Update to

Results of Quality Programs for Construction of Clinton Power Station

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UPDATE TO
RESULTS OF QUALITY PROGRAMS
FOR CONSTRUCTION OF
CLINTON POWER STATION

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ILLINOIS POWER COMPANY
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EXECUTIVE SUMMARY

A. INTRODUCTION

This report describes and evaluates the major programs and actions implemented to provide confidence in the quality of Clinton Power Station construction.

The quality of Clinton Power Station construction can originate only from two fundamental sources: the strong commitment of Illinois Power Company management to a quality product and the dedication to a quality product of each individual employee. Through these sources, Illinois Power Company has built high quality directly into the Clinton Power Station. In addition, the programs and actions described herein have operated as a systematic, multi-level composite to reinforce and verify the quality built into the Clinton Power Station. The programs and actions described herein have involved both massive efforts toward improvement of Clinton Power Station quality assurance organization activities and equally massive efforts to improve directly the performance of the Clinton Power Station construction work itself.

The major programs and actions described herein are as follows:

1. Quality Assurance Program - From the outset of the project, Illinois Power Company has implemented and continued its efforts to maintain its Quality Assurance Program in accordance with 10 CFR Part 50, Appendix B.

2. Recovery Programs - In response to specific deficiencies identified during 1981 and 1982, Illinois Power Company stopped work in nine major functional areas of construction and implemented extensive recovery programs.

3. Programmatic Improvements - Subsequently, Illinois Power Company instituted a broad range of fundamental programmatic improvements. These programmatic improvements resulted in substantial upgrading of the management and experience level of personnel, quality assurance organizations, nonconformance and corrective action programs, and control of construction and inspection activities.

4. Overinspection Program - Illinois Power Company implemented a major program for reinspection of safety-related, augmented class D (radioactive waste), and fire protection structures, systems, and components in those areas related to the stop work actions. In practice, this has resulted in three separate quality inspections for virtually all such reinspectable structures, systems, and components.

5. Record Verification Program - Illinois Power Company implemented a Record Verification Program which calls for 100% review of completed quality records by the constructor, Baldwin Associates, followed by a 20% sample review by Illinois Power Company Quality Assurance.

6. General Assessment and Corrective Action Activities - Throughout the course of Clinton Power Station construction, Illinois Power Company has maintained or has initiated aggressive assessment and corrective action activities, which augment and complement the programs and actions mentioned above. These activities include the 10 CFR Section 50.55(e) and Part 21 reporting systems, the Material Assurance Program, responses to the Nuclear Regulatory Commission inspections, third-party audits, systems for addressing employee quality concerns, the configuration control system, and the Management Corrective Action Request Program.

B. CLINTON POWER STATION QUALITY-RELATED PROGRAMS IN PERSPECTIVE

The size and complexity of the Clinton Power Station project are such that no summary report could impart a true sense of the efforts that Illinois Power Company has undertaken to assure Clinton Power Station construction quality. In an attempt to aid the reader, the text of this report is structured to present summaries of the evaluations of the major quality-related programs. Detailed information supporting the evaluations discussed in the text is provided in the appendices contained in a separate volume.

This report evaluates the results of each of the six major classes of Clinton Power Station quality-related programs and actions. When these programs and actions

are considered on a collective basis, several important overview observations emerge:

- The quality-related programs and actions are designed to identify, document, and correct deficiencies in Clinton Power Station construction.

- While error-free construction may be a goal, it is neither attainable nor required.

- The Clinton Power Station quality-related programs and actions have been effective in identifying and documenting deficiencies.

- The deficiencies identified have not had adverse implications for Clinton Power Station safety.

- Individual deficiencies have been corrected and effective actions have been taken to preclude their recurrence.

- Illinois Power Company has been diligent in examining the root causes of deficiencies and in effecting substantial programmatic changes to remedy those causes.

The magnitude of the Clinton Power Station project has produced quality-related programs and actions of correspondingly large scope. Reinspections conducted to date show high rates of conformance with design drawings and specifications for structures, systems, and components and have not revealed any nonconformances which have safety significance. The overall trend is to even higher rates of conformance, and, in certain judiciously selected areas, it may soon be possible to relax some verification programs where regularly established quality programs have been demonstrably effective. However, Illinois Power Company recognizes that in certain areas the verification programs have been beneficial, and these aspects of the programs will be maintained to ensure that Illinois Power Company will continue to receive the beneficial results of these programs.

C. THE CLINTON POWER STATION QUALITY ASSURANCE PROGRAM

Illinois Power Company management's strong commitment to assuring the quality of Clinton Power Station construction is reflected in the establishment, maintenance, and continuing improvement of the Clinton Power Station quality assurance organization. Illinois Power Company management is actively involved in ensuring the independence and effectiveness of the Illinois Power Company quality assurance organization and providing leadership to ensure that all employees produce and assure a quality product.

The Illinois Power Company Quality Assurance Program, which was established in conformance with 10 CFR Part 50, Appendix B, includes three basic types of activities that are fundamental to achieving adequate confidence in the quality of Clinton Power Station construction:

- Activities affecting quality are conducted in accordance with controlled written instructions, procedures, and drawings by appropriately trained and qualified personnel to ensure that these activities are performed correctly in the first instance.

- Activities affecting quality are subject to inspection by appropriately trained and qualified persons, who did not perform the activities inspected, to verify that the activities have been performed correctly.

- All aspects of the quality assurance program are subject to a comprehensive system of audits and surveillances by appropriately trained and qualified personnel, who do not have direct responsibility for the aspects audited, to verify that those aspects of the quality assurance program are properly implemented.

Because quality-related problems inevitably arise during construction, the Clinton Power Station Quality Assurance Program includes measures to ensure that conditions adverse to quality are promptly identified and corrected, the cause of any such condition is determined, and action is taken to preclude its recurrence. The Clinton Power Station Quality Assurance Program has been subjected to

numerous audits by both cognizant Clinton Power Station project personnel (see Appendix B) and third parties (see section VII.E). The results of these audits indicate that activities affecting Clinton Power Station quality, on the whole, have been conducted in accordance with applicable requirements, and numerous specific and programmatic corrective actions have been taken to resolve problems identified by those audits. In short, the audit results portray a quality assurance system which is not problem-free, but which is functioning effectively.

D. RECOVERY PROGRAMS

Prior to 1981, the type of deficiencies identified during Clinton Power Station construction were similar in kind and quantity to those expected during construction of any commercial nuclear power plant. Thereafter, the Nuclear Regulatory Commission, Illinois Power Company, and its contractors identified deficiencies in the implementation of the Clinton Power Station Quality Assurance Program that led Illinois Power Company and Baldwin Associates to stop the affected work activities. The Nuclear Regulatory Commission took confirmatory action in regard to the stop work actions. Illinois Power Company then developed and implemented specific recovery programs to address and correct the deficiencies for each affected area of work.

While the specific corrective actions varied with the area of activity affected, there were certain common denominators within these actions. The major types of actions included upgrading of procedures to assure complete and precise direction for work and inspections, training of personnel to improved procedures, reduction of inspection backlogs, accelerated closure of open nonconformance reports, and, where indicated, the performance of additional inspections in the affected area of activity. After Illinois Power Company implemented the corrective action in each recovery program area, the Nuclear Regulatory Commission conducted inspections to verify effective implementation and gave its concurrence to lifting the stop work actions. By the end of 1983, all stop work actions had been lifted and work had resumed in all affected areas at Clinton Power Station. In addition, Clinton Power Station project audits and surveillances of the recovery programs were performed and, where appropriate, additional corrective actions were taken to ensure that effective implementation continued.

E. PROGRAMMATIC IMPROVEMENTS

Illinois Power Company implemented extensive programmatic improvements in four key areas: (1) management and experience level of personnel; (2) quality assurance organizations; (3) nonconformance and corrective action programs; and (4) control of construction and inspection activities.

In the area of management and experience level of personnel, Illinois Power Company hired a new vice president with extensive nuclear experience to direct key nuclear activities, including quality assurance. It also hired new managers for: Nuclear Station Engineering, Quality Assurance, Nuclear Training, Project Management, Nuclear Support, and Nuclear Planning. In addition, the Illinois Power Company and Baldwin Associates organizations were augmented by more than two hundred experienced Stone & Webster Engineering Corporation personnel. Baldwin Associates also hired a new Manager of Quality and Technical Services and a new Project Manager. In addition, the Baldwin Associates organization was restructured to establish dedicated groups for nonconformance review, traveler review, and training. Illinois Power Company nuclear project personnel were consolidated and moved to the site. Both Baldwin Associates and Illinois Power Company issued policy statements which admonish against intimidation and encourage employee reporting of quality concerns. Both Illinois Power Company and Baldwin Associates established training departments to centralize project training and to establish and upgrade training programs for orientation and job-specific training for all site personnel.

Illinois Power Company and Baldwin Associates also substantially increased the size of their quality assurance organizations. As of July 1984, the Illinois Power Company Quality Assurance organization had grown from 25 in 1982 to more than 300 persons, while the Baldwin Associates Quality and Technical Services organization had grown from 191 in 1982 to more than 900 persons. The Illinois Power Company Quality Assurance organization was restructured to provide a supervisor and staff for each major quality assurance function. In practice, Illinois Power Company Quality Assurance became more involved in all levels of daily project activities, and the number and frequency of audits and surveillances

were significantly increased. Finally, a full-time quality assurance/quality control training staff was established, the quality assurance/quality control training program was augmented, and existing inspector certifications were verified.

In corrective action programs, emphasis was placed on increasing control over nonconformance identification and documentation, tracking nonconformances by computer to ensure timely corrective action, and notifying management of delay in resolution of conditions adverse to quality and of the status of corrective actions. The corrective action program was upgraded to include computer-assisted trending of conditions adverse to quality, analyses of individual conditions to identify root causes, and notification to senior management of the results of trend analyses.

Improvements in the controls for construction and inspection activities have concentrated on upgrading the traveler system, project procedures, and measures for document control. Among the major steps were establishment of formal construction and engineering reviews of travelers and a dedicated Baldwin Associates traveler review group. The Illinois Power Company Quality Assurance Department reviewed Baldwin Associates procedures and instructions to ensure conformance with quality assurance requirements and clarity of direction. Document control was enhanced by establishment of a computer-assisted traveler tracking system, an automated system to track controlled documents, and field satellite document stations that maintain updated controlled documents for reference at locations convenient to field workplaces.

Illinois Power Company's ongoing process for audits, surveillances, and third party audits indicate that the programmatic improvements have been implemented effectively. Taken together, this array of programmatic improvements has ensured that Clinton Power Station quality-related activities receive greater attention and more effective execution. These improvements have enhanced confidence in quality and, thus, the success of the project.

F. OVERINSPECTION PROGRAM

The Overinspection Program applies to safety-related, augmented class D (radioactive waste), and fire protection items in those areas in which stop work actions were issued. Both old work and new work are covered. For purposes of evaluation, July 26, 1982, was selected as the point of demarcation between old and new work (see subsection V.C.4). The Overinspection Program provides for additional inspections of completed and previously inspected work on two levels: a sample inspection by the Baldwin Associates Field Verification Group and a subsequent sample inspection by the Illinois Power Company Overinspection Group. As of December 31, 1984, both the Field Verification and Overinspection Groups have performed inspections of nearly 100% of all inspected lots. This has resulted in three inspections for virtually all reinspected work within the scope of the Overinspection Program. R

Illinois Power Company has performed an evaluation of the results of the Overinspection Program. This evaluation addressed five issues: (1) whether the available data from the program are sufficient to support reliable inferences as to the quality of Clinton Power Station construction, (2) whether the nonconformances identified by the program would have been safety-significant had they remained undetected by the Overinspection Program, (3) whether the as-constructed plant shows a high rate of conformance with design drawings and specifications, (4) whether the quality of new work differs from that of old work, and (5) whether the results can be applied to work not inspected under the program.

For the purpose of this evaluation, data from the Overinspection Program through December 31, 1984, were used. As of that date, more than 2 million attributes had been subjected to inspections under the Overinspection Program. In terms of the number of items within the scope of the program, approximately 12% of the total number of items have been inspected under the Overinspection Program. Illinois Power Company's analyses show that these data are sufficient to permit reliable conclusions to be drawn regarding the quality of Clinton Power Station construction. R R

Engineering evaluations of the nonconforming conditions identified by the Overinspection Program were conducted to determine if any such conditions would have been safety-significant if they had remained undetected by the Overinspection Program. These evaluations are Illinois Power Company's primary basis for verification of Clinton Power Station construction quality. All nonconformances identified by the Overinspection Program were evaluated by the Clinton Power Station architect-engineer, Sargent & Lundy. The results of many evaluations were obviously not significant (e.g., cosmetic defects such as superficial arc strikes). Others required detailed engineering analyses to examine the nonconforming condition and its relationship to performance of intended safety functions. No nonconforming condition was safety-significant; that is, even if the nonconformances were to have remained unidentified by the Overinspection Program, it would not have resulted in a loss of capability of a structure, system, or component to perform its intended safety function. The results of the engineering evaluations for safety-related structures, systems, and components are summarized as follows:

Overinspection Program Evaluation

Attributes Inspected	Nonconforming Attributes Identified By Overinspection	Safety-Significant Nonconformances
2,402,471	48,745	0

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In addition to the primary engineering evaluations, Illinois Power Company performed quantitative evaluations of the results of the Overinspection Program to determine whether the as-constructed plant shows a high rate of conformance with design drawings and specifications. The overall conformance rate for field verification inspections is high (97.6%). The rate for the subsequent overinspections by Illinois Power Company Quality Assurance is still higher (98.8%), thereby indicating the effectiveness of the field verification level of inspection. Conformance rates were also calculated on the basis of disciplines and commodities. The results of these evaluations also show generally high conformance rates. The results of the evaluation also demonstrate that the conformance rate for new work is generally higher than for old work, thus reflecting the favorable effect of the recovery program actions and

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programmatic improvements implemented since 1982. Finally, favorable inferences for the quality of items not inspected under the Overinspection Program (e.g., nonrecreatable attributes and inaccessible items) can be drawn from the results for items inspected within the program.

In broadest terms, the Overinspection Program confirms that the quality of Clinton Power Station construction is adequate. The primary measure of confidence in overall plant safety is gained from the engineering evaluations of the nonconformances identified by overinspection. None of the nonconformances would have caused a loss of capability of any structure, system, or component to perform its intended safety function if uncorrected by the Overinspection Program. In certain areas where favorable results are most apparent, it may be possible to relax or eliminate selected program elements. For present purposes, it is sufficient to conclude that the operation of Illinois Power Company's Quality Assurance Program, coupled with its additional recovery programs, programmatic improvement actions, and Overinspection Program, provides a high level of confidence in the quality of Clinton Power Station construction. R

G. RECORD VERIFICATION PROGRAM

Illinois Power Company implemented the Record Verification Program to verify the adequacy of Clinton Power Station construction quality assurance records generated before the stop work actions and to provide additional assurance as to the adequacy of records generated after the stop work actions. The reviews conducted under the program apply to quality assurance records for all completed Baldwin Associates construction work packages and site-generated purchase order documentation packages for safety-related, augmented class D (radioactive waste), and fire protection structures, systems, and, components. These reviews are conducted in addition to the activities governing records under the normal Illinois Power Company Quality Assurance Program. These reviews are conducted on two levels: Baldwin Associates' Document Review Group reviews all records within the scope of the program for acceptability, and Illinois Power Company's Records Review Group reviews a random sample of approximately 20% of the records reviewed by the Baldwin Associates' Document Review Group. A document exception list is prepared and maintained for each work package or

purchase order reviewed. The document exception list records the results of the review, including any record deficiencies disclosed during the review.

Illinois Power Company initiated an evaluation of the results of the Record Verification Program as of March 3, 1985. This evaluation consisted of three elements: (1) the safety significance, if any, of potential hardware-related nonconformances resulting from record reviews; (2) the implications for hardware quality, if any, of record deficiencies identified in record verification reviews; and (3) the basis for confidence in the acceptability of Clinton Power Station construction quality assurance records. R

When potential hardware-related nonconforming conditions are identified as a result of record reviews, nonconformance reports are initiated. During the course of the record verification review, more than 58,000 record packages, which include more than 7,600,000 attributes, have been placed in review, and 890 nonconformance reports have been initiated. Of these, 214 had a potential safety implication and were subjected to engineering evaluation by Sargent & Lundy. Each of these nonconformance reports was reviewed against the pertinent design criteria, as set forth in the applicable codes or standards, to determine whether the nonconforming conditions identified were safety-significant; that is, if a particular nonconforming condition had remained undetected by the Record Verification Program, it could have resulted in a loss of capability of a structure, system, or component to perform its intended safety function. None of the nonconforming conditions in the 214 nonconformance reports were found to be safety-significant. In round numbers, the results of the engineering evaluation are summarized as follows: R R

Record Verification Program Engineering Evaluation

Attributes Reviewed	Record Deficiencies Identified	Nonconformance Reports Resulting From Record Reviews	Nonconformance Reports With Potential Implications For Safety	Safety-Significant Nonconformances
7,600,000	147,000	890	214	0

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The record deficiencies identified in the Record Verification Program were reviewed to determine whether any had adverse hardware implications. The rates of record deficiencies for the program as a whole, new work and old work, were low (about 1.9% for the entire program). The rate of deficiencies for new work is less than for old work by about a factor of two - an apparent reflection of Illinois Power Company's implementation of improvements and corrective actions in regard to quality records subsequent to the stop work actions. Examination of deficiency rates with respect to individual disciplines, items of work, and types of attributes indicated no outstanding trends that would warrant further action.

Record deficiency resolutions also were reviewed to confirm that none were indicative of adverse hardware quality. This review confirmed that the resolutions had no adverse implications for hardware quality and that the only record deficiencies with a potential for hardware implications were those for which nonconformance reports had been initiated. As stated above, the Sargent & Lundy engineering evaluations of nonconformance reports indicated no instances of safety significance.

Confidence in the acceptability of Clinton Power Station construction quality assurance records is further bolstered by the results of Illinois Power and Baldwin Associates audits and surveillances, third-party audits, and Nuclear Regulatory Commission inspections. While specific open items have been identified through these audits and inspections, Illinois Power Company has taken or will take appropriate corrective action to ensure that record verification program activities will continue to be effectively implemented.

On the basis of the evaluation in this report:

- None of the potential hardware-related nonconformances resulting from record reviews are safety-significant. That is, if the nonconforming conditions were left unidentified by the Record Verification Program, no loss of capability of a structure, system, or component to perform its intended safety function would have resulted.

- The other record deficiencies identified in the program and their resolutions have no adverse implications for hardware quality.

- There is adequate confidence in the acceptability of the Clinton Power Station construction quality assurance records.

H. GENERAL ASSESSMENT AND CORRECTIVE ACTION ACTIVITIES

Throughout the course of the Clinton Power Station project, Illinois Power Company has maintained or initiated many assessment and corrective action activities, which operate in conjunction with the normal Quality Assurance Program, the recovery programs, programmatic improvements, Overinspection Program, and Records Verification Program, to buttress and complement Illinois Power Company's level of confidence in Clinton Power Station construction quality. Among these activities, the following programs and actions have particular importance in maintaining compliance with regulatory requirements and in providing management with effective tools to ensure Clinton Power Station construction quality.

With regard to regulatory compliance, the activities associated with 10 CFR Section 50.55(e) and Part 21 reporting and the responses to Nuclear Regulatory Commission inspections warrant emphasis. In the case of the reporting systems, Illinois Power Company's practice has been to employ these systems for providing the Nuclear Regulatory Commission with early notice and continuing information as to potentially reportable conditions and to ensure that corrective actions are timely and responsive. Illinois Power Company's responses to Nuclear Regulatory Commission inspections have served to focus management attention on ensuring effective corrective action and on maintaining compliance with regulatory requirements. The decline in noncompliances found by the Nuclear Regulatory Commission over the past several years serves as a measure of Illinois Power Company's improved performance in this area.

Third-party audits conducted by the Joint Utility Management Audit team, Lapp-Rice-Staker consultants, the American Society of Mechanical Engineers, and the Institute of Nuclear Power Operations have augmented the Nuclear Regulatory

Commission inspections to provide an additional management tool for Quality Assurance Program improvement and continued effective implementation.

As a result of experience with several findings in a 10 CFR Section 50.55(e) investigation involving material traceability, Illinois Power Company management implemented a Material Assurance Program for all safety-related, augmented class D (radioactive waste), and fire protection activities at Clinton Power Station. This program encompasses an evaluation of procedures, their implementation, and audit and surveillance plans and schedules. Existing audit and surveillance reports related to material issues were reviewed and studies of record reviews of material purchases were conducted to resolve any open materials-related issues. The Material Assurance Program provides additional confidence that Clinton Power Station materials will meet design requirements.

Illinois Power Company developed and implemented a Configuration Management Program consisting of four elements: configuration control, status accounting, verification, and management training. This program provides an additional effective management tool to ensure that Clinton Power Station structures, systems, and components conform to the approved design, that their physical characteristics are properly reflected in technical, procedural, and training documents, and that the plant configuration will meet regulatory requirements and commitments.

Illinois Power Company management has instituted two additional programs that provide mechanisms for raising quality-related issues for management attention and action. The first of these consists of three systems for addressing employee quality concerns: the quality concern telephone hotline, the Executive Vice President's Quality Report System, and the SafeTeam project. In addition, Illinois Power Company management has an open-door policy under which any employee may voice quality concerns and, of course, any employee may report his concerns to the Nuclear Regulatory Commission. Altogether, these systems have been effective in encouraging employees to express concerns and in giving visibility to Illinois Power Company's commitment to quality. The second of these is the Management Corrective Action Request System, which provides a mechanism for bringing specific quality issues to the attention of senior management for

immediate action or evaluation. The Management Corrective Action Request System also can be used to identify when previous corrective action proved inadequate or delinquent. That system has been used to effect high priority corrective actions when necessary and has augmented the effectiveness of the Clinton Power Station Quality Assurance Program.

I. CONCLUSION

The programs and actions for quality-related activities provide multiple tiers of assurance for the quality of Clinton Power Station construction. Illinois Power Company's management has maintained its commitment to effective implementation of the Quality Assurance Program, recovery programs, programmatic improvements, Overinspection Program, Record Verification Program, and general assessment and corrective action activities. The evaluation of the results of the programs and actions presented in this report bear out their effectiveness. Collectively, these programs and actions provide high confidence in the quality of Clinton Power Station construction.

V. OVERINSPECTION PROGRAM

IP established an Overinspection Program in 1982 to verify the quality of construction of CPS. All nonconformances identified by the Overinspection Program have been or will be reworked or determined to be acceptable as is.

This section presents an evaluation of the results of the Overinspection Program for CPS as of December 31, 1984. These results verify that construction of CPS would have been of acceptable quality even if it is assumed that the nonconformances identified by the program had been left uncorrected by the Overinspection Program. |R |R

In analyzing the results of the Overinspection Program, IP has relied primarily on an engineering evaluation of the safety significance of the nonconformances identified by the program to verify that structures, systems, and components at CPS are capable of performing their intended safety functions. Secondarily, IP has performed a quantitative analysis of the results of the Overinspection Program to verify that the QA Program for CPS has been effective in providing reasonable assurance that structures, systems, and components comply with design drawings and specifications. Thus, IP has taken two different but complementary approaches to show that the results of the Overinspection Program verify that the quality of construction of CPS is acceptable.

IP originally submitted the Overinspection Program plan to the NRC in a letter dated November 15, 1982. On December 3, 1982, the NRC concurred with the intent of the Overinspection Program. A revision to the program was transmitted on December 20, 1982, and was acknowledged by the NRC on January 25, 1983. A subsequent revision was transmitted on June 18, 1984. The discussion which follows is a brief summary of the Overinspection Program plan.

A. PROGRAM PLAN DESCRIPTION

1. Purpose

The purposes of the Overinspection Program are to verify that the structures, systems, and components within the scope of the program are properly installed and to provide IP with assurance that BA is performing

installation and inspection work that satisfies the applicable requirements of codes, standards, drawings, and specifications. These objectives are accomplished by performing additional inspections of completed and inspected work, whether performed before issuance of the stop work actions in 1982 (old work) or after the stop work actions were lifted (new work). The inspections conducted under the Overinspection Program are in addition to those normally performed as part of the QA Program for CPS. Therefore, the Overinspection Program is a supplement to the QA Program and not a substitute for it.

2. Scope

Inspections in the Overinspection Program focus on installation of safety-related, augmented class D (radioactive waste), and fire protection items in the following areas:

- Large bore piping
- Small bore piping
- Mechanical equipment
- Structural steel
- HVAC, as defined in the IP HVAC recovery plan
- Electrical hangers
- Electrical conduit and raceways
- Electrical terminations
- Electrical equipment
- Electrical and mechanical instrumentation

Other areas, such as concrete structures and masonry walls, are not subject to the Overinspection Program because no significant concerns have been identified in those areas.

3. Program Management

IP QA is responsible for the direction of the Overinspection Program. Within IP QA, the Overinspection Group performs the activities necessary to execute program commitments. The BA portion of the Overinspection Program is executed by the Field Verification Group, which reports to IP

QA through the BA Manager of Quality and Technical Services. Over 200 full-time personnel are currently assigned to perform the supervisory, administrative, and inspection tasks required by the Overinspection Program.

4. Operation

The program consists primarily of the elements described below.

a. Field Verification Inspections

BA Quality and Technical Services performs inspections (termed "field verification" inspections) of a sample of completed and inspected work. If the results of the field verification inspections do not satisfy the acceptance criteria described in subsection V.A.5 below, the results are evaluated to determine the need for further inspections of the lot from which the sample was selected. These further inspections may be limited to those attributes for which the results of the sample inspections did not satisfy the acceptance criteria, or the entire lot may be inspected. When the field verification inspection of a lot is complete, the lot is turned over to IP QA.

Nonconformances identified by field verification inspections are documented and processed according to approved procedures. These procedures require that the nonconformances be reviewed and evaluated and that appropriate corrective action be taken in each case. When rework, repair, or replacement of plant hardware is required to correct a nonconformance, this work also is inspected and the results of the inspections are documented to provide assurance of acceptability.

b. Overinspections

Following the completion of field verification inspections and turnover of the lot to IP QA, IP QA selects a sample of the work and conducts inspections (termed "overinspections"). If IP QA determines from the results of these overinspections that the sample of the work satisfies the acceptance criteria described in subsection V.A.5 below, the work

is considered acceptable. If the results of the sample overinspection do not satisfy the acceptance criteria, either the work is returned to BA for reevaluation and possible reinspection or IP QA may elect to reinspect 100% of the remainder of the lot. For work returned to BA, reinspections may be limited to specific attributes that are identified through reevaluation as having an unacceptable level of deficiencies. R

The relationship between overinspection and field verification inspections described above is graphically depicted in Figure V-1.

