, p.3.) As a result, Blount would sometimes be compelled to run two concrete batch plants simultaneously. (Gallagher, Prepared Testimony, p.10.)

There were two concrete batch plants on site at Byron. The primary plant was a modern, sophisticated plant known as the "Erie-Strayer." There was also a more primitive, manually-operated plant known as the "Ross" plant. (Gallagher, Prepared Testimony, pp.2-3.) This plant was supposed to be used only as a back-up to the Erie-Strayer, and in no event was it capable of producing Category I concrete. (Gallagher, Prepared Testimony, pp.4-5, 7, 8, 24.)

52. Mr. Gallagher testified that the Ross plant was not capable of producing competent safety-related concrete and Edison offered no evidence to the contrary. Mr. Gallagher, because he knew it would not make competent concrete, refused to run the plant for a safety-related pour and he was fired. (Gallagher, Prepared Testimony, pp.4-5, 24.).

53. The Ross plant was a dry mix plant, and the trucks provided by Blount were incapable of adequately mixing the ingredients into a uniform concrete mixture. (Gallagher, Prepared Testimony, p.5). On the day that Mr. Gallagher was fired, the temperature required a mix containing ice in the concrete, and without thorough mixing, ice balls would form and render the concrete incompetent. (Gallagher, pp.3509-10). Indeed, Blount

subsequently tried to mix concrete at Ross and, just as Mr. Gallagher had predicted, the batch was no good. (Gallagher, p.3518.)

54. Mr. Gallagher knew that the concrete that he refused to mix on the day he was fired was to be used for safety-related construction because it was so indicated that on the pour slip. (Gallagher, p.3505.) He had also made safety-related concrete at Ross in the past. (Gallagher, p.3504, 3506.) The Erie-Strayer batch plant was dismantled in 1980. Because the Ross plant has been the only operating concrete batch plant since that time, the Board can only find that Blount must have been using concrete from the Ross plant for safety-related construction for the past three years. (Pope, Prepared Testimony, p.3.)

55. Second, there was no maintenance program for the Ross concrete plant. Indeed Mr. Lou Andre, a Blount QA/QC employee, lied to the NRC by claiming that there was in fact such a maintenance schedule. (Gallagher, Prepared Testimony, p.7.)

56. Third, there was a recurring problem with aggregate containing an excessive amount of fines throughout Mr. Gallagher's employment with Blount, until the aggregate pile was finally condemned in 1979. (Gallagher, p.3477; Gallagher, Exhibit A, p.5) Approximately 100,000 yards of concrete made with noncomplying aggregate were used in safety-related construction at Byron. (Gallagher, Prepared Testimony, p.14) Mr. Donald Pope, batch plant operator for Blount at Byron, discussed the problem with his supervisor and complained many times to Edison engi-

neers, to no avail. (Gallagher, Prepared Testimony, pp.12-13.) Edison failed to offer any credible evidence to the contrary.

56. Fourth, Edison and Blount had too few QA employees to adequately supervise the placement of concrete, which at any given time might be taking place at as many as five different locations on site. (Gallagher, Prepared Testimony, pp.21-22; Gallagher, Exhibit A, p.6.) As a result, production workers were able to add water to the concrete in excess of specifications without either recording it on the batch ticket or being discovered by QA personnel. Mr. Pope admitted that the pour slips, which recorded the ingredients of the concrete, were not always accurate. (Pope, pp.2846-47.) (Gallagher, Prepared Testimony, pp.21-22; Gallagher, p.3487; Gallagher, Exhibit A, p.6.) The addition of more water into the concrete made it easier to work with, although it weakened the concrete. (Gallagher, Prepared Testimony, pp.18, 19, 22.)

58. The water was added to the concrete after test samples had been taken, so that the test results used to determine the strength of the concrete cannot be said to accurately reflect the competency of the concrete that was actually used in safety-related construction. (Gallagher, p.3536.) The production workers that informed Mr. Gallagher of this practice recently confirmed the information but refused to testify for fear that they would lose their job. (Gallagher, p.3540.)

59. Fifth, even if QA/QC personnel did observe the unauthorized addition of excess water into the concrete, they did

not have sufficient authority to overrule Blount's production supervisor, who would order the workers to add the water anyway. (Gallagher, Prepared Testimony, p.22.)

60. Sixth, for a period of at least one month, there was a problem with oil leakage from a faulty cement storage silo blower into the dry cement mixture and subsequently into the concrete mixture. (Gallagher, Prepared Testimony, p.23.) Although the problem was complained of repeatedly, there is absolutely no evidence in the record that it actually was fixed. (Gallagher, Prepared Testimony, pp.23-24; Gallagher, pp.3498-99.)

61. Seventh, it was made apparent to Mr. Gallagher that he was not supposed to talk to NRC investigators and, as a result, he "often sat quietly as the Blount QC people stretched the truth on a variety of quality control practices." (Gallagher, Exhibit A, p.6.)

62. Edison relies upon various tests for concrete strength to rebut the allegations concerning the competency of concrete used in safety-related construction but put in no direct evidence of any test results. The Board is not persuaded by that and finds that Edison failed to meet its burden of proving that the concrete work at Byron is proper. Edison's testing methods allowed too much opportunity for mistake or falsification. First, in the case of excess water being added to the concrete by production workers, it was stated that this was done after the

test samples were taken, so that the test results would not reflect the strength of the concrete actually used in construction. (Gallagher, p.3536.)

63. Second, the tests were performed on only a small percentage of the concrete. Cylinder tests are performed on every 15th truckload of concrete, or in the case of the concrete used in the containment, every 10th truckload. Slump tests are conducted for every fifth truckload. (Johnson, pp.3985-86.)

64. Third, the batch plant operator never saw any of the test results. Mr. Gallagher testified that he did not and we have no reason to believe that Mr. Pope did. (Gallagher, pp. 3467, 3481.)

