152

July 2, 1984

Ivan W. Smith, Chairman
Administrative Judge
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dr. A. Dixon Callihan*
Administrative Judge
Union Carbide Corporation
P. O. Box Y
Oak Ridge, TN 37830

Dr. Richard F. Cole
Administrative Judge
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington, DC 20555

In the Matter of
COMMONWEALTH EDISON COMPANY
(Byron Station, Units 1 and 2)
Docket Nos. 50-454 and 50-455

Dear Administrative Judges:

Enclosed is the following testimony of the NRC staff:

- Testimony of NRC Staff on Remanded Issues with Respect to the Reinspection Program.

- Testimony of NRC Staff on Allegations Resolved Based (In Whole or in Part) on the Reinspection Program or Otherwise Relevant to the Reinspection Program.

- Testimony of James G. Keppler, NRC Regional Administrator.

The Staff has not yet received OI's Report of Investigation on the Byron allegations assigned to it. As soon as the report is received by Staff counsel, it will be transmitted to the Licensing Board and parties. Until the Staff has had an opportunity to review the OI report, we will not be in a position to respond to the Board's inquiry as to whether the circumstances surrounding the termination of Mr. A. Koca by Hatfield Electric Company have any significance for the reinspection program. Similarly, we are not yet able to respond to the Board's inquiry whether any other allegations investigated by OI have significance for the reinspection program. Based upon information from OI, the Staff expects to receive the report within the next week.

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Pursuant to the Board's "Memorandum Following Telephone Conference of June 26, 1984" (June 27, 1984), the Staff will file its testimony on issues regarding Systems Control Corporation no later than July 16, 1984.

Sincerely,

Stephen H. Lewis
Deputy Assistant Chief
Hearing Counsel

Enclosures:
As stated

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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 Nos. 50-454
	)	50-455
(Byron Station, Units 1 and 2)	)	

TESTIMONY OF NRC STAFF ON REMANDED
ISSUES WITH RESPECT TO THE REINSPECTION PROGRAM

Q1. Please state your names.

A2. My name is William Little. I am a Branch Chief in the Division of Reactor Safety, NRC Region III. I have supervisory responsibility for Region III's inspection on the implementation and evaluation of the Reinspection Program.

My name is Kavin D. Ward. I am a Reactor Inspector in the Division of Reactor Safety, NRC Region III, with responsibility for welding inspection. I inspected welds at Byron and reviewed the Reinspection Report findings with respect to welds.

My name is Ray Love. I am a Reactor Inspector in the Division of Reactor Safety, NRC Region III, with responsibility in the electrical and instrumentation areas. I have conducted inspections of the work of the Hatfield Electric Company at Byron and reviewed the Reinspection Program findings with respect to Hatfield.

My name is James Muffett. I am a Reactor Inspector in the Division of Reactor Safety, NRC Region III. I reviewed the engineering evaluations conducted by Sargent & Lundy of discrepancies identified in the Reinspection Program.

My name is Kevin Connaughton. I am the Resident Inspector (reporting to the Senior Resident Inspector) at Byron. I have conducted inspections of activities under the Reinspection Program, including recertification practices.

Q2. Are your professional qualifications attached to this testimony?

A2. (Panel). Yes.

Q3. What is the purpose of this testimony?

A3. (W. Little). This testimony addresses the issues remanded by the Atomic Safety and Licensing Appeal Board in Commonwealth Edison Company (Byron Nuclear Power Station, Units 1 and 2), ALAB-770, 19 NRC ___ (May 7, 1984) with respect to the reinspection program instituted by Commonwealth Edison Company ("CECo") in response to the Staff's noncompliance identified in Inspection Report finding 50-454/82-05-19; 50-455/82-04-19. The aspects of the reinspection addressed in this testimony are those set forth in ALAB-770 and in the Licensing Board's "Memorandum and Order Following Prehearing Conference" (June 8, 1984) ("Prehearing Conference Order").

Q4. Which contractors covered by the reinspection program does your testimony address?

A4. (W. Little). As the Appeal Board ordered, we are presenting evidence of the reinspection program as it applied to Hatfield Electric Company and Hunter Corporation. At the Licensing Board's direction, this testimony also addresses the reinspection program as it applies to Pittsburgh Testing Laboratory.

Q5. Please clarify the scope of Pittsburgh Testing Laboratory's (PTL) work relative to the reinspection program.

A5. (K. Connaughton). Work, both first line inspections and overinspections, by selected PTL quality control inspectors was subject to the same reinspection program requirements as the other site contractors covered by the reinspection program. The results are discussed in testimony of other Region III personnel on the reinspection program.

PTL also acted to supply quality control inspectors to Hatfield Electric Company during the course of construction at Byron. For the purpose of being selected for reinspection, these QC inspectors were categorized as "Hatfield" inspectors.

The applicant directed PTL, as an independent testing agency, to perform special overinspections during the conduct of the reinspection program to determine if the PTL inspectors could independently arrive at the same inspection results as the contractor's quality control inspectors who were performing the reinspections and to

verify that the contractor inspectors were not biasing inspection results in favor of their company.

Q6. Has the sampling methodology provided adequate confidence in the capability of the Hatfield, Hunter and PTL quality assurance inspectors whose work was not reinspected and the overall quality of the work of those contractors? (ALAB-770; p. 29)

A6. (W. Little). The NRC staff believes that the results of the Reinspection Program provide adequate confidence in the capability of the Hatfield, Hunter and PTL quality control inspectors whose work was not reinspected, and provides additional assurance to support the Region III staff's position that the overall quality of the work of these contractors is acceptable. However, it should be noted that the Region III staff believed at the time of the Program's inception and believes today that the primary purpose of the Reinspection Program was to determine whether quality control inspectors who may not have been properly certified prior to September, 1982 had overlooked significant safety-related hardware deficiencies in their inspections.

The sampling methodology was not statistically conceived, but was based on engineering judgment. Considering that we had no reason to believe that significant hardware deficiencies existed and that we had insufficient evidence to suggest that the inspectors were incapable, the Region III staff believes that the sample size of inspectors whose work was inspected was sufficiently large and did

provide a good basis for evaluating whether there was reason to believe that inspectors whose work was not reinspected had overlooked significant discrepancies.

The Reinspection Program sampling methodology required that each inspector for Hatfield, Hunter and PTL be listed chronologically by date of certification, and the first inspector and every fifth inspector thereafter were selected for reinspection of their work. If a Hatfield or Hunter inspector had not performed a minimum of 50 inspections (25 inspections in the case of PTL) during the first three months of his work, then the next inspector in chronological order was selected. In addition to the above process, the Byron Senior Resident Inspector reviewed the QC inspector certification records and added two to four additional inspectors of his choice to the group of inspectors selected by the above mentioned process for each contractor.

Since the original certification of the inspectors was suspect, this could mean that the inspectors were not properly trained or they lacked the experience required to enable them to adequately perform their required inspection work. If this were true we would expect these inspectors to make most of their mistakes during the initial periods of their inspection work. Therefore, the first three months work of each inspector selected was reinspected and if the acceptance criteria were not met the second three months of the inspector's work was reinspected. If the inspector's work failed to

meet the acceptance criteria during the second three month period, the inspector was considered to be unqualified and all of his inspections of the type in which he failed to meet the acceptance criteria were reinspected, and the original inspector sample was expanded by as much as 50%. It was Region III's engineering judgment that this sampling methodology was conservative and adequate for the purpose of the Reinspection Program.

Using the sampling methodology resulted in reinspecting a large sample of the work performed by 27% of the 86 Hatfield inspectors, 26% of the 84 Hunter inspectors, and 27% of the 85 PTL inspectors employed prior to 1982. The following numbers of safety related elements were reinspected: 67,245 objective and 26,660 subjective elements for Hatfield; 69,624 objective and 3,725 subjective elements for Hunter; and 6,016 objective and 6,137 subjective elements for PTL. It is Region III's judgment that the large sample of inspectors whose work was reinspected and the reinspection results give reasonable assurance that the Hatfield, Hunter and PTL inspectors did not overlook significant safety related hardware deficiencies. Region III believes that the reinspection of a total of 179,407 safety related elements for Hatfield, Hunter and PTL, the results of those inspections, and the analysis and disposition of the reinspection findings give us reasonable assurance that the overall quality of the work of those contractors is good. This conclusion is considered valid for both accessible and inaccessible work. Mr. Muffett's testimony addresses inaccessible and non-recreatable attributes.

Q7. Has the Staff accepted the results of the reinspection program as sufficient to resolve noncompliance 82-05-19?

A7. (W. Little). The Region III staff has accepted the results of the Reinspection Program as sufficient to resolve noncompliance 82-05-19, as we documented in NRC inspection number 50-454/84-13 and 50-455/84-09. Our acceptance of the results of the Reinspection Program was based upon:

1. Our evaluation that the program, as conceived and implemented, was adequate to accomplish our purpose, which was to determine whether prior to September, 1982, inspectors who may not have been properly certified overlooked significant safety related hardware problems.
2. An extensive inspection effort of program implementation by numerous NRC inspectors who possess engineering and inspection expertise in the areas covered by the Reinspection Program, which is summarized in the previously referenced report.
3. Our evaluation of the disposition of the discrepancies identified by the Reinspection Program, which was done to assure ourselves that the discrepancies did not indicate that there were significant safety related hardware defects in the work reinspected by Hatfield, Hunter and PTL. This evaluation is described in the previously referenced report and in Mr. Muffett's testimony.

I have already testified why we believe that the sampling methodology used in the Reinspection Program was adequate.

I will now describe our position on the acceptance criteria used in the Program to evaluate the reinspection discrepancies. From the inception of the Reinspection Program until this time it has been the Region III position that the 90% and 95% acceptance criteria are acceptable. Our reasoning is described in the following paragraphs.

The Reinspection Program established the following acceptance criteria:

1. for objective inspections the reinspection results shall agree with the original inspections greater than 95% of the time; and
2. for subjective inspections the reinspection results shall agree with the original inspections greater than 90% of the time.

We reviewed and accepted these criteria based on considerations of the safety importance of the elements inspected, the importance of the inspections themselves, and the expected performance of inspectors in identifying deficiencies.

The results of the Reinspection Program are summarized as follows:

Hatfield

Objective Inspections - All 17 inspectors sampled passed at the end of the first three months.

Subjective Inspections - A total of 7 inspectors passed at the end of the first three months. One inspector failed at the end of the

first three months but had no more reinspectable work. An additional inspector was substituted whose work was found acceptable at the end of three months, and he is included in the above total.

Hunter

Objective Inspections - Nineteen inspectors passed at the end of the first three months. One inspector passed who had all of his accessible and recreatable work inspected, because he did not have the minimum quantity of inspections during his first three months.

Subjective Inspections - A total of 16 inspectors passed at the end of the first three months. One inspector failed at the end of the first three months, but had no more reinspectable work. An additional inspector was substituted whose work was found acceptable at the end of three months, and he is included in the above total.