Nonconformances identified by field verification inspections are not subject to validation by the Overinspection Group. Instead, the Overinspection Group assumes that the nonconformances identified by field verification inspections are valid nonconformances, and it does not include them in the group of nonconformances identified by overinspection. Only nonconformances originally identified by overinspections are documented by the Overinspection Group. These nonconformances are processed according to the same approved procedures used for field verification inspections.

c. Departure Inspections

In addition to conducting overinspections in series with field verification inspections, IP QA also has performed overinspections prior to field verification inspections by BA. These overinspections are termed "departure" inspections. Departure inspections were performed early in the Overinspection Program to enable IP to use overinspection personnel before BA began turning work over to IP QA in sufficient volume to make the program function efficiently.

Nearly 170,000 attributes were inspected by means of departure inspection. Of these, approximately 60,000 were subsequently inspected by the Field Verification Group as of December 31, 1984, pursuant to the program described in subsection V.A.4.a below. None of these attributes were subsequently subject to the overinspections described in subsection V.A.4.b below. The relationship between R

departure inspections and field verification inspections is graphically depicted on Figure V-1.

d. 100% Inspection by IP QA Overinspection Group

In certain instances after October 1984 IP QA has elected to perform 100% inspection of specific lots or specific types of items. IP QA decisions to conduct 100% inspection are in two categories.

First, as discussed previously, for some lots which have been rejected upon completion of sample inspection by IP QA, the lot has not been returned to BA for reevaluation and possible reinspection. Instead, IP QA has elected to reinspect 100% of the remaining items in the lot. In these cases, the lot is normally small, the amount of reinspection necessary to complete the lot has not been significant, and it has been more efficient to complete the reinspection using IP QA personnel. R

Second, in some cases IP QA has elected to perform 100% overinspection of lots or types of items which have not been inspected by BA. When IP QA performed 100% inspection on this basis, no field verification inspection is performed and no sample inspections are performed. This is the case for structural steel as is discussed in paragraph C.3.d, below. Other examples include old work items in which large numbers of items are not installed, thus providing small lots which can be efficiently inspected at the 100% level because sample sizes approach total lot size.

5. Sampling Inspection Criteria

The sampling procedures used by BA and IP in the Overinspection Program are based on sample sizes and acceptance criteria derived from MIL-STD-105D, a commonly used industry standard for inspection of samples from lots. Attributes inspected under the Overinspection Program are characterized as either critical or noncritical. For critical attributes (i.e., those which, if nonconforming, could adversely affect the safety of the installation) the acceptance quality level is set so that 95% confidence exists that at least 95% of the critical attributes in the entire lot under

investigation are conforming. The acceptance quality level for noncritical attributes is set so that 95% confidence exists that at least 85% of the noncritical attributes in the entire lot under investigation are conforming.

It should be noted that although the Overinspection Program was designed for sampling inspections, as of December 31, 1984, due to the small size of the lots and the stringency of MIL-STD-105D and the acceptance criteria, BA has inspected 100% of all but 10 of its lots and IP has inspected 100% of all but 19 of its lots. R R

6. Control

a. Procedures

The Overinspection Program is implemented in accordance with IP- and BA-approved procedures and instructions. Inspections are performed using BA-developed inspection checklists which identify the specific attributes to be inspected. These checklists were initially reviewed by S&L and by Stone & Webster to ensure that the checklists contained adequate inspection requirements, including the proper identification of critical attributes. Revisions to the checklists are reviewed and accepted by S&L. The checklists and revisions also are subject to review and approval by IP QA.

b. Personnel

Personnel performing the field verification inspections and over-inspections are trained and certified under a CPS-specific training program.

c. Records

The results of the inspections are recorded and retained. Nonconformances identified during the Overinspection Program are controlled as described in section V.A.4, and documents generated by the Overinspection Program are tracked from generation through placement in the record vault to provide a management tool for control of the Overinspection Program.

7. Audits and Surveillances

Activities under the Overinspection Program are subject to several layers of audits and surveillances. For example, BA field verification activities are subject to surveillances by IP QA overinspection personnel and to audits and surveillances by IP QA. Similarly, IP overinspection activities are subject to IP QA audits and surveillances. These audits and surveillances provide continuing assurance that Overinspection Program activities are conducted in accordance with procedures and provide IP management with further confidence in the results of the Overinspection Program and the quality of CPS.

8. Summary

As a result of the Overinspection Program, systems, structures, and components must pass through three levels of formal inspections before it is deemed acceptable: (1) an initial inspection of hardware under the normal BA QA Program, (2) the sample field verification inspection by BA Quality and Technical Services, and (3) the sample overinspection by IP QA. This redundancy verifies that systems, structures, and components comply with applicable installation requirements. Additionally, the Overinspection Program is conducted by trained and certified QA personnel in accordance with approved procedures, instructions, and checklists; the results of the program are documented and evaluated; and the program activities are subject to QA audits and surveillances.

B. PROCESS FOR EVALUATING RESULTS

The results of the Overinspection Program were evaluated from several perspectives. Each of these is described below.

First, the results of the Overinspection Program were evaluated to determine whether sufficient data from the Overinspection Program are available to permit reliable conclusions to be drawn regarding the quality of construction of CPS. The results of this evaluation are discussed in subsection V.C.1 below.

Second, the results of the Overinspection Program were subjected to an engineering evaluation to determine whether any of the nonconformances identified by the Overinspection Program would have been safety-significant if left unidentified by the program. The purpose of this evaluation is to verify that structures, systems, and components at CPS are capable of performing their intended safety functions. The results of this engineering evaluation are discussed in subsection V.C.2 below.

Third, the results of the Overinspection Program were evaluated quantitatively to verify that the QA program for CPS has been effective in providing reasonable assurance that construction complies with applicable design drawings and specifications. This evaluation includes a comparison of the results from IP's overinspections and BA's field verification inspections to determine the effectiveness of the BA field verification inspections. The results of these evaluations are discussed in subsection V.C.3 below.

Fourth, the results of the Overinspection Program were evaluated to determine whether the quality of old work is different from the quality of new work. The results of this evaluation are discussed in subsection V.C.4 below.

Finally, the results of the Overinspection Program were evaluated to determine whether the results are applicable to items that have not been inspected in the Overinspection Program. A summary of this evaluation is presented in subsection V.C.5 below.

It should be noted that the discussion presented below only reflects the results of the Overinspection Program for safety-related structures, systems, and components and seismically-designed non-safety-related HVAC systems. The results for the augmented class D (radioactive waste) and fire-protection systems are presented separately in Appendix D, part E, because these systems are not safety-related, have not been subject to all of the QA provisions of 10 CFR Part 50, Appendix B, and, as expected, contain proportionally more nonconformances than the safety-related structures, systems, and components. |R

C. RESULTS

1. Sufficiency of Data for Evaluation

The Overinspection Program has been in operation since December 1982 and is continuing. For purposes of this evaluation, a reference date was selected to permit evaluation of a fixed set of information from the Overinspection Program. Specifically, information generated by the Overinspection Program on or before December 31, 1984, was evaluated. The Overinspection Program generated sufficient information by this reference date to permit reliable conclusions to be drawn regarding the quality of CPS construction. R

As is shown in Table V-1, BA Quality and Technical Services and IP QA had inspected 2,402,471 attributes under the Overinspection Program as of December 31, 1984. Many of the same individual attributes were inspected by both BA and IP. Nevertheless, BA alone inspected a total of 1,672,414 different attributes under the Overinspection Program as of December 31, 1984. IP estimates that this number represents approximately 12% of the total number of attributes within the scope of the Overinspection Program. R

Appendix D, part A, discusses the distribution of the Overinspection Program inspections among the various construction disciplines and types of items in the plant. As this appendix demonstrates, more than 200,000 field verification inspections have been performed for each discipline. Furthermore, a large number of field verification inspections have been performed for each type of commodity. Consequently, given the magnitude and distribution of these inspections, any significant adverse condition applicable to a type of item or discipline should be evident from the results of the Overinspection Program as of December 31, 1984. Therefore, as shown in Appendix D, part A, these results provide a sufficient basis from which reliable conclusions regarding the quality of construction of CPS can be drawn. R R R

2. Engineering Evaluation

a. Introduction

IP requested S&L (with input from GE as necessary for GE-designed components) to evaluate each NCR to determine whether any of the nonconformances identified by the Overinspection Program were safety-significant. For purposes of this report, a safety-significant nonconformance is defined as a nonconformance which, were it to have remained unidentified by the Overinspection Program, could have resulted in the loss of capability of a structure, system, or component to perform its intended safety function.

NCRs that documented more than one nonconforming attribute were initially reviewed to identify the number of evaluations required to determine the significance of the nonconformance. For many cases in which one of the nonconforming attributes determined the total adverse impact upon the item, only an evaluation of that nonconformance was conducted. For example, if an item contained more than one surface defect such as an arc strike, gouge, and scratch, the most limiting defect (i.e., the defect with the deepest penetration) was selected for evaluation. For cases in which one NCR documented nonconformances on different items or in which one item contained nonconforming attributes of differing natures (e.g., loose bolt and arc strike), separate evaluations of the impact of the nonconforming attributes on each item were conducted to ensure that all possible adverse impacts were addressed.

In general, S&L evaluated each nonconformance by one of three methods. First, many nonconformances on their face have little or no impact on the integrity of an item. Nonconformances in this category, for example, typically include minor documentation errors and cosmetic defects such as those arc strikes which do not reduce base metal thickness. These nonconformances can be designated as having no safety significance, with no need to conduct more detailed evaluations.

Second, there are many types of nonconformances which do not adversely affect the function of an item because of the inherent conservatism of the design for the item. Many of these nonconformances, such as minor cases of undercut and surface slag on welds, are readily identifiable from engineering experience and knowledge of the design without the need to conduct detailed calculations.

Finally, any nonconformance not falling within one of the above two categories was subject to detailed engineering evaluations to determine whether the nonconformance adversely affected the capability of a structure, system, or component to perform its intended safety function.

Although S&L evaluated each nonconformance identified by the Overinspection Program to determine whether it was safety-significant, it should be emphasized that most of the nonconforming items have been reworked in accordance with applicable design drawings and specifications and the remainder have been determined to be acceptable as they are. Consequently, the evaluations below were undertaken to determine the safety significance of the nonconformances assuming they had been left uncorrected by the Overinspection Program. R

b. Results

1) Introduction

The results of the S&L engineering evaluation of the nonconformances identified by the Overinspection Program demonstrate that none of these nonconformances was safety-significant.

The discussion below identifies the type of nonconforming attributes identified by the Overinspection Program and explains, in general, why these nonconformances had no safety significance. Additionally Appendix D, part B, identifies each of

the major types of commodities inspected under the Overinspection Program and explains, in general, why the nonconformances in these commodities were not safety-significant.

The nonconforming attributes identified by the Overinspection Program were divided into 42 categories. Table V-2 lists the number of nonconforming attributes occurring within each category. As is evident from this table, four of these categories (insufficient weld size, arc strike, undercut, and incorrect identification markings) comprise more than half of the total number of nonconforming attributes, and 14 of these categories account for approximately 90% of the total number of nonconforming attributes identified by the Overinspection Program. Since these categories encompass the vast majority of nonconformances discovered by the Overinspection Program, each is discussed below in order of decreasing frequency, together with an explanation of why the nonconformances in each category are not safety-significant. The remaining categories are defined in Appendix D, part C. R R R

It should be noted that the discussion below does not account for seven individual nonconformances. S&L was unable to determine the precise impact of these nonconformances on the affected items because the items had been reworked and the NCRs did not contain sufficient information to permit performance of detailed engineering calculations. Nevertheless, as is demonstrated in Appendix D, part D, the NCRs contain sufficient information, except in one case, to determine that none of these nonconformances would have caused a safety-significant condition to exist at CPS. R R

2) Evaluation by Type of Nonconforming Attribute

(a) Weld Size

Nonconformances involving insufficient weld size comprise 16.6% of the total number of nonconforming attributes identified by the Overinspection Program. R

Some of the welds which were reported to be undersized were not designed to perform a load-carrying function, including fillet weld caps on full penetration welds. Consequently, the fact that the weld is undersized is immaterial to the function of these welds.

Other welds identified as having insufficient size were evaluated to determine the effect of the reduced size on the load-carrying capacity of the weld. For purposes of the evaluation, the capacity of the weld was calculated based on the reduced size of the weld. In each case, the load-carrying capacities of the connections with the undersized welds were determined to be sufficient to meet the design loading. Consequently, none of the nonconformances was safety-significant.

(b) Arc Strikes

Arc strikes comprise 14.8% of the total number of nonconforming attributes identified by the Overinspection Program. R

An arc strike is a surface indication on the base metal or a weld which results when a source of welding current has inadvertently contacted the weld or base metal and produced some localized fusion. In general, arc strikes are cosmetic defects that do not penetrate the base metal to any appreciable extent. Consequently, most arc strikes are not potentially safety-significant because they do not

approach the required minimum wall thickness for pressure-retaining components or reduce the base metal of other components to a sufficient degree to affect load-carrying capacity significantly.

In some cases, the Overinspection Program identified arc strikes on components with relatively thin walls, such as tubing. In these cases, S&L compared the actual wall thickness (as reduced by the arc strike) against the minimum wall thickness requirements. As a result of this comparison, S&L determined that none of the arc strikes violated minimum wall thickness requirements. Consequently, none of the arc strikes affected the required function of any item.

(c) Undercut

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Undercuts comprise 13.9% of the total number of nonconforming attributes identified by the Overinspection Program.

Undercuts are unfilled grooves in the base metal adjacent to a weld which are created during the welding process. Undercut may reduce the thickness of the base metal and, if it exceeds code allowables, may result in a reduction in pressure-retaining or load-carrying capacity. Undercut nonconformances identified by the Overinspection Program were evaluated by assuming reduced capacity of the affected item. All connections having undercut were found to provide adequate capacity to meet the code allowable stresses. Consequently, none of these nonconformances was determined to be safety-significant.

(d) Missing or Incorrect Identification Markings

Missing or incorrect identification markings on items comprise 8.0% of the total number of nonconforming attributes identified by the Overinspection Program. R

S&L evaluated all cases of missing, incorrect, or damaged identification markings to assure that the proper identity had subsequently been established. In all cases, the correct items were installed. In addition, the plant startup and testing process would have identified these cases and the missing, damaged, or incorrect equipment tags would have been replaced. Consequently, none of these nonconformances was safety-significant. R

(e) Tolerance

Items installed outside of specified tolerances comprise 7.4% of the total number of nonconforming attributes identified by the Overinspection Program. R

For items that were out-of-tolerance, S&L evaluated their as-built condition to determine the impact, if any, on the design loadings and clearance requirements for the items. For example, if, as a result of the evaluation, component loadings for a support changed significantly, a further evaluation was performed to determine the impact of the resultant loads on the design margins of the affected support. None of the nonconformances identified by the Overinspection Program resulted in an inability of out-of-tolerance items to satisfy calculated loads or clearance requirements. Consequently, none of these nonconformances was safety-significant.

(f) Loose Hardware

Loose hardware comprises 5.1% of the total number of nonconforming attributes identified by the Overinspection Program. R

Loose hardware consists primarily of loose nuts and bolts. With the exception of the nonconformances discussed below, these nonconformances were evaluated to assess their impact on the affected item's overall strength. None of the nonconformances was determined to reduce the strength of the item below that required to satisfy design loads.

The most frequently observed example of loose hardware consists of loose jam nuts on adjustable rod and sway strut pipe supports. These items do not have a structural load-carrying function in the present dead load service condition. Furthermore, there is a requirement that these items be examined and corrected in the normal preservice inspection and adjustment checkout. Consequently, these nonconformances were determined to have no safety significance because they would have been identified and corrected even if the Overinspection Program had not been performed.

(g) <u>Overlap</u>

Nonconformances involving overlap on welds comprise 4.9% of the total number of nonconforming attributes identified by the Overinspection Program. |R

Overlap is the protrusion of weld material beyond the edge of the weld. Welds with overlap pose a potential problem because the overlap could mask a lack of fusion between the weld material and the base metal or mask an insufficiently sized weld.

IP established a program to determine if overlap reported on NCRs at CPS involved lack of fusion or insufficiently sized welds. This program used a selection of 141 structural steel welds with overlap identified by the Overinspection Program which had not yet been reworked. The overlap on

these welds was re-examined and, where necessary, subjected to grinding to determine the size of the weld and whether lack of fusion was present beneath the overlap. It was determined that the welds were of sufficient size and that lack of fusion did not exist in any of these 141 welds. Consequently, IP concludes that welds with overlap do not indicate lack of fusion or insufficiently sized welds at CPS and, therefore, they were not safety-significant.

Finally, it may be noted that many nonconformances involving overlap also were determined to be acceptable by confirming that the individual weld had sufficient size and fusion to perform its function or by evaluating the connection assuming lack of fusion or undersized welds.

(h) <u>Wrong Weld</u>

Nonconformances involving wrong weld type comprise 3.8% of the total number of nonconformances identified by the Overinspection Program.

Wrong welds were reported when the weld type specified on the design drawings differed from the actual weld on the installed item. An example of this type of nonconformance is the use of an intermittent weld in lieu of a continuous weld or a continuous weld in lieu of an intermittent weld. In each case, the nonconforming weld was evaluated to determine if the load-carrying capacity of the connection was sufficient to ensure that allowable stresses were not exceeded. In some cases, the wrong weld was actually stronger than that specified by the design. All of the wrong welds were found to provide adequate strength and, therefore, were not safety-significant.

(i) Missing Hardware

Nonconformances involving missing hardware comprise 3.1% of the total number of nonconforming attributes identified by the Overinspection Program. R

Most of the nonconformances involving missing hardware pertained to mechanical and electrical hangers or equipment foundations which were missing nuts, washers, or clamp spacers. Missing jam nuts and clamp spacers on pipe supports did not perform any load-carrying function and were determined not to be safety-significant. Missing hardware on adjustable pipe supports was determined not to be safety-significant because these nonconformances would have been identified by subsequent inspection and testing even if the Overinspection Program had not been performed. Missing hardware on other items was evaluated to determine if any reduction in load-carrying capacity of the items would occur or if the function of the items would be jeopardized. As a result of its evaluation, S&L determined that none of this missing hardware would have affected the function of any item. Consequently, the missing hardware was not safety-significant.

(j) Gouges, Scratches, and Cuts

Gouges, scratches, and cuts comprise 3.0% of the total number of nonconforming attributes. R

Gouges can reduce base metal thickness. Most of the damage to items due to gouges had only minor impact on the base metal thickness. In each case, it was determined that the reduction in the base metal thickness was not sufficient to violate minimum wall thickness requirements for pipes or to result in a condition in which allowable stresses were exceeded for tubing. Consequently, these nonconformances were not safety-significant.

(k) Slag

Slag in welds comprises 2.5% of the total number of nonconforming attributes identified by the Overinspection Program. R

Slag is a nonmetallic material which results from the welding process. Slag is generally found on weld surfaces as a result of incomplete cleaning after the weld is made and, as such, does not affect the weld integrity. However, if slag is entrapped in the weld itself, the slag reduces the volume of the weld metal and consequently reduces the weld strength.

Each case of slag inclusion identified by the Overinspection Program was evaluated by assuming that the affected portion of the weld did not contribute to the strength of the weld. In each case, it was determined that the affected connection had sufficient load-carrying capacity to satisfy design loads. Consequently, none of these nonconformances was safety-significant.

(l) Lack of Fusion

Lack of fusion in welds comprises 2.4% of the total number of nonconforming attributes identified by the Overinspection Program. R

Lack of fusion generally describes a condition in which the welding material is not completely fused to the base metal. For welds with no load-carrying function, reduction in weld strength caused by lack of fusion was not safety-significant. For other welds, incomplete fusion was evaluated by assuming that the defective portion of the weld provided no load-carrying capability for the weld in question. Furthermore, lack of fusion was evaluated to

determine whether it could have caused crack propagation. If it was determined that cracks would propagate such that the entire weld would be lost, the weld was assumed to have zero strength in evaluating the capacity of the connection.

In each case involving incomplete fusion, either the unaffected portion of the nonconforming weld and/or the other welds in the connection were determined to possess adequate strength to satisfy design loads. Therefore, these nonconformances were not safety-significant.

(m) Wrong Hardware R

Nonconformances involving wrong hardware comprise 2.3% of the total number of nonconforming attributes identified by the Overinspection Program.

Nonconformances pertaining to wrong hardware involve the substitution of a hardware item different from that specified on the design drawings. Typically, wrong hardware identified by the Overinspection Program resulted from incorrect size components being installed, usually bolts, washers, nuts, or lugs. Wrong hardware identified by the Overinspection Program was evaluated to determine if any reduction in load-carrying capacity would result. In many cases, components were substituted which actually increased the strength of the item. All items evaluated were found to provide the required load-carrying capacity, and, consequently, none of the wrong hardware was found to be safety-significant.

(n) Orientation/Configuration

Nonconformances involving orientation and configuration of hardware resulting from the installation process comprise 2.1% of the total number of nonconforming attributes identified by the Overinspection Program. R

Orientation and configuration are reported as nonconforming when the as-installed condition does not agree with the design drawing. In each of these cases, S&L evaluated the as-installed condition to determine the impact on design loadings and clearance requirements. Further evaluations were performed as necessary to ensure that adequate design margins existed for various operating conditions such as thermal and seismic loading. None of the nonconformances identified resulted in an inability of the item to satisfy the calculated loads or clearance requirements. Consequently, none of these nonconformances was safety-significant. R

(o) <u>Other Nonconforming Attributes</u> R

The remaining types of nonconforming attributes cumulatively account for approximately 10% of the total number of nonconformances identified by the Overinspection Program. Each individually accounts for less than 1.5% of the total nonconformances identified by the Overinspection Program. These nonconformances range from minor defects which did not impact the integrity of items, such as dirt and debris, to more significant cases, such as cracks in welds. R R

In particular, cracks were evaluated to determine if localized stresses would cause cracks to propagate. If the cracks could propagate, the strength of the connection or supporting member was evaluated by accounting for any reduction in capacity resulting from the crack. In all cases, the connections were determined to have sufficient capacity to satisfy design loads. Consequently, none of these nonconformances was determined to be safety-significant.

3) Conclusion

Of the more than 2 million inspections conducted under the Overinspection Program, none revealed any safety-significant nonconformances. Therefore, the Overinspection Program has verified that the type of nonconformances being identified by the program would not result in the loss of capability of a structure system, or component to perform its intended safety function if left uncorrected by the Overinspection Program. R

3. Quantitative Evaluation

a. Introduction

The engineering evaluation of the nonconformances discussed in the preceding section is the primary factor relied upon by IP to verify the quality of construction of CPS because the engineering evaluation verifies that the type of nonconformances being identified by the Overinspection Program would not result in the loss of capability of a structure, system, or component at CPS to perform its intended safety function if left uncorrected by the Overinspection Program. To provide a secondary confirmation of quality, IP also has performed a quantitative analysis of the results of the Overinspection Program to verify that the QA program has been effective in providing reasonable assurance that construction complies with applicable design drawings and specifications. R

For both overinspections and field verification inspections, several types of information were compiled in order to perform a quantitative evaluation of the nonconformances identified by the Overinspection Program. First, the number of inspected and nonconforming attributes was calculated for the plant as a whole, for each construction discipline, and for each type of commodity. Based on this information, various rates of conformance (expressed in percent attributes conforming with design drawings and specifications per inspected attribute) were calculated. These conformance rates were then evaluated to verify that the QA Program for CPS has been effective in

providing reasonable assurance that structures, systems, and components at CPS comply with applicable design drawings and specifications.

In evaluating the conformance rates identified by the Overinspection Program, IP has used a conformance rate of 95% as a threshold indicator that the QA program for CPS has been effective in providing reasonable assurance that construction complies with applicable design drawings and specifications. This rate reflects the fact that a 100% conformance rate is unobtainable and unnecessary in practice and that a conformance rate of 95% is a reasonable indicator of quality. For those disciplines or items with conformance rates of less than 95%, IP has taken various factors, discussed below, into account, including the significance of the nonconformances being identified, to determine whether additional action may be warranted to assure the quality of construction of these disciplines or items.

The discussion presented below is based primarily on the conformance rates for field verification inspection because these rates are the lowest (and thus the most conservative) rates identified by the Overinspection Program.

b. Overall Conformance Rates

As of December 31, 1984, 1,672,414 attributes had been inspected and 39,712 nonconforming attributes had been identified by field verification inspections, for an overall field verification conformance rate of 97.6%. Additionally, 730,057 attributes had been inspected and 9,033 nonconformances had been identified by overinspection, for an overall overinspection conformance rate of 98.8%. R R R

These high overall conformance rates verify that the QA Program has been effective in providing reasonable assurance that structures, systems, and components at CPS comply with applicable design drawings and specifications.

c. Discipline Conformance Rates

Table V-3 presents the conformance rates found by field verification inspections, departure inspections, and overinspections performed in series with field verification inspections for the three major disciplines (structural, electrical and instrumentation, and piping and mechanical).

Table V-3 shows that the conformance rate for structural attributes is 93.8% for field verification inspections, which is the lowest rate for any of the construction disciplines. However, IP had previously decided to perform overinspections on 100% of the accessible primary structural members in the plant (i.e., those members which must perform their intended design functions during normal operations and safe shutdown, including those members which support safety-related components). Consequently, these inspections will assure that nonconformances in structural steel will be identified for corrective action. R

The conformance rates in the other disciplines are more than 97% for field verification inspections. Consequently, these rates verify that the QA Program has been effective in providing reasonable assurance that construction in these disciplines complies with applicable design drawings and specifications. R

Other data on Table V-3 should be noted. First, the conformance rates for departure inspections are lower than the conformance rates for overinspections performed in series with field verification inspections. This is expected because the departure inspections were initial reinspections, whereas the series overinspections have been performed for work on which nonconformances have already been identified for corrective action by the field verification group.

Table V-3 also shows that the conformance rate for overinspections performed in series is extremely high (99.1%) and is significantly higher than the conformance rate for field verification inspections. Since overinspections performed in series have, in practice, been redundant R

of those conducted by the Field Verification Group, this high rate indicates that field verification inspections have been effective in identifying nonconformances.