65. Fourth, the Board has serious doubts about the accuracy of Blount's records and documents. Mr. Pope admitted that batch tickets were not always accurate, Mr. Gallagher testified that the batch tickets did not accurately reflect the ingredients of each batch and, as will be shown below, Mr. Stomfay-Stitz casts doubt on the integrity of other Blount documents. (Pope, pp.2846-47, Gallagher, p.3487.)

66. The Board finds that Edison failed to meet its burden of refuting the allegations of Mr. Stomfay-Stitz, former QA/QC Materials Inspector for Blount at the Byron site, and we thereby accept as fact his allegations which identify an alarming number of deficiencies in Blount's QA/QC program. Although his demeanor on the witness stand raises some questions concerning his specific recollection of events while he was employed at Byron, we

find that it reflects most seriously on the general level of competency of the QA/QC personnel at Edison and its contractors at the Byron site. Mr. Stomfay-Stitz, after all, was the only one of the Intervenors' former construction worker witnesses who was not fired. He quit of his own accord in April, 1979 and there is no reason to believe that Blount was less than satisfied with his performance through that time. (Stomfay-Stitz, Prepared Testimony, p.1; Somsag, Prepared Testimony, p.23; Gallagher, Prepared Testimony, p.24.)

67. The Board finds that Mr. Stomfay-Stitz performed his receiving inspections of safety-related items in a manner which differed significantly from Blount procedures, and which has resulted in a completely unreliable and misleading set of QA/QC documentation records. First, miscellaneous steel items from Mid-City Architectural Iron that arrived without proper documentation were supposed to be either rejected or accepted and quarantined. (Stomfay-Stitz, Prepared Testimony, p.14.) However, Mr. Stomfay-Stitz's supervisor, Mr. Richard Barnhart, in order to generate less paperwork, instructed him to accept the items, call the manufacturer to request the documentation and, upon receiving the documentation, to date and fill out the imspection report as if the item and documentation had originally arrived intact. (Stomfay-Stitz, Prepared Testimony, p.13; Barnhart, pp.2808-09.)

68. Second, Mr. Stomfay-Stitz was instructed by Mr. Rick Donica, Blount's QA/QC Control Manager at Byron, to accept concrete blocks that were wet and dirty from Eller and Wylie, a supplier of Category I materials, without recording the fact that

these blocks were not properly protected. (Stomfay-Stitz Prepared Testimony, pp.14-15.)

69. Third, Mr. Stomfay-Stitz was also responsible for inspecting tendons that arrived on site. Upon being informed that the tendons would be reinspected by the manufacturer, the quality and thoroughness of Mr. Stomfay-Stitz's receiving inspections slacked off considerably, with the knowledge and acquiescence of Mr. Barnhart and Mr. Donica. (Stomfay-Stitz, Prepared Testimony, p.20.)

70. Fourth, and most importantly, Mr. Stomfay-Stitz was ordered to fill out receiving and inspection reports for items which he did not see, and which he had no opportunity to inspect. (Stomfay-Stitz, Prepared Testimony, p.38-39; Barnhart, pp.2805-07).

71. The Board accepts as fact Mr. Stomfay-Stitz's allegations concerning deficiencies in Blount's QA program overseeing the storage of safety-related items. First, Blount Work Procedure 10 required daily surveillance of tendon storage barns. (Barnhart pp.2809-10; Stomfay-Stitz, Prepared Testimony, p.18.) However, Mr. Barnhart instructed Mr. Stomfay-Stitz to perform the surveillances on a weekly basis. (Barnhart, p.2810.)

72. Second, in his surveillances of tendon storage barns, Mr. Stomfay-Stitz found that conditions were unacceptable because of the presence of mud and water and deficiencies in security, aisle spacing and accessibility. (Stomfay-Stitz, Prepared Testimony, p.18.) However, Mr. Donica ordered him to find the

conditions acceptable, stating that this would save paperwork. (Stomfay-Stitz, Prepared Testimony, p.18.) Mr. Stomfay-Stitz did so out of fear that he would lose his job. (Stomfay-Stitz, p.3032.) Mr. Stomfay-Stitz's initial findings were confirmed by the subsequent discovery of rust on a number of the tendons, which Region III admitted was attributable to storage conditions. (Hayes, p.3732.)

73. Third, Category I (suitable for safety-related jobs) and Category II (unsuitable for safety-related jobs) concrete blocks were not stored properly at the Byron site. Both categories of block were stored in a variety of locations, neither were clearly marked and Category II block was often stored in locations more convenient to safety-related jobs than was Category I block. (Stomfay-Stitz, Prepared Testimony, pp. 15-16.) Therefore, neither Blount nor Edison can provide any assurance that only Category I block has been used for safety-related construction.

74. The Board accepts as fact Mr. Stomfay-Stitz's allegations concerning deficiencies in the Blount QA/QC inspections of work-in-progress in which he participated. First, inspections of slotted and fixed bolt connections in the containment buildings were not performed properly. There was no schedule for inspecting bolted connections; Mr. Stomfay-Stitz would just go out and look at connections wherever work was going on at the time. (Stomfay-Stitz, p.3216.) In order to reduce paperwork, Mr. Barnhart instructed Mr. Stomfay-Stitz that when he found a missing bolt he should just have a worker replace it on the spot,

and not file a deviation report. (Stomfay-Stitz, Prepared Testimony, p.37.) In many cases, Mr. Stomfay-Stitz would simply not inspect bolts that required inspection. (Stomfay-Stitz, Exhibit A, p.6.) At the time of the hearing, all of Blount's structural steel bolting was being reinspected. (Shewski, p.2382.)