Pittsburgh Testing

Objective Inspections - Nine inspectors passed at the end of the first three months.

Subjective Inspections - A total of seven inspectors passed at the end of the first three months. Three inspectors passed who had all of their accessible and recreatable work inspected, because they did not have the minimum quantity of inspections during the first three months. One inspector failed at the end of the first and second three month periods, resulting in all of his work being reinspected

and the addition of the last remaining inspectors (4) to the sample. All four of these inspectors passed at the end of the first three months and are included in the above total.

In summary the Region III staff has accepted the results of the Reinspection Program as sufficient to resolve noncompliance 82-05-19 because we have found the program's sampling methodology and acceptance criteria, the program's implementation, and the evaluation and disposition of discrepancies identified by the program to have satisfied the program's intended purpose.

Q8. With respect to Hatfield, Hunter and PTL, please describe how the Staff monitored the implementation of the reinspection program?

A8. (Ward). Another Staff inspector and I assessed the Hatfield, Hunter and PTL reinspection of welds. A description of our efforts in doing so is found at pages 19-26, 27-29 and 37-38 of Inspection Report 83-39/83-29, dated December 28, 1983, and pages 10-14 of Inspection Report 84-13/84-09 dated April 16, 1984. Those pages are Enclosure 1 and 2 to this testimony attached and I adopt them as part of my testimony.

The review of the weld reinspections consisted of my selecting a number of welds that were subject to the reinspection program. I examined the welds themselves to determine it they had been reinspected and that the reinspector did not overlook a discrepancy. I also examined the documentation of welds generated by the rein-

spection program and the documentation generated by the original inspection of the weld. My inspection also included discussions with supervisors and lead weld inspectors.

In the course of my inspection, I found no instance in which a reinspector missed a deficiency. In fact, in many cases the reinspections were overly conservative and inspectors were classifying welds and attributes as "unacceptable" even though they were in fact acceptable under the American Welding Society (AWS) Code 1. I also found no instance in which a reinspection was not being conducted correctly. Furthermore, I found no deficiencies in the documentation generated by the reinspection program. With respect to the documentation of the original inspections, I did not find any deficiencies.

Another inspector observed the Hunter reinspection of components other than welds. The results of that review are found at pages 38-39 of Inspection Report 83-39/83-29 dated December 28, 1983. Those pages are attached to this prefiled testimony. (Enclosure 3).

Q9. With respect to Hatfield, excluding the welding area, please describe how the Staff monitored the implementation of the Reinspection Program? What were the findings and their safety significance?

A9. (R. Love). The implementation of the reinspection program was verified through the review of inspection reports, nonconformance reports, deficiency reports, and observation of work activities including inprocess inspections. The Region also verified CECo's involvement

in the Reinspection Program by reviewing QA audit and surveillance reports and by interviews of CECo personnel.

The findings for these attributes are summarized in Inspection Report 83-37, pages 5-7, and in Exhibit D-1 of CECo's Report on the Byron QC Inspector Reinspection Program, dated February 1984, Pages 7-10. (Enclosures 4 and 5 to this testimony). As indicated on page 9, paragraph 5, of the attached portion of the CECo report, the reinspection program provided a small sample for equipment setting and modifications, and A325 and conduit support bolting work. Additional inspections in these areas were conducted by CECo. The results of this additional inspection effort is documented in CECo's June 1984 supplement to the February, 1984 report. This supplemental response is currently under evaluation by Region III.

With respect to CECo report dated February 1984, Region III concurs that the deficiencies identified in the area of cable terminations, conduit installation, equipment installation and modification, cable tray and hanger installation, A325 bolts, and as-built drawings are not safety significant.

Q10. Have the deficiencies identified during the reinspections been properly included in the statistics of the program regardless of the particular documentation used to record such deficiencies?

A10. (W. Little). Yes, the Region III inspection staff has expended much inspection effort toward ensuring that discrepancies were properly

identified, documented, evaluated and included in the "Report on the Byron QC Inspector Reinspection Program", February, 1984. Our inspections identified no instances of improper documentation practices for Hatfield, Hunter and PTL, that would have resulted in deficiencies not being properly included in the Reinspection Program, and that would have impeded the ability to detect patterns or trends.

In addition, one of the primary objectives of the three Commonwealth Edison Company QA audits was to ensure that deficiencies were properly identified, accurately documented, evaluated and dispositioned. The first audit conducted in June and July, 1983 revealed that certain contractors, including Hatfield, Hunter and PTL were documenting discrepancies in accordance with the Reinspection Program, but the documentation did not meet the specific requirements of each contractors' QA program. However, since all discrepancies were being accurately documented this finding did not call into question the validity of the Reinspection Program results. The second audit conducted in August, 1983 was to ensure that documentation problems that Hatfield experienced during the early years of construction were not being repeated in the Reinspection Program. It was found that Hatfield had instituted special precautions to maintain the integrity of the Reinspection Program. The third audit conducted in November, 1983 identified problems with respect to some instances in which welds were rejected by PTL, reviewed by the required third-party who concurred in the rejection, but later accepted by PTL. A

problem arose because PTL did not obtain third party concurrence in the subsequent acceptances of the rejected welds. The audit found this to be unacceptable and all welds processed in this manner received the third-party review.

Q11. Has the integrity of the reinspection program been established even though the reinspections were conducted by Hatfield and Hunter personnel, rather than by an independent organization (i.e., was there evidence in the reinspection program of a "buddy system", where inspectors reinspected their own work or work of their friends)?

A11. (W. Little). Region III believes that the integrity of the Reinspection Program has been established and that effective measures were taken to prevent a "buddy system" bias of the results. Our belief is based upon the following:

1. Commonwealth Edison established controls to ensure that no inspector would reinspect his own work, and to ensure that the reinspectors did not know either who performed the original inspection, or what the original inspection findings were. It should be noted that it was not possible for inspectors to reinspect their own work on a significant scale in that 61% of the Hunter inspectors, 57% of the Hatfield inspectors and 57% of the Pittsburg Testing Laboratory (PTL) inspectors no longer were on the site at the time of the reinspection.

2. Audits of the reinspection program by Commonwealth Edison Quality Assurance and inspections conducted by the Region III staff, confirmed the integrity of the Reinspection Program.

Commonwealth Edison Company Quality Assurance performed three audits of the Reinspection Program to ensure that the Reinspection Program was properly implemented and to ensure that inspectors chosen to be reinspected were not selected to provide a bias in favor of their company. Their third audit performed after the issuance of the "Preliminary Report on the Reinspection Program", October 28, 1983 involved a 100% review of the QC inspection personnel of all contractors involved in the Byron Reinspection Program and verified that none had been involved in reinspection of work they had either originally inspected or had reviewed and accepted.

The Region III inspection staff inspected the Reinspection Program throughout its implementation and evaluation and found no indication that bias in favor of the original inspectors or the contractors was a problem. In fact, extensive Region III inspection efforts confirmed that the reinspectors, including those for Hatfield, Hunter and PTL, were very conservative in identifying discrepancies. Our inspector found that in the subjective visual weld inspections the reinspectors were identifying weld attributes as unacceptable which were in fact, acceptable under the AWS Code. If a buddy system were in effect, we would expect to find instances where decisions

were made in favor of the original inspector and the Region III inspection staff found none of these instances.

Q12. Has the Applicant provided a system to assure that inspectors certified between September 1982 and early 1983 are capable of performing their tasks?

A12. (K. Connaughton). Yes. Individuals certified after September 30, 1982 were certified in accordance with the Applicant's June 9, 1982 directive which established criteria to be uniformly applied by contractors for QC inspector certification.

Based upon the results of extensive NRC inspections and the Applicant's 100% review of inspector certification documents, only one QC inspector was identified who had been hired and certified after September 30, 1982 and who did not meet the experience requirements for the area and level of certification. That individual was a Level II weld inspector for Hatfield Electric.

The individual had worked once before as a QC inspector for Hatfield Electric prior to September 30, 1982. The first three months of work from his initial period of employment was reinspected as part of the reinspection program and a 95% acceptability rate was established. After being identified as improperly certified for his reemployment after September 30, 1982 the Applicant reinspected his first 30 days work following his reemployment and certification and established an acceptability rate which exceeded 99%.

Individuals hired and certified prior to September 30, 1982 in accordance with earlier QC inspector certification practices were included in the population of inspectors considered in the reinspection program. The reinspection program indicated that these QC inspectors were not overlooking significant discrepancies prior to September 1982. It would not be expected that these inspectors would be overlooking significant discrepancies between September 1982 and early 1983.

All individuals, regardless of when hired and initially certified, were recertified, as necessary, to meet the Applicant's June 9, 1982 directive by April 30, 1983. The Applicant's 100% review of QC inspector certifications was completed in July, 1983. These reviews resulted in the temporary decertification of one individual who did not possess a high school diploma or GED certificate. The individual subsequently obtained a GED and his certification was reinstated.

(K. Ward). Yes. I reviewed 33 visual weld inspector personnel certifications of Hatfield, Hunter and PTL personnel who were onsite and personnel who had left the site, including all visual weld inspectors recertified between September 1982 and early 1983. I found all of the certifications to be acceptable (Inspection Report No. 50-454/83-39; 50-455/83-29, pages 18, 19, 25 and 27).

I a'so visually examined approximately 330 welds that had been examined by Hatfield, Hunter and PTL and found that the companies did an acceptable job. (Inspection Report No. 50-454/83-39; 50-455/83-29, pages 18-30).

Q13. How many Hatfield inspectors required recertification and/or retraining at the inception of the recertification program?

A13. (K. Connaughton). Hatfield employed 46 inspectors as of September 30, 1982 who were previously certified in accordance with Hatfield procedures. In order for Hatfield to comply with the QC inspector certification requirements established in the Applicant's June 9, 1982 directive, all of these inspectors required one or more of the following: additional testing, documented on-the-job training, classroom training or additional objective evidence in support of their education and/or experience.

Q14. What significance is there to this number?

A14. (K. Connaughton). The Applicant's June 9,1982 directive regarding QC inspector certification included requirements which were highly prescriptive in regard to certain certification activities. For example, the directive established minimums for the number of questions to be contained on a required "closed book" written examination and for the number of hours of on-the-job training.
Whether or not previously certified inspectors had received adequate testing and on-the-job training for their area(s) and level(s) of certification, they were required to be recertified

if they had not met the Applicant's newly established minimums. Regardless of the reason(s) inspectors required recertification, they were included in the population considered in the reinspection program. There is, therefore, no particular significance to the number of Hatfield inspectors who required recertification to meet the Applicant's June 9, 1982 directive.

Q15. What were Hunter's documentation practices regarding discrepant conditions identified during the reinspection program?