R

d. Commodity Conformance Rates

Table V-4 presents the conformance rates found during overinspections and field verification inspections for each type of commodity. As is evident from this table, with three exceptions, the field verification conformance rates for each commodity are greater than 95%. Therefore, these rates indicate that the QA Program has been effective in providing reasonable assurance that construction of these commodities complies with applicable design drawings and specifications. R

For the three types of commodities with field verification conformance rates less than 95%, IP is taking appropriate action to assure that the commodities will be of acceptable quality after completion of construction. Specifically: R

1) Structural Steel

The field verification conformance rate for structural steel is 93.8%. As mentioned above, IP has decided to perform overinspections for 100% of the accessible primary structural members, thereby assuring that the quality of the structural steel is acceptable. R

R

2) Electrical Equipment

The field verification conformance rate for electrical equipment is 93.1%. IP is continuing to perform the Overinspection Program for electrical equipment and will perform additional evaluations as more data specifically applicable to electrical equipment become available. R

3) Mechanical Equipment

Given the 93.8% field verification conformance rate for and the relatively few inspections conducted on mechanical equipment, IP R

believes it is appropriate to continue performing the Overinspection Program for mechanical equipment.

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4. Evaluation of Old and New Work

To evaluate the effectiveness of corrective actions which IP implemented after the identification of deficiencies in 1982, the work which has been inspected under the Overinspection Program has been divided into old and new work.

For purposes of this report, July 26, 1982, was selected as the date for dividing construction between old and new work (this date is after the issuance of the major stop work actions in 1982 and before the lifting of them). More specifically, construction work is classified as old or new based on the following criteria. All structural work within the scope of the Overinspection Program has been classified as old work for purposes of the Overinspection Program because it was completed prior to July 26, 1982. All HVAC work has been classified as new work because it was turned back to the contractor for rework and inspection after July 26, 1982. Finally, electrical cable and instrument panels for which construction was completed by July 26, 1982, have been classified as old work; electrical and mechanical hangers and raceways inspected by QC personnel by July 26, 1982, have been classified as old work; all other construction work for which documentation was completed by July 26, 1982, has been classified as old work; and all remaining work has been classified as new work. The results of evaluations based on these classifications are conservative because much construction work that was completed but not inspected or documented by July 26, 1982, has been classified as new work. Since the conformance rate for old work is lower than the conformance rate for new work, this has resulted in a lower conformance rate for new work than would have existed if the old work/new work classification had been based solely on the completion date of the installation work.

Table V-5 presents the conformance rates for old and new work for each of the construction disciplines. As can be seen from the field verification inspections, the conformance rate for new work is 98.9%, which is signi- |R |R

ficantly higher than the conformance rates for old work. This indicates improvement in the quality of new work and reflects favorably on the effectiveness of the corrective actions that have been implemented since 1982. Furthermore, the high conformance rate for new work verifies the quality of that work.

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5. Items Not Inspected Under the Overinspection Program

As discussed above, the scope of the Overinspection Program did not include all types of safety-related items. Additionally, all items within the scope of the Overinspection Program have not been inspected. Nevertheless, the Overinspection Program provides a basis from which conclusions can be drawn regarding the quality of construction for the categories of items that have not been inspected under the Overinspection Program. Each of these categories is briefly discussed below.

a. Items Within the Scope of the Overinspection Program

As was demonstrated in subsection V.C.1, given the large number of inspections that have been performed for each construction discipline and for each commodity, any significant adverse condition which is applicable to a class of items would have been identified by the Overinspection Program. Consequently, the results of the Overinspection Program as of December 31, 1984, are generally applicable to the uninspected items within the scope of the program. |R

b. Items Not Within the Scope of the Overinspection Program

The only safety-related discipline not encompassed within the scope of the Overinspection Program is civil, which consists of such items as rebar, concrete, masonry walls, and soil compaction. Although both the NRC and IP have identified some deficiencies in civil work during construction of CPS, these deficiencies have been relatively minor in both number and severity and have been typical of the types of deficiencies expected during construction of any nuclear power plant. As a result, IP concludes that the QA Program for CPS has been effective for civil work, that the quality of civil work is acceptable, and that a reinspection program for civil work is unnecessary.

Also, to the extent that the Overinspection Program has shown that the overall quality of construction of CPS is acceptable, that conclusion is applicable to civil work since BA performed both the civil work and most of the remaining construction work at CPS. Consequently, the results of the Overinspection Program reinforce IP's position that no reinspection program is necessary for civil work.

c. Non-Recreatable Attributes

During construction of a nuclear power plant, inspections of attributes are performed for many in-process activities. Often, after the process is complete, it is no longer possible to inspect the same attribute because the attribute is non-recreatable. Examples of such attributes are welding preheat and cable pull tension. Consequently, it was impossible for the Overinspection Program to inspect these types of non-recreatable attributes. Nevertheless, there is no reason to believe that the quality of non-recreatable attributes would have been significantly different than the quality of the attributes which were actually inspected by the Overinspection Program.

d. Inaccessible Items

There are individual items within the scope of the Overinspection Program which are not available for inspection because the items have been rendered inaccessible by subsequent construction. An example of such an item is a piece of pipe or conduit that has been embedded in a wall. However, there is no single type of commodity within the scope of the Overinspection Program that is generically inaccessible, i.e., which is always inaccessible to inspection. Since there is no reason to believe that the quality of inaccessible items is significantly different from the quality of accessible items, the results of the Overinspection Program apply equally to inaccessible items and to other items which were not inspected.

e. Vendor-Supplied Items

The purpose of the Overinspection Program is to verify the quality of construction and installation activities at CPS. Consequently, the

Overinspection Program has included inspection of installation of pumps, valves, and other components fabricated offsite by vendors, but has not included inspection of the internals of these types of items. Fabrication of these components is subject to the vendors' QA programs, with appropriate receipt inspections, surveillances, and audits under the QA Program for CPS. The vendors' QA programs provide adequate confidence that vendor-supplied items will perform their safety-related functions during operation.

D. CONCLUSION

The more than 2 million inspections conducted under the Overinspection Program as of December 31, 1984, verify that the overall quality of construction is acceptable. R

None of the nonconformances identified by the Overinspection Program would have adversely affected the capability of structures, systems, and components at CPS to perform their intended safety functions, thereby demonstrating that construction of CPS is of acceptable quality.

Additionally, the overall conformance for field verification inspections is 97.6% and the overinspection conformance rate is even higher at 98.8%. These rates indicate that the QA Program for CPS has been effective in providing reasonable assurance that structures, systems, and components comply with applicable design drawings and specifications. R

The data from the Overinspection Program also demonstrate other positive trends. For example, the overall conformance rate for new work is higher than that for old work, which indicates that corrective actions and improvements implemented by IP after the identification of deficiencies in 1982 have been effective. Additionally, the conformance rate for overinspections performed in series is very high and significantly higher than the conformance rates for field verification inspections, thereby indicating that BA Quality and Technical Services has been effective in identifying nonconformances in the lots subject to field verification inspections.

Table V-1
Number of Attributes Inspected by
BA and IP Under the Overinspection Program as of December 31, 1984

Number of attributes inspected by BA's field verification	1,672,414
Number of attributes inspected by IP overinspection	730,057
Total	**2,402,471**

R

Table V-2
Nonconformances Within Nonconformance Types

Type	Attribute	Number of Nonconforming Attributes	Percent of Total Nonconformances
Welding	Weld size	8,081	16.6
	Undercut	6,791	13.9
	Overlap	2,379	4.9
	Convexity	60	0.1
	Concavity	105	0.2
	Lack of fusion	1,184	2.4
	Porosity	193	0.4
	Slag	1,225	2.5
	Crack	188	0.4
	Reinforcement	145	0.3
	Transition	4	0.0
	Subtotal	**20,355**	**41.8**
Installation	Wrong hardware	1,142	2.3
	Missing hardware	1,502	3.1
	Loose hardware	2,493	5.1
	Incomplete	253	0.5
	Cold set	39	0.1
	Orientation/configuration	1,019	2.1
	Tolerance	3,630	7.4
	Clearance/interference	310	0.6
	Slope	50	0.1
	Routing	22	0.0
	Bending radius	74	0.2
	Wrong weld	1,859	3.8
	Gaps	559	1.1
	Thread engagement	108	0.2
	Termination error	107	0.2
	Subtotal	**13,167**	**27.0**

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Table V-2
Nonconformances Within Nonconformance Types

Type	Attribute	Number of Nonconforming Attributes	Percent of Total Nonconformances
Damage	Arc strike	7,206	14.8
	Grinding	534	1.1
	Dent/bent/warped	576	1.2
	Gouge/scratch/cuts	1,464	3.0
	Bolt/nut broken	47	0.1
	Coating missing	150	0.3
	Defective material	190	0.4
	Dirt/debris	84	0.2
	Protection	16	0.0
	Rust	41	0.1
	Holes	263	0.5
	Gaps	85	0.2
Subtotal		10,656	21.9
Documentation	ID missing/incorrect	3,887	8.0
	Drawing incorrect	403	0.8
	Traceability	123	0.3
	Inspection error	154	0.3
Subtotal		4,567	9.4
	Total	48,745	100.0

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Table V-3
Conformance Rates by Construction Discipline

Type of Inspection	Discipline	Attributes Inspected	Number of Nonconforming Attributes	Conformance Rate(%)
Field verification (FV)	Structural	273,609	16,956	93.8
	Electrical/instrumentation	690,387	12,917	98.1
	Piping/mechanical	708,418	9,839	98.6
Total		**1,672,414**	**39,712**	**97.6**
Overinspection departure inspection (prior to FV)	Structural	86,317	3,014	96.5
	Electrical/instrumentation	52,166	839	98.4
	Piping/mechanical	31,380	342	98.9
Total		**169,863**	**4,195**	**97.5**
Overinspection Series Inspections (post FV)	Structural	279,768	4,097	98.5
	Electrical/instrumentation	146,838	314	99.8
	Piping/mechanical	133,588	427	99.7
Total		**560,194**	**4,838**	**99.1**

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Table V-4
Nonconformance Rates by Type of Commodity

Commodities	Field Verification			Overinspection		
	Attributes Inspected	Nonconforming Attributes	Conformance Rate (%)	Attributes Inspected	Nonconforming Attributes	Conformance Rate (%)
Beams and structural steel	273,609	16,956	93.8	366,085	7,111	98.1
Cable	21,861	501	97.7	8,031	32	99.6
Cable termination	117,036	453	99.6	48,277	31	99.9
Conduit	22,717	59	99.7	1,056	0	100.0
Cable trays	87,092	111	99.9	0	2[4]	-
Electrical equipment[1]	14,899	1,025	93.1	9,053	372	95.9
Electrical hangers	403,546	10,675	97.4	107,460	712	99.3
Instrumentation	6,465	2	>99.9	613	0	100.0
Instrument pipe	16,771	91	99.5	24,514	4	>99.9
Large bore pipe	32,673	675	97.9	16,317	40	99.8
Small bore pipe	49,140	440	99.1	22,223	30	99.9
Mechanical equipment[2]	3,491	217	93.8	416	14	96.6
Mechanical supports[3]	326,096	5,623	98.3	102,344	676	99.3
HVAC duct	218,889	1,952	99.1	11,402	4	>99.9
HVAC hangers	78,129	932	98.8	12,266	5	>99.9
Total	**1,672,414**	**39,712**	**97.6**	**730,057**	**9,033**	**98.8**

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[1] Includes electrical boxes, electrical panels, and switchgear.
[2] Includes compressors, pumps, valves, and miscellaneous equipment.
[3] Includes anchor plates, expansion anchors, and hangers.
[4] Identified during cable inspection; therefore no inspection attributes are credited.

Table V-5
Conformance Rates for Old Work and New Work

Field Verification Inspections

Discipline	Work	Number of Attributes Inspected	Number of Nonconforming Attributes	Conformance Rate (%)	
Structural	Old	273,609	16,956	93.8	R
	New	N/A	N/A	N/A	
Electrical/ instrumentation	Old	228,159	9,327	95.9	R
	New	462,228	3,590	99.2	
Piping/ mechanical	Old	77,080	1,412	98.2	
	New	631,338	8,427	98.7	
Totals	**Old**	**578,848**	**27,695**	**95.2**	
	New	**1,093,566**	**12,017**	**98.9**	

Overinspections

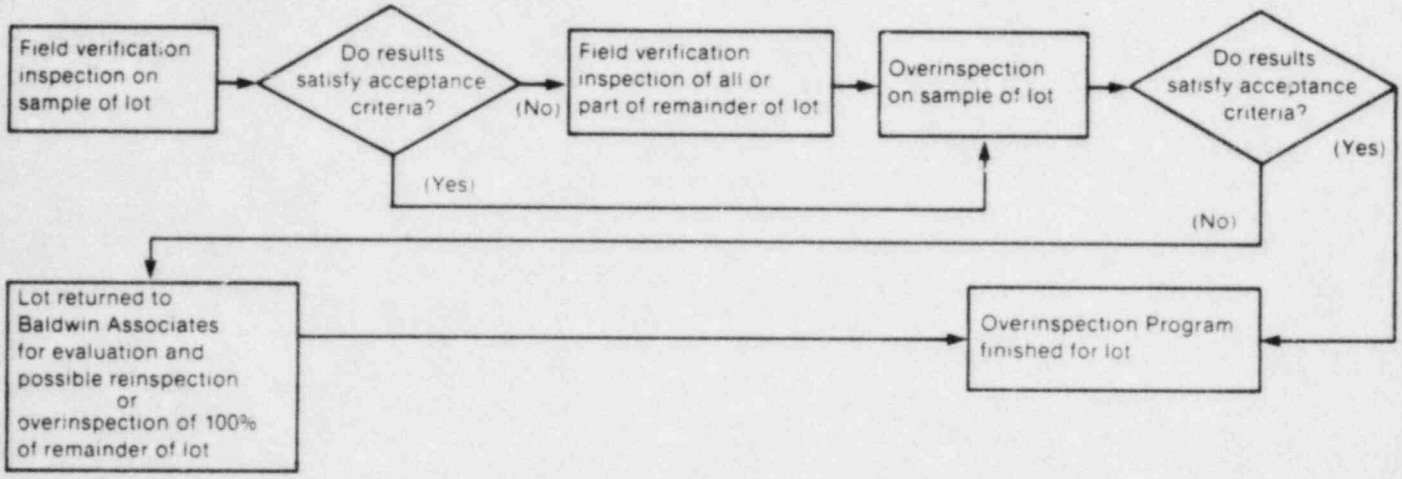
Discipline	Work	Number of Attributes Inspected	Number of Nonconforming Attributes	Conformance Rate (%)	
Structural	Old	366,085	7,111	98.1	R
	New	N/A	N/A	N/A	
Electrical/ instrumentation	Old	99,631	759	99.2	R
	New	99,373	394	99.4	
Piping/ mechanical	Old	54,873	313	99.4	
	New	110,095	456	99.6	
Totals	**Old**	**520,589**	**8,183**	**98.4**	
	New	**209,468**	**850**	**99.6**	

N/A = Not applicable. All structural is old work.

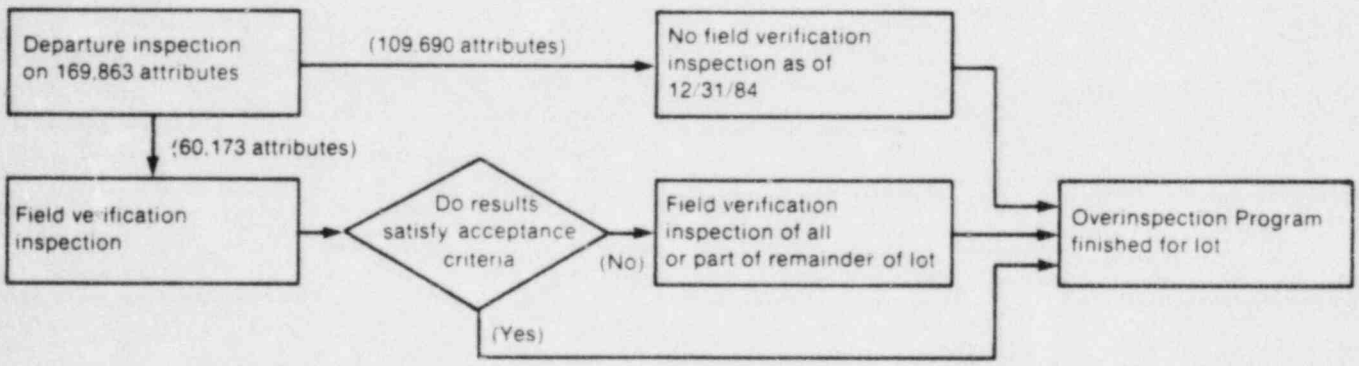
Flow Diagram of the Types of Inspections Performed Under the Overinspection Program

Figure V-1

I. Lots Subject to Field Verification Inspection and Overinspection



II. Lots Subject to Overinspection Departure Inspections (status as of December 31, 1984)



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VI. RECORD VERIFICATION PROGRAM

IP developed the Record Verification Program in response to the June 1982 stop work actions (SWA) to verify the acceptability of CPS construction QA records. The program serves both to verify the adequacy of construction QA records generated before the issuance of the SWAs and to provide additional assurance as to the adequacy of such records generated after the SWAs. The reviews conducted under the Record Verification Program are performed in addition to those normally performed as part of the QA Program for CPS. They are a supplement to the CPS QA Program and not a substitute for it.

The following discussion presents a summary description of the major elements of the program and an evaluation of the results of the program. This evaluation of results shows that:

- None of the hardware-related nonconformances identified as a result of the records verification review are safety-significant.

- The rates of record deficiencies identified in the program are low, no adverse trends are evident that warrant further action, and none of the record deficiencies identified in the record verification review have adverse implications for hardware quality.

- The program provides adequate confidence in the acceptability of CPS construction records.

A. MAJOR PROGRAM ELEMENTS

The Record Verification Program plan was originally described in detail in IP's November 15, 1982, letter to the NRC. The NRC's December 3, 1982, letter concurred with the intent of the program plan. On January 20, 1983, IP submitted revisions to the program plan in response to NRC comments. On September 26, 1984, IP refined and clarified the program plan as it has developed and evolved during the course of its implementation.

IP QA is responsible for managing the Record Verification Program. The reviews conducted under the program apply to quality records for all completed BA construction work packages for safety-related, augmented class D (radioactive waste), and fire protection structures, systems, and components, and BA safety-related purchase order packages. These reviews are conducted on two levels: BA's Document Review Group (DRG) reviews all records within the scope of the program for acceptability and IP's QA Records Review Group (RRG) reviews a random sample of approximately 20% of the records reviewed by the BA DRG.

As stated above, the reviews are conducted for completed work packages (travelers) and purchase orders drawn from the BA records vault. A document exception list (DEL) is prepared and maintained for each work package or purchase order selected for review. The DEL records the results of the review, including any record deficiencies (referred to as "DEL items") identified during the review.

The reviews and any associated field validations are performed by trained and certified QA personnel using approved checklists that specify the applicable review acceptance criteria. The acceptance criteria include legibility, completeness, traceability, and identification of the item involved, as well as compliance with applicable codes, standards, specifications, and procedures. At completion of CPS construction, there will have been more than 140,000 work packages generated, which include some 18 million reviewable record verification attributes.

Record deficiencies identified in a work package are documented on the DEL and routed to the DEL Resolution Group for resolution or initiation of a nonconformance report (NCR) for potential hardware-related conditions. After resolution, records are reprocessed through the BA DRG for final acceptance review. All documentation packages accepted by the DRG are then transmitted to the IP RRG for selection of the review sample.

The IP RRG sample review of approximately 20% of completed packages transmitted by the BA DRG uses the same criteria and checklists used by the BA DRG. Record deficiencies identified in the IP RRG review are recorded on a

record deficiency report (RDR), which is forwarded to the BA DRG for resolution. After evaluation, BA DRG may prepare DEL items or NCRs, as appropriate, and process all deficiencies for resolution. Following resolution, the completed record packages are routed back to the IP RRG for final review and acceptance.

The record review process is monitored by computer-assisted systems that enable BA and IP management to track the status of documents and deficiencies and analyze trends resulting from the records review. In addition, record verification activities are subject to audits and surveillances by the BA and IP QA organizations. Pertinent data developed from the Records Verification Program are presented in Appendix E.

B. EVALUATION OF RESULTS

The following evaluation of the results of the CPS Record Verification Program consists of three elements: (1) the safety significance, if any, of potential hardware-related nonconformances resulting from record reviews; (2) the implications for hardware quality, if any, of record deficiencies identified in record verification reviews; and (3) the basis for confidence in the acceptability of CPS construction QA records. For purposes of this evaluation, records verification data were accumulated through March 3, 1985, and resolutions of NCRs and record deficiencies were accumulated through March 17, 1985. R

1. Potential Hardware-Related Nonconformances

As indicated in the foregoing discussion, potential hardware-related nonconformances identified during the course of record verification reviews are documented on NCRs. As of March 17, 1985, 890 NCRs had been initiated as a result of record verification reviews. The 890 NCRs can be categorized as follows: R

NCR Category	Number of NCRs
Open: pending disposition or closure.	19
Invalid: NCRs that have been determined not to document valid nonconformances.	31
Superseded: closed and covered by a new NCR.	39
Material rejected: material rejected in stores before installation. Not used; therefore, no safety significance.	2
Transferred to IP Operations for evaluation as a nonconforming material report (NCMR) (for systems already turned over to IP Operations).	33
Not hardware-related or "use as is" evaluation by S&L: Disposition is used when a nonconformance does not affect permanent plant hardware or S&L has evaluated the item for all engineering functional requirements, including performance, maintainability, fit, and safety. None of these items has safety significance in the operation of CPS.	166
Not hardware-related or "use as is" evaluation by IP or BA: No violation of design or plant hardware existed. A "use as is" disposition may be used when it can be established that the discrepancy will result in no adverse condition and that the item under consideration will continue to meet engineering functional requirements, including performance, maintainability, fit, and safety. Therefore, these items are not safety-significant.	419
Dispositioned by rework based on an evaluation by S&L.	27
Dispositioned by rework based on evaluation by IP/BA.	154
Total	**890**

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Excluding the 19 NCRs that are now pending disposition[1], there are also 72 NCRs that are invalid, superseded, or involve material rejects prior to installation. These NCRs, therefore, do not present a potential for affecting hardware quality or plant safety. Five hundred eighty-five of the NCRs were subjected to the existing CPS process for evaluation and disposition of NCRs and were determined to be unrelated to hardware quality or technically acceptable for use as is (i.e., without any rework).[2] The remaining 214[3] NCRs were subjected to engineering evaluations by S&L to determine whether any condition significant to plant safety would have existed if the nonconforming conditions had remained undetected by the Record Verification Program.

S&L evaluated each NCR to determine the hardware impact if the nonconforming condition had gone undetected by the Record Verification Program. For NCRs that impacted hardware quality, S&L determined whether the nonconformance was safety-significant. A safety-significant nonconformance is defined for the purposes of this evaluation as one which, had it remained unidentified by the Record Verification Program, could have resulted in the loss of capability of a structure, system, or component to perform its intended safety function.

For purposes of describing the S&L evaluation results, the nonconformances can be divided into eight categories. Each category is discussed below, together with an explanation of why the nonconformances were not safety-significant. Nonconformances in the first five categories had no impact on

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[1] The 19 open NCRs have not been dispositioned due to insufficient time available for closure prior to issuing this report. There is no reason to believe that any are unique or have any greater potential for safety significance than the 871 NCRs already dispositioned.

[2] Additional description and discussion of the disposition of these 585 NCRs is contained in Appendix E, Part B.

[3] Three evaluations were not complete as of April 2, 1985.

hardware quality. Nonconformances in the last three categories were such that their presence would not result in the failure of any structure, system, or component to meet the plant design basis.

a. Documentation and Procedural Nonconformances

Documentation and procedural nonconformances, with 89 occurrences, were by far the most prevalent type of nonconformance evaluated by S&L. These nonconformances typically dealt with improperly or incompletely documented items in the construction traveler packages, receipt inspection reports, certified material test reports, or other construction documents. In all cases, the acceptability of the material or construction was subsequently confirmed and only the documents themselves had to be corrected. The procedural nonconformances reported instances in which project procedures were not correctly followed. None of these nonconformances were determined to affect hardware quality. |R

b. Material Supplier Qualification

In 11 cases, the material supplied could not be confirmed initially as being supplied in accordance with an ASME Section III acceptable material control program. These items were either downgraded or replaced. In each case, a review of the item's certified material test report demonstrated that the material originally supplied was the same as the material specified, and the hardware was determined to be acceptable. |R

c. Welding Preheat Temperature

Incorrect welding preheat temperatures were identified in 18 cases. The purpose of performing welding at specified preheat temperatures is to reduce the effect of the localized rapid heating and cooling caused by welding on thick material sections. In the worst case, incorrect preheating might result in the weld cracking as it cools. However, acceptability of each weld was verified by nondestructive examinations

performed after the weld had been completed and cooled. These examinations determined that the welds had not cracked due to improper preheat.

d. Inspection Not Performed

In 22 cases, either an inspection was not performed or it was performed but not documented properly. In 20 cases, a subsequent inspection was performed to confirm the acceptability of the original material or construction. In one case, installed tack welds in an electrical pull box were inacessible and could not be inspected. In the other case, a weld had been reworked so that a subsequent inspection could not be performed. However, the originally installed conditions were determined to be acceptable based on an evaluation of the design loads applied to the connections. R R R R

e. Items Identifiable Through Subsequent Inspection and Testing

Nineteen nonconformances were reported that would have been detected and corrected during subsequent plant construction and testing. These nonconformances involved items such as flow direction indicators on valves not being visible, shop hydrostatic testing being waived in lieu of field system hydrostatic testing, meggering electrical cables and equipment, and one case of a valve motor operator qualification that would have been inspected and detected during another program. These nonconformances would have been detected and corrected in the normal course of other programs. R

f. Component Substitution

Fifteen occurrences of component substitution were reported. These cases dealt with substitution of a heavier schedule pipe spool, substitution of bolting material, substitution of different size bolts, substitution of weld rod, or substitution of plate material thicker than that specified. In each case, it was determined that the substituted component was capable of performing its intended function. R R

g. Material Traceability

Thirty-six occurrences of failure to maintain material traceability were evaluated. These cases typically dealt with bolting or structural materials that, upon examination, no longer had the proper identification marks. Each such occurrence was examined assuming installation of the lowest grade material available at the site for bolting material and the lowest grade available commercially for structural material. In each case, there was sufficient margin in the design to allow for the lower grade material substitution. Thus, even though material traceability could not be established, structural integrity was demonstrated to be within the design criteria. R

h. Bolt Torque

One case of an inadequately torqued conduit support anchor was evaluated. The reduced torque value was determined to be acceptable based on the capability of the bolt in its original condition to transfer the applied loads within the design basis.