75. Second, an inspection of cracks in buttonheads was conducted in a careless, unprofessional manner and, indeed, Edison did not produce any documentation of that inspection. Region III had determined that the tendons had arrived at Byron with cracks in the buttonheads and that INRYCO, the manufacturer, had failed to discover these problems. (Hayes, p.3740.) Although it was apparently documented in the inspection in which Mr. Stomfay-Stitz participated that 100% of the buttonheads were reinspected, many were not because they were not easily accessible. (Stomfay-Stitz, Prepared Testimony, pp.22-23.) All buttonheads were wrapped in plastic which had to be opened for inspection. However the inspection was performed in -10°F and the plastic was effectively left open because the tape used to reseal the plastic did not stick at that temperature. (Stomfay-Stitz, Exhibit A, p.3.) While it appears that the doucments generated from this inspection have been destroyed or otherwise rendered unavailable for our review, it appears that at some later time another inspection was done. Testimony by Edison and the Staff was unhelpful in this regard. As a result of that subsequent inspection, those buttonheads that had cracks exceeding specifications were not repaired, but instead the specifications were changed so

that the cracks could be deemed acceptable. (Mihovilovich, pp.2767-68.)

76. Third, Mr. Stomfay-Stitz inspected the location of certain structural beams to determine whether they matched the locations given in the design drawings. However, upon finding a location in which a beam was missing, Mr. Stomfay-Stitz would call Sargent and Lundy, who would simply delete the beam from its plans and then generate paperwork to cover its decision that the beam was not needed. (Stomfay-Stitz, Prepared Testimony, pp.40-41.) It is clear that Mr. Stomfay-Stitz was not certified to do this, and Edison appeared unable or unwilling to proffer any evidence on this matter.

77. Fourth, the procedure used to identify and separate bad aggregate from the rest of the aggregate pile was woefully inadequate. If an aggregate sample failed its tests and was found to be unacceptable, then an employee of Pittsburgh Testing Laboratory (PTL) would take Mr. Stomfay-Stitz to the aggregate pile which was several hundred feet long and often strewn with debris, and Mr. Stomfay-Stitz would attempt to ascertain the general area from which the bad sample had been taken. (Stomfay-Stitz, Prepared Testimony, p.24; Stomfay-Stitz, pp.3237-38.) The PTL employees often expressed doubts as to where they had gotten the sample, and would therefore guess. (Stomfay-Stitz, Prepared Testimony, p.25.) The PTL personnel would then proceed to take additional samples from the pile without marking the spot from which they had been taken. Additional samples would be taken until a passing sample was found. Mr. Stomfay-Stitz was never

informed of more than one failing sample in any given test series. (Stomfay-Stitz, Prepared Testimony, pp.25-26.) In response to aggregate that failed the sieve analysis test, Sargent & Lundy merely changed the specifications to increase the allowable amount of fines in the aggregate. (Hayes, pp.3774-75.)

78. It was also Mr. Stomfay-Stitz's task to isolate the area from which the failing sample had come, although he was never given any guidelines establishing how big an area was to be cordoned off. (Stomfay-Stitz, Prepared Testimony, p.25.) No precautions were taken to ensure that production workers would not take aggregate from the cordoned off section of the pile, or that the cordoned off section of the pile was in fact the place from which the sample was actually taken. (Stomfay-Stitz, Prepared Testimony, pp.25, 27.) In some cases, the cordoned off section of the pile was either taken away for use or was covered over by new aggregate, which was dumped on the pile at random. (Stomfay-Stitz, Prepared Testimony, p.28; Stomfay-Stitz, pp.3237-38; Johnson, p.3974.) PTL did not test every truckload of aggregate that was added to the pile. (Stomfay-Stitz, Prepared Testimony, pp.27-28.)

79. Although the aggregate pile was condemned in 1975 and again in 1979, the Board finds no assurance that deficient aggregate was not used in safety-related concrete throughout the period of Mr. Stomfay-Stitz's employment. Although the NRC investigated the condemnation of 1975 and 1979, they did not investigate the acceptability of the aggregate pile between those two events. (Hayes, pp.3773-74.) In fact, Mr. Hayes admitted

that some nonconforming aggregate was in fact used to make concrete for safety-related jobs. (Hayes, pp.3916-16A.) This is confirmed by Mr. Gallagher's testimony regarding a constant problem with excessive fines in the aggregate. (Gallagher, Prepared Testimony, pp.11-14).

80. The Board finds that these problems, as serious as they are in their own right, are more disturbing because they are certainly indicative of problems throughout Blount's operation. Perhaps even more alarming, are the following, far-reaching flaws that the Board finds exist in the very structure of Blount's QA program. First, contrary to what Blount's formal organizational charts would indicate, its QA/QC office is not separately and independently run but is actually controlled by production officials. (Stomfay-Stitz, Prepared Testimony, p.8.) The QA/QC organization therefore lacks the requisite authority to evaluate the quality of production independently from considerations of time and cost. Decisions regarding hiring, overtime and pay increases for QA/QC personnel were improperly made by the project manager, who repeatedly denied Mr. Stomfay-Stitz's request for overtime and pay increases. (Stomfay-Stitz, Prepared Testimony, pp.9-10.) Mr. Stomfay-Stitz's salary was $4.00 per hour, considerably lower than that of the production workers over whom the was supposed to have authority. (Stomfay-Stitz, Exhibit A, pp.6-7.) As a result, the Board finds that QA/QC personnel did not feel, and were not in fact, supported in disagreements with production. The Board further finds that the Region III attempts to investigate this allegation were completely inadequate, for it

is apparent from Mr. Hayes' testimony that the questions supposedly aimed at ascertaining a conflict were entirely ineffective to do so. (Hayes, pp.3757-58.)

81. Second, the Board finds that Blount provided training for QA personnel that was inadequate in terms of its length and quality. First, Blount's documents grossly overstated the amount of training that Mr. Stomfay-Stitz received (Stomfay-Stitz, Prepared Testimony, pp.6-7, 32) and, because we have seen absolutely no indication that Blount documents are reliable, we must believe Mr. Stomfay-Stitz's recollection of his training, as supported by his testimony (passim) that he was often confused as to how to go about the performance of his duties. Second, as a trainee, Mr. Stomfay-Stitz performed the same duties that he did later as an allegedly qualified inspector and while doing so, he was accompanied by his supervisor for only about 5% of the time. (Stomfay-Stitz, Prepared Testimony, pp.5-6.) Third, as described above, Mr. Stomfay-Stitz was instructed to perform his receiving, storage and bolting inspections in a manner flatly in conflict with company procedures. (Stomfay-Stitz, Prepared Testimony, pp.13, 14-15, 37; Barnhart, pp. 2808-10.) Fourth, Mr. Stomfay-Stitz's training for bolting in inspections was given in a "hurried and vague" manner, by Mr. Barnhart who was at that time also receiving training for weld inspection. (Stomfay-Stitz, Prepared Testimony, p.32-33.) In fact, it was not until Mr. Stomfay-Stitz came forward with his allegations that the NRC found that neither Mr. Stomfay-Stitz nor his trainer and predecessor, Mr. Barnhart, were certified to perform bolting in inspections. (Hayes,

p.3725.) Therefore, we conclude that Region III's normal inspections of Blount have utterly failed to uncover serious QA deficiencies.