A15. (K. Connaughton). As documented in the Applicant's QA audit report No. 6-83-66, an audit was conducted of Hunter and other contractors between June 21 and July 6, 1983 which resulted in a finding that Hunter and others were not utilizing the formal corrective action documentation specified in their QA programs to document discrepancies identified during the reinspection program. Instead, Hunter documented discrepancies with "field problem sheets". The discrepancies were captured in the reinspection program results. The audit finding was subsequently closed after Hunter issued discrepancy and nonconformance reports covering these discrepancies. Appropriate corrective action documentation was generated by Hunter for later identified discrepancies.

Q16. Were the reinspection results for Hunter compromised in any way by the "tabling" practices alleged by Michael Smith?

A16. (K. Connaughton). The tabling practices were alleged to have occurred prior to the reinspection program. There is no evidence that "tabling"

(i.e., failure to document and control) discrepancies occurred at Hunter during the reinspection program. As noted in the previous answer, Hunter did, however, document and control identified discrepancies prior to July 6, 1983 outside of the corrective action system specified in the Hunter QA program.

(K. Ward). In reviewing Hunter's documentation in the reinspection program the NRC inspectors found no problems. (See attached Report No. 50-454/83-39; 50-455/83-29, pages 18, 25, paragraph 12 on page 37, 38 and 39.) I reviewed visual weld inspection reports and visual weld inspection personnel certifications. Another inspector reviewed components.

No indication was found that the practice referred to as "tabling" was applied to discrepancies during the Reinspection Program. In fact, we uncovered no discrepancies in any documentation generated by the Hunter reinspections.

Q17. What significance is there to Hunter's alleged "tabling" practices in terms of assurance of the quality of Hunter's work?

A17. (K. Connaughton). Prompt identification and correction of nonconforming conditions is an objective of QA programs and required by 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action". The basis for this objective is that if identification of problems and initiation of corrective actions are put off, the system of checks and balances provided by a proper QA program could be rendered ineffective. Deferral

of inspections and corrective actions by Hunter had been identified by the NRC during and subsequent to the employment of the individual who alleged to have personally witnessed the tabling of identified problems. Hunter instituted programmatic improvements to ensure that QC inspections and corrective actions were more timely and NRC findings relative to this issue have been satisfactorily resolved. "Tabling", if it occurred as alleged, has been addressed such that assurances of the quality of Hunter's work have not been compromised.

Q18. How were inspection attributes determined to be inaccessible or non-recreatable for the purpose of the reinspection program?

A18. (J. Muffett). Certain work activities by their nature and location are not generally reinspectable. CECo divided these attributes into two categories.

1. Inaccessible: The item which requires reinspection is located in an area or inside a structure which would require "extensive dismantling" to gain access for reinspection.
2. Non-recreatable: A condition where a process or event cannot feasibly be recreated for reinspection.

These basic terms require a certain amount of judgment and interpretation to be useful in a program conducted on a construction site. During the life of the reinspection program various interpretations were developed by CECo. These interpretations deal with a wide range of issues including the classification of inspections as either

inaccessible or non-recreatable. For example, CECo determined that the inspection of certain Hatfield conduit supports should be classified as inaccessible due to the fact that the supports were covered by firestops, and removal of these firestops had the potential for damaging electrical cables encased in the firestops. In another instance, CECo determined that inspections of structural bolting were non-recreatable due to the fact that the original inspector is only required to check a random 10% sample and not required to record which bolts made up this sample.

The basic categories and the interpretations have been reviewed by Region III and have been found to result in a practical program for reviewing previously inspected work to determine if signficant deficiencies were overlooked by certain inspectors. Therefore, we believe this aspect of the reinspection program was conducted in an acceptable manner.

Q19. Why do the reinspection results give reasonable assurance as to the quality of inaccessible and non-recreatable items?

A19. (J. Muffett). Careful review of the results of the reinspection program identified no cases in which the ability of a component or installation to fulfill its design function was jeopardized by an overlooked defect. This fact indicates that the inspectors were not overlooking significant discrepancies.

To the extent that nonreinspectable attributes are similar to the reinspectable attributes, the sampling of the reinspectable attributes can be readily applied to the nonreinspectable attributes. With respect to Hatfield and Hunter, the nonreinspectable attributes are highly similar to the reinspectable attributes. In addition, only approximately 10% of Hatfield and Hunter's visual weld inspections were classified as inaccessible. Accordingly, the reinspection program provides a high degree of assurance that significant discrepancies were not overlooked in the original Hatfield and Hunter inspections of nonreinspectable attributes.

As for PTL, there is still a fair degree of correlation between reinspectable and nonreinspectable work. Many of the reinspectable attributes, e.g. visual weld inspections, are similar to the nonreinspectable ones. However a number of the nonreinspectable items are not similar to the reinspectable ones, e.g. soils. Also, less of the PTL work was reinspectable than for Hatfield and Hunter. However, even though the reinspection program reveals less about nonreinspectable PTL attributes than it does about Hatfield and Hunter attributes, reasonable assurance as to the quality of the PTL inspections is provided by the reinspection program and by the fact that throughout the construction of the plant nonreinspectable items inspected by PTL have been audited by CECo and inspected by the Staff. No pattern of significant problems has been discovered.

Q20. Could the knowledge that certain work would be inaccessible for reinspection or non-recreatable have influenced craftspersons and inspectors?

A20. (J. Muffett). The question can be asked whether craftspersons and inspectors at Byron did less than their best job when they knew that certain work would become inaccessible or non-recreatable. The Staff has no reason to believe that this occurred, since any attribute at Byron which would become inaccessible or non-recreatable was required to be inspected while still accessible.

Furthermore, it is my understanding that during the construction of the plant, CECo has overinspected and the staff has performed inspections of items that are now inaccessible or non-recreatable. There has been no indication of pattern of significant problems with those types of inspections. Also in some cases the original inspector did not know the component or installation would be inaccessible or non-recreatable, so in these cases there could be no influence.

Q21. Have all identified discrepant conditions identified in the Reinspection Program been properly resolved? Has CECo's commitment to repair any defect identified during the reinspection program been satisfied and effective? What technical analyses provide assurance that discrepant conditions which are not corrected are not safety-significant?

A21. (J. Muffett). Based on our inspections and reviews we believe all discrepant conditions identifed in the Reinspection Program have been properly resolved. The basis for the resolution of these discrepancies

and defects is a detailed engineering evaluation performed by Sargent and Lundy. All discrepant welds with subjective or objective defects have been evaluated and no weld which required repair has been discovered.

The Staff has reviewed discrepancies relating to all the contractors in the reinspection program and a broad spectrum of the types of discrepancies. These include concrete expansion anchors, pipe ovality, improper fit up gap for a weld, undersized weld and undersized socket weld, among others. The Staff reviewed the Sargent and Lundy analyses which form the bases for the resolution of these discrepancies. On the basis of this review, the Staff concurs in Sargent and Lundy's conclusion that none of the discrepancies have safety significance.

Q22. What was the cause and safety significance of the electrical cable overstressing episodes as described in Inspection Reports 84-02 and 84-09? What is the relationship, if any, between those episodes and the reinspection program? (Prehearing Conference Order, Page 9).

A22. (R. Love) - The occasional overstressing of an electrical cable is not safety significant providing it has been documented, properly analyzed, and appropriate corrective action taken. Even if cable installation procedures are properly implemented, it is expected that a small number of these cables will be overstressed when pulled through raceways. The cable installation activities were not considered during the 82-05-19 reinspection program because this activity is not recreatable.

Following is a summary of the cable pulling effort at Byron Station: As of June 22, 1984, there have been 20,652 electrical cables installed in Unit #1, and 6,769 in Unit #2. The total number of cables to be installed is approximately 36,400. During a followup of an allegation concerning overstressing of cables at the Byron Station, it was identified that approximately 110 cables had been overstressed during the initial installation or during rework activities (Reference: Inspection Report 454/84-09; 455/84-07). After analysis, some of these cables were acceptable as installed while others were replaced. The analysis for the cables that had been accepted as installed was found by the Staff to be adequate.

As discussed in Inspection Report 84-02, Pages 12-15, the NRC had identified shortcomings in the Hatfield cable installation procedure. The prime concerns were with cables installed in conduits prior to December 1982. Sargent and Lundy (S&L) identified that electrical cables had been pulled into approximately 2600 conduits prior to December 1982 and these would require analysis.

As documented in Inspection Report 454/84-27; 455/84-19, pages 10 and 11, the calculations performed by S&L were reviewed and found to be adequate. The worst case accepted, as observed by the inspectors, had a safety factor of approximately 3.3, that is, if the maximum allowable cable pulling tension was 330 pounds, S&L calculations showed that the cable could be pulled with 100 pounds tension or less. This analysis plus the various tests performed

prior to reactor operations provides Region III with a reasonable assurance that these cables will perform their intended function for the life of the plant.

Q23. Is there a pattern of nonconformances by Hatfield which is significant in terms of assurance of the quality of Hatfield's work?

A23. (R. Love). The Staff has not identified any pattern of nonconformances by Hatfield that would indicate widespread or significant problems with Hatfield work. There are, however, two matters of potential safety significance which have been preliminarily identified under 10 C.F.R. § 50.55(e) and which remain open as of the date of this testimony. They are:

1. Potential 50.55(e) (454/83-14-EE; 455/83-14-EE): This item pertains to the improper installation of electrical cable grips. As installed, the cable grips are not supporting the cables in risers (vertical raceway).
2. Potential 50.55(e) (454/84-03-EE; 455/84-03-EE): This item pertains to electrical conductor butt splices and is being investigated by CECo under an inspection plan which has been approved by Region III. That investigation will include an analysis of the safety significance of all defects identified.

Both of these items will be tracked by NRC as open § 50.55(e) potential deficiencies and must be closed prior to fuel load.

PROFESSIONAL QUALIFICATIONS

WILLIAM S. LITTLE

U.S. NUCLEAR REGULATORY COMMISSION

I am employed as the Chief of the Engineering Branch, Division of Reactor Safety, Nuclear Regulatory Commission, Region III. I received a Bachelor of Chemical Engineering degree from Georgia Institute of Technology, Atlanta, Georgia in 1953. I completed eighteen semester hours of graduate study toward a Masters of Nuclear Science degree at the University of Idaho.

Since January, 1982 I have managed the Engineering Branch in Region III responsible for inspections at the Region III nuclear power plant operating and construction sites in the following areas of engineering: civil, structural, electrical, mechanical, metallurgical, nondestructive examination, welding and fire protection. During 1980 and 1981 I supervised a Reactor Projects Section in Region III responsible for the resident inspection program at four operating and construction sites. From August, 1975 through 1979 I supervised a Nuclear Support Section in the Operation Branch in Region III responsible for the inspection of operating nuclear power plants in various areas of engineering. From September, 1971 until August 1975 I was the Principal Inspector for Browns Ferry Units 1 and 2 in Region II during preoperational, startup testing and initial operation.

Prior to joining the U.S. NRC I was employed by Babcock & Wilcox Company, Lynchburg, Virginia from June 1968 through August 1971 as a Licensing Supervisor responsible for the B&W licensing activities for several nuclear power plants. From October 1956 until June 1968 I was employed by the Phillips Petroleum Company, Atomic Energy Division at the National Reactor Testing Station in Idaho. With Phillips Petroleum Company I held numerous engineering and supervisory positions in areas related to the design, construction and operation of nuclear test reactors and experiments conducted in those reactors, and in water reactor safety analysis and testing.