In summary, the S&L engineering evaluations of the nonconforming conditions identified by the Record Verification Program showed that, even if the nonconforming conditions had remained unidentified by the record verification review, no loss of capability of any structure, system, or component to perform its intended safety function would have resulted. That is, none of the nonconforming conditions were safety-significant.

2. Evaluation of Record Deficiencies

The record deficiencies identified in the Record Verification Program as of March 3, 1985, were evaluated to determine: (1) whether there were any outstanding trends in record deficiency rates that would warrant additional action and (2) whether any adverse hardware implications are evident from the resolutions of record deficiencies completed by March 17, 1985. Each of these evaluations is discussed below. R R

a. Deficiency Rates

As of March 3, 1985, a total of 58,556 work packages or purchase orders have been placed in the Record Verification Program review process. Upon completion of CPS construction, approximately 140,000 record packages will have been generated. Of the 58,556 packages in review to date, 38,255 are for new work and 20,301 are for old work. R R

The 58,556 packages include 7,602,553 individual attributes that were reviewed by BA for compliance with the applicable acceptance criteria. Within these attributes, 147,018 DEL items or record deficiencies have been identified. Over 4,305,000 attributes are associated with new work and nearly 3,298,000 are associated with old work. Approximately 60,600 DEL items were identified for new work and approximately 86,000 were identified for old work. R R

The rates of record deficiencies for the total program (1.9%), new work (1.4%), and old work (2.6%) are low. The significantly lower rate for new work relative to old work indicates IP's effective implementation of programmatic improvements and corrective actions in regard to quality records. R

The IP RRG conducted a sample review of the record packages previously accepted by the BA DRG. The IP RRG review encompassed over 1,261,000 attributes, within which 1,358 record deficiencies were identified. The IP RRG deficiency rate of 0.11% can be contrasted with the BA DRG overall program deficiency rate of 2.6%, indicating that the BA DRG reviews have been effective in identifying record deficiencies. The overall trends for the Record Verification Program results are favorable and indicative of an effectively functioning program. R

Appendix E, Part A presents tabulations of the data for NCRs generated from the Record Verification Program as of March 17, 1985, and record deficiencies as of March 3, 1985, to show the distribution of NCRs and record deficiencies by old and new work, by discipline, by work item type, and by checklist attribute group. These data were evaluated to determine whether there were any adverse trends that might warrant further action. The results are discussed below. R

Table E-1 correlates NCRs by work item for both old and new work. All nonconformance rates are low, new work rates are lower than old work rates, and no outstanding adverse trends warranting further action are evident.

Tables E-2 and E-3 correlate DEL items by discipline for both old and new work and for DRG and RRG reviews, respectively. Deficiency rates are generally low and new work rates are essentially all below old work rates. No outstanding trends warranting further action are evident from RRG reviews. In the DRG reviews, one discipline (old work procurement) shows a deficiency rate warranting further examination. This is discussed in Appendix E in connection with the evaluation of Table E-4. R

Table E-4 correlates DEL items identified in DRG reviews by item of work for both old and new work. While deficiency rates were generally low and new work rates were lower than old work rates, the rates for four items warranted further examination. As explained in Appendix E, no further action beyond continuation of the DRG reviews was warranted for any of the four cases. R R

Tables E-6 and E-7 correlate record deficiencies by checklist attribute for each work item type for both old and new work and for DRG and RRG reviews, respectively. The rates are low, new work rates are

generally less than old work, and no adverse trends warranting further action are evident.

Appendix F presents an analysis of the Record Verification Program data base to show that, with the exceptions noted in Appendix E, Part A, the population of records reviewed to date is sufficient to enable reasonable inferences to be drawn for the program as a whole. |R

In summary, the evaluation of deficiencies for the Record Verification Program shows low deficiency rates for the overall program, lower rates for new work relative to old work, and effective identification of record deficiencies by the BA DRG. Further examination of record deficiencies in terms of their distribution by discipline, by work item type, and by checklist attribute indicate no outstanding trends that warrant further actions. The evaluation indicates that the Record Verification Program has been effectively implemented, and has been effective in confirming the acceptability of CPS QA records.

b. Record Deficiency Resolutions

The resolutions of record deficiencies identified in the Record Verification Program as of March 17, 1985, were evaluated to determine whether any of those deficiencies had adverse implications for hardware quality. In general, record deficiencies are related solely to documentation and do not involve nonconformances in the hardware itself. Of course, each record deficiency is ultimately resolved and any potential hardware deficiencies are documented as NCRs and resolved. Nevertheless, this evaluation examines the two major classes of record deficiency resolutions employed in the CPS Program - generic resolutions and specific resolutions - to confirm that this has remained the case. |R

1) Generic Resolutions

Of the 147,018 record deficiencies evaluated herein, 58,102 were resolved by generic resolutions (GR). A GR is a preapproved resolution that can be directly applied by a document reviewer for closing a particular type of recurring record deficiency. Appendix G describes each individual GR, its current status, and function in narrative format. For each GR, the underlying problem and its resolution are described, along with the reasons and justification for the resolution action. These reasons and justification show that all record deficiencies resolved by GRs have no adverse implications for hardware quality. |R

2) Specific Resolutions

After resolution of more than 58,000 record deficiencies by GRs, the remaining deficiencies were resolved by specific resolutions. These case-by-case resolutions resort to additional sources of information available to substantiate quality and resolve the record deficiency. The specific resolution process consists of four basic approaches which can be used sequentially as necessary to resolve any particular deficiency. Each of these four basic approaches are described and illustrated in the following discussion: |R

- Resolution of the DEL item by the BA DRG reviewer by obtaining the necessary information from other documents in the traveler package being reviewed or from supplemental records. Examples of other documents that can be used include:

  - welder qualification log
  - Q&TS certification matrix
  - heat log

- computer printout of the history of instructions and procedures
- material requisitions
- receiving inspection reports

- Resolution of the DEL item by BA DEL resolution personnel by obtaining the necessary information from other documents in the traveler package or from supplemental records.

  The DEL Resolution Group uses the same methods as the BA DRG reviewer in the approach described above. However, this group has more information and evaluations at its disposal. The BA DEL Resolution Group is comprised of Quality Engineering and Resident Engineering personnel. The BA DEL Resolution Group Quality Engineering was developed from the consolidation of Quality Control, Technical Services, and Quality Assurance Level II and III personnel who were previously assigned to DEL resolution activities. This group may review and evaluate drawings, procedures, and other revised documents against the stated deficiency to determine acceptability. This group performs further research and evaluations while the BA DRG reviewer can only evaluate from reference tables and logs contained within the BA DRG Program area.

- Resolution of the DEL item by obtaining the necessary information from reinspection of the stored or installed hardware.

  Most reinspections are conducted to provide additional verification of heat number, serial number, or some form of material or part ID. These inspections are accomplished in

accordance with applicable procedures and documented by one or more methods. If the discipline DEL resolver performs the inspection, the results are usually documented on the DEL. If another quality group does the inspection, then a separate inspection report is generated and inserted in the document record package.

- Closure of the DEL item by issuing an NCR for resolution of the deficiency.

The specific resolution approaches described above provide a controlled, systematic method for assuring that all deficiencies are properly resolved and that no questions remain as to hardware quality. The first two approaches to specific resolution were applied to resolve some 80,342 deficiencies. Hardware inspections resolved another 1,470 deficiencies, and NCRs were used to resolve 1,780 deficiencies that were identified as having potential hardware-related nonconformances. The NCRs were evaluated and none were determined to be safety-significant. R

There are 5,324 record deficiencies that are open pending resolution. The bulk of the open deficiencies have not been resolved because their resolution has not been necessary to support system turnovers. Consequently, there is nothing inherent in these open deficiencies which would suggest that their resolution would be significantly different than the deficiencies which have been resolved. The 5,324 open DEL items are reasonably distributed in time and result from the lag time between identification and resolution with no other imposed priority. In order to evaluate the potential impact on overall nonconformance rates due to lack of closure of these DEL items, the rate of NCR generation for closure of those DEL items between January 17, 1985, and March 17, 1985, was examined. R R

During this period, 24,000 DEL items were resolved, resulting in 303 NCRs. Projecting this NCR rate to cover the balance of open record deficiencies would add 67 NCRs to the total generated by the Record Verification Program to date. This would increase the overall program ratio of NCRs per inspection attribute by only 0.0009%. Moreover, the nonconforming conditions identified were similar in kind to those already observed in the evaluation of the overall population for the program. Finally, the distribution of record deficiencies by work item for old and new work was consistent with the distribution observed in the evaluation of the overall program. This confirms that the evaluation of results presented in this report is not significantly affected by the existence of pending record deficiency resolutions. Nevertheless, these deficiencies will be resolved, and the results will be evaluated and documented.

In conclusion, with the exception of the 890 NCRs, the record deficiencies identified by the Record Verification Program do not have adverse implications for hardware quality. For the 890 NCRs, it has been shown in subsection 2 above that none of the nonconforming conditions were safety-significant.

3. Basis for Confidence in Acceptability of Records

The evaluations of deficiency rates discussed above indicate that a small portion (0.6%) of the record deficiencies identified in the Record Verification Program involve potential hardware-related nonconformances and thus result in NCRs. More importantly, the evaluations of the hardware-related nonconforming conditions identified in those NCRs showed that none of the nonconforming conditions were safety-significant. This affords a high level of confidence in the ultimate quality and safety of CPS hardware.

On a secondary level of analysis, the overall deficiency rate for the Record Verification Program is low (1.9%), and the rate for new work is roughly a factor of two less than for old work. This indicates that, in general, CPS construction QA records are of acceptable quality and that IP's programmatic improvements and corrective actions in regard to QA records have been effective. The small rate of deficiencies identified by IP RRG reviews (0.11%) indicates that BA DRG reviews have been effective in identifying record deficiencies. Evaluation of NCR and record deficiency rates for both old and new work by discipline, by work item type, and by checklist attribute isolated four areas in which further examination was necessary to determine whether further action was warranted. That examination, however, indicated that no further action, beyond continuation of the program in those areas, was warranted.

The methods employed for resolution of record deficiencies have been effective in identifying potential hardware-related record deficiencies and in assuring that identified record deficiencies are properly resolved and do not have adverse implications for hardware quality.

The effective implementation of the Record Verification Program is confirmed by the results of IP and BA QA audits and surveillances, third-party audits, NRC inspections, and IP and BA corrective actions.

The Record Verification Program has been subjected to audits and surveillances by IP QA and BA QA, and audits by third parties. Since December 1982, IP QA has performed three audits and eight surveillances, and BA QA has performed four audits and nine surveillances. In 1982 and 1983, the Joint Utility Management Audit group audited the Record Verification Program. In April 1984, Lapp-Rice-Staker Management Consultants performed a management assessment for the CPS project that included an assessment of Record Verification Program activities. The major findings

and recommendations resulting from each of these activities and the corrective actions taken by IP in response are briefly summarized in Table VI-1.

Since the beginning of the program, the NRC has conducted inspections that have included Record Verification Program activities. The results of these inspections are documented in NRC IE Inspection Reports 50-461/83-08, 83-16, 84-02, 84-17, and 84-43. One item of noncompliance was identified by investigation of record verification activities. This finding represents an isolated occurrence and not a generic deficiency in the program. No corrective action is anticipated. No other items of noncompliance have been identified. There are, however, three specific items which remain open from these inspections: 84-02-02, 84-02-04, and 84-17-03. A brief description of each open item and the associated corrective actions taken by IP or the IP action plan and schedule for closure on each item is given in Table VI-2.

The results of the evaluation of the safety significance of NCRs; deficiency rates and trends; resolutions of deficiencies; and audits, surveillances, and inspections together confirm that the Record Verification Program has been effectively implemented and that the program affords high confidence in the quality of CPS QA records.

C. CONCLUSION

This evaluation of the results of the record verification program shows that:

- None of the potential hardware-related nonconformances resulting from record reviews are safety-significant. That is, if the nonconforming conditions were left unidentified by the Record Verification Program, no adverse effect on plant safety would have resulted.

- The rates of record deficiencies identified in the program are low, no adverse trends are evident that warrant further action, none of the

record deficiencies identified in record verification reviews have adverse implications for hardware quality, and none of the 890 NCRs contained safety-significant deficiencies. R

- There is adequate confidence in the acceptability of the CPS construction QA records.

Table VI-1
Record Verification Program Audit Results and Corrective Actions

Activity	Quantity	Dates Performed	Total Findings	Results	Corrective Action
IP QA and BA surveillances	17	4/25/83 5/3/83 5/6-9/83 6/8-9/83 10/27/83 11/22/83 12/2/83 12/26-30/83 1/5-10/84 3/28-29/84 3/28-4/16/84 3/31/84 4/9-10/84 5/18-21/84 5/24-6/1/84 6/5/84 7/27 and 8/21-22/84	21	No major findings requiring rereviews identified Minor findings were categorized as follows: • Administrative deficiencies • Lack of adherence to instructions or procedures • Checklist inadequacies • Inadequate implementation of generic resolution	• Training was increased • Instructions and procedures were revised and clarified • Upper management directives were issued • Checkout logs were established • Checklists were revised to provide adequate controls to ensure accountability and review of documents • Generic resolutions were revised to ensure proper implementation • Controlled manuals were reviewed and verified as complete and accurate • In several instances, no corrective action was necessary because existing administrative controls were more than adequate

Table VI-1
Record Verification Program Audit Results and Corrective Actions

Activity	Quantity	Dates Performed	Total Findings	Results	Corrective Action
IP QA and BA QA Audits	7	7/6-12/83 8/15-23/83 9/28-10/5/83 10/19-21/83 1/23-25/84 6/5-18/84 8/27-30/84	16	No major findings requiring rereviews identified Minor findings were categorized as follows: • Administrative deficiencies • Lack of training • Lack of adherence to instructions or procedures • Inadequate procedures	• Increased training in specific areas (i.e., administration and instructions and procedures) was incorporated into the training program • Instructions and procedures were revised and clarified • Entry and/or process instructions were printed on back of forms used • Department responsibilities were reassigned
LRS management assessment review	1	4/84	0	No major findings requiring rereviews identified LRS consultants recommended: • Consolidate all documentation verification and control into one organization • Interchange of personnel between TPRG and DRG to reduce inconsistent practices • Improve the QC inspection support to receiving documentation and DEL resolution • Second-shift support of Q & TS organizations to DEL resolution should be increased	The following resulted from the recommendations: • Removed duplication of functions in TPRG and DRG • Checklists used by TPRG and DRG were revised to be consistent • DEL resolution was removed from QC and placed under Quality Engineering where it will receive a higher priority and higher level of attention
JUMA third-party audit	2	9/13-17/82	0	No major findings requiring rereviews identified Recommended IP review the programs used by other utilities in the records retrieval/turnover documentation area	IP was developing a comprehensive records management plan using the services of consultants with expertise from other projects The IP plan addressed the need for the following:

Table VI-1
Record Verification Program Audit Results and Corrective Actions

Activity	Quantity	Dates Performed	Total Findings	Results	Corrective Action
					• A system for the BA QA final review of incoming safety-related, augmented class D (radioactive waste), and fire protection records • A system for transfer of records from BA and S&L • A system for handling records generated during the startup program • A system for handling records generated during operation, maintenance, and modification
		9/26-30/83		The records management and document turnover as planned appears to adequately address IP quality and hardware support requirements	N/A
EBASCO Third-Party Cost Estimate and Construction Schedule Evaluation	1	1/16/84	0	No major findings requiring rereviews identified It was recommended that BA re-evaluate staffing levels, both present and projected, and increase staff appropriately to ensure timely completion of all required QA records review	BA aggressively pursued the hiring of additional review personnel. A resolution group has been established to ensure timely resolution of deficiencies. BA added 23 personnel to DRG as of 7/30/84.
Hartford Steam Boiler Inspection and Insurance Co. ANSI N626.0 Audits	2	3/12-14/84 10/15/84	1	No significant findings concerning BA DRG were identified One finding concerning change documents (NCR) identified. During the final review of a traveler by DRG, the attached NCR was a "reference only - Not to be used for construction" copy and was not final reviewed by Q&TS.	BA DRG personnel were instructed to ensure that all change documents attached to a traveler are closed out

Table VI-1
Record Verification Program Audit Results and Corrective Actions

Activity	Quantity	Dates Performed	Total Findings	Results	Corrective Action
IP special review of BA DRG final review checklists	1	1/4 to 4/13/84	4	No major findings requiring rereviews identified With some exceptions, the applicable DRG checklists, along with the general checklist, used with the corresponding BQAI-110-series instruction by trained and qualified reviewers, are capable of, and valid for, determining and ensuring the completeness, traceability, legibility, and accountability of records in the package for which they were intended. The exceptions were documented as IP QA surveillance findings and categorized as follows: • Records not addressed by or covered in the BA DRG checklists • S&L-approved and status-stamped copies of DRG checklists were not on file in the document record center • Superseded checklists not deleted from approved instruction • Checklists or instructions were lacking specific points or documents to be checked or reviewed	• Additional record types were identified for review • Checklist revised to provide adequate controls to ensure accountability and review of documents • Instructions and procedures were revised and clarified • Training was increased

Table VI-2
NRC IE Reports Concerning Record Verification Program

NRC IE Report #	Date of Inspection	Results	Status	Comments
50/461/83-08	6/21-25/83	No items of noncompliance were identified	Closed	
50-461/83-16	9/13-16/83	No items of noncompliance were identified	Closed	IP met the requirements for overinspection and document review program as described in the CAL of September 1, 1982
05/461/84/02	9/18-20/84	No items of noncompliance were identified	Closed during routine inspection 50-461/84-15 performed on 5/24-25/84.	Open item 50-461/84-02-01 - procedures BQA 184 and BAP 2.1.1 appeared to require further clarification and revision. BAP 2.1.1 was revised 2/13/84 stipulating in Section 6.2.1 the method in which the applicable disciplines review exception list items, including the document distribution order. BQA 184 is in the process of being revised, deleting the portion of the job description for Levels II and III regarding the interpretation and evaluation of results.
			Awaiting closure of 50.55(e) report which is estimated to be answered by 4/15/85.	50-461/84-02-02 - Cable tray structural support traceability
			Closed during routine inspection 50-461/84-15 performed 5/24-25/84.	Open item 50-461/84-02-03 - The generic resolution group supervisor was previously in the process of documenting the 10 CFR Section 50.55(e) review for all Generic Resolutions. During the inspection, the inspector determined that the Generic Resolution Group supervisor has reviewed all generic resolutions for 10 CFR Section 50.55(e) applicability. This review has been documented. The inspector reviewed generic resolutions 1, 5, 10, 15, 20, 24, and 39.
			CAR 162 was generated which requires a rereview of all generic resolution corrective actions, such as training and surveillance. CAR 162 was closed on 4/1/85.	50-461/84-02-04 - DEL generic resolutions are not adequately supported by document justification.

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Table VI-2
NRC IE Reports Concerning Record Verification Program

NRC IE Report #	Date of Inspection	Results	Status	Comments
50-461/84-17	6/11-15/84	No items of noncompliance were identified	Awaiting NRC evaluation of proposed corrective action per C. Anderson letter CEA-1732384, dated 7/13/84	50-461/84-17-03 - Open item: The BA Document Review Program generates DEL items. Recently, the unresolved backlog DEL curve is increasing while the number of DEL items per document package is decreasing. The NRC inspector believes that these two conditions are contradictory.
50-461/84-43	12/3-14/84	One item of noncompliance was identified related to BA DRG	Evaluation has been completed and response is in preparation. Preliminary assessment is that finding was related to supplementary data and not part of required documentation to be reviewed as per the approved checklist.	BA has accepted documents for 3/4" ASME valves. Five certifications of compliance/conformance, which contained no dates, were provided as back-up to ASME NPV-1 data report. BA DRG failed to identify the missing information.

Table VII-2
Current Status of IP Programs for Reporting Concerns

System	System Initiation Date	Quality Concerns	Non-Quality Concerns	Total Concerns	Investigations Completed	Quality Concerns Substantiated	Non-Quality Concerns Substantiated
Quality report	2/82	75	49	124	122	17 of 75	14 of 47
IP QA hotline	11/83	12	9	21	17	2 of 8	4 of 9
SafeTeam	6/84	988	321	1,309	770	34 of 659	44 of 111

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This table reflects the status of concerns as of March 8, 1985.

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APPENDIX D

OVERINSPECTION PROGRAM SUPPLEMENTAL INFORMATION

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APPENDIX D
OVERINSPECTION PROGRAM SUPPLEMENTAL INFORMATION

A. SUFFICIENCY OF DATA FROM THE OVERINSPECTION PROGRAM FOR PURPOSES OF EVALUATION OF THE QUALITY OF CONSTRUCTION

Baldwin Associates (BA) and Illinois Power Company (IP) have conducted more than 2 million inspections under the Overinspection Program as of December 31, 1984. Moreover, as is demonstrated in Table D-1, BA has inspected at least 200,000 attributes in each of the major construction disciplines. Given the large number of attributes inspected within each discipline, any significant adverse condition applicable to a class of attributes should be identifiable. R

In order to confirm that the inspection samples were sufficiently comprehensive within each discipline, IP has calculated the number of attributes inspected under the Overinspection Program for each type of major item within the scope of the program. The results are presented in Table D-2. As this table demonstrates, each type of major item has had at least 2,000 attributes inspected by BA. Any significant adverse condition applicable to a type of item should be evident from such a large number of inspections. Thus, sufficient data are available to evaluate the quality of each type of item with 2,000 or more inspected attributes. R

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Statistical analysis lends support to the judgment that sufficient data from the Overinspection Program are available for analysis. The large number of attributes inspected under the Overinspection Program permits judgments regarding the quality of construction of Clinton Power Station (CPS) to be drawn with a high degree of statistical confidence. For example, based on an overall total of 1,672,414 attributes inspected by BA, and assuming an infinitely-sized lot, statistical analysis predicts that the rate of conformance in the lot would have a maximum uncertainty R

of only 0.08% at the 95% confidence level.[1] For a type of item such as mechanical equipment that has been subject to relatively few inspections (3,491 field verification inspections of attributes), the maximum uncertainty in the conformance rate is reasonably low at only 1.7% at a 95% confidence level. These small uncertainties indicate that sufficient data are available for evaluation from the Overinspection Program as of December 31, 1984. R R R

As of December 31, 1984, the Field Verification Group had inspected over 50% of the structural steel, cable tray, instrumentation, and large bore pipe; 40 to 50% of the mechanical equipment and mechanical supports; 20 to 30% of the cable, electrical equipment, small bore pipe, and HVAC duct; 10 to 20% of the cable terminations, electrical hangers, and HVAC hangers; 5 to 10% of the conduit; and less than 5% of the instrument pipe. Given the large number of inspections that have been conducted, these percentages permit reliable conclusions to be drawn on both a statistical and judgmental basis. R

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[1] At the 95% confidence level, the maximum uncertainty is determined from the following equation:

$$U = \frac{1.96\ \sigma}{N} \times 100\%, \text{ where } \sigma^2 = N[p(1-p)]_{max} = .25N$$

and where U = maximum uncertainty in conformance rate at a 95% confidence level

σ = Standard deviation

N = Number of inspected attributes

p = Probability that an attribute is nonconforming

B. ENGINEERING EVALUATION OF NONCONFORMANCES BY TYPE OF COMMODITY

The results of the Overinspection Program were evaluated for each type of commodity within the program. The number of nonconforming attributes for each type of commodity (including augmented class D [radioactive waste] and fire protection) is presented in Table D-3, together with an indication of the number of nonconformances that have been determined to be safety-significant. As is evident from this table, none of the commodities contains any safety-significant nonconformances. For each commodity (except augmented class D [radioactive waste] and fire protection which are discussed in part E below) a discussion is provided which explains, in general, why the nonconformances are not safety-significant.

1. Conduit Supports

The Overinspection Program identified 10,223 nonconforming attributes on conduit supports. As is discussed below, none of these was safety-significant.

Approximately one-third of the nonconformances were minor, involving documentation nonconformances (such as unsigned travelers), minor damage (such as gouges), and installation errors (such as tolerance nonconformances, wrong welds, and wrong hardware). These types of nonconformances generally do not significantly reduce the strength of the conduit support since the attributes in question have little or no bearing on support strength.

Approximately two-thirds of the nonconformances (6,607 in total) pertained to arc strikes and welds between the conduit support and the supporting steel. Of these, 2,689 nonconformances were arc strikes and weld profile violations that generally are cosmetic and do not reduce the strength of the weld. Most of the remaining welding nonconformances involved weld size, undercut, slag, and other discrepancies which were determined to reduce the strength of the weld but not to affect the capability of the weld to satisfy design loading conditions. None of the nonconformances was determined to be safety-significant.

2. Cable Tray Hangers

The Overinspection Program identified 1,164 nonconforming attributes on cable tray hangers. In general, these nonconformances were similar to those identified on conduit supports. Approximately 58% of the nonconformances were minor, having little or no relationship to the strength of the hangers. The remaining nonconformances all pertained to discrepancies in the welds attaching hangers to supporting steel. All of these welding nonconformances were either cosmetic or did not reduce the strength of the weld below that required to satisfy design loading conditions. Consequently, none of the nonconformances was determined to be safety-significant. R R

3. Cable Tray

One hundred thirteen nonconforming attributes were identified on cable trays by the Overinspection Program. As is discussed below, none of these was safety-significant. R

Seventeen nonconformances involved the lack of proper support for cables which drop out of the bottom of ladder-type trays. This support was only required to prevent the weight of the cables from bending the supporting rung of the cable tray. These nonconformances were determined not to affect the function of the cables or the cable trays' ability to function as designed.