82. Third, the Board finds that as a result of the lack of independence of the QA/QC program, QA/QC personnel were severely overworked. This had an especially undesirable effect on performance in the case of employees, such as Mr. Stomfay-Stitz, who were both inexperienced and poorly trained. Clearly Mr. Stomfay-Stitz was not capable of conducting receiving, storage and other inspections at the same time that he was both learning and conducting bolting-in inspections. Also, both Mr. Stomfay-Stitz and Mr. Barnhart were forced to take on extra responsibilities because of Blount's failure to replace Mr. Kevin Herbig, a QA/QC inspector who had quit on short notice. (Stomfay-Stitz, Prepared Testimony, p.34.) In the words of the Applicant's counsel, it is "strange that someone who had graduated from high school less than a year before had more work to do than anyone else on the staff," with the exception of Mr. Barnhart. (Stomfay-Stitz, p. 3218.)

83. Fourth, the Board finds that Blount did nothing to encourage employees to come forward with evidence of wrongdoing. Indeed, the contrary was the case, for Blount employees were discouraged from doing so and afraid of losing their jobs. (Stomfay-Stitz, Prepared Testimony, p.43; Gallagher, p.3540.)

84. Edison has failed to submit credible evidence which might tend to show that Mr. Stomfay-Stitz' allegations were

anything other than accurate. First, Mr. Mihovilovich, whose testimony was submitted to rebut this witness, admitted that he based his testimony on documents which he knew Mr. Stomfay-Stitz had sworn were inaccurate, and in some cases falsified. (Mihovilovich, pp.2755-62). Second, Mr. Barnhart, whose purpose as a witness was the same, admitted that he instructed Mr. Stomfay-Stitz to sign inspection reports for materials which Mr. Stomfay-Stitz had never seen (Barnhart, pp.2805-06). Although Mr. Barnhart admitted that he had seen the shipments and reviewed the documents, he had absolutely no excuse for not filling out the paperwork himself, but instead ordering his subordinate to falsify the paperwork. (Barnhart, pp.2806-07).

EDISON'S QA/QC ORGANIZATION

85. The Board finds that Edison has failed to meet its burden of proving to the Board that the problems which came to light during this hearing are not indicative of the general disregard for QA/QC and corresponding weakness of the QA/QC organization of Edison and its vendors and contractors. First, the Board finds that Edison has been grossly lax and perhaps even obstreperous in its duty to encourage its employees and contractors' employees to come forward with information of wrongdoing. First, it was only at the insistence of Mr. William Forney, the NRC's Senior Resident Inspector at the Byron site, that Edison posted signs around the site instructing workers how to contact the NRC with evidence of wrongdoing and what their rights were when they did. (Forney, pp.3662-64.)

86. Second, Mr. Michael Stanish, Edison's QA Superintendent at the Byron site, admitted that Edison has never informed contractors and their employees that they can and should come to QA personnel or the NRC with information of wrongdoing. (Stanish, Prepared Testimony, p.1; Stanish, p.2705.) In fact, Mr. Stanish could not even recall a single specific instance in which a worker came forward with confidential information. (Stanish, p.2705.)

87. Third, Mr. Robert Querio, Edison's Station Superintendent at Byron, admitted that he has no knowledge of nor reason to believe that Edison has ever informed its contractors of their responsibility to protect employees who make allegations of wrongdoing. (Querio, p. 27-36.)

88. The Board finds that, as a result of Edison's failure to facilitate the free flow of information from workers with knowledge of wrongdoing, the ability of the NRC and Edison and its contractors' QA organizations to discover noncompliances in the production process has been greatly reduced. Employee allegations have proven to be a fertile ground for generating NRC special inspections, items of noncompliance and unresolved findings. (Forney, p.3693; Hayes, p.3921.) Since 1977, it has become a priority of the NRC to promote communication with workers. (Hayes, p.3894.) Mr. Forney estimates that at least 10-20% of employee allegations are substantiated, and a substantial percentage are not resolved. (Forney, p.3921.) Because, as we discuss below, we find that Region III failed to adequately investigate allegations brought to it by workers, and appeared to

work at discrediting those allegations in lieu of aggressively enforcing NRC requirements, one may assume that this number represents only a tiny portion of the allegations which would normally have been substantiated, and an infinitesimal portion of problems which have been observed by Byron workers.

89. In the first several months of 1982, the NRC received about one employee allegation per month. (Forney, p.3710.) However, at the time of the NRC's inspection 82-05, the number of employee allegations increased dramatically. (Forney, p.3710.) The Board finds that this demonstrates that efforts to increase employee awareness of problems can successfully encourage more employees to come forward with valuable information.

90. Second, Edison has admitted that its emphasis is on production, not on quality, and this low priority of QA/QC is nowhere more evident than in its hiring practices. (Shewski, p.2402.) The Board finds that this failure to build an experienced, qualified QA staff has had a pervasive, enervating effect on Edison's entire QA program.

91. Region III has found that Edison moves new personnel into QA and then quickly promotes them into production positions. (Forney, pp.3877-78.) NRC Report 82-05 found that the high rate of turnover in the post of QA Site Superintendent at Byron was undesirable. (Forney, pp. 3876-77.) NRC Report 82-07, issued in April 1982, found that Byron had had five QA Superintendents since 1976. (Shewski, p.2397.) These five people possessed a pitifully paltry amount of prior QA experience, staying an

average of 14 months on the job, the first few months of which had been spent learning and training. (Shewski, p.2398.)