Prior to October 1956 and following my graduation in 1953 I worked in non-nuclear areas as an engineer in organic chemical p ocess development, and as a research engineer in the areas of heat transfer and refrigeration systems development testing.

PROFESSIONAL QUALIFICATION

KAVIN D. WARD
U. S. NUCLEAR REGULATORY COMMISSION

I am employed as a Reactor Inspector in the Region III, Materials and Processes Section.

I received a B.S. degree in Mechanical Engineering from Pacific Western University, Encino, California. I am also a Professional Engineer in Quality Engineering from the State of California.

I am assigned as a Reactor Inspector in Region III and have been since January, 1978. In this capacity I perform inspections in construction and operating facilities in accordance with Codes, Standards and Guides. I observe the performance of welding and nondestructive examination (NDE) of support personnel, evaluate and report upon appraisal of their qualifications and performance, primarily in the fields of NDE and welding. Participate in investigations involving or pertaining to nuclear facilities.

Prior to joining the Commission in January, 1978, I worked 7 years for Bechtel Corporation, San Francisco, California. I held the position of Engineering Supervisor and was certified in various methods of NDE, including being a test examiner.

From 1970 to 1971, I was employed by Nebraska Testing Lab as a Quality Assurance Manager.

From 1969 to 1970, I was employed by Peter Kiewit Cons. Company as a Quality Assurance Engineer.

From 1968 to 1969, I was employed by Phillips Petroleum Co. as a Quality Assurance Representative.

From 1966 to 1968, I was employed by Westinghouse Electric Co. as a NDE Technician.

From July 1946 to August 1966, I was in the United States Navy. While in the Navy, I attended several welding and NDE schools and served primarily aboard submarine tenders as a pipefitter, welder and NDE inspector.

PROFESSIONAL QUALIFICATIONS

RAY S. LOVE

U.S. NUCLEAR REGULATORY COMMISSION

I am employed as a Reactor Inspection in Region III, Division of Reactor Safety, Engineering Branch, Plant Systems Section.

In this capacity, I have performed inspections of the electrical and instrumentation nuclear construction work activities in Region III facilities to ascertain licensee conformance with NRC requirements, SAR commitments, applicable codes and standards and locally prepared procedures and instructions.

As a collateral assignment, I served as the NRC representative on the ASME Boiler and Pressure Vessel Committee, Section III General Requirements, Work Group on Duties and Responsibilities. My five (5) year term expired in March 1984.

Prior to joining the Commission in April 1981, I worked 11 years for various contractors in the construction or modification of nuclear power plants as a QC inspector, QA/QC Manager, and an Electrical Engineer. Also worked 3 years as a Reactor Operator at the EBR-II facilities for Argonne National Laboratories.

From December 1945 to July 1965, I was in the United States Navy. While in the Navy, I qualified as an Engineering Officer of the Watch (EOOW) for nuclear facilities.

I am a Registered Professional Engineer, State of California, Number QU-2789, dated February 8, 1978.

PROFESSIONAL QUALIFICATIONS

JAMES W. MUFFETT

U.S. NUCLEAR REGULATORY COMMISSION

I am employed as a Reactor Inspector in Region III, Division of Reactor Safety, Materials and Processes Section.

I received a B.S. degree in Physics from Purdue University in 1972 and a Master of Engineering degree in Mechanical Engineering from the University of Idaho in 1978. I am a registered Professional Engineer in the States of Illinois, Indiana and Minnesota.

Over the last twelve years I have been involved in the design and analysis of piping, pipe supports, structures at various nuclear stations including Zion, Ft. St. Vrain, Monticello, Fermi-2, and the "Loss of Fluid Test" reactor among others.

I was employed at Sargent & Lundy from 1972 until 1975 as a stress analyst and from 1975 to 1978 at the Idaho National Engineering Laboratory as a Group Leader in the Applied Mechanical Branch.

From 1978 until 1981 I was employed outside the Nuclear Industry in the development of analytical methods. From early March 1981 until August 1981 I was employed with Nuclear Power Services' Chicago office as manager of analytical services. From 1981 until 1983 I was employed at Nutech Engineers as Manager of Mechanical Design and Analyses for various nuclear station modifications. In August 1983 I joined US NRC Region III.

KEVIN A. CONNAUGHTON

Organization: Nuclear Regulatory Commission
Region III

Title: Resident Inspector

Education: B.S., Nuclear Engineering, University of Cincinnati

Experience:

8/82 - Present — Resident Inspector, Projects Section 1B - Performs assigned portions of 2513 and 2514 programs at Byron Nuclear Station, Units 1 and 2.

6/82 - 8/82 — Reactor Inspector, Management Programs Section - Inspects reactors in operation and test and startup. Prepares assigned portions of Byron and Perry SER (OL Stage).

2/81 - 6/82 — Reactor Inspector Intern, Management Programs Section - Inspects reactors in operation and test and startup. Prepares assigned portions of Byron and Perry SER (OL Stage).

6/80 - 2/81 — Reactor Inspector Intern, Nuclear Support Section 2 Inspects reactors in operation and test and startup.

9/78 - 3/79 — Inspection Assistant, Reactor Operations and Nuclear Support Branch, Region III - Employed through the Cooperative Education program. Attended PWR Fundamentals Course, assisted Fire Protection Review Team, accompanied and assisted RO&NS Inspectors.

9/77 - 3/78 — Inspection Assistant, Reactor Operations and Nuclear Support Branch, Region III - Employed through the Cooperative Education Program. Accompanied and assisted RO&NS Inspectors. Responsible for familiarization with pertinent aspects of plant design, regulation, operation, etc., of nuclear power facilities.

9/76 - 3/77 — Inspection Assistant, Fuel Facilities and Materials Safety Branch - Employed through Cooperative Education Program. Accompanied inspectors from all branches and sections of the regional office. Attended Headquarters orientation program.

As the re-inspection program progressed beyond the early stages, CECo Quality Assurance and Project Construction personnel became aware of problems at Hatfield in determining which welds were to be included in the re-inspection. These problems were primarily due to the manner in which Hatfield generated and maintained inspection records during the early years of construction. Also, the NRC advised CECo of concerns with the Hatfield inspection records. As a result, CECo Site Q.A. performed an audit to specifically address these concerns. The audit (report #6-83-124) was conducted by a three man team during the period 8/24/83 through 9/1/83.

The scope of the audit included the following:

- Review documentation practices
- Correlation of weld record cards to welders and inspectors
- Identifying the latest weld record
- Re-numbering hangers
- Re-inspection - incorrect assumptions
- Procedures not being followed

In reviewing the above audits the inspector determined that the contractors were actively implementing the re-inspection program.

D. Welding

The following addresses welds that the inspector visually examined and documents the inspector reviewed of various contractors involved in the reinspection program. The welds visually examined were welds located in Unit 1 and Unit 2.

1. Hatfield Electric Company

Hatfield reinspected approximately 22,900 welds. The third party is in the process of reinspecting all of their unacceptable welds. This reinspection will be completed in the near future.

(a) The following are specific examples of noncompliances identified in Inspection Report No. 50-454/82-05; 50-455/82-05.

- The certification records for three (3) of the nine (9) inspector qualifications reviewed did not contain a Certification Evaluation Sheet.

- The certification record for one (1) of the nine (9) QC inspector qualifications reviewed did not have records of examinations or work samples.

- The certification records for two (2) of the nine (9) QC inspector qualifications reviewed did not provide complete evaluation and justification for certification to perform the level of inspection identified.

To verify the licensee's corrective actions taken in response to noncompliance 454/82-05-19; 455/82-04-19, the inspector reviewed Hatfield Class I Visual Weld Examination Procedure No. 13AE, Revision 2, Hatfield Qualification and Training of Inspection and Audit Personnel Procedure No. 17, Revision 10; and nine (9) weld inspection personnel certifications which included the following documents. All were found to be acceptable in the following areas.

- Training
- Eye Tests
- Written tests; no oral tests are given
- Verification of prior work (letter or telephone conversations documented resumes)
- Diplomas or verification of education
- Certification of qualification
- Experience profile report
- Personnel evaluation letters
- Surveillance

(b) The following welds were visually examined by the inspector:

Weld Inspection Abbreviations

A/S	Arc Strike
U/S	Undersize (leg or throat)
N/F	Non Fusion
U/C	Under Cut
O/L	Overlap
PROF	Profile
P or POR	Porosity
S	Slag
SP	Spatter
CR	Crater
E/L	Excessive leg
E/C	Excessive converity
O/W	Overweld
N/P	Non Penetration

Package or Traveler	Weld ID	Contractor Results			3rd Party Results			Type of Installation
		Acc	Rej-Defects		Agree	Disagree-Defects		
9887	1		x	U/C	x			Plate to Tube Steel
	2	x		U/C				"
5396	1		x	U/C		U/C		Junction Box to Column
	2		x	U/C		U/C		"
9866	1		x	U/C		U/C		"
25875	1		x	U/S	x			Plate to Tube Steel
	2		x	U/S	x			"
	3		x	U/S	x			"
	4		x	U/S	x			"
	5		x	S, N/F	x			"
38,324	1		x	U/C		U/C		Plate to Tube Steel
	2	x						"
	3							"
	4	x						"
	5	x						"
	6	x						"
	7	x						"
	8	x						"
25777	1		x	N/F	x			Plate to Tube Steel
25778	1		x	U/S	x			Plate to Tube Steel
	2		x	O/L	x			"
	3		x	S	x			"
25750	1		x	O/L	x			"
20315	1		x	S		S		"
	2		x	S		S		"
	3		x	Prof		Prof		"
9048	1		x	P,CR,N/F	P, NF	CR		Unistrut to Channel
	2		x	P, CR	x			"
37218	1		x	CR	x			Plate to Tube Steel
	2	x						"
37223	1		x	O/L	x			Clips to Tube Steel
	2	x						"
	3	x						"
	4	x						"
	5	x						"
37074	1		x	U/C		U/C		Unistrut to Tube Steel
	2		x					"
	3		x					"

Package or Traveler	Weld ID	Contractor Results		3rd Party Results		Type of Installation
		Acc	Rej-Defects	Agree	Disagree-Defects	
37057	1		x U/C		U/C	Unistruct to Tube Steel
	2		x			"
37039	1		x U/C		U/C	"
37067	1		x U/C		U/C	"
25958	1	x				Pan to Unistrut
6871	1	x				Tube to Plate
20370	1		x U/C, O/L		U/C, O/L	Pan to Unistrut
	2		x			Tube to Plate
	3		x			Pan to unistrut
	4		x			Tube to Plate
	5		x			Pan to unistrut
2196	1	x				Plate to Plate
4217	1	x				Plate to Plate
25777	2	x				Plate to Tube Steel
	3	x				"
	4	x				"
	5	x				"
	6	x				"
	7	x				"
	8	x				"
25778	2	x				"
	3	x				"
	4	x				"
	5	x				"
	6	x				"
	7	x				"
25919	1	x				Tube to Plate
25945	1	x				Pan to unistruct
25916	1	x				"
25923	1		x U/C,O/L S, POR	x		Tube Steel to Tube Steel
	2					"
	3					"
	4					"
	5					"
	6					"
	7					"
	8					"
	9					"
	10					"
	11					"
	12					"
	13					"
	14					"
	15					"
	16					"