Forty-seven nonconformances involved dirt and debris in cable trays. This condition, though not desirable, was evaluated as having no impact on the system design capabilities. R

The remaining nonconformances involved missing or incorrect tray identification tags or cable wear strips, an inspection error dealing with cable routing, or tolerance violations. All of these were shown not to affect the tray design capabilities or the subsequent installation of cables in the trays because (1) other documentation properly identified the trays, (2) the wear strips provide an extra measure of cable protection, but are not necessary in and of themselves, (3) the cable routing was verified to be correct, and (4) the tolerances were not exceeded by a significant margin and the affected items were capable of performing their design functions. R

4. Electrical Equipment (Electrical Boxes, Switchgear, Panels, Motors) R

a. Electrical Boxes

Seven hundred twenty-one nonconforming attributes were identified on electrical boxes by the Overinspection Program. As is discussed below, none of these was safety-significant. R

One hundred seventy-three nonconformances involved damage such as dents or arc strikes and gouges on pull boxes or junction boxes or associated supports. The damage was minor and did not affect the functional capabilities of the boxes. R

One hundred thirty-eight nonconforming attributes were identified in the welding for structural attachments and supports for the electrical boxes. These nonconforming items were evaluated and determined to provide adequate strength to support the electrical boxes. R

Sixty-four nonconformances involved documentation nonconformances such as missing dimensions on drawings, threaded fasteners not having identification markings, or boxes with incorrect, damaged, or missing identification labels. Drawings with missing dimensions were evaluated to determine if the missing information was critical to the installation of the electrical box or if the existing dimensional information was adequate to allow proper installation. Threaded fasteners were previously dispositioned "use-as-is" on the NCRs and, therefore, were found to be acceptable with no replacement required. Boxes with incorrect, damaged, or missing labels were all properly identified on the installation drawings which were used to verify that the installed boxes were correct. In all cases, the nonconforming conditions involving documentation on electrical boxes were minor and had no impact on the design function. R R

Three hundred forty-six nonconformances involved electrical box installation discrepancies, such as installation outside of specified tolerances and wrong or missing hardware. The tolerance discrepancies were evaluated for possible structural impact on the support member to R

which the electrical box is attached. In all cases, the as-installed condition had negligible effect on the supporting member. Wrong and missing hardware discrepancies primarily involved washers used on electrical boxes. Many washers were not installed per the detail drawings, or a material was substituted other than that specified per the details. In all cases, other notes existed on electrical drawings which either allowed the material substitution or made installation of the designated washer an option. None of these nonconforming attributes was found to be safety-significant.

b. Switchgear

Two hundred twelve nonconforming attributes were identified by the Overinspection Program on the switchgear. As is demonstrated below, none of these nonconformances was safety-significant. R

Sixty-five of these nonconforming attributes involved the switchgear hold-down welds. Although these nonconformances were postulated to reduce the strength of these welds, all nonconforming welds were found to be acceptable due to the large margin between the calculated stresses in the welds and the maximum allowable stresses in the welds permitted by the applicable code. R

Eighty-six nonconforming attributes involved loose, missing, or incorrect hardware, such as nuts, bolts, and vibration washers. In each case, the strength or vibration damping of the affected connection was determined to be sufficient to satisfy design loads and damping requirements. R

Twelve nonconforming attributes involved insulated low voltage wires which touched bolt threads. An inspection showed that the wires were touching but not resting on the bolt threads. Also, the bolt threads were dull and were not causing any damage to the wire insulation. Thus, these nonconformances were not affecting the design function of these wires.

Twelve nonconforming attributes involved low voltage molded case panel circuit breakers. Six breakers were missing shunt trips which were in the R

process of being replaced when inspected under the Overinspection Program; thus a valid nonconformance did not exist. Five attributes involved breakers with the wrong size trip elements. These breakers are primarily for short circuit protection of the connected low voltage circuits, and subsequent pre-operational inspection and/or testing would have discovered and corrected these five nonconformances. One attribute was a circuit breaker that was being scraped by opening and closing a cubicle door. The function of the breaker was unimpaired by the scrapes and was evaluated to be of no safety significance.

Eight nonconforming attributes involved documentation nonconformances. Six attributes involved missing nameplates; in each case other documentation, such as installation drawings, was available to verify proper identity. Two documentation nonconformances were for incorrectly designated equipment locations on the cable tabulation. The as-installed condition was acceptable and the cable tabulation was corrected. R

Eight nonconforming attributes involved damage to switchgear, such as broken door latches, bent door panels, or cracked switch handles. Each of these conditions was evaluated and had no impact on the proper operation of the switchgear and, therefore, was of no safety significance.

The remaining nonconforming attributes involved loose terminal strips or damaged hardware (such as screws). Any movement of the loose terminal strips would have been restricted by wire training and wire wraps used to hold in place the conductors terminated on the terminal strips. Additionally, any possible movement of the terminal strips would not affect the function of the switchgear because the movement would not be sufficient to disrupt any connections. Similarly, the damaged hardware were located in a door-locking device that did not affect the operation of the switchgear. Consequently, the loose terminal strips and damaged hardware were not safety-significant.

c. Electrical Panels

Four hundred fifty-five nonconforming attributes on electrical panels were identified by the Overinspection Program. As is discussed below, none was safety-significant. R

Two hundred forty-six of the nonconformances involved missing washers on bolts. The evaluation of these nonconformances found that the structural integrity of the bolts and the seismic capability of the panels were not affected. R

Fifty-six nonconformances involved missing or loose bolts and screws on panel-to-panel connections. The results of the evaluations show that these nonconformances had no impact on the panel's dynamic qualifications.

Eight nonconformances were attributable to inspectors who interpreted documents incorrectly or too stringently. None of these cases involved hardware that did not satisfy design specifications or drawings. R

Eight nonconformances involved incorrect or missing identification tags, but this equipment was properly identified on the drawings. Consequently, none of these nonconformances was safety-significant. R

Eighty-six nonconformances involved panel hold-down welds. An analysis was performed which showed that the panels would have remained fixed at all four corners during a seismic event. Consequently, these nonconforming welds did not affect the design function of the panels. R

Nineteen nonconformances involved damage, such as rust, bent doors, and scratches on panel surfaces, which would not affect the design function of the panels. R

Finally, none of the remaining miscellaneous nonconformances in electrical panels were determined to be safety-significant.

d. Motors

Nine nonconforming attributes were identified on a non-safety-related, non-seismically-designed HVAC motor. Eight of these involved minor damage to the steel motor support and one was a missing motor hold-down bolt. None of these nonconforming conditions affected the function of the motor or the integrity of the support. R

5. Conduit

Fifty-nine nonconforming attributes were identified on conduits by the Overinspection Program. As is discussed below, none of the nonconformances were safety-significant. R

Eighteen of the nonconforming attributes involved documentation. Sixteen nonconformances were missing or contained damaged conduit identification labels. However, in each case, other documentation, such as installation drawings, was available to verify the identity of the conduits. The remaining two documentation nonconformances included an incorrect conduit elevation on the installation drawing and an alternative bonding jumper installation on a flex conduit. A review of applicable installation drawings showed that the as-installed condition of the conduit was acceptable and that the conduit elevation on the installation drawing should be revised accordingly. Also, the alternative conduit bonding jumper installation is now an accepted practice and installation documentation has been revised accordingly. R

Thirty-seven of the nonconforming attributes involved conduit installation discrepancies, such as installation outside of specified tolerances, loose or missing hardware, or bend radius violations of flex conduit. The tolerance discrepancies were evaluated and found to satisfy the requirements of the design as installed. Loose and missing hardware discrepancies normally involved conduit fittings used on conduit terminations at electrical boxes. The loose fittings were evaluated and in each case found not to affect the proper operation of the circuit since the conduit is adequately supported by the electrical box and conduit supports. The missing fittings involved conduit bushings which are used for additional cable protection but are not necessary to the function or protection of the cables. These cases were evaluated and

found to have no safety significance. The minimum bending radius discrepancies of the flex conduit were evaluated and found not to affect the integrity of the cable within and hence were considered not to be safety-significant. R

The remaining four nonconformances involved dents or nicks on flex conduit or rigid steel conduit. The dents were very small and did not affect the integrity of the conduit.

6. Cable

The Overinspection Program identified 533 nonconforming attributes affecting cable. As is described below, none of these nonconformances were found to be safety-significant. R

One hundred forty-eight of the nonconforming attributes involved documentation nonconformances, such as the absence of or damage to a cable's identifying tag. Since other documentation verified that the correct types of cable were properly installed, this type of nonconformance did not affect the cable's capabilities. R

One hundred thirty-one nonconforming attributes were attributed to missing hardware, including missing edge guards for cables, missing cable supports, and missing ground wires. Edge guards provide an extra margin of cable protection, but each multiconductor cable and each conductor's insulation was provided with a protective jacket. Thus, the conductor insulation, as per design, was adequately protected even though some edge guards were missing. With respect to the missing cable supports, the cable manufacturer's cable support requirements are less restrictive than project requirements. When missing supports for cables were evaluated against the cable manufacturer's criteria, it was determined that the cables were adequately supported. R

Instances of missing ground connections on cable tray sections and on a flexible conduit connection were noted. These ground connections are installed to provide a primary ground path for fault currents and also to provide for personal safety. Alternative ground paths were determined to R

provide adequate grounding and this condition was found not to be safety-significant. R

Twenty-five small cuts were reported in the insulation of the conductors near the termination points. These cuts, which did not remove any insulation, were on conductors whose insulation is rated 600 volts (the applied voltage was only 125V DC or 120V AC, which is far lower than the rated 600 volts). Also, the cuts in the insulation were all located inside a junction box, termination cabinet, or other such controlled environment which would prevent further damage. The locations of all cuts were evaluated and found not to provide a grounding fault path. Thus, none of these nonconformances affected the design function of the cables. R

One hundred and twenty-one gouges and dents were reported in the outer jacket of cables; however, 100 of these were accounted for by one low voltage instrumentation cable and the gouges were determined to be cosmetic damage to the jacket. The conductor insulation was not damaged on any of these cables; therefore, these nonconformances would not affect the design function of any of these cables. R

The remaining nonconformances included incorrect, improperly installed, or loose hardware, which were primarily cable grips; and cable routing errors (in the routing itself or in bend radius). Each of these was evaluated and determined to have no safety significance.

7. Cable Terminations

Four hundred eighty-four nonconforming attributes in cable terminations were identified by the Overinspection Program. As is discussed below, none of these nonconformances was found to have safety significance. R

One of the more frequently occurring nonconforming attributes (9%) involved lugs that were not tightly connected to the terminal block (inspector could move the lug from side to side). However, all lugs used were of the ring-tongue type, which were specifically used to prevent the lug from coming off of the terminal block even if the hold-down screw is not properly tightened. Thus, electrical continuity was ensured. R

Other nonconformances (31%) involved conductor termination errors. IP will be conducting preoperational system testing which will include operation of all interlocks, alarms, lights, and relays. This will ensure construction completeness and proper system operation and will identify nonconformances involving electrical termination errors. Consequently, these nonconformances were not safety-significant because they would have been identified and corrected even if the Overinspection Program had not been performed. |R

Discrepancies concerning bending radii of the control conductors near the termination point comprised 9% of the nonconformances. The specifications for bending radius at CPS are more conservative than required by the manufacturer. The actual bending radius was compared to the manufacturers' requirements and 11 were found slightly to exceed those requirements. These were further reviewed and found to be installed in a physically protected and controlled environment. Consequently, even if the insulation at the bend were to have developed a crack, the connection would not have been grounded. |R

Bent lugs comprise 4% of the nonconformances in cable terminations. Information furnished by the suppliers of these lugs showed that these bends did not adversely affect the integrity or function of the lugs. Consequently, none of the bent lugs were safety-significant. |R

Approximately 19% of the nonconformances involved wire crimps in which the wire did not extend out the far side of the lug barrel. However, in each case, it was determined that the wire was firmly secured in the lug barrel, and, therefore, the termination was able to perform its design function. |R

An additional 5% of the nonconformances involved documentation errors such as missing wire code labels. These lables are only for later convenience in maintenance and checkout. They are not needed for correctly terminating the wire. |R

About 13% of the discrepancies involved use of mechanical compression connections instead of ring-tongue lugs. However, use of the compression |R

connections was permitted by the equipment supplier. Thus, these terminations were capable of performing their intended design function.

Approximately 8% of the nonconformances pertained to spare conductors, trimming and cosmetic scratches to the lugs, untidy bundling of conductors in panels, and missing wear strips. Spare conductors, trimming of lugs to fit the terminal block, and cosmetic scratches would not prevent the terminations from meeting their design requirements. Neat bundling of conductors is not necessary but is desirable to facilitate later checkout and maintenance. Also, wear strips are an extra measure of protection for the control wire, but are not necessary because the wires are provided with a tough outer jacket which prevents damage to the underlying insulation. Consequently, none of these nonconformances was safety-significant. R

None of the remaining 2% miscellaneous nonconformances was determined to be safety-significant. R

8. Structural Steel

The Overinspection Program identified 24,067 nonconforming attributes on structural steel. As is discussed below, none of these nonconformances was found to have safety significance. R

Approximately one-half of the nonconforming attributes (11,975) involved welding nonconformances. Most of the welding nonconformances were insufficient weld size, undercut, or overlap. Insufficient weld size included reductions in the effective throat size of the weld, as well as the length of the weld. Undercut involved reductions in the effective thickness of the base metal. Both insufficient weld size and undercut can reduce the strength of the structural steel. Each nonconformance that affected strength was evaluated, and it was determined that the reduced capacity in each case was sufficient to support the required loads. Finally, since S&L determined by a sampling program that overlap identified by the Overinspection Program did not mask lack of fusion or undersized welds, the overlap did not reduce the strength of the structural steel. Therefore, overlap nonconformances were not safety-significant. R

The second largest category of nonconforming attributes identified in structural steel involved installation nonconformances (5,773). This category of nonconformance generally consisted of minor tolerance nonconformances or loose hardware. The tolerance nonconformances and other strength reducing nonconformances were reviewed, and adequate capacity was found in the structural members to accept the nonconformances. Loose hardware in structural steel normally consisted of loose high-strength bolts. While this condition may reduce the ability of the connection to perform as a friction connection, the connections had adequate capacity when the bolts were considered as bearing bolts. R

The third largest category of nonconforming attributes identified in structural steel involved documentation (3,292). For the most part, these nonconformances consisted of missing nut and bolt identification. Since these nonconformances did not physically affect the structural steel, none was found to be safety-significant. R

The last category of nonconformances was damage (3,027). The majority of the instances of reported damage to structural steel were arc strikes (1,840), which are only cosmetic and do not reduce the capacity of the structural steel. R

The other cases of damage were evaluated on a case-by-case basis. While some cases of damage did reduce the strength of the structural steel, adequate reserve capacity was available for the structural steel to support the required loads.

9. <u>Piping</u>

The Overinspection Program identified 1,185 nonconforming attributes on safety-related piping. As is discussed below, none of these nonconforming attributes was determined to be safety-significant. R

The majority (744) of the nonconforming attributes involved minor damage to pipe walls. Damage to pressure-retaining components was evaluated by considering if the reduction in the wall thickness was acceptable considering the minimum allowable wall thickness. Arc strikes constituted almost all of R

this type of damage and were determined to be acceptable based on the minimum allowable wall requirements for piping. The gouges, scratches, and cuts in piping also were judged to be acceptable based on minimum allowable wall thickness requirements.

One hundred forty-seven welding nonconformances affecting piping were evaluated. About one-fourth of the nonconformances were determined to be localized cosmetic surface defects, such as concavity, porosity, and surface slag. For more severe welding problems involving overlaps, undercut, lack of fusion, and undersized welds, localized pipe stresses were examined to determine the adequacy of the weld under all loading conditions. In no case was the applicable code allowable stresses exceeded. R

There were 171 installation nonconforming attributes identified. These items were mostly due to small installation tolerance violations and loose bolting. These were determined to be acceptable. One hundred twenty-three documentation and procedural nonconformances were examined which required only "paper" corrections that had no impact on the physical design. R

10. Mechanical Equipment

Mechanical equipment consists of safety-related valves, pumps, HVAC fans, other miscellaneous equipment, and equipment foundations. Two hundred thirty-one nonconforming attributes were identified that affected mechanical equipment. The majority of these items (134) dealt with missing or damaged identification tags and arc strikes on equipment and valve bodies. The arc strikes were evaluated to be acceptable within the original design basis since none violated minimum wall thickness for the valves in question. The missing or damaged identification tags had no impact on the design function of any component. The remainder consisted of miscellaneous types of nonconformances, none of which were evaluated to be safety-significant. R

11. Instrument Tubing

Ninety-five nonconforming attributes were identified by the Overinspection Program in instrument tubing. The primary nonconforming attributes involved damage and installation nonconformances. R

Damage to instrument tubing was primarily due to arc strikes. All damage penetrating into the exterior wall of the tubing was evaluated for minimum wall violations. No arc strikes caused the minimum wall thickness to be reduced below that required by the design. Therefore, these nonconformances were not safety-significant. R

Nonconforming attributes identified in the installation of instrument tubing were comprised primarily of improper slope and, in some cases, inadequate clearance. Installation nonconformances were evaluated to determine the affect on the design function of the instrument line in the overall system performance. It was determined that all lines with improper slope could still perform their design function, and all nonconformances were found to have no safety significance. Most clearance problems involved instrument lines in contact with conduit supports or with insulation from surrounding piping. These interactions were evaluated to assess potential impact on the tubing. The evaluations indicated that the structural integrity of the tubing would be maintained, and that none of the installation-related nonconformances was determined to be safety-significant. R

Finally, some welding nonconformances were identified, primarily involving concavity in welds. None of these was safety-significant.

12. <u>Piping Supports</u>

A total of 6,299 nonconforming attributes were identified by the Overinspection Program in piping supports. The largest number (2,667) of nonconforming attributes identified were in the welding area. The next most prevalent nonconforming attributes were in the area of damage (2,056) and installation nonconformances (1,458). R R

Welding nonconformances on pipe supports primarily involved undersized welds, overlap, undercut, and slag inclusion. When the nonconforming welds could not be determined to be acceptable by other means, the nonconforming welds were evaluated by comparing the actual weld stresses (excluding damaged areas) to maximum stresses allowed by design. This comparison

verified that sufficient margin existed in the nonconforming weld and the remaining welds on the support to preclude failure of the support.

Over 27% of the nonconforming attributes involved arc strikes. The majority of the remaining damage was comprised of gouges, defects caused by grinding, and bent component items. Arc strikes and gouges were evaluated to determine the effect of the reduction in base metal on the support's design capacity. No support was found to have sufficient reduction in base metal to cause any piping support to fail. None of the remaining damage was determined to be safety-significant. R

Installation nonconformances on pipe supports involved loose or incomplete hardware installation, incorrect adjustment of supports, lack of clearance or interference, and construction tolerance nonconformances. Each nonconforming condition was evaluated to determine if the nonconformance was of a type that would be specifically examined in subsequent preoperational testing. For example, inspections that specifically check for hot and cold positions of adjustable support components would ensure that proper construction tolerances and construction completeness are verified prior to operation. Consequently, these nonconformances were not significant because they would not have been left unidentified and uncorrected if the Overinspection Program had not been performed. For supports which are not adjustable, such as rigid or welded supports, specific preoperational programs to inspect for proper installation and fitup do not exist (other than 79-14 walkdowns conducted on piping and support systems). In these cases, the nonconforming attributes were evaluated for their impact on the structural integrity of the support and the complete piping system. Several nonconformances were for clearance requirements on guide or "box" type supports. These conditions required a detailed evaluation of specific load increases on adjacent supports and the structure and detailed reanalysis of the affected piping system. In no case was a safety-significant condition identified among the installation nonconformances evaluated. R

Documentation-related nonconformances accounted for less than 2% of pipe support nonconforming attributes and typically pertained to the lack of a

welder ID or hardware ID tag. Since evaluations determined that all identifications required for safety-related hardware were recoverable from other records, there were no safety-significant nonconformances in this group.

13. HVAC Ducts and Duct Supports

The Overinspection Program identified 2,893 nonconforming attributes in HVAC. These nonconforming attributes affected both HVAC ductwork and the duct supports and primarily involved installation and welding nonconformances. As is discussed below, none of those nonconformances was safety-significant. R

Over half of the nonconforming attributes identified were minor tolerance violations, incorrect orientation or configuration, installation gaps in the ductwork, and loose, missing, or wrong hardware. The nonconforming conditions involving tolerance, orientation, and configuration were evaluated against the design drawings and were determined to have no impact on operational performance of the duct system or the support system. Installation gaps occurred when ductwork sheet metal would deflect and not lie flat against a support or when a small portion of the gasket used in companion angle mating surfaces was missing or damaged. These gaps were evaluated and found not to affect the integrity of the companion angles or duct support system. Other hardware nonconformances involved duct companion angles for which design criteria had been revised subsequent to the performance of the Overinspection Program for the items. When compared against these revised criteria, the items were acceptable. R R

Nonconforming attributes involving loose and missing hardware primarily involved nuts and bolts used to connect duct companion angles. These were not tightened adequately, were improperly installed, or were missing from the connection. Wrong hardware was reported primarily for incorrectly-sized access door assemblies in the ductwork. None of these nonconforming attributes were determined to adversely affect the integrity of the connections or the function of the duct systems.

Approximately one-fourth of the nonconforming attributes involved welding and consisted of minor nonconformances in weld size and various weld defects, resulting in reduced capacity of the weld connection. Each nonconforming condition was evaluated to determine if the connection, excluding the defective weld, would cause code allowable stresses to be exceeded. No nonconforming conditions were found to result in excessive stresses in the ductwork or support system. R

Physical damage to HVAC ductwork and supports consisted mostly of scratches, gouges, arc strikes, and grinding marks. A number of pin holes in ductwork were the result of abandoned insulation pins. All cases of physical damage were evaluated to determine if the integrity of the duct system was violated or if a reduction in strength of a duct support occurred as a result of base metal damage. None of the nonconformances was determined to affect the design function of the duct system. R

14. Instrumentation

Two arc strikes on instruments were identified by the Overinspection Program. Neither affected the ability of the instrument to perform its design function. R

C. NONCONFORMING ATTRIBUTE TYPES

Provided below are definitions of the various types of nonconforming attributes and a brief description of the nature of the possible impact of the nonconformances on the integrity of affected items.

Arc strike: Damage on or adjacent to a weld resulting in localized fusion caused by the inadvertent establishment of current between electrical arc welding equipment and a weld on base metal. In general, arc strikes are cosmetic defects. Severe cases of arc strike can result in a reduction in the volume of the weld or base metal.

Convexity: Weld metal on the face or surface of a weld that is in excess of the weld metal necessary for the required weld

size. Convexity results in a weld of poor appearance, but has no adverse effect on the capability of the weld to perform its design function.

Concavity: A condition where a weld face or surface has less weld metal than is required for the specified weld size. If severe enough, concavity can reduce the strength of the weld.

Slag: A nonmetallic material which results from the welding process. Slag is generally found on weld surfaces as a result of incomplete cleaning after the weld is made and, as such, is a cosmetic defect. If slag is entrapped in the weld itself, it reduces the volume of the sound weld metal and, therefore, the load-carrying capacity of the weld.

Undercut: A groove that is melted into base metal adjacent to a weld and that remains unfilled with weld metal. Undercut may result in a reduced thickness of the base metal and may affect the strength of the metal.

Weld size: A welding attribute that identifies an inadequacy in the size, dimension, or length of a weld as specified by code or on the design documents. Inadequate weld size typically will result in a weld that will have reduced load-carrying capacity.

Lack of fusion: A condition in a weld when the base and weld metal fail to fuse during the welding process. Lack of fusion may cause a reduction in weld strength and, in the worst case, a potential for weld failure.

Overlap: Excessive weld metal that protrudes over the interface of a weld and the adjacent base metal. Overlap is not a

concern unless it obscures lack of fusion or an insufficiently-sized weld.

Reinforcement: A condition in a weld due to the deposit of excess weld metal. Reinforcement does not cause a reduction in weld strength.

Porosity: Cavity type discontinuities formed by gas entrapment during the solidification of a weld. Porosity is a nonpropagating defect with minimal impact on weld capacity.

Crack: A linear discontinuity in material that reduces material strength and may propagate under stress and cause failure of an item. To determine if a crack will propagate, the localized stresses must be determined and a fracture mechanics analysis applied.

Cold set: The position of a variable support when the piping system is at the temperature of the environment. This position is confirmed during preoperational testing to document functional capability and does not present a safety concern during construction.

Transition: The weld surface exceeds a 3 to 1 slope between two metals of different thicknesses. Typically, the strength of the weld is not reduced by improper transition.

Grinding: The base metal thickness of a commodity is reduced by abrasion from a grinding tool. The reduction in base metal could reduce the strength of a component.

Dent, bent, warped: The commodity has been dented, bent beyond specified limits, or warped, which could result in a reduction in

design capacity, improper fit-up, or modification in the performance of an item.

Ovality: The flattening that may occur when a pipe has been bent. Excess ovality can hinder performance by restricting flow or causing localized overstressing of the piping system.

Gouge, scratch, cut: Surface defects in an item due to removal or severance of base material. These can result in a reduction in the strength of a component or provide a potential path for shorts in electrical components.

Bolts/nuts broken: A broken nut or bolt resulting in loss of connection strength.

Coating missing: Paint, galvanized coating, or other protective coating missing from a surface specified to be coated. Typically, coatings are not required for the strength of a commodity, only for its protection against adverse elements. The specific purpose of each missing coating must be evaluated based on the intent of the original design specification.

Defective material: Material that does not satisfy all of the specified design requirements. This nonconformance presents a potential for a reduction in capacity.

Dirt/debris: Dirt or debris allowed to collect on an item in violation of storage and maintenance procedures. Typically, dirt and debris will not affect an item's structural integrity or component operation and is flushed out of a piping system during preoperational flushing.

Protection: Failure to protect an item from surrounding elements per established storage and maintenance requirements. Lack of protection could result in damage from subsequent work in the area.

Rust: Accumulation of iron oxide on the surface of an item. Rust typically has no safety significance unless left for extended periods of time or allowed to become pervasive, reducing the strength of the component or hampering its operating characteristics.

Holes: An item has holes drilled through a surface meant to be free of holes. Holes can cause a reduction in strength.

ID missing/ incorrect/damaged: An item identification tag, nameplate, or label is either missing, incorrect, or damaged. This does not imply lack of material traceability. In most cases, the item can be identified through other documentation or field inspection.

Drawing incorrect: A fabrication or construction drawing does not correctly reflect the design. The drawing errors require review on a case-by-case basis to determine if the errors could cause a reduction in a component's capability to perform its design function.

Traceability: The ability to trace or verify through certified documents that an item is constructed from the specified material. Incorrect material can result in various adverse conditions such as material incompatibility or strength reduction. In general, nonconformances involving lack of traceability can be determined not to be safety significant by conducting investigations to re-establish traceability, testing, or determining that

traceability is not a requirement for the commodity identified.

Inspection error: This consists of nonconformance reports (NCRs) written incorrectly against a conforming attribute. Since no nonconformance actually exists, these NCRs have no effect on hardware quality.