92. Third, the Board finds that Edison has been extremely careless in its staffing of production personnel at Byron. Although Edison has had its reactor operators and other staff requiring licenses in place since 1978, at the time of the hearing not a single one of these employees had actually been licensed. (Querio, p.2733.) These employees will not be taking their licensing examinations until May, June and July, even though at the time of testimony the plant was scheduled to go on line in August. (Querio, p.2733.) The Board finds that this irresponsibly leaves too little time for Edison to take appropriate action in case a significant number of employees fail the licensing tests. The Board finds that this scheme is likely to create tremendous pressure to compromise either the training or licensing of these employees, and we fail to find reasonable assurance that Edison, who created this pressure, will adequately assure the integrity of those QA/QC processes.

93. The record of contractor behavior set out above has persuaded the Board that contractors at Byron have neither the capability nor the inclination to follow NRC regulations and safety procedures. The Board finds that Edison has neither the capability nor the inclination to monitor and correct the QA programs of its contractors. Mr. Walter Shewski, Edison's Corporate Manager of QA, did not even know how many contractors were on site at Byron, or how much of the contractors' work Edison

audited, although he conceded that it was less than half. (Shewski, pp.2365, 2378-79.)

94. For the work that Edison does audit, QA relies heavily on company documents which they assume to be true. (Shewski, pp.2373-74, 2378.) This is apparently based on the assumption that anyone who violates rules or procedures would dutifully incriminate himself in the appropriate documents. This assumption is especially suspect in light of Mr. Shewski's admission that he could not be sure that contractors do not lie to Edison. (Shewski, p. 2520.)

95. The weakness of this reliance on documents was glaringly obvious in the testimony of Mr. John Mihovilovich, Edison's Lead Structural Engineer at the Byron site. Mr. Mihovilovich attempted to rebut some of Mr. Stomfay-Stitz's testimony with the very documents which Mr. Stomfay-Stitz testified that he had falsified. (Mihovilovich, pp.2757-62.)

96. The Board finds that Edison's general attitude towards compliance with NRC regulations is grudging at best. For example, Edison has taken exception to the NRC's requirement that QC inspectors have the equivalent of a high school diploma. (Shewski, pp.2564-65.) Since 1976, Edison has claimed that the components of safety-related concrete are not themselves safety-related (Franklin, pp.3776-77.)

97. In his prepared testimony, Mr. Stanish indicated that all items of noncompliance at the Byron site had been resolved. (Stanish, p.2683.) However, he was subsequently forced to concede

that this was untrue, for although the items had been resolved to Edison's satisfaction, Region III disagreed. (Stanish, p.2683-84.)

98. For the period 1976 to 1982, 99 items of noncompliance were found in Byron Unit I, with 30 of them discovered in 1982 alone. (Hayes, p.3590.) Edison attempts to attribute this awful record for 1982 to the increased pace of activity as the plant neared completion and an enhanced inspection effort on the part of the NRC's regional inspectors. (Hayes, pp.3590-92; 3609-3610; Forney, pp. 3605-06.)

99. However, the Board finds this argument to be unpersuasive on both counts. First, in 1978, there was about one item of noncompliance for every 120 inspection hours, but in 1982, one item of noncompliance was found for every 85 inspector hours. (Hayes, p.3604; Forney, p.3604.) Clearly then, the increase in noncompliances cannot be attributed to an increased inspection effort.

100. Second, the LaSalle nuclear power plant, Unit 2, has approximately the same construction and fuel loading schedule as Byron Unit 1. (Hayes, pp. 3841-42.) However, LaSalle Unit 2 was cited by the NRC with only four items of noncompliance in 1982, as opposed to 30 for Byron Unit 1 during the same period. (Hayes, p.3842.) A greatly increased number of noncompliances, then, does not necessarily occur in the period before fuel loading. Therefore, Edison's record of a high number of nomcompliances, particularly in 1982, cannot be explained away as the result of factors outside of its control.

101. Edison has not only been cited for a substantial number of noncompliances, but it has been very slow in resolving these problems. NRC Report 82-05 expressed the NRC's concern with Edison's record of leaving items of noncompliance open for a long time. (Forney, p.3878.) The Board finds that this is still a serious problem. Of the items of noncompliance for which Edison was cited at the Byron site in 1980, 21.4% are still open; of the noncompliances found in 1981, 42.9% are still open, and of the noncompliances found in 1982, 71.4% are still open. (NRC Region III Panel, Attachment A.)

102. Region III has frequently questioned the effectiveness of Edison's QA/QC program and the Board joins in that skepticism. The NRC has found that Edison's audit of vendor facilities should be improved in terms of both its scope and timliness. (Shewski, pp.2393-94.)

103. NRC Reports 80-05 and 81-09 found that Edison had not effectively audited Hunter Corpration's implementation of their timiliness inspection program. (Yin, p.3795.)

104. NRC Report 82-05 cited Edison not only with noncompliances in the areas of materials and design control, but also with the failure to adequately audit production. (Forney, pp.3873, 3875.)

105. Addressing noncompliance in Edison's preoperational testing program, NRC Report 82-07 stated, "We are concerned about the lack of effectiveness of your quality assurance program that allowed these conditions to occur." (Forney, p.3880.)

106. Mr. Stanish admitted that Edison has a long history of failing to safeguard safety-related equipment. This problem has continued even though Edison has been aware of it since 1979. The problem was again identified in a 1982 QC inspection report. (Stanish, p.2650.)

107. The Board finds that Edison's QA organization does not perform even simple, basic monitoring of production. For example, Mr. Stanish admitted that Edison's QA organization failed to examine whether Hatfield Electric changed their QA manual to keep in line with a recent change in their organization. (Stanish, pp.2638-40.)