45

Package or Traveler	Weld ID	Contractor Results		3rd Party Results		Type of Installation
		Acc	Rej-Defects	Agree	Disagree-Defects	
25960	1		x U/S	x		Pan to Tube
	2					Tube to Tube
	3					Pan to Tube
	4					Tube to Tube
37069	1		x U/C		U/C	Unistrut to Tube
25918	1		x U/C		U/C	Pan to unistrut
	2		x U/C	x		"
29507	1		x O/L	x		Tube to Plate
	2		x O/L	x		"
37037			x U/C		U/C	Unistrut to Tube Steel
33018	1		x A/S,U/C,O/L	A/S,O/Lx	U/C	Plate to Embed
	2		x A/S,O/L,U/C	x		"
33015	1		x A/S,O/L,U/C	A/S,O/Lx	U/C	"
	2		x A/S,O/L,U/C	A/S,O/Lx	U/C	"
33046	1		x A/S, U/C	A/S x	U/C	"
	2		x A/S, U/C	A/S x	U/C	"
33043	1	x				"
33036	1		x U/C	x		"
	2		x U/C	x		"
	3	x				"
	4	x				"
33042	1		x O/L	x		"
	2		x A/S, U/C	A/S	U/C	"
	3		x U/C, O/L		U/C, O/L	"
20791	1		x U/C	x		Brace to Tube Steel
	2		x S	x		"
	3		x U/C, A/S	x		"
	4		x U/C	x		"
	5		x U/C, O/L	O/L	U/C	"
	6		x O/L, S	x		"
	7		x U/C, O/L		U/C, O/L	"
	8		x U/C, A/S	A/S	U/C	"
	9		x S, U/C	S	U/C	"
	10		x U/C	x		"
	11		x U/C,O/L,S	U/C, S	O/L	"
	12		x O/L, S	x		"
	13		x U/C, S, O/L	S, O/L	U/C	"
	14		x S,O/L,U/C,	x		"
	15		x O/L		O/L	"
	16		x A/S, U/C	x		"
26048	3	x				Brace to Tube Steel
	4	x				"
	5	x				"
33044	1		x U/C	x		Plate to Embed
	2		x A/S	x		"

Package or Traveler	Weld ID	Contractor Results		3rd Party Results		Type of Installation
		Acc	Rej-Defects	Agree	Disagree-Defects	
	3		x U/C	x		Plate to Embed
	4	x				"
25878	1		x O/L	x		Brace to Aux Steel
	2		x N/F, S	x		"
25839	1		x U/C	x		"
20316	1		x S		S	Pan to Unistrut
	2		x S		S	"
26105	1		x O/L, N/F	x		Tube Steel to Tube Steel
	2		x O/L	x		"
	3	x				"
	4	x				"
25826	1		x U/C		U/C	Tube Steel to Aux Steel
	2		x U/C, O/L	O/L	U/C	"
25772	1		x U/C		U/C	"
	2		x U/C		U/C	"
	3		U/C	x		"
	4	x				"
	5	x				"
	6	x				"
	7					"
20790	1		x U/C		U/C	Plate to Tube Steel
	2		x A/S	x		"
	3		x U/C	x		"
	4		x U/C		U/C	"
	5		x U/C		U/C	"
	6		x U/C		U/C	"
	7		x O/L, S, U/C	U/C	O/L, S	"
	8		x O/L, U/C	U/C	O/L, U/C	"
20784	1		x U/C, O/L	U/C	O/L	"
	2		x U/C, O/L	U/C	O/L	"
	3		x U/C	x		"
	4		x O/L, U/C	O/L	U/C	"
20786	1		x U/C	O/L	U/C	"
	2		x U/C	x		"
	3		x O/L		O/L	"
	4		x O/L		O/L	"
	5		x O/L, U/C	U/C	O/L	"
	6	x				"
	7	x				"
20309	1		x Prof, S	S	Prof	Pan to Tube Steel
	2		x CR, U/C	CR	U/C	"
	3		x Prof, U/C		Prof, U/C	"
	4	x				"

Package or Traveler	Weld ID	Contractor Results		3rd Party Results		Type of Installation
		Acc	Rej-Defects	Agree	Disagree-Defects	
25832	1		x U/C		U/C	Pan to Tube Steel
499	1		x U/C		U/C	Plate to Tube Steel
	2	x				"
26049	1		x CR	x	U/C	Pan to Unistrut
	2		x CR, U/C	CR	U/C	"
	3		x Poro		Poro	"
	4		x CR	x		"
	5		x CR, A/S	x		"
	6		x CR	x		"
	7		x CR	x		"
	8		x U/C	x		"
	9		x CR	x		"
26048	1		x CR	x		"
	2	x				"
33039	1		x U/C	x		"
33042	4		x A/S	x		"
33041	1		x A/S, O/L, U/C	A/S, O/L	U/C	"
33041	2		x A/S, O/L U/C	A/S O/L	U/C	"
	3		x A/S, O/L	x		"
	4		x A/S, O/L	x		"
33034	1		x A/S, O/L U/C	A/S, O/L	U/C	"
	2		x A/S, O/L U/C	A/S O/L	U/C	"
33019	1		x O/L	x		"
	2		x O/L, SP	x		"
33033	1		x A/S, O/L U/C	x		"
33033	2		x O/L, U/C SP	O/L, SP	U/C	"
5832	2	x				"
	3	x				"
	4	x				"
	5	x				"
	6	x				"
	7	x				"

2. "unter Corporation

Hunter reinspected approximately 3,662 welds, found approximately 724 unacceptable welds and are in the process of repairing.

(a) The following is a specific example of noncompliance identified in Inspection Report No. 454/82-05; 455/82-04.

. The certification records for two (2) of the seven (7) QC inspector qualifications reviewed did not provide determination of equivalent inspection experience to support the level of certification.

. To verify the licensee's corrective actions taken in response to noncompliance 454/82-05-19; 455/82-04-19 the inspector reviewed Hunter Acceptance Criteria for Visual Examination, Application and Reports Procedure No. 6001, Revision 3, Hunter Qualification and Inspection Examination, Testing, Auditing Personnel No. 1,702, Revisions 10; and 12 visual weld inspection personnel certifications which included the following documents. All were found to be acceptable:

. Certification of qualifications
. Personnel evaluation sheets
. Training
. Written tests (no oral tests are given)
. Eye tests
. Resumes
. Diplomas or verification of education
. Verification of prior work (letters or telephone conversations documented).

(b) The following welds were visually examined by the inspector:

WELD INSPECTION ABREVIATIONS

See paragraph D.1.(b) above.

Package or Traveler	Weld ID	Contractor Results		3rd Party Results		Type of Installation
		Acc	Rej-Defects	Agree	Disagree-Defects	
S-CC-001-20	798		x U/C	x		Pipe weld
S-SI-001-48	1660		x U/S	x		Pipe weld
S-SI-001-48	1662		x U/S	x		Pipe weld
S-CC-100-52	1884		x POR	x		Pipe weld
S-SX-100-14	96		x U/S	x		Pipe weld
S-SX-100-14	1919		x U/S	x		Pipe weld
S-SX-100-24	569		x U/S	x		Pipe weld
S-SX-100-24	570		x U/S	x		Pipe weld
S-SX-100-24	1275		x U/S	x		Pipe weld
S-SX-100-24	1276		x U/S	x		Pipe weld
1RY3	2		x U/S	x		Pipe weld
1RY3	9		x U/S	x		Pipe weld
1RY3	10		x U/S	x		Pipe weld
S-CC-100-33	1265		x POR	x		Pipe weld
AF25	224		x POR	x		Pipe weld
S-CC-001-20	785	x				Pipe weld
S-CC-001-20	786	x				Pipe weld
S-CC-001-20	787	x				Pipe weld
S-CC-001-20	788	x				Pipe weld
S-CC-001-20	794	x				Pipe weld
S-CC-001-20	796	x				Pipe weld
S-CC-001-20	797	x				Pipe weld
S-CC-001-20	804	x				Pipe weld
S-CC-001-20	805	x				Pipe weld
S-CC-001-20	808	x				Pipe weld
S-CC-001-20	809	x				Pipe weld
S-CC-001-20	810	x				Pipe weld

(27)

3. Nuclear Installation Service Co. (NISCo)

NISCo reinspected approximately 229 welds and found all the welds acceptable.

(a) The inspector reviewed the following:

- NISCo, QC Perform Visual Inspection of Weld Procedure, ES 100-5, Revision B.
- NISCo, Qualification and Certification of Inspection Personnel Procedure No. ES 116-2, Revision E.
- NISCo, Four Visual Weld Examination Personnel Certifications.

(b) The following are welds visually examined by the inspector.

Package or Traveler	Weld ID	Contractor Results		3rd Party Results		Type of Installation
		Acc	Rej-Defects	Agree	Disagree-Defects	
405-22	22	x				Fuel Transfer
405-21	21	x				Tube Supports
405-20	20	x				Fuel Transfer
405-19	19	x				Tube Supports
405-15	15	x				Fuel Transfer
405-13	13	x				Tube Supports
405-12	12	x				Fuel Transfer
405-11	11	x				Tube Supports

4. Pittsburgh Testing Laboratory (PTL)

PTL reinspected approximately 4,973 welds and found approximately 724 welds unacceptable. No repairs have started.

(a) The following is a specific example of a noncompliance previously identified in Inspection Report No. 50-454/82-05; 50-455/82-04.

- The certification record for one of the three (3) QC/QA inspector qualification records reviewed did not have a verification of prior work experience.

To verify the licensee's corrective actions taken in response to noncompliance 454/82-05-19; 455/82-04-19, the inspector reviewed PTL Visual Inspection of Welding Procedure No. IS-BY-1, Revision 3; PPL Personnel Qualification/Certification Procedure No. IS-BY-49-PQ, Revisions 4; and 12 visual weld inspector personnel certification packages which included the following documents. All were found to be acceptable:

- Training
- Eye tests
- Written test
- Verification of prior work
- Diplomas or vertification of education
- Certification of qualification
- Resumes

(b) The following welds were visually examined by the inspector:

Weld Inspection Abbreviations

See paragraph D.1 (b) above.