Wrong hardware: Installation of items not specified or referenced on design documents, or substitutions of components not specifically allowed by appropriate codes or standards. The impact of using the wrong items depends on the strength and capabilities of the substituted hardware. In some cases, the substituted hardware may actually have greater capacity than hardware specified in the design.

Hardware missing: Missing items required by design documents. The impact of the nonconformance depends on the function of the item and the existence of other hardware that serves similar functions (e.g., one missing bolt on a multiple bolt connection).

Hardware loose: Items that are not adequately torqued or snug tight. Loose hardware may reduce the strength of the overall connection.

Incomplete: Items or materials for which the installation has not been completed. In some cases, incomplete installation may result in a reduction in strength of the component.

Orientation/ configuration Items which are not oriented or configured in accordance with design requirements. Typically, nonconformances involving orientation or configuration involve cases in which construction tolerances were not specified for the installation or inspection process. Such nonconformances

could potentially impact upon adjacent components or affect the function of, or stresses in, the nonconforming item.

Tolerance: Tolerance nonconformance involves installation of an item outside the dimensional envelope permitted by design. The actual location of the item must be evaluated to determine whether there is any change in the stresses on the item or adjacent items.

Clearance/ interference: The space between two items is less than the minimum allowable space specified by design. The actual movements of the items during operating conditions, thermal transients, or seismic events must be evaluated to determine whether any interactions might result.

Slope: Incorrect slope of an instrument sensing line or other line requiring a slope for proper function. Improper slope could affect the function of the line.

Routing: The routing of a commodity (e.g., cable tray, conduit) does not agree with construction drawings. The as-routed configuration could alter support loads and stresses used in the original design analyses.

Bend radius: The bending radius of the electrical cables or electrical conduits are less than the minimum specified by design. This could impact the ability to pull cables, but would not affect cable function if the cable is undamaged or if the cable is protected in a controlled environment.

Wrong welds: Welds installed were not the type specified (e.g., intermittent welds in lieu of continuous welds). The strength of the weld could be altered if the wrong weld is installed.

Gaps (Installation): A gap which exists between two items that is not in accordance with design documents. The as-installed gap could impair the function of one or both of the items.

Thread engagement: When the threads of a bolt do not extend through the entire nut as required to provide maximum contact of load-bearing surfaces. This condition reduces the strength of the connection.

Gaps (Damage): A gap caused by damage to a supporting or interfacing concrete surface, such as by spalling of concrete caused by the heat generated in welding. The gaps in this category could cause a reduction in the ability of the concrete to support a load.

Termination/error: When electrical cables have not been connected to the correct terminals or were connected in an improper manner. This nonconformance could result in improper operation if not identified by subsequent testing.

D. NONCONFORMANCE REPORTS CONTAINING INSUFFICIENT INFORMATION

Seven NCRs prepared during the Overinspection Program did not contain sufficiently detailed information for purposes of this evaluation, and the nonconforming item was reworked prior to commencement of the S&L evaluation. Therefore, it was not possible for S&L to evaluate the impact of those nonconformances on the integrity of the affected item. However, as is demonstrated below, except for the seventh nonconformance, S&L was able to determine that none of the nonconformances was significant to safety. R R

The first nonconformance involved a half-inch diameter stainless steel instrument tube in the main stream system that had "numerous nicks and gouges." The depth of the gouges was not documented on the NCR. The tubing was subsequently replaced, eliminating both the nonconforming condition and the information required to

evaluate its significance. However, this particular instrument line is connected to one of four redundant first-stage turbine low-pressure transmitters. The pressure transmitters signal the turbine stop valve and control the valve fast closure trip bypass, using a two-out-of-four logic. As such, the signal from any one transmitter cannot initiate any plant system response. Consequently, even if it is assumed that this item would fail, failure of this item would not impact plant safety.

The second nonconformance involved a half-inch stainless steel instrument tubing line in the residual heat removal system which had several arc strikes. The depth of the arc strikes was not recorded on the NCR, and the tubing was subsequently replaced, eliminating both the nonconforming condition and the information required to evaluate it. However, even if it is assumed that this item would fail, the loss of this line would not impact plant safety. The line provides the residual heat removal pump minimum flow control valve positioning (open/close) signals, based on the low pressure coolant injection flow rate. If the instrument line lost pressure, the minimum flow control valve would be automatically closed and the full low pressure coolant injection flow rate would be provided to the reactor vessel.

The third nonconformance involved a half-inch diameter stainless steel instrument tube in the residual heat removal system which was observed to have several arc strikes on the tube wall. The depth of the arc strikes was not reported on the NCR and the tubing was subsequently replaced, eliminating both the nonconforming condition and the information required to evaluate it. Further evaluation of the tubing and the associated instrumentation indicated that, even if failure were postulated to occur, loss of pressure in the line would provide the permissive signal required for operational testing of the low pressure coolant injection valve. These permissives allow the operator to manually cycle the valve. The permissives are timed for 15 minutes and are automatically negated after that. This test loop is not required during either plant normal or post-accident operating condition. Loss of pressure to this line would cause no automatic system response. Consequently, failure of this line would have no impact on plant safety and is therefore not safety-significant. R

The fourth nonconformance involved an arc strike on the diesel oil day tank 1DG01TB level sensing line. The depth of the arc strike was not reported on the

NCR and the tubing was subsequently replaced, eliminating both the nonconforming condition and the information required to evaluate it. Further evaluation of the tubing and the associated instrumentation indicated that, even if failure was postulated to occur, the loss of pressure in the line would cause the diesel oil transfer pumps to start and refill the day tank, replacing the leakage, and ensuring an adequate fuel supply to the diesel generator. Any such postulated leakage does not present a safety-significant condition from a fire protection standpoint since complete rupture of the day tank is a postulated event and adequate protection has been provided.

The fifth nonconformance identified a crack visible on the end of a load pin installed in the rear-end bracket assembly of a large-bore pipe support. No information was given regarding the depth of this crack, and the pin was subsequently replaced. It was, therefore, impossible to determine whether the condition was a simple surface defect or a more significant structural condition. Consequently, the support was assumed to fail and the piping system was analyzed in detail with this support removed from service. Analysis showed that even without this support, the system loads were within design limits and would not impact the safety of the plant. R

The sixth nonconformance involved a cut on a jumper wire inside the valve limit switch enclosure for valve 1E12-F027B. The location of the jumper wire and the cut on the wire was not documented in enough detail to evaluate its significance. However, in the event that the jumper would fail, the valve indicating lights on the Main Control Board would go out. Also, an alarm in the Main Control Room would be annunciated, indicating a loss of valve control power, and thus would be immediately repaired.

Valve 1E12-F027B is the outboard containment isolation valve on the B-loop of the residual heat removal low pressure coolant injection line. This valve is open in all modes (normal and accident) of plant operation and can only be closed by independent operator action from the Main Control Room. Valve 1E12F027B is provided to comply with 10 CFR 50, General Design Criteria 56. There are no design basis events that require closure of this valve. Therefore, this would not result in a safety-significant condition.

The seventh nonconformance also involved a cut on a jumper wire inside the valve limit switch enclosure for valve 1FC037. The location of the jumper wire and the cut on the wire was not documented in enough detail to evaluate its significance. Therefore, it is not possible to evaluate whether this condition might have been safety-significant. However, in the event that the jumper fails, the valve would fail in its current position and the indicating lights on the Main Control Board would go out. Also, an alarm in the main Control Room would be annunciated, indicating a loss of valve control power. Valve 1FC037 is the inboard containment isolation valve on the reactor vessel pool flooding line. This valve is normally open and closes on a containment isolation signal. Automatic closure of outboard containment isolation valve 1FC036 will provide for containment isolation. R

E. EVALUATION OF THE QUALITY OF AUGMENTED CLASS D (RADIOACTIVE WASTE) AND FIRE PROTECTION SYSTEMS

The augmented class D (radioactive waste) and fire protection systems are not safety-related and have not been subject to all of the quality assurance provisions of 10 CFR Part 50, Appendix B. Consequently, the results of the Overinspection Program for the augmented class D (radioactive waste) and fire protection systems are discussed separately from the results for safety-related structures, systems, and components.

More than 77,000 attributes of the augmented class D (radioactive waste) system and 1,600 attributes on the fire protection system were inspected by the Field Verification Group as of December 31, 1984. R

On the augmented class D (radioactive waste) and fire protection systems, 6,663 nonconforming attributes were reported. Of these, 2,637 nonconforming attributes were evaluated by S&L. The remaining 4,026 nonconforming attributes could not be evaluated for significance because the nonconformance reports did not contain sufficiently detailed descriptions to permit performance of these evaluations. R

Of the engineering evaluations that could be performed, the results are similar to their safety-related counterparts. Minor damage, such as arc strikes, gouges, and

grinding marks on the pipe surface, was involved in 1,506 of the nonconforming attributes. In all cases, it was determined that the minimum allowable wall thickness was not violated. R

Seventy-seven nonconforming welding attributes were evaluated. While these welding problems may have resulted in a reduced weld capacity, in no case were the applicable code (ANSI B31.1) allowable stresses exceeded. R

The 301 installation nonconformances associated with the augmented class D (radioactive waste) and fire protection systems and components are primarily due to the increased use of flanged connections in these systems. Installation problems dealt with loose bolts, insufficient thread engagement, missing gaskets, poor alignment, or other flange-related problems. The flange-related problems that result in a loose or poor connection would have been discovered during the system hydrostatic testing and would have been reworked to an acceptable condition. All others were determined to be acceptable based on an evaluation. This group of installation problems was found not to be significant. R

The Overinspection Program identified 953 nonconformances involving documentation. The most prevalent documentation nonconformance dealt with use of a substitute bolting material. However, this material was previously determined to be generically acceptable. Another common type of nonconformance dealt with installed spool length that did not agree with the constructor's installation isometric drawing. However, the nonconforming spools were found to be in accordance with the design drawings, and the contractor's isometric drawings were reworked to reflect the design and the installed condition. R

Of the nonconforming attributes not evaluated due to lack of information on the NCRs, 91% involved damage, 6% welding, 2% installation, and 1% documentation. The description of the nonconforming attributes noted on these NCRs is similar to those already evaluated. Consequently, these nonconformances would not be expected to adversely affect the function of the augmented class D (radioactive waste) or the fire protection system if left uncorrected. R

Table D-1
Number of Attributes Inspected by Construction Discipline

Type of Inspection	Construction Discipline	Number of Attributes Inspected
Field verification	Structural	273,609
	Electrical/instrumentation	690,387
	Piping/mechanical	708,418
Total		**1,672,414**
Overinspection	Structural	366,085
	Electrical/instrumentation	199,004
	Piping/mechanical	164,968
Total		**730,057**

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Table D-2
Number of Attributes Inspected by Type of Major Commodity

Commodity	Number of Inspected Attributes FV	OI
Structural steel	273,609	366,085
Cable	21,861	8,031
Cable termination	117,036	48,277
Conduit	22,717	1,056
Cable trays	87,092	0
Electrical hangers	403,546	107,460
Electrical equipment[1]	14,899	9,053
Instrumentation	6,465	613
Instrument pipe	16,771	24,514
Large bore pipe	32,673	16,317
Small bore pipe	49,140	22,223
Mechanical equipment[2]	3,491	416
Mechanical supports[3]	326,096	102,344
HVAC duct	218,889	11,402
HVAC hangers	78,129	12,266
Total	**1,672,414**	**730,057**

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[1]Includes electrical panels, switchgear, and electrical boxes

[2]Includes compressors, pumps, valves, and miscellaneous equipment

[3]Includes anchor plates, expansion anchors, pipe hangers, and instrument supports

Table D-3
Nonconforming Attributes by Commodity

Commodity	Attribute	Number of Nonconformances	Number of Safety-Significant Nonconformances
Conduit supports	Weld size	1,354	0
	Undercut	1,128	0
	Overlap	408	0
	Convexity	7	0
	Concavity	22	0
	Lack of fusion	294	0
	Porosity	8	0
	Slag	755	0
	Crack	29	0
	Reinforcement	2	0
	Wrong hardware	305	0
	Hardware missing	94	0
	Hardware loose	90	0
	Incomplete	6	0
	Orientation/configuration	188	0
	Tolerance	869	0
	Clearance/interference	31	0
	Wrong welds	277	0
	Gaps	206	0
	Thread engagement	23	0
	Arc strike	2,600	0
	Grinding	201	0
	Dent/bent/warped	179	0
	Gouge/scratch/cut	192	0
	Bolt/nut broken	7	0
	Coating missing	110	0
	Defective material	48	0
	Dirt/debris	11	0
	Protection	1	0
	Rust	37	0
	Holes	116	0
	Gaps (damage)	32	0
	ID missing/incorrect/ damaged	292	0
	Drawing incorrect	202	0
	Traceability	37	0
	Inspection error	62	0
	Total	**10,223**	**0**

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Nonconforming Attributes by Commodity

Commodity	Attribute	Number of Nonconformances	Number of Safety-Significant Nonconformances
Cable tray hangers	Weld size	270	0
	Undercut	64	0
	Overlap	43	0
	Concavity	6	0
	Lack of fusion	53	0
	Porosity	7	0
	Slag	55	0
	Crack	2	0
	Reinforcement	5	0
	Wrong hardware	44	0
	Hardware missing	83	0
	Hardware loose	45	0
	Incomplete	3	0
	Orientation/configuration	22	0
	Tolerance	91	0
	Clearance/interference	3	0
	Wrong weld	133	0
	Gap	12	0
	Arc strike	122	0
	Grinding	24	0
	Dent/bent/warped	9	0
	Gouge/scratch/cut	16	0
	Bolt/nut broken	1	0
	Coating missing	2	0
	Dirt/debris	1	0
	Holes	6	0
	Gaps (damage)	5	0
	ID missing/incorrect/ damaged	18	0
	Drawing incorrect	13	0
	Traceability	1	0
	Inspection error	5	0
	Total	**1,164**	**0**

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Nonconforming Attributes by Commodity

Commodity	Attribute	Number of Nonconformances	Number of Safety-Significant Nonconformances
Cable Tray	Wrong hardware	2	0
	Hardware missing	28	0
	Hardware loose	3	0
	Orientation/configuration	1	0
	Tolerance	21	0
	Clearance/interference	1	0
	Dirt/debris	47	0
	ID missing/incorrect/ damaged	8	0
	Drawing incorrect	1	0
	Inspection error	1	0
	Total	**113**	**0**
Electrical equipment	Weld size	120	0
	Undercut	84	0
	Overlap	25	0
	Lack of fusion	11	0
	Slag	9	0
	Crack	1	0
	Reinforcement	4	0
	Wrong hardware	124	0
	Hardware missing	361	0
	Hardware loose	43	0
	Incomplete	8	0
	Orientation/configuration	48	0
	Tolerance	172	0
	Clearance/interference	18	0
	Wrong welds	15	0
	Gaps	19	0
	Thread engagement	9	0
	Termination Error	1	0
	Arc strike	61	0
	Grinding	8	0
	Dent/bent/warped	55	0
	Gouge/scratch/cut	17	0
	Bolt/nut broken	12	0
	Coating missing	26	0
	Defective material	18	0
	Dirt/Debris	2	0
	Rust	2	0
	Holes	32	0
	Gaps	3	0
	ID missing/incorrect/ damaged	40	0
	Drawing incorrect	35	0
	Traceability	1	0
	Inspection error	13	0
	Total	**1,397**	**0**

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Nonconforming Attributes by Commodity

Commodity	Attribute	Number of Nonconformances	Number of Safety-Significant Nonconformances
Conduit	Hardware missing	4	0
	Hardware loose	8	0
	Incomplete	1	0
	Orientation/configuration	18	0
	Clearance/interference	1	0
	Wrong welds	4	0
	Thread Engagement	1	0
	Dent/bent/warped	2	0
	Gouge/scratch/cut	1	0
	Defective material	1	0
	ID missing/incorrect/ damaged	16	0
	Incorrect drawing	1	0
	Inspection error	1	0
	Total	**59**	**0**
Cable	Wrong hardware	25	0
	Hardware missing	114	0
	Hardware loose	2	0
	Incomplete	17	0
	Orientation/configuration	12	0
	Tolerance	17	0
	Clearance/interference	3	0
	Routing	22	0
	Bend radius	25	0
	Dent/bent/warped	6	0
	Gouge/scratch/cut	141	0
	Defective material	1	0
	ID missing/incorrect/ damaged	121	0
	Drawing incorrect	13	0
	Inspection error	14	0
	Total	**533**	**0**

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Nonconforming Attributes by Commodity

Commodity	Attribute	Number of Nonconformances	Number of Safety-Significant Nonconformances
Cable terminations	Wrong hardware	65	0
	Hardware missing	20	0
	Hardware loose	43	0
	Incomplete	44	0
	Orientation/configuration	15	0
	Tolerance	93	0
	Clearance/interference	3	0
	Bend radius	43	0
	Termination error	106	0
	Dent/bent/warped	18	0
	Gouge/scratch/cut	5	0
	Bolt/nut missing	1	0
	Defective material	5	0
	ID missing/incorrect/ damaged	11	0
	Drawing incorrect	4	0
	Traceability	1	0
	Inspection error	7	0
	Total	**484**	**0**

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Nonconformance Attributes by Commodity

Commodity	Attribute	Number of Nonconformances	Number of Safety-Significant Nonconformances
Structural steel	Weld size	4,926	0
	Undercut	4,744	0
	Overlap	1,052	0
	Convexity	38	0
	Concavity	51	0
	Lack of fusion	574	0
	Porosity	90	0
	Slag	275	0
	Crack	111	0
	Reinforcement	114	0
	Wrong hardware	397	0
	Hardware missing	526	0
	Hardware loose	1,722	0
	Incomplete	102	0
	Orientation/configuration	169	0
	Tolerance	1,310	0
	Clearance/interference	57	0
	Wrong welds	1,328	0
	Gaps	143	0
	Thread engagement	19	0
	Arc strike	1,840	0
	Grinding	103	0
	Dent/bent/warped	213	0
	Gouge/scratch/cut	754	0
	Bolt/nut broken	22	0
	Coating missing	12	0
	Defective material	50	0
	Dirt/debris	21	0
	Holes	11	0
	Gaps (damage)	1	0
	ID missing/incorrect/ damaged	3,157	0
	Drawing incorrect	35	0
	Traceability	70	0
	Inspection error	30	0
	Total	**24,067**	**0**

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Nonconforming Attributes by Commodity

Commodity	Attribute	Number of Nonconformances	Number of Safety-Significant Nonconformances
Piping	Weld size	75	0
	Undercut	30	0
	Overlap	4	0
	Convexity	2	0
	Concavity	9	0
	Porosity	13	0
	Slag	1	0
	Crack	1	0
	Reinforcement	9	0
	Transition	3	0
	Wrong hardware	11	0
	Hardware missing	13	0
	Hardware loose	51	0
	Incomplete	6	0
	Orientation/configuration	46	0
	Tolerance	20	0
	Slope	14	0
	Bend radius	2	0
	Thread engagement	8	0
	Arc strike	655	0
	Grinding	24	0
	Dent/bent/warped	13	0
	Gouge/scratch/cut	37	0
	Defective material	2	0
	Protection	13	0
	ID missing/incorrect/ damaged	77	0
	Drawing incorrect	27	0
	Traceability	8	0
	Inspection error	11	0
	Total	**1,185**	**0**

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Nonconforming Attributes by Commodity

Commodity	Attribute	Number of Nonconformances	Number of Safety Significant Nonconformances
Mechanical equipment			
	Wrong hardware	8	0
	Undercut	13	0
	Overlap	2	0
	Concavity	2	0
	Lack of fusion	2	0
	Hardware missing	4	0
	Hardware loose	3	0
	Incomplete	1	0
	Orientation/configuration	10	0
	Tolerance	2	0
	Clearance/interference	2	0
	Arc strike	91	0
	Grinding	2	0
	Dent/bent/warped	1	0
	Bolt/nut broken	2	0
	Defective material	29	0
	Protection	2	0
	Gaps	1	0
	ID missing/incorrect/ damaged	43	0
	Drawing incorrect	6	0
	Inspection error	5	0
	Total	**231**	**0**
Augmented class D (radioactive waste) and fire protection	Weld size	64	0
	Undercut	41	0
	Overlap	31	0
	Convexity	3	0
	Concavity	43	0
	Lack of fusion	43	0
	Slag	3	0
	Reinforcement	48	0
	Transition	48	0
	Wrong hardware	49	0
	Hardware missing	31	0
	Hardware loose	66	0
	Incomplete	16	0
	Orientation/configuration	104	0
	Tolerance	27	0
	Clearance/interference	9	0

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Nonconforming Attributes by Commodity

Commodity	Attribute	Number of Nonconformances	Number of Safety Significant Nonconformances
Augmented class D (radioactive waste) (Cont.)	Slope	25	0
	Bend radius	1	0
	Wrong welds	3	0
	Gaps	12	0
	Thread engagement	49	0
	Arc strike	4,668	0
	Grinding	46	0
	Dent/bent/warped	17	0
	Ovality	13	0
	Gouge/scratch/cut	183	0
	Defective material	5	0
	Dirt/debris	6	0
	Protection	3	0
	Rust	1	0
	Holes	6	0
	ID missing/incorrect/ damaged	910	0
	Drawing incorrect	51	0
	Traceability	26	0
	Inspection error	12	0
	Total	**6,663**	**0**
Instrument tubing	Weld size	4	0
	Concavity	11	0
	Reinforcement	2	0
	Orientation/configuration	1	0
	Tolerance	1	0
	Clearance/interference	3	0
	Slope	36	0
	Arc strike	27	0
	Dent/bent/warped	2	0
	Gouge/scratch/cut	3	0
	Dirt/debris	1	0
	ID missing/incorrect/ damaged	1	0
	Drawing incorrect	3	0
	Total	**95**	**0**

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Nonconforming Attributes by Commodity

Commodity	Attribute	Number of Nonconformances	Number of Safety-Significant Nonconformances
Piping supports	Weld size	1,019	0
	Undercut	602	0
	Overlap	742	0
	Convexity	13	0
	Concavity	2	0
	Lack of fusion	97	0
	Porosity	30	0
	Slag	127	0
	Crack	25	0
	Reinforcement	9	0
	Transition	1	0
	Wrong hardware	86	0
	Hardware missing	79	0
	Hardware loose	263	0
	Incomplete	18	0
	Cold set	39	0
	Orientation/configuration	83	0
	Tolerance	476	0
	Clearance/interference	186	0
	Wrong welds	97	0
	Gaps	90	0
	Thread engagement	43	0
	Arc strike	1,717	0
	Grinding	91	0
	Dent/bent/warped	46	0
	Gouge/scratch/cut	158	0
	Bolt/nut broken	1	0
	Defective material	16	0
	Dirt/debris	1	0
	Rust	2	0
	Holes	14	0
	Gaps (damage)	9	0
	ID missing/incorrect/ damaged	86	0
	Drawing incorrect	27	0
	Traceability	2	0
	Inspection error	2	0
	Total	**6,299**	**0**

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Nonconforming Attributes by Commodity

Commodity	Attribute	Number of Nonconformances	Number of Safety-Significant Nonconformances
HVAC ducts and supports	Weld size	305	0
	Undercut	126	0
	Overlap	103	0
	Concavity	2	0
	Lack of fusion	153	0
	Porosity	45	0
	Slag	3	0
	Crack	19	0
	Wrong hardware	83	0
	Hardware missing	176	0
	Hardware loose	220	0
	Incomplete	47	0
	Orientation/configuration	406	0
	Tolerance	558	0
	Clearance/interference	2	0
	Wrong welds	9	0
	Gaps	89	0
	Thread engagement	5	0
	Arc strike	91	0
	Grinding	81	0
	Dent/bent/warped	32	0
	Gouge/scratch/cut	140	0
	Bolt/nut broken	1	0
	Defective material	20	0
	Holes	84	0
	Gaps	34	0
	ID missing/incorrect/ damaged	17	0
	Drawing incorrect	36	0
	Traceability	3	0
	Inspection error	3	0
	Total	**2,893**	**0**
Instrumentation	Arc strike	2	0
	Total	**2**	**0**

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APPENDIX E
RECORD VERIFICATION DATA

This appendix presents the record verification data as of March 17, 1985, for resolution of nonconformance reports (NCRs) and as of March 3, 1985, for record deficiencies generated from the Record Verification Program (Part A) and a description of "Use As Is" NCRs as of March 17, 1985 (Part B). The data are tabulated to establish the distribution of NCRs and record deficiencies by old and new work, by discipline, by item type, and by checklist category. R

A. DOCUMENT EXCEPTION LIST ITEM DEFICIENCY RATES R

Table E-1 gives the number of NCRs developed by work item type and a breakdown between old and new work. Tables E-2 and E-3 give the status of the Document Review Group's (DRG) review and Records Review Group's (RRG) review, respectively, by discipline for total record attributes inspected and for old and new work. Table E-4 displays the distribution of new and old work document exception list (DEL) items for DRG versus the total record attributes inspected by work item category.

Table E-5 gives the number of record deficiency reports (RDR) for old and new work versus the total number of attributes by work item category.

Table E-6 gives the distribution of DEL items for old work by checklist attribute in each work item category.

Table E-7 shows the same information as Table E-6 for new work.

A description of the checklist attributes used for Tables E-6 and E-7 is given in Table E-8.

Table E-4 gives the distribution of old and new work DEL items by work item. Some individual categories of work items have deficiency rates which warrant further examination to determine whether further action is warranted in regard to the individual work item categories, as explained below.

1. Old Work

a. Cable Trays - The relatively high (11.5%) deficiency rate should be considered in light of the relatively limited data available for evaluation in this work item category to date. In addition, over 81% of the deficiencies involve accountability, completeness, legibility, procedure and drawing revisions, or non-checklist items. The resolutions of these deficiencies to date have indicated no adverse implications for hardware quality. IP is continuing to perform the Record Verification Program for records related to cable tray old work and will perform additional evaluations as more record review data applicable to cable tray old work becomes available.

b. Electrical Equipment - The 7.5% deficiency rate for records related to electrical equipment is concentrated in only 119 records. Most of the electrical work at Clinton Power Station (CPS) that is subject to the Record Verification Program is new work. The number of new work attributes reviewed is ten times that for old work and the deficiency rate for new work is only 1.3%. Since only 11 NCRs resulted from record reviews related to electrical equipment and none were safety-significant, the continued performances of the Record Verification Program for records related to electrical equipment old work is sufficient to assure that the quality of these records is acceptable.

c. Purchase Orders - Within the 5.4% deficiency rate, more than 66% of the deficiencies involve such attributes as accountability, legibility, completeness, improper corrections, whiteout, and line-through. The resolutions to date have been shown to have no adverse hardware implications. Since only 123 NCRs resulted from the 25,336 record deficiencies (0.5%) and none was found to be safety-significant, the continued performance of the Record Verification Program for old work purchase orders is sufficient to assure that the quality of these records is sufficient.