108. The Board finds that Edison is clearly more interested in ensuring that everything looks proper on paper than it is in establishing and performing an effective QA/QC program. For example, Mr. Shewski proudly described Edison's unit concept of inspection as a method of conducting complete reinspection of individual elements of the plant which "gives us the confidence that the plant is built properly." (Shewski, p.2572.) However, Mr. Shewski admitted under cross-examination that the unit concept did not actually involve complete reinspection because by the time any unit would be completed some items would necessarily be inaccessible to inspection. (Shewski, p.2590.)

109. Edison has seriously undermined the effectiveness of its own trending analysis by voiding noncompliances. (Stanish, pp.2647-48.) This practice makes Edison appear to be in greater compliance with NRC regulations, but it does so at the price of

removing the very problems which the trending analysis is designed to track.

110. Even after the adoption of procedures for the processing, packinging and handling of low level radioactive waste, Edison continued to be denied access to waste disposal sites because of the unsafe nature of their transportation practices. (Querio, p.2720.)

111. The Board finds that Edison's heavy emphasis on production has compromised its QA efforts. First, Edison has actually been stripping Unit II of equipment for installation in Unit I in order to complete the latter on time. (Stanish, p.2678.) Such a headlong rush for completion at one of the most crucial points in the construction process has had two dangerous effects. First, it has compromised QA at Unit I by simultaneously increasing the liklihood of worker error and decreasing the opportunities for QA to discover those errors. Second, it has also compromised QA at Unit II, because a disproportionate majority of QA personnel have been moved to Unit I.

112. Second, in the event that the reactor shuts down for safety reasons, Edison's operating procedures allow the plant superintendent to restart the reactor, even if no one has determined what caused the reactor to shut down in the first place. (Querio, p.4052.)

113. Region III has additionally found, in Byron's Safety Evaluation Report (SER) that Byron's QA program does not comply with the NRC's newly revised Standard Review Plan, in seven

respects. First, the QA program does not establish criteria for determining the size of the QA organization. (Sproul, Prepared Testimony, SER p.17-1.)

114. Second, the Byron QA program does not specify that QA personnel are involved in day-to-day plant activities which are important to safety, such as daily plant work schedule and status meetings. (Sproul, Prepared Testimony - SER, p.17-1.)

115. Third, the Byron QA program does not specify that "the QA organization participates early in the QA program definition stage to determine and identify the extent QA controls are to be applied to specific structures and components. (Sproul, Prepared Testimony - SER, p.17-1.)

116. Fourth, the Byron QA program has no established procedures "requiring a documented check to verify the dimensional accuracy and completeness of design drawings and specifications." (Sproul, Prepared Testimony - SER, p.17.1.)

117. Fifth, the Byron QA program has no procedures which establish criteria with which design drawings and specifications would be reviewed by QA to ensure that the documents contain necessary QA requirements and are prepared, reviewed and approved in accordance with company procedures. (Sproul, Prepared Testimony - SER, p.17-1, 17-3.)

118. Sixth, the Byron QA program contains no procedures which "provide criteria for determining the accuracy requirements of inspection equipment and criteria for when inspections are

required or define how and when inspections are performed." (Sproul, Prepared Testimony - SER, p.17-3.)

119. Seventh, the Byron QA program does not specify that nonconformance reports undergo trend analysis which is reported to upper management for review and assessment. (Sproul, Prepared Testimony - SER, p.17.3.)

EFFECTIVENESS OF NRC INSPECTIONS

118. The Board finds that the NRC Region III has actually inspected only a very small percentage of the construction work at Byron. The inspections that it has conducted have both relied heavily on documents of suspect accuracy and been colored with an overly deferential attitude towards Edison and its contractors. Therefore, the Board is neither reasonably assured that Region III has effectively monitored the QA programs of Edison and its contractors nor is it persuaded by the staff's conclusion that some allegations put forth by the Intervenors' witnessses cannot be substantiated.

121. The NRC Region III has only 10-12 inspectors available to work at Byron, and these inspectors must divide their time between the region's ten sites. (Hayes, pp.3683-84.) Mr. Hayes estimated that the NRC inspects only 1-2% of the construction work at a site such as Byron. (Hayes, p.3685.)

122. Mr. Forney admitted that the NRC only uncovers a small number of the problems at these construction sites and operational plants, and that it assumes that wherever it does find a

problem, other undiscovered problems must exist. (Forney p.3691; Hayes p.3728.) As a result Region III relies on the optimistic hope that NRC inspections will spur Edison and its contractors to perform their own inspections and in turn uncover additional problems. (Forney, p.3691.)

123. In fact, Mr. Isa Yin, Senior Mechanical Engineer for the NRC, Region III, admitted that it is a matter of "pure luck" whether any given item of noncompliance is discovered by the NRC. (Yin, p.3676.)

124. The Board finds that the attitude of Region III toward Edison and its contractors is excessively and dangerously deferential. First, in his investigation whether Edison's QA/QC organization is sufficiently independent from production, Mr. Hayes simply assumed that QA/QC was independent. (Hayes, p.3760.)

125. Second, without knowing how many QA/QC personnel were needed at the Byron site, how many QA/QC personnel Edison actually had there, or what the scope of construction activity was there, Mr. Cordell Williams, Chief of the Plant Systems Section of the NRC Region III, stated that he was "sure" that the combined QA/QC staff of Edison and its contractors was sufficient to do the job. (Williams, pp.3685-87.)

126. Third, in the face of Mr. Stomfay-Stitz's allegations concerning missing structural beams, Mr. Hayes speculated, based solely on his 35 years experience, that it was "very likely" that proper procedures were in fact followed. (Hayes, pp.3741-42.)

127. Fourth, in the face of Mr. Stomfay-Stitz's allegation that he had not possessed sufficient authority or independence to effectively carry out his duties as a QA/QC inspector for Blount, Mr. Hayes stated simply that "I have to believe that he had the authority and responsibility." (Hayes, p.3744.) This attitude of assuming the best even while faced with serious charges of falsified documents, intimidation of workers, and the like is hardly the appropriate demeanor for an investigatory staff.