Package or Traveler	Weld ID	Contractor Results		3rd Party Results		Type of Installation
		Acc	Rej-Defects	Agree	Disagree-Defects	
2211	263		x E/L		x E/L	I-Beam to Embed
2211	263		x E/L		x W/L	I-Beam to Embed
2211	247		x N/F	x		Structural
2211	247		x N/F	x		Structural
2211	247		x N/F	x		Structural
2211	247		x O/L	x		Structural
2211	247		x O/L Prof	x		Structural
2211	247		x E/L	x		Structural
2211	247		x O/L	x		Structural
2211	247		x O/L	x		Structural
2211	247		x UC, E/L	x		Structural
2211	247		x Prof, Por	x		Structural
2211	247		x U/S	x		Structural
1895	106		x U/C		x U/C	Structural
2108	106	x				Structural
2112	632	x				Structural
2060	633	x				Structural
2730	641		x O/L, E/L		x E/L	Structural
2730	641		x O/L, E/L		x E/L	Structural
2730	615		x N/F, O/L	x		Structural
2083	570		x N/F		x	Structural
2086	570		x N/F		x N/F	Structural
2081	570		x U/C, N/F		x	Structural
2168	610		x U/C		x U/C	Structural
2168	610	x				Structural
2168	610		x N/F, U/C	x		Structural
2168	610		x N/F,O/L,U/C	x		Structural
2168	610		x O/L	x		Structural
1867	1	x				Structural
1867	1	x				Structural
1899	402	x				Structural
1899	402	x				Structural
1899	403		x U/C	x		Structural
1899	403	x				Structural
1108	4AWC7		x U/C E/L		x E/L, U/C	Clip to embed
1108	4AWC7		x C/L,U/C,O/W	x O/L	x U/C, O/W	Clip to embed
2472	Ho47A		x U/C, U/S	x		Electrical
2472	Ho47A	x				Stiffeners
2472	Ho47A	x				Electrical
2472	Ho47A	x				Stiffeners
2472	Ho47A	x				Electrical
2472	Ho47A		x U/S	x		Stiffeners
2472	Ho47A	x				Electrical
2472	Ho47A	x				Stiffeners
2472	Ho47A		x U/S	x		Electrical
2472	Ho47A	x				Stiffeners
2472	Ho47B	x				Electrical
2472	Ho47B	x				Stiffeners

48

Package or Traveler	Weld ID	Contractor Results		3rd Party Results		Type of Installation
		Acc	Rej-Defects	Agree	Disagree-Defects	
2472	Ho47B	x				Electrical
2472	Ho47B	x				Stiffeners
2472	Ho47B	x				Electrical
2472	Ho47B	x				Stiffeners
2472	Ho47B	x				Electrical
2472	Ho47B	x				Stiffeners
2472	Ho47B	x				Electrical
2472	Ho47B	x				Stiffeners
2472	Ho37	x				Electrical
2472	Ho37	x				Stiffeners
2472	Ho37	x				Electrical
2472	Ho37		x U/S	x		Stiffeners
2472	Ho37	x				Electrical
2090	226		x U/C	x		Structural
2090	227	x				Structural
1966	305	x				Structural
1966	305	x				Structural
1966	289	x				Structural
1966	289	x				Structural
2146	562		x O/L,U/C,E/L CR		x O/L,U/C,E/L,CR	Structural
1990	688		x U/C,POR, CR	x		Structural
1980	689		x S,POR	x		Structural
1963	689		x U/C	x		Structural
1892	691		x O/L,U/C	x		Structural
1845	692		x U/C	x		Structural
1988	672		x U/C,U/S	x		Structural
2665	CC10		x O/L		x O/L	Electrical to Structural
2665	CC10		x U/S	x		"
2665	CC10		x N/F		x N/F	"
2665	CC10		x U/S,U/C		x U/S,U/C	"
2665	CC10		x N/F,O/L		x N/F,O/L	"
2665	CC9		x E/C		x E/C	"
2665	CC9		x O/L	x		"
2665	CC9		x N/F	x		"
2665	CC9		x U/S,U/C	x		"
2665	CC9		x O/L,E/C		x E/C	"
2003	MS126	x				Steel to Structural
2003	MS126	x				"
2003	MS126	x				"
2003	MS126	x				"
2070	366	x				Stiffeners to Structural
2070	366	x				"
2070	366	x				"
2070	366	x				"

There was also a telecon on November 10, 1983, between Region III Messrs. DelGeorge and Tramm of CECo regarding the preliminary report.

As discussed during the telecon, the NRC believes the report should address the following items:

- The report should be drafted in accordance with the original program. Specifically, the tables and conclusions based on those tables should be based on the findings of the Level II examiner or the independent Level III examiner. Use of a CECo Level III examiner to change the results of the independent Level III findings is not in accordance with the original program.

- It was the NRC understanding, that CECo will provide tabulation of the results of inspection attributes (weld overlap, undercut, etc.) in order to determine the need if any, for further inspections. This tabulation may be made available to the NRC inspectors, and need not be in the report, but as a minimum, the conclusions CECo have reached regarding the tabulations should be included in the report.

- It was also the NRC understanding that CECo will review different inspection activities and determine if certain areas such as final hanger inspections warrant further review based on reject rates.

11. Disposition of Discrepancies

All discrepancies identified as a part of the reinspection are being corrected either by physical rework to correct the condition or by detailing condition on nonconformance reports to perform engineering analysis to determine acceptability of the condition without correction. The determination, as to the course of action employed to disposition the condition, is a function of the estimate of the more cost effective path to resolution. That is, when it appears that the cost to physically correct the condition is less than the costs associated with detailing data and performing an engineering analysis, then physical correction is chosen, and vice versa.

12. NRC Regional Inspector Observations

The performance and results of visual weld reinspections were reviewed by the inspector. The review consisted of discussions with supervisors/lead weld inspectors, examination of original inspection records and reinspection records, and visual examination of 500 welds which had been reinspected by several companies. In the visual examination, the inspector found that in many cases the reinspections were overly conservative and inspectors were classifying weld attributes as unacceptable which, infact, were acceptable under the AWS Code. The third party inspection was correcting most of these over calls. The

overly conservative inspection findings resulted from the evaluations of overlaps, undercuts, and craters. For example, there were several instances of undercut that were less that 1/32-inch in depth, which were acceptable under AWS Code requirements but were determined unacceptable by the original reinspections. There were also problems in interpretation where the welder had welded a brace and a plate to tube steel. In most cases these were 90° joints. Often, where the welder started welding there was a slight undercut indication and where the welder stopped at the end of the weld, there was a dish type indication. Some inspectors were rejecting the welds (for a crater) when in fact, most met AWS Code requirements. Other welds were erroneously being rejected (for overlap) because of a slight build-up which occurred if the welder had hesitated a fraction of a second at the end of a weld.

The inspector also found that in the area of the instrumentation piping socket to piping fillet welds, the welds are being rejected due to undersize because the fillet welds are almost polished for liquid penetrant examination. The welds were acceptable prior to grinding.

E. Components

The NRC inspector verified the reinspection program by reviewing the documentation and observing the work activities. The documentation review covered 100% of the reinspection as follows:

Section 1

Prepared by K. D. Ward

Reviewed by D. H. Danielson, Chief
Materials and Processes Section

1. Licensee Action on Previous Inspection Findings

a. (Closed) Noncompliance (454/82-05-19; 455/82-04-19): The Reinspection Program conducted as a result of concerns defined in Region III Inspection Report No. 50-454/82-05; 50-455/82-04 associated with the qualification and certification inspection personnel is completed.

An extensive program of reinspections was agreed upon and documented in a CECo letter to NRC Region III dated February 23, 1983. The deficiencies in the training and certification of QC inspectors called into question the initial capabilities of some inspectors. The program was initiated to determine whether these deficiencies resulted in the QC inspectors overlooking significant safety deficiencies in their inspection work.

The Reinspection Program began February 22, 1983, by meeting with contractors to identify purpose and content of the activities to be performed. The individual inspectors whose work was selected to be reinspected were established, and the process of record search to identify individual inspections to be reinspected was initiated.

A preliminary report dated October 28, 1983, was submitted to the NRC-Region III office. Comments on the preliminary report were identified in NRC-Region III letter dated November 18, 1983. One additional HECo, one Hunter and four PTL weld inspectors had to be selected and their first 90 days of work reinspected to complete the reinspection activities. The reinspection activities of these weld inspectors are now completed.

Based on the inspection of welds by the NRC inspector for Hunter and PTL activities (See Region III Inspection Report No. 50-454/83-39; 50-455/83-29) and the amount of welds that the additional inspectors had examined it was decided that the NRC inspector should visually examine only the HECo welds. The added HECo weld inspector had inspected 5,070 welds during his first 3 months. Hatfield reinspected the 5,070 welds and found 656 of the welds did not meet specification. The 3rd party Level III inspected the 656 welds and found 501 of those welds did not meet specification. The NRC inspector reviewed the inspection records and visually examined the following 240 welds and basically found the same results as the 3rd party.

Weld Inspection Abbreviations

Acc.	Acceptable
U/L	Unacceptable length
U/S	Undersize
M/W	Miss weld
O/G	Over ground
NPD	Not per detail
I/L	Insufficient length
CV	Concavity
D	Damaged
Pro	Unacceptable profile
O/L	Over lap
I/T	Incomplete throat
Por	Porsity
W/T	Welds together
W/I	Welds intersect
U/C	Under cut
C	Crater
S	Slag
L/F	Lack of fussion
N, P, DWG	Not per drawing

Weld No.		Material Welded	Reinspection Results	3rd Party Agreed	3rd Party Disagreed
H 190	(4 welds)	Tube steel to plate	Acc		
H 190	(4 welds)	Gusset to embed	Acc		
H 190	(3 welds)	Gusset plate to embed	Acc		
H 190	(1 weld)	Gusset plate to embed	U/L	U/L	
H 683	(6 welds)	Angle iron to gusset plate	Acc		
H 683	(1 weld)	Angle iron to gusset plate	U/L	U/L	
H 683	(1 weld)	Angle iron to gusset plate	U/S	U/S	
H 683	(2 welds)	Plate to plate	Acc		
H 182	(4 welds)	Tube steel to plate	Acc		
H 182	(4 welds)	Gusset to embed	Acc		
H 191	(12 welds)	Tube steel to angle clips	Acc		
H 191	(4 welds)	Angle clips to web of beam	Acc		
H 186	(3 welds)	Gusset to embed	Acc		
H 186	(1 weld)	Gusset to embed	U/L	U/L	
H 186	(8 welds)	Angle to plate	Acc		
H 186	(2 welds)	Plate to plate	Acc		
H 186	(20 welds)	Plate to channel	Acc		
TS 182	(20 welds)	Tube steel to angle clip	Acc		
TS 182	(1 weld)	Tube steel to angle clip	Missing	Missing	
H 122	(16 welds)	Tube steel to unistrut	Acc		
H 122	(3 welds)	Tube steel to unistrut	U/L	U/L	
H 122	(1 weld)	Tube steel to unistrut	Overground	Overground	
H 122	(4 welds)	Plate to I beam	Acc		
H 122	(3 welds)	Plate to embed	Acc		
H 122	(1 weld)	Plate to embed	O/L		O/L
H 079	(2 welds)	Pan to unistrut	Acc		
H 079	(4 welds)	Pan to unistrut	Not per detail	Not per detail	
H 566	(5 welds)	Angle to plate	Acc		
H 566	(2 welds)	Angle to plate	I/L	I/L	
H 566	(1 welds)	Angle to plate	CV		Damaged
H 566	(5 welds)	T beam to I beam	Acc		
H 566	(1 weld)	T beam to I beam	Unacc profile	Unacc profile	
H 566	(1 weld)	T beam to I beam	U/S, O/L	U/S, O/L	
H 566	(1 weld)	T beam to I beam	U/S	U/S	
H 128	(11 welds)	Tube steel to tube steel	Acc		
H 128	(1 weld)	Tube steel to tube steel	U/S	U/S	
H 128	(3 welds)	Gusset to tube steel	Acc		
H 128	(1 weld)	Gusset to tube steel	U/S	U/S	
H 141	(8 welds)	Pan to unistrut	Acc		
H 141	(1 weld)	Pan to unistrut	I/T, I/L	I/T, I/L	
H 141	(1 weld)	Pan to unistrut	U/L	U/L	