2. New Work

Cable Trays - 82% of the record deficiencies that make up the 11.6% deficiency rate involve such attributes as accountability, legibility, completeness, procedure and drawing revisions, and non-checklist items. The resolutions to date have been shown to have no adverse implications for hardware quality. Only two NCRs resulted from the identified record deficiencies, and neither was found to be safety- significant. The continued performance of the Record Verification Program for records related to cable tray new work is sufficient to assure that the quality of these records is acceptable. R

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3. Summary

The individual work items generally show a decline in deficiency rates from old work to new work. In several cases (see attached Table E-4), there was a slight increase from old to new work, but that difference is not considered significant in light of the nature and extent of the deficiencies identified. All record deficiencies have a very low rate of potentially significant nonconformances. These low record nonconformance rates and the fact that no safety-significant hardware deficiencies have been found indicate that there are no adverse implications for CPS hardware quality and safety. R

B. "USE AS IS" NCRs R

As discussed in chapter VI, out of the total of 890 NCRs initiated from the Record Verification Program, 585 were dispositioned not hardware related or "use as is" by Illinois Power Company (IP)/Baldwin Associates (BA) or Sargent & Lundy onsite reviewers. The distribution of these NCRs and a discussion of the rationale for disposition "use as is" is discussed below. R

1. Process or Procedure Issues

A number of NCRs, 175, dealt with deviations from process or procedure requirements. Examples of these are incorrect weld preheat, incorrect weld interpass temperatures, concrete placement time violations, or concrete curing temperature deviations. In all NCRs of this type, the impact of the process or procedure deviation was evaluated to have an acceptable impact R

on the finished product; hence, no rework was recommended. In the welding issues, the condition of the final welds were all determined not to impact the functional requirements of the item. On the concrete process questions, test cylinder results, rebound hammer tests, and other results were used to determine that no structural impact existed.

2. Material Specification, Substitution and Traceability Issues

In the broad area of material specification, substitution, and traceability, 177 NCRs were initiated and dispositioned "use as is." Examples of these are deviations in specified materials installed, missing material traceability, and missing material code certifications. In each case, the NCR was evaluated and the replacement material determined to be one of the following: (1) acceptable for the function intended, (2) traceability not required or equivalent traceability established, or (3) downgraded code requirements acceptable for the function intended. In a few cases, a higher grade material was used and later verified to be acceptable. In all cases in this category, the issue was rigorously pursued and evaluations completed to allow a "use as is" decision, with no requirements for rework. |R

3. Sequence or Inspection Signoff Issues and Traveler Entry Errors

In the broad area of inspection or inspector signoff and incorrect traveler entries, 110 NCRs were issued. Use as is determinations were made using additional follow-up information for all NCRs of this type. For example, for incorrect signoff sequence or hold points bypassed, the condition of the item was determined acceptable by subsequent inspection documentation. For missing or improperly documented weld travelers, the correct information was recovered and, based on this information, no rework was required. Questions on welds or inspector certifications were later verified to be acceptable, and evaluations indicated no hardware impact. |R

4. Missing or Incorrectly Documented Tests or Inspections

In 98 instances, NCRs were initiated due to missing or incorrectly documented tests, calibrations, or inspections. In each case, either an additional test or calibration was performed, a vendor statement of certification was received, actual test reports were recovered, or the test |R

was determined not to be essential to the performance of the items. In each of these cases, a use as is determination was made based on equivalent or replacement documentation, and no deviation was found to put the item performance outside the plant design basis.

5. Drawing Issues

In 25 cases, NCRs were initiated due to drawings that did not properly reflect as-built conditions. In each case, a drawing discrepancy was identified and the as-built condition was verified as correct and acceptable within the plant design basis. All of these NCRs resulted in use as is determination with no rework required. |R

6. Summary

As a result of the Record Verification Program, 585 NCRs were initiated that originally raised potential questions as to the adequacy of quality documentation and ultimately resolved with a non-hardware or "use as is" disposition. In each case, the issue was rigorously pursued to determine whether or not the item function would be impaired with respect to the plant design basis, the documentation was corrected, and none of the items required any rework within the process of NCR evaluation. |R

Table E-1
Nonconformance Report
Distribution by Item

Item	Nonconformance Rates by Type of Item Per Attribute					
	Old Work			New Work		
	Attributes	NCRs	Rate (%)	Attributes	NCRs	Rate (%)
Beams and structural steel	298,980	109	0.04	117,150	12	0.01
Civil-earthwork	374,578	73	0.02	17,986	1	0.01
Cable	5,962	2	0.03	241,724	3	0.001
Cable terminations	2,538	0	0	150,228	6	0.003
Conduit	0	0	0	126,820	1	0.007
Cable trays	590	0	0	20,330	2	0.01
Electrical boxes	0	0	0	39,216	0	0
Electrical hangers	585,808	73	0.01	498,060	9	0.001
Electrical equipment	10,115	11	0.11	106,760	3	0.002
Instrumentation	85	0	0	14,535	8	0.06
Instrument pipe	56,508	5	0.01	502,656	16	0.003
P/M hydro packages	3,422	5	0.15	45,902	4	0.01
Large bore pipe	211,110	67	0.03	575,218	49	0.01
Small bore pipe	1,085,968	49	0.004	814,022	56	0.01
Mechanical equipment	54,166	12	0.02	88,298	15	0.02
Mechanical supports	136,009	42	0.03	731,759	88	0.01
Purchase orders (includes HVAC)	471,660	123	0.03	127,050	34	0.03
Meggers/hypots (cable tests)	10	0	0	7,890	7	0.09
Miscellaneous* (non-traveler)	0	0	0	79,440	5	0.01
Totals	**3,297,509**	**571**	**0.02**	**4,305,044**	**319**	**0.01**

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* The number of attributes shown for old work in the February 1985 report was incorrect. Some travelers did not show a traveler type in the DRG printout which caused them to fall in the wrong categories. These travelers have been corrected.

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Table E-2
Document Review Status
Document Review Group
Distribution by Discipline

Discipline	Total Attributes	Old Work			New Work			
		Attributes	DEL Items	Rate (%)	Attributes	DEL Items	Rate (%)	
Electrical	1,788,151	605,013	22,801	3.77	1,183,138	27,014	2.28	
Piping/mechanical	3,745,874	1,490,675	22,434	1.5	2,255,199	20,941	0.93	
Instrumentation	573,784	56,593	1,332	2.35	517,191	5,975	1.16	
Civil/structural	808,694	673,558	14,492	2.15	135,136	2,558	1.89	
Purchase orders (includes HVAC)	598,710	471,660	25,336	5.37	127,050	2,309	1.82	R
Meggers/hypots (cable tests)	7,900	10	0	0	7,890	287	3.64	
Miscellaneous* (non-traveler)	79,440	0	0	-	79,440	1,539	1.94	
Totals	**7,602,553**	**3,297,509**	**86,395**	**2.62**	**4,305,044**	**60,623**	**1.41**	

* The number of attributes shown for old work in the February 1985 report was incorrect. Some travelers did not show a traveler type in the DRG printout which caused them to fall in the wrong categories. These travelers have been corrected. R

Table E-3
Document Review Status
Records Review Group
Distribution by Discipline

Discipline	Total Attributes	Old Work			New Work			
		Attributes	RDRs	Rate (%)	Attributes	RDRs	Rate (%)	
Electrical	350,662	97,353	193	0.2	253,309	405	0.16	
Piping/mechanical	689,637	331,244	256	0.08	358,393	234	0.07	
Instrumentation	67,091	8,528	34	0.4	58,563	62	0.11	
Civil/structural	20,374	12,692	7	0.06	7,682	3	0.04	
Purchase orders (includes HVAC)	47,960	0	0	0	47,960	128	0.27	R
Meggers/hypots (cable tests)	2,786	0	0	0	2,786	1	0.04	
Miscellaneous (non-traveler)	82,800	0	0	0	82,800	35	0.04	
Totals	**1,261,310**	**449,817**	**490**	**0.11**	**811,493**	**868**	**0.11**	

Table E-4
Document Review Status
Document Review Group
Distribution by Type of Item

Item	Total Attributes Reviewed	Deficiency Rates by Type of Item: Old Work Attributes	Old Work DEL Items	Old Work Rate (%)	New Work Attributes	New Work DEL Items	New Work Rate (%)
Beams and structural steel	416,130	298,980	5,883	2.0	117,150	2,289	2.0
Civil-earthwork	392,564	374,578	8,609	2.3	17,986	269	1.5
Cable	247,686	5,962	211	3.5	241,724	1,897	0.8
Cable terminations	152,766	2,538	32	1.3	150,228	836	0.6
Conduit	126,820	0	0	0	126,820	1,038	0.8
Cable trays	20,920	590	68	11.5	20,330	2,358	11.6
Electrical boxes	39,216	0	0	0	39,216	263	0.7
Electrical hangers	1,083,868	585,808	21,729	3.7	498,060	19,219	3.9
Electrical equipment	116,875	10,115	761	7.5	106,760	1,403	1.3
Instrumentation	14,620	85	1	1.9	14,535	244	1.7
Instrument pipe	559,164	56,508	1,331	2.4	502,656	5,731	1.1
P/M hydro packages	49,324	3,422	29	0.9	45,902	547	1.2
Large bore pipe	786,328	211,110	4,131	2.0	575,218	4,123	0.7
Small bore pipe	1,899,990	1,085,968	12,123	1.1	814,022	3,678	0.5
Mechanical equipment	142,464	54,166	2,340	4.3	88,298	1,335	1.5
Mechanical supports	867,768	136,009	3,811	2.8	731,759	11,258	1.5
Purchase orders (includes HVAC)	598,710	471,660	25,336	5.4	127,050	2,309	1.8
Meggers/hypots (cable tests)	7,900	10	0	0	7,890	287	3.6
Miscellaneous* (non-traveler)	79,440	0	0	-	79,440	1,539	1.9
Totals	**7,602,553**	**3,297,509**	**86,395**	**2.6**	**4,305,044**	**60,623**	**1.4**

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* The number of attributes shown for old work in the February 1985 report was incorrect. Some travelers did not show a traveler type in the DRG printout which caused them to fall in the wrong categories. These travelers have been corrected.

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Table E-5
Document Review Status
Record Review Group
Distributed By Type of Item

Item	Total Attributes Reviewed	Deficiency Rates by Type of Item: Old Work Attributes	Old Work RDRs	Old Work Rate (%)	New Work Attributes	New Work RDRs	New Work Rate (%)
Beams and structural steel	20,374	12,692	7	0.06	7,682	3	0.04
Civil-earthwork	0	0	0	0	0	0	0
Cable	57,671	1,072	2	0.19	56,599	59	0.1
Cable termination	38,967	62	0	0	38,905	65	0.17
Conduit	26,433	0	0	0	26,433	7	0.03
Cable trays	5,725	0	0	0	5,725	39	0.68
Electrical boxes	7,200	0	0	0	7,200	1	0.01
Electrical hangers	189,034	94,261	181	0.19	94,773	205	0.22
Electrical equipment	25,632	1,958	10	0.51	23,674	29	0.12
Instrumentation	2,403	0	0	0	2,403	3	0.12
Instrument pipe	64,688	8,528	34	0.4	56,160	59	0.11
P/M hydro packages	5,490	610	1	0.16	4,880	4	0.08
Large bore pipe	102,592	34,808	41	0.12	67,784	44	0.06
Small bore pipe	348,080	250,526	167	0.07	97,554	47	0.05
Mechanical equipment	19,500	6,375	2	0.03	13,125	28	0.21
Mechanical supports	213,975	38,925	45	0.12	175,050	111	0.06
Purchase orders (includes HVAC)	47,960	0	0	0	47,960	128[1]	0.27
Meggers/hypots (cable tests)	2,786	0	0	0	2,786	1[1]	0.04
Miscellaneous (non-traveler)	82,800	0	0	0	82,800	35[1]	0.04
Totals	**1,261,310**	**449,817**	**490**	**0.11**	**811,493**	**868**	**0.11**

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[1] Non-traveler items: old or new, not identified in data base

Table E-6
Document Exception List Item Per Checklist Attribute Group
Old Work by Item

	QA/QC/TS[3] Personnel Qualification	Welding	Inspection Report Checklist Support Document	Accountability Completeness Legibility	Improper Correction Without Line-through	Personnel Sign-off	Traceability Material	Procedure and Drawing Review	Calibration	Engineering Approval Change Document	Inspection Test Requirements	Vendor Requirements	General Non-List Miscellaneous Items	Input Errors	Totals
Beams and Structural Steel	249	421	625	660	517	1,006	430	465	2	1,177	0	0	464	67	5,883
Civil-earthwork	1,645	8	0	526	584	586	1,516	2,612	105	636	0	0	750	41	8,609
Cable	10	0	7	21	113	12	1	5	1	4	5	0	32	0	211
Cable termination	0	0	0	11	18	0	0	0	1	2	0	0	0	0	32
Conduit	0	0	^	0	0	0	0	0	0	0	0	0	0	0	0
Cable trays	1	0	0	16	7	5	0	17	0	2	0	0	22	0	68
Electrical boxes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electrical hangers	4,519	275	2,576	816	1,502	2,572	764	6,506	18	482	1	0	1,783	515	21,729
Electrical equipment	176	22	60	84	54	84	27	145	0	45	4	0	82	0	761
Instrumentation	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Instrument pipe	17	29	1	184	170	112	101	467	5	220	0	0	27	0	1,551
P/M hydro packages	0	0	0	7	2	1	0	12	0	2	0	0	5	0	29
Large bore pipe	72	208	5	482	742	562	578	1,052	4	552	0	0	90	4	4,151
Small bore pipe	240	197	1	1,255	2,207	1,913	734	5,875	2	1,485	0	2	208	8	12,123
Mechanical equipment	106	119	21	441	309	207	100	681	65	162	0	0	129	0	2,540
Mechanical supports	107	592	25	475	444	568	177	1,238	4	510	0	24	47	2	3,811
Purchase orders (includes HVAC)	2,877	0	217	11,741	4,865	3,085	1,564	8	0	119	0	604	221	37	25,336

Table E-6

Document Exception List Item Per Checklist Attribute Group

Old Work by Item

	QA/QC/TS[1] Personnel Qualification	Welding	Inspection Report Checklist Support Document	Accountability Completeness Legibility	Improper Correction Whiteout Line-through	Personnel Sign-off	Traceability Material	Procedure and Drawing Review	Calibration	Engineering Approval Change Document	Inspection Test Requirements	Vendor Requirements	General Non-List Miscellaneous Items	Input Errors	Totals
Meggers/hypots (cable tests)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Miscellaneous	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	9,819	1,671	3,536	16,717	11,114	10,509	5,792	16,861	705	5,196	10	650	3,861	674	86,395

[1] QA = Quality Assurance
QC = Quality Control
TS = Technical Services

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Table E-7

Document Exception List Item Per Checklist Attribute Group

New Work by Item

	QA/QC/TS Personnel Qualification	Welding	Inspection Report Checklist Support Document	Accountability Completeness Legibility	Improper Correction Whiteout Line-through	Personnel Sign-off	Traceability Material	Procedure and Drawing Review	Calibration	Engineering Approval Change Document	Inspection Test Requirements	Vendor Requirements	General Non-List Miscellaneous Items	Input Errors	Totals
Beams and Structural steel	42	159	197	476	56	76	273	134	10	711	0	0	72	83	2,289
Civil-earthwork	6	0	0	23	2	27	58	105	4	7	0	0	35	4	269
Cable	127	1	121	148	95	691	95	51	1	50	187	0	322	28	1,897
Cable termination	163	8	18	175	80	69	1	31	51	35	0	0	199	26	836
Conduit	72	25	34	53	6	304	47	50	16	31	0	0	390	12	1,038
Cable trays	44	7	19	414	97	117	44	747	34	52	0	0	777	6	2,358
Electrical boxes	36	2	1	6	1	21	5	74	5	5	0	0	152	5	263
Electrical hangers	1,328	181	5,010	1,127	990	1,957	483	6,897	41	1,004	1	0	1,844	356	19,219
Electrical equipment	312	3	200	169	35	154	41	274	1	54	17	0	130	13	1,403
Instrumentation	61	2	55	22	3	29	2	30	0	6	2	0	26	6	244
Instrument pipe	774	469	10	984	178	378	1,487	1,310	28	532	0	1	58	22	5,731
P/M hydro packages	36	3	1	138	7	35	40	172	4	82	0	1	28	0	547
Large bore pipe	176	344	11	691	322	503	662	838	55	451	0	0	52	17	4,123
Small bore pipe	178	174	1	511	196	415	656	950	2	539	0	0	44	12	3,678
Mechanical equipment	42	29	18	326	92	136	94	456	25	54	0	0	61	2	1,335
Mechanical supports	397	1,229	76	1,283	479	1,182	1,210	4,470	30	675	0	34	171	22	11,258
Purchase orders (includes HVAC)	247	0	63	1,315	172	44	332	1	0	15	0	32	65	25	2,309

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Table E-7

Document Exception List Item Per Checklist Attribute Group

New Work by Item

	QA/QC/TS Personnel Qualification	Welding	Inspection Report Checklist Support Document	Accountability Completeness Legibility	Improper Correction Whiteout Line-through	Personnel Sign-off	Traceability Material	Procedure and Drawing Review	Calibration	Engineering Approval Change Document	Inspection Test Requirements	Vendor Requirements	General Per List Miscellaneous Items	Input Errors	Totals
Meggers/hypots (cable tests)	125	0	40	6	6	17	0	0	19	1	0	0	72	1	287
Miscellaneous	96	177	0	199	7	59	69	508	24	293	0	0	58	69	1,539
Totals	3,762	2,811	3,875	8,066	2,824	6,194	5,619	17,026	331	4,577	207	58	4,556	707	60,625

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Table E-8

Checklist Attribute Groups

Group Number	Checklist Group Description	Comments
1	QA/QC/TS personnel certifications/qualifications	This is the review of quality-related documentation to ensure that non-certified individuals did not sign for quality-related activities, and that inspection personnel did not exceed the limits of their certified capability, i.e., cross-discipline sign-off of quality inspections.
2	Welding information, welder qualifications, needed ID, and inspection	This is the review of quality-related documentation to ensure that the required information for welder-listed variables and inspection personnel is correct for the welding process listed on the documentation.
3	Inspection reports/checklists supporting documentation	This is the review of inspection documentation that checks for compliance to the quality instructions and for inspection documentation that reflects the type of inspection performed.
4	Accountability, completeness, and legibility	This is the review of quality documentation to verify that all documentation required by procedures, standards, and codes have been completed and can be read.
5	Improper corrections, whiteouts, line throughs, etc.	This is a review of documentation to verify that corrections were made by individuals authorized to correct errors or entries and to ensure that any obliterated data does not have an impact on the quality of the hardware.
6	Personnel sign-offs, initial and final review, and hold and inspection points	This is a review to assure that all required hold or inspection points were completed and that all necessary reviews were completed. This review is completed in conjunction with Groups 1 and 2.
7	Material traceability	This is a review of material to verify that the material listed on the installation is traceable to the receiving or purchase documentation. Additionally, this review verifies that the material listed on the installation agrees with the material shown on design or installation drawings.
8	Procedure and drawing revisions	This is a review to verify that procedure or drawing revisions listed on the installation documentation are correct for the time period used.
9	Calibration	This is to ensure that properly calibrated tools were used to perform quality inspections.

Table E-8

Checklist Attribute Groups

Group Number	Checklist Group Description	Comments
10	Change documents and AE review and concurrence, engineering change notices, nonconformance reports, field change requests, field engineering change notices, red-line drawings to blue-line drawings, etc.	This is to ensure that the documentation package contains the correct change documents required for the installation, that the documents are referenced in the installation package, and that all in-process drawing changes have been incorporated into the final blue-line drawing contained in the installation package.
11	Inspection and test requirements	This is to ensure that all tests and inspections required by procedures, codes, and standards have been completed and are documented in the traveler package and that the test is acceptable.
12	Vendor requirements	This is a review of purchase and receiving documentation to ensure that all vendor- and site-generated documentation complies with the purchase order and that all procedural requirements have been complied with.
13	General items not covered by specific checklist attribute	This group is used for special cases not covered by a checklist attribute in the preceding 12 categories.
14	Data base input errors	This group accounts for errors in the computer data base caused by typographical keypunch errors or reviewer errors entered into the computer.

APPENDIX F

ANALYSIS OF RECORD VERIFICATION DATA BASE FOR SUFFICIENCY OF DATA

The Record Verification Program has completed more than 7,600,000 attribute examinations as of March 3, 1985. As is demonstrated in Table F-1, at least 500,000 attributes have been examined in each of the major construction disciplines. Given the large number of attributes examined within each discipline, any significant adverse record conditions applicable to a construction discipline class of attributes should be identifiable. R

In order to confirm that inspection samples were sufficiently comprehensive within each discipline, Illinois Power Company has calculated the number of attributes evaluated under the Record Verification Program for each type of major item within the scope of the program. The results are presented in Table F-2. As this table demonstrates, each type of major item has had at least 14,000 record attributes evaluated. In all categories except instrumentation, the number of record attributes examined exceeds 20,000. Any significant adverse record condition applicable to a type of item should be evident from such a large number of record attributes evaluated. Thus, sufficient data are available to evaluate the quality of records for each type of item. R R

Statistical analysis lends support to the judgment that sufficient data from the Record Verification Program are available for analysis. The large number of record attributes examined under the Record Verification Program permits judgments on the quality of construction records of the Clinton Power Station to be drawn with a high degree of confidence.

For example, based on the overall total of 7,602,553 record attributes examined and assuming an infinitely large lot, statistical analysis predicts that the nonconformance rate in the lot would have a maximum uncertainty of only 0.04% at the 95% confidence level.[1] For the instrumentation item category, which has the least number (14,620) of record attributes evaluated, the maximum uncertainty in the nonconformance rate is reasonably low at only 0.8% at a 95% confidence level. These small uncertainties indicate that sufficient data are available from the Record Verification Program as of March 3, 1985, to permit evaluation.

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[1] At the 95% confidence level, the maximum uncertainty is determined from the following equation:

$$U = \frac{1.96}{N} \sigma \times 100\%, \text{ where } \sigma^2 = N[p(1-p)]_{max} = .25N$$

and where U = maximum uncertainty in nonconformance rate at a 95% confidence level

σ = standard deviation
N = number of inspected attributes
p = probability that an attribute is nonconforming

Table F-1
Number of Record Attributes Examined
by Construction Discipline

Construction Discipline	Number of Attributes Evaluated
Electrical	1,788,151
Piping/mechanical	3,745,874
Instrumentation	573,784
Civil/structural	808,694
Procurement	598,710
Others	87,340
Total	**7,602,553**

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Table F-2
Number of Record Attributes Examined
by Type of Major Item

Item	Number of Evaluated Record Attributes
Beams and structural steel	416,130
Civil-earthwork	392,564
Cable	247,686
Cable terminations	152,766
Conduit	126,820
Cable trays	20,920
Electrical boxes	39,216
Electrical hangers	1,083,868
Electrical equipment	116,875
Instrumentation	14,620
Instrument pipe	559,164
P/M Hydro packages	49,324
Large bore pipe	786,328
Small bore pipe	1,899,990
Mechanical equipment	142,464
Mechanical supports	867,768
Purchase orders	598,710
Others	87,340
Total	**7,602,553**

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APPENDIX G

GENERIC RESOLUTIONS IN THE RECORDS VERIFICATION PROGRAM

Table G-1 lists the current status and function of generic resolutions (GR) in a narrative format. For each GR, the underlying problem and its resolution are described, along with the reasons and justifications for the resolution action taken. These reasons and qualifications show that all record deficiencies resolved by GRs have no adverse implications.

GRs are numbered sequentially as they are proposed. If a proposed GR is disapproved, the number is retired and not used again. The issuance and distribution of GRs are handled and controlled as a controlled document under standard Baldwin Associates (BA) document control procedures.

GRs are prepared in a standard format which includes subject, references, problem description, resolution, and justification sections. Specific criteria and instructions are written in the resolution section so that the application and use of each GR can be clearly understood. Training in their use is an integral part of the program.

Each controlled GR write-up includes references to applicable procedures, codes, and backup documentation. Underlying problems and root causes are presented, along with a detailed account of the resolutions. A justification statement must be included in each GR which explains why the resolution is suited to the problem. The justification includes accurate references to historical policy and policy changes, procedure and code citations, quotations or references to commitments from Illinois Power Company (IP) or the Nuclear Regulatory Commission (NRC), and explanations or clarifications of procedures, drawings, or systems. The GR acknowledges the role of quality assurance (QA) field verification in assuring project quality by citing specific QA field verification activities that will relate to the GR's subject. The Manager of Quality Engineering must evaluate each proposed GR and each revision for potential 10 CFR Section 50.55(e) and 10 CFR Part 21 reportability and must document the results in writing. These evaluations by the BA Manager of Quality Engineering, reviews and approvals by cognizant disciplines, and the concurrence of IP QA

provide the controls and assurance that GRs do not affect the safety of plant operations or quality by violating established site commitments or procedures.

Once approved, a GR is implemented into the Document Review Group (DRG) review process by training users to assure accurate understanding of the criteria for use, the reason and justification for its use, and when it cannot be used. Revisions to GRs are approved and implemented in the same way as new GRs.

The GR Program assures that records accepted through the use of a GR acceptably document that the hardware was properly purchased or installed to perform its safety-related function during operation.

Table G-1
Generic Resolutions

GR No.	Rev.	Subject	Discipline[1]	Reason/Problem	Justification and Significance to Safety
1	1	Improper corrections made to documents, including correction fluid and tape	(All)	Corrections, additions, and deletions have been improperly made on documents. This violates American National Standards Institute (ANSI) N45.2.9 requirements, project directives, and procedures.	Per site procedures, documents that must be corrected due to update or deletion of information, human error, or other shall be done by placing a single line through the original entry, the date of the correction, and the initials of the individual making the change. Contrary to this, corrections, additions, and deletions have been made on quality documents that did not comply with site procedures. This GR allows these improperly corrected documents to be reviewed and evaluated by a certified Level II or Level III reviewer. If the correction does not involve acceptability, traceability, identification of the hardware, vendor documents, or BA records and does not leave indeterminate or identify a condition found to be potentially adverse to the quality, it may be accepted.