128. The Board finds that at times, Region III has been blatantly biased in favor of Edison and its contractors. First, neither the Intervenors' allegors witnesses whose charges were under investigation, nor Intervenors' attorneys or representatives, were even invited to the exit meeting at which the results of Region III's investigation was discussed, although the two attorneys for Edison on the QA/QC issue were present. (Hayes, p.3717.)

129. Second, Hunter's Site QA Supervisor testified that the NRC felt that Hunter should undertake timely hanger inspections because it would make resolution of the problem "easier and less costly," yet Hunter disagreed, with Edison's apparent backing. (Somsag, Prepared Testimony, p.20.)

130. Third, when Sargent and Lundy changed specifications to increase the allowable amount of fines in aggregate for safety-related concrete, an NRC Report credited them with having taken "corrective action." (Hayes, p.3774.)

131. The Board finds that Region III has placed an exces-

sively heavy, unquestioning and unjustified reliance on company-generated documentation in its inspections, which has compromised the effectiveness of its investigations at Byron. First, in the NRC's investigations of allegations concerning tendon storage, cracked buttonheads, aggregate competency, missing structural beams and mixture uniformity of concrete trucks, the NRC relied heavily on Blount documents, even though the witnesses testified that such records had been either falsified or did not reflect the true situation. (Hayes, pp.3727, 3735, 3741, 3743, 3765.)

132. Second, in its investigation of Mr. Smith's allegations that his supervisors had often ordered him to change his inspection audits, the NRC relied on the written drafts of the audits on file, even though Mr. Somsag, Mr. Smith's supervisor, had testified that Smith's original drafts were missing from company files. (Yin, pp. 3790-91.)

133. Third, the author of the NRC's Byron SER, Mr. John Sproul, testified that in writing that document, he only examined Edison's stated commitments to safety and did not investigate whether Edison's practices were actually in accordance with those committments. (Sproul, p.3594.)

134. Even if we put this reliance on official documents aside, the Board finds that Region III inspections at Byron in general were not sufficiently thorough to accurately reflect operations at Byron. For example, although the NRC investigated the certification of Blount's QA/QC inspectors in Report 82-05, which was described as a "very thorough inspection," only as a

result of Mr. Stomfay-Stitz's allegations did they discover more problems, including the fact that two bolting inspectors had not been certified. (Forney, p.3723; Hayes, pp.3725.)

135. In the Region's investigation of the independence of Blount's QA/QC organization from production, the NRC inspector failed to ask Blount personnel just who had control over QA/QC personnel's paychecks, pay levels and requests for overtime. (Hayes, pp.3757-58.)

136. Although Mr. Stomfay-Stitz alleged that he had signed receiving inspections for materials that he had never seen, the allegation was not addressed in any of the NR reports concerning Mr. Stomfay-Stitz's charges, and Mr. Hayes could not recall whether he had spoken to Mr. Stomfay-Stitz's supervisor about the allegation. (Hayes, p.3761.)

137. The Board finds that the NRC's inability to effectively investigate allegations of past misconduct is not limited to the examples given above, but rather is the result of their methods of operation and therefore pervades their work in general. Region III has demonstrated a lack of determination to track down and interview former employees, unless they have already been given a lead as to their whereabouts. (Hayes, p.3779.)

138. As a result, when investigating allegations of past misconduct, the Region is frequently left with little more than documents to examine. However, inspectors examine these documents in search of official Edison or contractor policies or

practices that would directly cause or authorize the problems at issue. (Hayes, p.3745.) This approach is apparently based on the questionable premise that Edison and its contractors will elevate improper and illegal behavior to the status of official company policy, and will duly document these noncompliances.

139. In fact, Region III does not even get all of the relevant records for its inspections. NRC Report 80-05 largely duplicated Hunter Corporation Audit 059-3 because neither Hunter nor Edison had bothered to inform the NRC of its existence. (Yin, pp.3785-87.)

140. The Board finds that Region III's failure to effectively oversee nuclear power plant construction was amply demonstrated by events at the Zimmer nuclear site. The NRC had been inspecting construction at the Zimmer site for "at least seven to eight years," and yet it had failed to uncover major problems which led to a "major breakdown in the quality assurance" which forced the NRC to stop all construction there (Forney, p.3867.) Mr. Forney admitted that this could lead one to question the Region's ability to adequately monitor licensee construction compliance. (Forney, p.3867.)

CONTENTION

Contention 1A asserts that Commonwealth Edison has neither the ability nor the willingness to maintain a quality assurance and quality control program of sufficient authority, independence and commpetency to comply with its responsibilities under 10 CFR

50, Appendix B.

APPLICABLE LAW

Throughout this proceeding it is Commonwealth Edison which has the burden to disporve Intervenors' contention and demonstrate clearly that it has the ability and willingness, to adhere to, has in fact implemented, an effective quality assurange program. E.g., 10 CFR §§2.732 and Appendix A.

Part 50, Appendix B of the Commission's regulations, 10 CFR 50, Appendix B, sets forth the requirements for the quality assurance (QA) program which must be established by all applicants for operating licenses.

The Applicant is responsible for establishing the QA programs for itself and its contractors, verifying that its activities have been correctly performed, and ensuring that the QA personnel and organization has "sufficient authority and organizational freedom to identify quality problems; to initiate, recommend or provide solutions and to verify implementational solutions." 10 CFR 50, Appendix B(I). Specifically, the QA personnel and organization should report to a management level sufficiently high to ensure independence from considerations of cost and schedule. 10 CFR 50, Appendix B(I).

The QA program shall be established at the earliest practicable time and shall be documented by written policies, procedures or instruction. This program must idenitfy the structures, systems and components that it is to cover. The program must take into account the need for both special controls and

processes and "for verification of quality by inspection and test." The program must provide for the training of personnel "to assure that suitable proficiency is achieved and maintained." The applicant is bound to "regularly review the status and adequacy of the QA program." 10 CFR 50, Appendix B(II).