Weld No.		Material Welded	Reinspection Results	3rd Party Agreed	3rd Party Disagreed
H 102	(1 weld)	Pan to unistrut	I/T, I/F		POR
H 102	(7 welds)	Pan to unistrut	Acc		
H 640	(2 welds)	Plate to I beam	Acc		
H 640	(2 welds)	T beam to tube steel	Acc		
H 640	(2 welds)	Angle to plate	Acc		
H 640	(1 weld)	Angle to plate	Welds together		Weld intersect
H 640	(1 weld)	Angle to plate	O/L, U/S	O/L, U/S	
H 640	(1 weld)	Angle to plate	U/S	U/S	
H 640	(2 welds)	Angle to plate	U/L	U/L	
H 640	(1 weld)	Angle to plate	U/C	U/C	
H 106	(6 welds)	Unistrut to pan	Acc		
H 106	(1 weld)	Unistrut to pan	I/T	I/T	
H 106	(1 weld)	Unistrut to pan	C	C	
H 146	(5 welds)	Pan to unistrut	Acc		
H 146	(1 weld)	Pan to unistrut	U/S	U/S	
H 100	(3 welds)	Unistrut to pan	Acc		
H 100	(1 weld)	Unistrut to pan	O/L PROF	O/L PROF	
H 177	(1 weld)	Unistrut to channel	Acc		
H 177	(1 weld)	Unistrut to channel	S	S	
H 177	(2 welds)	Gusset to I beam	Acc		
H 107	(4 welds)	Pan to unistrut	Acc		
H 107	(2 welds)	Pan to unistrut	O/L	O/L	
H 88	(1 weld)	Tube steel to plate	U/L, CV	U/L, CV	
H 88	(1 weld)	Tube steel to plate	U/L	U/L	
H 88	(1 weld)	Tube steel to plate	U/L, L/F, S	U/L	L/F, S
H 88	(1 weld)	Tube steel to plate	U/L, Not per dwg	U/L, Not per dwg	
H 88	(4 welds)	Gusset to embed	Acc		
H 88	(7 welds)	Unistrut to channel	Acc		

The NRC inspector reviewed the results of the reinspection program as it progressed. Results are presented in Region III Inspection Report Nos. 50-454/84-05, 50-455/84-04; 50-454/83-39, 50-455/83-29.

The performance and results of visual weld reinspections were reviewed by the NRC inspector. The review consisted of discussions with supervisors/lead weld inspectors, examination of original inspection records and reinspection records, and visual examination of 500 welds which had been reinspected by several companies. (Region III Inspection Report No. 50-454/83-39; 50-455/83-29).

All discrepancies identified as a part of the reinspection were corrected either by physical rework to correct the condition or by detailing the condition on nonconformance reports to perform engineering analysis to determine acceptability of the condition without correction (Ref. CECo letter dated February 24, 1984 to NRC). All welds that were repaired were also evaluated and it was determined that they would have met specification even if they had not been repaired. The determination as to the course of action employed to disposition the condition was a function of the estimate of the more cost effective path to resolution. That is, when it appeared that the cost to physically correct condition was less than the costs associated with detailing data and performing an engineering analysis, then physical correction was chosen, and vice versa.

Based on discussions with cognizant personnel, review of records and engineering evaluations, and verification inspection, documented in this Section and Section II below, no further NRC review is considered necessary at this item. This item is closed.

(1) The NRC inspector and the NRC staff of Region III reviewed the final report on the Byron QC Inspector Reinspection Program, dated Feburary 24, 1984. The Staff requested the NRC inspector to review and verify the following items taken out of the final CECo report. The first paragraph is a paragraph out of the final CECo report and the second paragraph is the NRC Findings. This same method continues into the report. The attached pages are out of the CECo final report and are located at the end of this report.

. CECo's Final Report, Section IV, D. Page IV-6 (See Attached Page 1)

Hatfield Electric has completed the reconciliation of hanger and weld inspections, which are documented on the weld travelers. For hangers that have weld traveler cards with incomplete data, new inspections are being performed. These new inspections are in addition to, and outside the scope of, the Reinspection Program. These inspections are expected to be completed in March 1984. Audit No. 6-83-124 remains open pending completion of these inspections.

overly conservative inspection findings resulted from the evaluations of overlaps, undercuts, and craters. For example, there were several instances of undercut that were less that 1/32-inch in depth, which were acceptable under AWS Code requirements but were determined unacceptable by the original reinspections. There were also problems in interpretation where the welder had welded a brace and a plate to tube steel. In most cases these were 90° joints. Often, where the welder started welding there was a slight undercut indication and where the welder stopped at the end of the weld, there was a dish type indication. Some inspectors were rejecting the welds (for a crater) when in fact, most met AWS Code requirements. Other welds were erroneously being rejected (for overlap) because of a slight build-up which occurred if the welder had hesitated a fraction of a second at the end of a weld.

The inspector also found that in the area of the instrumentation piping socket to piping fillet welds, the welds are being rejected due to undersize because the fillet welds are almost polished for liquid penetrant examination. The welds were acceptable prior to grinding.

E. Components

The NRC inspector verified the reinspection program by reviewing the documentation and observing the work activities. The documentation review covered 100% of the reinspection as follows:

1. Hunter

LEVEL II	NO. OF REINSPECTIONS AND NO. OF REJECTS BY TYPE							
INSPECTOR	DOC	REJ	HDW	REJ	WELD	REJ	TORQUE	REJECTS (REJ)
1130	8214	71	935	10	263	14	36	15
1211	1185	4	0	0	34	1	0	0
1284	0	0	0	0	51	4	0	0
1313	331	3	934	2	181	0	52	41
1354	102	1	0	0	33	0	0	0
1515	41	1	265	7	214	6	0	0
1529	19	0	12	0	55	6	16	7
1533	6363	60	5390	22	392	11	4	0
1562	8520	16	81	0	237	5	161	32
1605	283	3	190	4	344	11	116	77
1714	2144	56	64	3	301	18	104	46
1782	3725	74	8060	36	822	25	0	0
1946	366	0	206	2	273	0	68	28
9076	161	0	21	0	129	13	12	10
9208	138	4	0	0	14	0	0	0
9446	47	0	133	4	319	4	44	37
TOTALS	31639	293	16291	90	3662	118	613	293
LEVEL I -								
INSPECTOR	DOC	REJ	HDW	REJ	WELD	REJ	TORQUE	REJECTS
1041	294	5	921	18	NA	-	NA	-
1705	1804	15	6323	72	NA	-	NA	-
1867	130	4	339	8	NA	-	NA	-
1958	442	27	1253	7	NA	-	NA	-
9357	2269	74	7893	57	NA	-	NA	-
TOTALS	4939	125	16729	162	NA	-	NA	-

-- Rework on all of the above rejects will be initiated as of September 14, 1983, and the licensee estimates that the rework will be completed by December 31, 1983.

The NRC inspector observed field installations in verifying the following reinspection work:

- 12 component supports, Unit 1 auxiliary feedwater system, auxiliary feed tunnel-confirmed hardware configuration, dimensions, and location (Inspector 1533).

- 4 mechanical joints, essential service cooling for pumps in Unit 1 and 8 mechanical joints, boron thermal regeneration station; Unit 1 auxiliary building - verified documentation, identification, and full thread engagement (Inspectors 1529, 1130 and 1605).

- 9 piping dimensions, boron thermal regeneration station, Unit 1 auxiliary building - verified dimensions and documentation (Inspectors 1605 and 1946).

1 - Flexible hose for instrument 1FT-426 was not installed within the 1/2" installation tolerance. This is documented on an FIS report.

f. Attribute #7 - One rejectable pipe bend was identified in the OPI-W0008 system. NRC 178 was prepared to document this bend as having excessive flatness.

Hatfield Electric Company

Inspector	Att. #1	Att. #2	Att. #3	Att. #4	Att. #5	Att. #6	Att. #7	Att. #8	Att #9
A	625(166)								
B	51(0)								
C	4190(400)								
D	2841(109)								
E	572(41)								
F	10868(1383)	60(0)	41(4)						
G	933(166)	564(2)	304(14)	(0) 1 report					
H		770(0)	40(8)		24(0)			8(0)	
I		132(0)	137(1)	(0) 2 reports					
J			1046(40)						
K			586(48)						
L						80(0)	173(56)		
M		8208(7)			24(0)				
N							198(5)		
O									1509(91)
P									4488(207
Q									2879(197
R									2113(102
S									88(3)
T									7020(244
U									2542(201
V									2012(155
Totals	20,140 (2,265)	9,734(9)	2,154(115)	(0) 3 reports	48(0)	80(0)	1932(61)	8(0)	22,660 (1,200)

The numbers in parentheses are the number of rejects for that attribute.

Attribute #1 - Visual weld inspection of raceway hangers and cable tray to hanger welds.
Attribute #2 - Inspection of cable terminations.
Attribute #3 - Inspection of conduit installation.
Attribute #4 - Inspection of equipment modifications.
Attribute #5 - Inspection of equipment installation.
Attribute #6 - Inspection of cable pan (tray) installation.
Attribute #7 - Inspection of cable pan hanger installation.
Attribute #8 - A-325 bolt inspection.
Attribute #9 - Preparation of as-built drawings.

a. Attribute #1 is discussed in NRC inspection report 50-454/83-39; 50-455/83-29.

b. Attribute #2. A total of 9 rejectable items were identified in this area. Breakdown is as follows:

1 - Copper exposed at terminal lug. DR 2380 prepared.
2 - Cable jacket damaged. NCR/DR 771 prepared.
1 - Conductor not terminated per drawing. DR 2380 prepared.
1 - Cable separation was not to drawing/specification requirements.
1 - Copper conductor was nicked when insulation was removed.
3 - Conductor not terminated per drawing. Drawing ~~as~~ was revised after termination was inspected.

c. Attribute #3. A total of 115 rejectable items were identified in this area. Breakdown is as follows:

7 - Condulets installed without Engineering approval.
2 - Exposed threads on conduit were not galvanized.
4 - Conduit run contained more than 270° of bends.
8 - Insulated bushings were not installed in conduit fittings.
9 - Grounding was not installed per drawings.
1 - 90° conduit fitting installed without Engineering approval.
2 - Conduit bends were less than minimum radius specified.
11 - Installed seal-tite flex conduit is greater than 6' in length.
2 - Wrong type fasteners utilized on J-Boxes.
1 - Improper size conduit installed.
5 - Damaged seal-tite flex conduit.
6 - Installed pull-sleeves are less than standard length.
21 - Paper type gaskets installed.
6 - J-Boxes did not have barriers installed per drawings.
3 - Wrong type J-Box installed (bolted vs hinge cover).
1 - Conduits not separated per drawing/specification.
2 - Hanger strap missing or was not of proper length.
3 - Conduits were not terminated per drawing.
1 - J-Box cover was missing.
2 - J-Box had been removed.
10 - Conduit hanger location was not per drawings.
8 - Hanger material was of improper size.

d. Attribute #4, #5, #6 - No rejectable items were identified in these areas.

e. Attribute #7 - A total of 61 rejectable items were identified in this area. Breakdown is as follows:

38 - Configuration, approved alternate connection details utilized but documentation indicated that scheduled connection detail had been installed.
11 - Hanger member size was not per drawing (tube steel rotated 90° on its axis or oversized unistrut installed).
1 - Auxiliary steel was oversized.

1 - Auxiliary steel plate was undersized.
2 - Fit-up gap larger than specified.
1 - Auxiliary steel elevation was out of specifications.
1 - Wrong hanger connection detail installed.
1 - Hanger brace location was out of specifications.

f. Attribute #8 - No rejectable items were identified in this area.

g. Attribute #9 - A total of 1200 rejectable items were identified in this area. A detailed breakdown of the rejectable items was not available as of August 19, 1983. A detailed breakdown was available for two of the eight as-built personnel. Location of items for as-built drawings are to be within ± 1" of actual locations. Typical dimension discrepancies ranged between 1-3/8" and 6-7/8".

This item of noncompliance remains open. Region III will continue to monitor the re-inspection program at the Byron station.

(Closed) Unresolved item (50-454/82-17-07; 50-455/82-12-07): This item pertains to the effectiveness of the HECo training program in the area of welding. A review of the HECo reinspection program indicated a weld rejection rate of approximately 11%. Pittsburgh Testing Laboratory (PTL) is performing a 10% overinspection of welds accepted by HECo. Between January 1, 1983 and August 16, 1983, PTL inspected 889 welds accepted by HECo. Of the welds inspected, 865 were accepted and 21 were rejected. The rejection rate for the overinspection program is approximately 2.3%, indicating that the training program appears to be effective. This item also closes an allegation pertaining to the effectiveness of the HECo training program. The alleger stated that the HECo training program accomplishes nothing. Based on the results of the PTL over-inspect program, this allegation could not be substantiated.

(Open) Open item (50-454/83-16-02): This item pertains to the separation of instrument sensing lines installed by Powers-Azco-Pope (PAP). In accordance with FCR-15437, PAP prepares as-built drawings of the installed instrument sensing lines. These as-built drawings are submitted to Westinghouse Electric Corporation - Nuclear Technology Division (WNTD) for analysis. WNTD letter, No. CAE-2.1.205, to Ceco, dated July 22, 1983, indicates that there are 12 potential separation violations for the installed sensing lines. The licensee prepared NCR 187 to document the 12 separation violations. NCR 031 and FIS 992 also document sensing line separation violations. Pending review of actions taken to close NCR 031, NCR 187, and FIS-992, this item remains open.

3. Functional or Program Areas Inspected

A. Powers-Azco-Pope (PAP)

(1) The Region III inspector reviewed the following PAP procedures and found them to be adequate, except as noted:

QC-2, Revision 7, "Welding Equipment Calibration". This proce-

Table DE-4
Summary of Objective Discrepancy Evaluation
NISCo

Type of Discrepancy By Attribute	Total Quantity	Category X No. Within Parameters	Category Y No. Acceptable by Judgment	Category Z No. Acceptable by Calculation	No. with Design Significance
Mechanical					
1. Length of stitch welds on shim plates	12	0	12	0	0
TOTAL	12	0	12	0	0

Note for Table DE-4:

The discrepancies in Category Y cover minor variations (approximately 1/4") in the length of stitch welds on shim plates. These are non-load bearing welds and were, therefore, considered to be acceptable.

Table DE-5
Summary of Objective Discrepancy Evaluation
Hatfield Electric

Type of Discrepancy By Attribute	Total Quantity	Category X No. Within Parameters	Category Y No. Acceptable by Judgment	Category Z No. Acceptable by Calculation	No. with Design Significance
Conduit Installation					
1. Supports	3	1	2	0	0
2. Auxiliary steel	1	0	0	1	0
3. Conduit	42	7	23	12	0
4. Junction box	13	3	10	0	0
5. Other	7	0	7	0	0
Cable Termination					
1. Workmanship	7	0	7	0	0
2. Wiring	2	0	2	0	0
Cable Pan Hanger					
1. Configuration change	8	2	4	2	0
2. Detail substitution	15	1	13	1	0

Table DE-5, Cont.

Type of Discrepancy By Attribute	Total Quantity	Category X No. Within Parameters	Category Y No. Acceptable by Judgment	Category Z No. Acceptable by Calculation	No. with Design Significance
3. Dimensions out of tolerance	18	1	5	12	0
4. Other	1	1	0	0	0
Conduit As-Builts					
1. Supports	972	813	0	159	0
2. Auxiliary steel	14	1	0	13	0
3. Conduit	298	178	0	120	0
4. Junction box	247	209	0	38	0
5. Other	27	26	1	0	0
TOTAL	1675	1243	74	358	0

Notes for Table DE-5:

1. The majority of the evaluations in Category X are as-built location dimensions of conduit, conduit supports and junction boxes that are within the 6-inch installation tolerance. These were identified in the Reinspection Program because the reinspector was using a 3-inch tolerance to ensure that all potential discrepancies were identified.

2. The evaluations in Category Y cover such items as grounding discontinuities, missing insulated throats in conduit fittings, cable pan hanger detail substitutions and in one case a missing junction box barrier. Alternate ground paths existed for all grounding discontinuities. The insulated throats while providing an extra measure of cable protection are not necessary. The substituted details were similar in member size and capacity and varied only in their attachment configuration. The missing barrier was not separating cables of different divisions but rather power and control cables of the same division. The cables are in fact separated without the barrier.

3. The evaluations in Category Z consist primarily of as-built location dimensions of conduit, conduit supports and junction boxes and other minor dimensional differences that exceeded installation tolerances. Generally, the dimensional difference was limited to a few inches. The installation drawings and supporting calculations have been revised to show the actual dimensions as standard practice and the revision confirms that the actual dimensions are acceptable.

4. Discrepancy HE-129 covers a termination error for cable 1VA075. This discrepancy would result in damper 0VA052YA not closing automatically on the start of charcoal booster fan OE which starts automatically on a safety injection

signal. Operation of the damper is required in the event that radioactive effluents are present in the auxiliary building exhaust air. Radiation monitors in the exhaust plenum alarm in the control room and damper 0VA052YA can be closed manually through a control switch in the main control room. Byron operating procedure BOA-RAD-1 requires that the operator check the damper position in response to the alarm. Therefore, the termination error is judged to be not significant. However, the FSAR description of the auxiliary building exhaust systems states that the damper operates either automatically on a safety injection signal or manually through a control switch in the main control room. If undetected, the design would have differed from the FSAR description, but it would not affect the safe operation of the plant. The termination error did not go undetected. The inspection of this design feature by the electrical contractor is only the first of three checks made to ensure the design functions properly. The discrepancy was actually detected and corrected independent of the Reinspection Program during construction testing, and the interlock would have been tested as part of the auxiliary building ventilation system (VA) pre-operational test. It is also worth noting that only two wiring errors were identified out of the 7,784 terminations reviewed in the reinspection program. The other involved the diesel generator cylinder temperature indication at the local control panel which does not serve either an operating or alarm function.

5. The Reinspection Program provided a small sample for Hatfield Electric's equipment setting and modifications, A325 bolting and conduit support bolting work. Additional inspections are being undertaken for these objective attributes. It should be noted that QC inspections for all objective attributes require similar skills and training. The Hatfield inspectors who were reinspected did exceptionally well on other objective attributes. Therefore the effectiveness of their QC inspections is not in question. The additional work is being performed to complete the data base. The inspection plan being implemented is as follows:

   - Equipment Setting and Equipment Modifications
     To confirm that the safety-related electrical equipment that was installed, mounted, or modified in the field by Hatfield Electric is installed properly, the total population of approximately 250 of such items has been identified, and a program for reinspection of a sample size of 50 has been selected for reinspection in accordance with Mil. Std. 105D single sampling plan. In case the success criterion is not met for the selected sample, the total population will be reinspected.

   - A325 Bolting
     The Reinspection Program in the area of A325 bolting resulted in a total sample population of 8. Although no discrepancies were noted, further reinspections are being performed to increase the confidence level. The total population of such items has been determined to be approximately 170, and a sample of 50 has been selected for reinspection in accordance with Mil. Std. 105D single sampling plan. In case the success criterion is not met for the selected sample, the total population will be reinspected.

- Conduit Support Bolting
  The Reinspection Program did not include checking the torque level on the conduit support bolting. This was considered acceptable inasmuch as the Program was designed to validate the qualifications of the inspectors rather than the quality of construction. However, in view of the specific apparent concerns expressed by the ASLB, a reinspection of this attribute has also been included. The total population of this attribute has been determined to be approximately 25,000. The reinspection sampling will be in accordance with Mil. Std. 105D multiple sampling plan. The initial sample size is 125. Additional samples of 125 will be inspected if required.

Table DE-6
Summary of Objective Discrepancy Evaluation
Powers-Azco-Pope

Type of Discrepancy By Attribute	Total Quantity	Category X No. Within Parameters	Category Y No. Acceptable by Judgment	Category Z No. Acceptable by Calculation	No. with Design Significance
Pipe Material Verification					
1. Incorrect quantity on piping bill of material	19	19	0	0	0
2. Incorrect size on piping bill of material	3	3	0	0	0
3. Incorrect heat number on bill of material	28	28	0	0	0
Hanger Material Verification					
1. Incorrect quantity on hanger drawing bill of material	34	34	0	0	0
2. Incorrect size of hanger drawing bill of material	45	37	2	6	0
3. Incorrect heat number on hanger drawing	84	84	0	0	0
Final Hanger					
1. Incomplete weld length	55	22	2	31	0