The QA program shall adopt measures to verify and check the adequacy of design control and subsequent design changes, 10 CFR 50, Appendix B(III). The QA program shall adopt measures to ensure that "applicable regulatory requirements which are necessary to assure adequate quality are suitably included or referenced in the documents for procurement of material, equipment and services." 10 CFR 50, Appendix B(IV). The QA program shall ensure that activities affecting quality are prescribed by suitable documentation and accomplished in accordance with such documentation. 10 CFR Appendix B(V). The QA program shall establish measures to control the issuance of documents and to review both their adequacy and any subsequent changes to the documents. 10 CFR 50, Appendix B(VI).

The QA program shall establish measures to assure that purchased material, equipment and services conform to these procurement documents. Such measures shall include the inspection and examination of items upon delivery. 10 CFR 50, Appendix B(VII). These materials, parts and components shall then be identified and controlled to "prevent the use of incorrect or deficient materials, parts and components." 10 CFR 50, Appendix B(VIII). Measures shall also be adopted to assure that special processes, such as welding, are conducted by qualified personnel using qualified procedures. 10 CFR 50, Appendix B(IX).

Conformance with these documented procedures must be verified through an established program of inspections of activities affecting quality. 10 CFR 50, Appendix B(X). A test program shall be established to "assure that all testing required to demonstrate that structures, systems and components will perform satisfactorily in service" is done in accordance with written procedures. "Test results shall be documented and evaluated to assure that test requirements have been satisfied." 10 CFR 50, Appendix B(XI). The QA program shall also adopt measures to assure that "tools, gauges, instruments and other measuring and testing devices used in activities affecting quality are properly controlled, calibrated and adjusted at specified periods to maintain accuracy within necessary limits." 10 CFR 50, Appendix B(XII).

The QA program shall establish measures to "control the handling, storage, shipping, cleaning and preservation of material and equipment." 10 CFR 50, Appendix B(VIII). Through the use of markings such as stamps, tags and labels, individual items are to be marked according to their status as determined by tests and inspections. 10 CFR 50, Appendix B(XIV). Materials, parts and components which do not conform to requirements are to be identified, documented and segregated "in order to prvent their inadvertent use or installation." 10 CFR 50, Appendix B(XV).

The QA program shall establish measures to assure that "conditions adverse to quality...are promptly identified and corrected." The measures shall assure that "the cause of the condition is determined and corrective action taken to preclude

repetition. The adverse condition, its cause and the corrective response are to "be documented and reported to appropriate levels of management." 10 CFR 50, Appendix B(XVI).

The QA program shall ensure that sufficient QA records "shall be maintained to furnish evidence of activities affecting quality." 10 CFR 50, Appendix B(XVII). Finally, "a comprehensive system of planned and periodic audits shall be carried out to verify compliance with all aspects of the quality assurance program and to determine the effectiveness of the program." These audits "shall be performed in accordance with the written procedures or check lists by appropriately trained personnel." The audit results shall then be "documented and reviewed by management having responsibility in the area audited," and following action "shall be taken where indicated." 10 CFR 50, Appendix B(XVIII).

It is against the above regulations and guidelines that the Board must review the evidence concerning Edison's ability and willingness or lack thereof, to maintain a quality assurance and quality control program.

CONCLUSIONS OF LAW

Based upon the evidence in the record and set forth in the Findings of Fact, the Board concludes that the record of repeated noncompliances compiled by Edison's contractors at the Byron site demonstrates that neither Edison nor its contractors have the ability or willingness to establish, maintain and adhere to an adequate and effective QA/QC program.

The Board concludes that Edison's QA/QC organization at the Byron site is plagued by ineffective investigatory practices, inexperienced personnel, inadequate staffing, a lack of commitment to performing its QA/QC responsibilities, and a lack of independence from production.

The record is replete with examples of Edison's failure to find substantial numbers of deficiencies in construction at the Byron site. Indeed, each of Intervenors' witnesses brought to the attention of the Board, as well as to the attention of Region III, significant instances of noncompliance and violations of NRC, Edison and contractor regulations and programs which had completely escaped the attention of both Edison and NRC staff personnel.

Among the many examples of noncompliances and repeated failure of Edison to uncover defects or problems and refusal to take appropriate action when it does uncover them are those set forth above, in the findings, regarding the Phillips-Getschow Company, Hatfield Electric, Reliable, and Systems Control Corporation.

A quality assurance program which fails to find problems is a fortori ineffective and inadeqauate. See Texas Utilities Generating Co. (Comanche Peak Steam Elec. Station, Units 1 and 2), ALAB __, (Slip op. July 29, 1983) (proposed partial initial decision).

The specific items of noncompliance and violation brought forward by Intervenors' witnesses cannot be viewed in isolation, for it is the entire QA program at Byron which is in issue here. Neither Edison nor the Staff has submitted evidence sufficient to

convince the Board that the facts testified to by Intervenors' witnesses are not indicative of the failure of Edison to implement, maintain and monitor an effective quality assurance program.

Accordingly, the Board concluded that Edison's own QA/QC organization lacks the ability and willingness to monitor its own activities as well as the QA/QC organizations of its contractors. This conclusion is buttressed by Edison's long history of noncompliance at all of its plants, both in operation and under construction. Edison has not met its burden of proving otherwise.

The Board finds that there is no reasonable assurance that construction at the Byron site has been conducted according to adequate QA/QC procedures and we must therefore deny Edison's request for a license to operate the Byron Nuclear Station as a nuclear power facility.

Respectfully submitted,

August 9, 1983

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
COMMONWEALTH EDISON COMPANY	)	Docket No. 50-454
	)	50-455
(Byron Station, Units 1 and 2)	)	

CERTIFICATE OF SERVICE

I hereby certify this 9th day of August, 1983, that copies of "INTERVENORS' PROPOSED FINDINGS OF FACT AND CONCLUSIONS OF LAW ON QUALITY ASSURANCE/QUALITY CONTROL in the above captioned proceeding were served on the following by hand delivery, or, as indicated by an asterisk, by deposit in the United States Mail, First Class.

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