[1] C/S-Civil/Structural
E-Electrical
P/M-Piping/Mechanical
PRO/SUB-Procurement/Subcontract
ALL-All disciplines

GR No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
1	1	(Continued)			However, the reviewer evalutes the condition and determines that hardware may be affected. As mentioned above, he indicates the condition as a document exception list (DEL) item, which is then closed after initiation of a nonconformance report (NCR) that is used to bring the item back to a conforming condition. Plant quality and safety at Clinton Power Station (CPS) is maintained with the use of this GR.
2	3	Illegible data on documents due to mishandling, poor reproductions, holes, folds, tears, or creases	(All)	Data on documents are illegible due to mishandling and poor reproduction.	The Level II reviewer evaluates and determines if the obliterated entries affect the acceptability, traceability, or identification of the hardware, vendor records (documents provided by the hardware and material suppliers), and BA documents. BA documents are records that provide architectural design criteria, construction, and quality inspection data. The data indicates the receiving, fabrication (putting material together to make a completed item), and installation status of items and equipment. If the obliterated entry does not affect the acceptability of the documentation or hardware, or if other records within the traveler substantiate the missing information, no DEL item is required. When the obliteration makes a complete evaluation impossible or affects the acceptability of a document or hardware, a DEL item is written. The resolution of the DEL item may be to insert a replacement copy of the document into the package. The replacement copy contains the legible data. If the item requires re-inspection by a quality inspector, the results are attached to the DEL to substantiate that the hardware is acceptable.

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Generic Resolutions

GR No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
3		Same as GR2 (not issued)			The use of this GR relieves the reviewer of having to document each and every obliteration when it is clear that the obliterations do not affect the quality of the documentation or hardware installed in the plant.
4	2	Red-line as-built drawings in vaulted augmented class D (radioactive waste) traveler packages	(P/M)	Augmented class D (radioactive waste) travelers do not have complete blue-line as-built drawings as required by 3I-P-020, although Specification K-2882 and FCR-18008 accept red-line drawings.	GR 4 addresses the attachment of red-line construction drawings to a traveler when blue-line as-built drawings were required by an engineering job instruction. When drawings are issued by the design engineer to construction, they are commonly known as blue-line drawings (because they have a blue tint). These drawings give the construction information needed to install the equipment. It is often necessary to make field changes during installation. These changes are noted on a blue-line drawing by using red ink or red pencil, thus giving the drawing the term, red-line. These changes are approved by engineering and quality control (QC) prior to implementation by construction. After completion of the installation, QC uses the red-line drawing for inspection and acceptance of the item. When inspection and acceptance of the item is completed, the red-line drawing becomes the reflection of the item as it is installed in the plant or as-built.

Generic Resolutions

GR No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
4	2	(Continued)			The engineering job instruction required the engineering/drafting department to incorporate the red-line changes onto a master drawing. A copy of the master drawing was made and termed the "blue-line as-built." This copy was then required to be inserted into the traveler. If it was not, the DRG reviewer identified it on the DEL. The engineering job instruction imposed requirements not specified by the contract specifications. GR 4 allows the red-line as-built to be accepted in place of a blue-line as-built. When a DRG reviewer determines that a red-line as-built drawing is not complete, a DEL item is generated and the appropriate changes are noted on the drawing by the engineering department. The use of this GR does not adversely affect the quality of the hardware or documentation at CPS.
5	0	QA/DRG generic disposition to accept "D" in the "class" space of the title block of augmented class D (radioactive waste) traveler	(P/M)	Part of the system description was omitted from the title block of the traveler. "D" was used instead of "Aug D." DEL items were written on these.	This GR allows the use of the letter "D" in the "class" space of the title block of augmented class D (radioactive waste) travelers (Form JV-577). The use of this GR does not adversely affect the hardware or documentation of CPS.

Generic Resolutions

GR No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
6		Not issued			
7	1	Absence of welder identification (ID) on ANSI and American Welding Society (AWS) related travelers	(C/S) (E) (P/M)	QA/DRG is unable to verify welder qualification for some welds on AWS and ANSI related travelers where the welder ID was not documented on the traveler.	The DEL items that stimulated this GR were written in response to a checklist item that called for verification of welder qualifications. Many travelers do not show welder ID, and, therefore, welder qualifications in these cases cannot be verified from the documentation. Both ANSI and AWS standards require that welder ID be placed either on the documentation or near the weld. Consistent with these requirements, BA's general welding specification, BTS-401, requires only that the welder ID be placed adjacent to the weld. Welder ID and qualifications are verified in the field by BA Technical Services (TS) welding inspectors per project procedure BTS-405. Accordingly, the absence of welder ID on the traveler violates no requirements and in no way compromises the integrity of the documentation of the quality of the welds.
8a	2	Level I inspection sign-offs on travelers and supporting inspection reports	(C/S) (E) (P/M)	Travelers and inspection documents have been signed off by Level I inspectors without objective evidence of a Level II review.	Level I personnel have been trained and certified to implement inspection and test procedures and to record the results of such inspections. After the Level I inspector implements the applicable inspection procedure, a Level II inspector evaluates the inspection results and documents their validity by signing the traveler "final review" block.

Generic Resolutions

GR No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
8a	2	(Continued)			When inspections are signed-off by Level I inspectors and there is objective evidence of Level II review (Level II certified in the same discipline, i.e., electrical, mechanical, civil/ structural), the document reviewer does not document this as an exception. However, when no objective evidence of a Level II review exists, the condition is written on a DEL. The appropriate Level II discipline DEL resolver, certified in the appropriate discipline, reviews the scope of work of the Level I inspector for technical adequacy, which is an evaluation of the validity and acceptability of the inspection, examination, and test results. This review ensures that the integrity of the documentation or the safety of the plant is not affected.

GR No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
8b	1	Initial and final review sign-offs on travelers	(C/S) (E) (P/M)	QC traveler initial and/or final review was performed by an individual either who was not a certified Level II QC inspector or who was not certified as Level II in the discipline appropriate to the activity documented by the traveler.	The initial or final review of installation/fabrication travelers was to have been performed by individuals who were certified as Level II QC inspectors in the activity or discipline documented on the traveler. Contrary to this requirement, the initial/final review of travelers was performed by individuals other than Level II QC inspectors. The traveler review process is not now considered to be an inspection, and since it was performed by authorized individuals, the initial/final review by other than a QC Level II is acceptable provided that all QC inspections documented in the traveler package have been reviewed by four Level II QC inspectors certified in the discipline documented in the traveler. If no documentary evidence exists indicating that QC Level II review of inspections were documented by a QC Level I inspector, then a DEL item must be issued and resolved by QC in accordance with the requirements of GR 8a.

Generic Resolutions

GR No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
8b	1	(Continued)			The above review is performed while the traveler is in process. QA/DRG reviews completed travelers using criteria equal to, or more stringent than, those of the QC traveler final reviewer, thus ensuring the quality of the documentation and that the safety of the plant is not compromised.
9		Not issued			
10	3	Missing and incorrect governing procedures and revisions on travelers	(C/S) (E) (P/M)	Reference procedures and their revisions are missing from the travelers or are erroneous. This violates BA QA Manual, paragraph 10.4.1, that requires listing of procedures and applicable revisions on all travelers.	The BA QC Manual requires that applicable procedures and their proper revision be listed on all travelers. Due to human error, and in some cases because more than one revision of a procedure was in effect at different times when a work activity extended over a long period, this was not always done. The resident engineering (RE) DEL Resolution Group has evaluated over 5,000 DEL items identifying this deficiency on a case-by-case basis, with no NCRs being generated. In other words, it has been determined that no safety-related, hardware impacting conditions adverse to the quality of the plant have been detected. Based on this, it is clear that there is no statistically significant relationship between this type of DEL item and hardware nonconformances. Plant safety is therefore not compromised.

Generic Resolutions

GR No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
11	2				Since GR 11, revision 2, was superseded by GR 10, revision 1, all descriptions and significance to design and safety are contained within the superseding GR.
12a	2	Incorrect revisions for M06, M07, and isometric drawings on component support travelers except headfittings	(P/M)	DRG reviewers were writing DEL items for incorrect M06, M07, and isometric drawing revisions listed in the reference block on component support travelers (excluding headfittings).	GR 12a was initiated to cover cases of incorrect revisions of M06, M07, and isometric drawings listed in the reference block of component support (hanger) travelers. This GR is not used for headfitting travelers. These drawings are listed on component support travelers as references only, and the revision level is not always updated on the travelers. The piping drawings show the layout of the pipe system including location of the valves, fittings, component supports, etc. They do not govern the installation of the hangers and, therefore, do not directly affect the work performed in component support travelers. The construction and installation of a hanger is governed by Sargent & Lundy's (S&L) hanger drawing included in the traveler package. This drawing gives the exact locations of the hanger attachments. Any changes to the referenced piping drawings that affect the hanger design are incorporated by S&L in the hanger drawing. Quality of the hardware construction, installation, and acceptance is not affected, and, therefore, the use of this GR can have no impact on the safety of the operation of CPS.

Generic Resolutions

GR No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
12b	0	QA/DRG's GR for incorrect isometric drawing revision referenced on fabrication travelers	P/M	QA/DRG's GR for incorrect isometric drawing revision referenced on fabrication travelers.	A fabrication traveler is used to provide documentation of the construction, inspection, and assembly of hardware items that will be physically incorporated into the plant at a later date per an installation traveler. An installation traveler is used to provide documentation of the installation of fabricated hardware items into the plant. Final QC inspection and acceptance is documented in these travelers and will confirm or supersede any previous inspections that were made in the fabrication travelers. This GR is applied only if the following conditions are met: - There is a piping system fabrication or installation traveler walkdown inspection checklist (Form JV-734) in the fabrication traveler that lists the correct isometric drawing revision. - The installation traveler reflects the correct or later revision of the traveler, and QC has accepted the installation of the fabricated items based on the latest revision of the isometric drawing. If one or both of the above conditions are met, there is documented evidence provided that the installed hardware items have been inspected and accepted as meeting the latest design requirements. Therefore, there is no impact on the quality of construction or safety of operation of CPS.

Generic Resolutions

GR No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
12b	0	(Continued)			If the above conditions are not met, QA/DRG documents the condition as a DEL item and forwards it to the DEL Resolution Group for resolution.
12c	0	QA/DRG GR for incorrect isometric drawing revisions listed in the drawing reference block of piping travelers	(P/M)	QA/DRG GR for incorrect isometric drawing revisions listed in the drawing reference block of piping travelers.	This GR can be used only if the correct isometric drawing revision is listed in the attachment block of the traveler. A document listed in the attachment block must be included in the traveler package. Construction and inspection activities must adhere to the latest drawing revision included in the traveler. Therefore, if the correct revision is attached and listed in the attachment block, assurance is provided that construction and inspections were performed to the latest design requirements. QA/DRG reviewers are instructed not to write DEL items on this condition because there is no impact on the quality of construction nor safety of operation of the plant.
12d	0	GR for incorrect revisions of M04 drawings referenced on mechanical equipment installation travelers	(P/M)	GR for incorrect revisions of M04 drawings referenced on mechanical equipment installation travelers.	GR 12d applies exclusively to drawings M04-1005, M04-1006, M04-1007, M04-1008, M04-1009, and M04-1035. This GR is used only if other M04 drawings having a sequence number of 1037 or above with the correct revision are referenced in the traveler.

Generic Resolutions

GR No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
12d	0	(Continued)			M04 drawings concern equipment foundations and provide a means of identifying the location of a piece of equipment. The lower numbered drawings listed above are general in scope, cover large areas, and give the location of several pieces of equipment. M04 drawings numbered 1037 and above contain this same information, plus greater detail. Any design change in the lower numbered drawings are incorporated into revisions of the higher numbered drawings. If the correct revision of these higher numbered drawings is listed in the traveler, the lack of correct revisions on the subject drawings can have no adverse impact on the quality of construction or safety of operation of the plant. If the correct revision of the higher numbered drawings is not listed in the traveler, the QA/DRG reviewer will issue a DEL item and forward it to the DEL Resolution Group.
13	2	Deletion of QC and TS inspection and sequence points indicated by initial review Level II on augmented class D (radioactive waste) and fire protection travelers	(P/M)	QC and TS inspection personnel marked "N/A" or left blank the inspection/sequence points on augmented class D (radioactive waste)/fire protection fabrication/installation travelers (JV-577).	Inspection and sequence points were assigned to certain inspection attributes during initial review of augmented class D (radioactive waste) and fire protection travelers. These inspection points specify a particular attribute that must be inspected before work continues on other items or specifies a particular sequence of events in the construction activity.

GR No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
13	2	(Continued)			QC and TS personnel marked "NA" or left blank the inspection and sequence points that were designated by initial Level II review personnel on augmented class D (radioactive waste) and fire protection/fabrication/installation travelers (Form JV-577). These conditions are documented as DEL items and accepted per GR 13 with the following exceptions: - Location and orientation, alignment and configuration, final dimensions, or protective seals and covers. If these attributes are not inspected on the corresponding installation traveler, DELs are written and submitted to the DEL resolver group for resolution. - Block 8 of Form JV-577, GR 13 applies to all items in block 8 other than "weld complete." If welding is performed, the weld complete block must be filled in or a DEL item is submitted to the DEL Resolution Group. The only required sign-off by code or standard is "weld complete."

Generic Resolutions

GR No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
13	2	(Continued)			Fabrication travelers are inspected prior to installation travelers; therefore, the acceptance of the installation traveler would supersede the acceptance of the fabrication traveler. The acceptance criteria is the same for both travelers. A final review is performed for each completed traveler in accordance with site procedures by a certified Level II inspector. This review includes, but is not limited to, verifying that all required inspections have been completed and that deleted inspection and sequence points are not applicable. The Level II personnel performing final review are trained and certified and have demonstrated capabilities in the validation and acceptance of inspections, examinations, and test results. Therefore, the deletion of these inspection points has no adverse effect on the quality of the plant or the integrity of the applicable documentation.
14		Not issued			
15		Not issued			

Generic Resolutions

GR No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
16	0	QA GR for discrepancies involving the JV-118 (requisition/purchase order [PO] review form)	(PRO/SUB)	QA GR for discrepancies involving form number JV-118.	JV-118 is an obsolete checklist type form that was used by procurement engineers as an aid to assure that the information on a requisition was incorporated on the PO. At no time did it provide documentary evidence of the quality of items or activities. The information provided on JV-118 was a reiteration of the information provided on both the PO and the purchase requisition. Both the PO and the requisition are subject to review for quality requirements and require management level approval, which is authenticated by date and signature. The use of this GR does not compromise the safety of the plant or of the documentation because all quality-related requirements are extracted from approved codes, standards, and specifications, which in themselves are used by DRG for the review and approval of the requisitions and PO, not the JV-118.
17		Not issued			
18	0	QA/DRG GR for cases where final cleaning was designated as a "sequence" but was not signed-off	(P/M)	QA/DRG GR for cases where final cleaning was designated as a "sequence" but was not signed-off.	GR 18 was initiated for cases where final cleaning was designated as a sequence step on travelers, but was not signed by BA inspection personnel. Per site procedures and directives, sequence points must be signed and dated by authorized personnel.

GR No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
18	0	(Continued)			Final cleaning is designated by S&L in Specification K-2882 as IP's responsibility. Though it is considered a procedural violation to leave a sequence step blank, the quality of the hardware is not affected in these instances because IP verifies that the final cleaning during startup and pre-op testing has been performed per design requirements. It was never the responsibility of BA and should not have been sequenced on the travelers. Therefore, a deficiency of this nature can have no impact on the quality of documentation or construction nor on the safety of operation of CPS.
19	1				Since GR 19, revision 1, was superseded by GR 72, revision 0, all descriptions and significance to design and safety are contained within the superseding GR.
20		Retracted			This GR dealt with material traceability or the lack of material traceability documented on NCRs or discrepancy reports which were part of corrective action request (CAR)-073. The use of this GR did not compromise the safety or design of the installation because the problems associated with material traceability on electrical installations prior to 1/1/84 have been resolved by CAR-073, NCR 23422, and GR 111.

Generic Resolutions

GR No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
21	0	QA/DRG GR for items and materials with non-safety receiving inspection report (RIR) numbers listed on augmented class D (radioactive waste) travelers, form JV-577	(P/M)	QA/DRG GR for items and materials with non-safety RIR numbers listed on augmented class D (radioactive waste) travelers, form JV-577.	Non-safety RIR numbers (RIR numbers with an "N" prefix) do not denote a lack of QA involvement. The use of the non-safety RIR number was generated by QC to document receipt of items and materials purchased in accordance with attachment A of the procurement manual for non-safety POs. Because items and materials received on safety- and non-safety-related RIRs are inspected per the same criteria, it is assured that the implementation of this GR could have no adverse effect on the design or safety of the plant.
22	0				GR 22 addressed incorrect heat or RIR numbers on electrical installations. Since GR 22 was superseded by GR 111, all descriptions and significance to design and safety are contained within the superseding GR.
23		Not issued			
24	0				GR 24 addressed various sizes and dimensions of sheared plate installed in electrical installations without heat or RIR numbers for material traceability. Since GR 24 was superseded by GR 111, all descriptions and significance to design and safety are contained within the superseding GR.
25		Not issued			

Generic Resolutions

GR No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
26		Not issued			
27	1	Missing JV-146 forms and deleting duplicate data on JV-146 and JV-155 forms from scope of QA/DRG review	(PRO/SUB)	Completed JV-146 and JV-155 forms that are required to be included in record packages are missing. Also, data on these forms is missing, incorrect, or has been improperly corrected, etc., but this data is duplicated data on other project records.	GR 27 addresses two site documents: JV-146 (QA documentation checklist) and JV-155 (QC receiving inspection instructions). This GR is used where one or both of these documents are missing from record packages and for deleting duplicate data entries made on these forms. Where one of these documents is missing, an acceptable copy of the missing original must be obtained, reviewed, approved, and inserted in the package or a new original must be initiated, reviewed, approved, and inserted in the package. Certain data (e.g., requisition numbers, names of suppliers, CPS unit numbers) appear on numerous site documents (RIRs, the PO, the subcontracts, etc.) and are duplicated on both JV-146 and JV-155. The data do not significantly affect the quality of the plant, hardware, or vendor documentation as it is not used to accept or reject documents. The PO, subcontract, and RIR contain this same data and it is on these forms that this data is reviewed and approved or rejected; therefore, no design or safety significance exists.
28		Not issued			
29		Not issued			

Generic Resolutions

GR No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
30		Not issued			
31	2	Arrows, continuation lines, and ditto marks used to carry data forward on BA travelers and checklists	(C/S) (E) (P/M)	Arrows, continuation lines, and ditto marks have been used to carry data forward on BA travelers and checklists, and their use is not addressed by codes, standards, etc.	Though the use of ditto marks, arrows, and continuation lines is a practice widely used in many other industries to signify inclusiveness, its use had not been addressed by site procedures, codes, or directives until 9/15/83, per memo JF 34883. This policy memorandum accepts this practice for use on BA documentation prior to 9/15/83, providing that after review by a certified Level II reviewer, the subject documentation is found to be legible and readily comprehensible. Any other condition would leave the quality of the item indeterminate and require that a DEL item be generated. This situation would automatically make the item subject to reinspection or resolution by an NCR where the quality of the hardware is determined to be questionable.
32		Not issued			
33		Not issued			
34		Not issued			

Generic Resolutions

GR No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
35	0	GR for acceptance of Level I inspector sign-offs on receiving inspection documentation forms.	(PRO/SUB)	GR for acceptance of Level I inspector sign-offs on receiving inspection documentation forms.	This GR was initiated to accept Level I inspector sign-offs on receiving inspection documentation forms. The DRG will not write DEL items when the following conditions exist: - RIR (form JV-152) is signed and dated in the "inspected by" block by a Level I inspector and the "reviewed by" block is signed by a certified Level II inspector. Level I inspection personnel are trained and certified in accordance with industry standards, which allow a Level I inspector to implement inspections, examinations, and test procedures. The RIR is subject to a review by a Level II inspector who evaluates the inspection results and documents their validity by signing the "reviewed by" block. - RIR form JV-155 is signed, initialed, and dated by a Level I inspector and the "reviewed by" block on RIR form JV-152 is signed by a certified Level II on or after the Level I inspection date. Receiving inspection instruction form JV-155 is part of the inspection documentation and must be attached to RIR form JV-152 at the time the Level II reviewer performs the documentation review. The Level II reviewer will not accept the documentation package without a completed JV-155 form. The Level II reviewer evaluates the inspection results recorded by the Level I inspector and documents their validity by signing the "reviewed by" block on form JV-152.

GR No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
35	0	(Continued)			- Script or printed names or initials that are in agreement with the authorized signature card are acceptable, provided there is no disagreement noted with the authorized signature card. If a disagreement does exist, the presence of a higher level review resolves the item. Incorporating this GR into the document review program does not adversely affect the quality of the documentation or the physical integrity of the plant.
36	1	Referenced change documents not in traveler packages	(C/S) (E) (P/M)	Change documents, such as NCRs, deviation reports (DR), field change requests (FCR), field engineering change notices (FECN), and engineering change notices (ECN), required by governing procedures are to be listed as attachments to traveler packages and included in the traveler packages. However, they are not included in packages or are not marked with "approved for construction" control stamps.	This GR has been issued because change documents that are required by procedure to be listed as attachments to a traveler package or that are not marked with "approved for construction" control stamp as required are not attached to the package. This applies to travelers in the civil/structural, electrical, and piping/mechanical disciplines. This GR ensures that traveler packages list and contain the required change documents in the following manner: The Level II or III reviewer must first determine that the suspect document is, in fact, required. If they are required but missing, the QA/DRG reviewer will obtain a copy of the change document and place it in this package after verifying that it is complete, closed by site procedures, and stamped "approved for construction."

Generic Resolutions

GR No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
36	1	(Continued)			If the above conditions cannot be met, a DEL item is generated and remains open until the above requirements are satisfied. In this way, the quality of the plant is assured and no design of safety significance exists.
37		Same as GR 13 (not issued)			
38		Not issued			
39		Not issued			
40	0	Use of non-black ink on project records is deleted from the scope of QA/DRG review	(All)	Use of non-black ink on project records deleted from the scope of QA/DRG review.	ANSI and site requires that documentation be suitable for microfilming. The onsite microfilm equipment will reproduce any color ink, and using black ink or non-black ink will neither enhance nor detract from the quality of the documentation. The use of this GR, therefore, has no effect on acceptability of the documentation or on the quality of the hardware installed in the plant, and no design or safety significance exists.
41	0	Blank inspection checklists in electrical traveler packages	(E)	Blank inspection checklists in electrical traveler packages.	As part of the initial traveler review (R/O of traveler), blank inspection checklists are inserted into the traveler package per project procedures. The requirement for placing blank checklists into the traveler for subsequent traveler revisions has been deleted. For subsequent traveler revisions, checklists will be added when necessary by the QC inspector at the time of inspection.

GR No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
41	0	(Continued)			Placing electrical inspection checklists into traveler packages at the time of the initial review is in complete accordance with project procedures. Deleting the requirement to add checklists at each initial review for subsequent traveler revisions does not affect project quality. When a traveler is found with blank forms, initiated prior to the procedure changes, a DEL item is written to document the occurrence. It is resolved by accepting the package with the blank forms under this GR. Project quality is not adversely affected, using the same logic as described above.
42	0	Verification of signature and initials authorization deleted from scope of QA/DRG review	(All)	Delete authorized release signature list.	GR 42 deleted a requirement to use the authorized release signature list to verify that people were authorized to sign particular signature blocks on documentation whether the signature was quality related or not. This GR clarified that people had to be certified to sign quality inspection or review and acceptance blocks on documentation. These certifications are found on the Quality and Technical Services (Q&TS) certification matrix, which is a computerized record of all quality personnel listing the different types and certification levels for each person (a person's certification is determined by education, experience, and test results).

Generic Resolutions

GR No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
42	0	(Continued)			Non-quality signature blocks do not indicate acceptance of a quality-related attribute, and the reviewer verifies only that a signature is in the block. The authorized release signature list is used only to match a signature with a name. The name is then used to verify certification status of the individual. The use of this GR does not adversely affect the quality of the hardware or documentation at CPS.
43	0				GR 43 addressed improper corrections on BA documents. Since this was superseded by GR 1, revision 1, all descriptions and significance to design and safety are contained within the superseding GR.
44	1	QC hold points deleted on augmented class D (radiocative waste) and fire protection piping travelers (JV-577)	(P/M)	Travelers (JV-577) containing QC hold points assigned at the time of initial review have been deleted during inspection activities.	This GR was issued because augmented class D (radioactive waste) and fire protection fabrication and installation travelers (form JV-577), which contained QC hold points assigned at the time of initial review, had been deleted during inspection activities. A hold point is an inspection point established on the traveler by QC beyond which work cannot proceed without the QC inspector's initial and date sign-off on the traveler.

GR No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
44	1	(Continued)			DRG document reviewers document findings for this condition on a DEL, unless any one of the following conditions exist: - All mandatory hold points (all raw material has been identified with heat and RIR numbers) have been satisfied or the item being installed on an installation traveler has had all hold points satisfied on the fabrication traveler. - Work has not progressed beyond a point where the inspector could witness the operation and verify that the initial and date sign-offs on the traveler (or on other approved documents attached to the traveler package) are in the proper sequence. - The initial and date sign-offs for deleting a hold point for material traceability is concurrent with or later than the initial and date sign-offs for material issued within the traveler package. Site procedures state that mandatory hold points must be placed on travelers covering the fabrication of spools furnished by Southwest Fabricators to ensure that the raw material has been identified with a heat and RIR number. Each hold point requiring a QC inspector signature must be signed and dated before the next operation in the fabrication sequence can be performed.

Generic Resolutions

GR No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
44	1	(Continued)			Since all mandatory hold points required by site procedures were satisfied, deletion of other established hold points would not adversely affect the quality of the hardware or the documentation.
45	0	JV-874 deleted from scope of QA/DRG review	(PRO/SUB)	JV-874 deleted from scope of QA/DRG review.	DEL items are not to be written on items involving form JV-874 (vendor documentation review) and vendor documentation review letters. The documentation checklist (JV-146) is the form used for vendor documentation received onsite with or for a given PO and its subsequent acceptance by BA vendor QA. Form JV-874 and vendor documentation review letters are not required to verify assurance of quality of the documentation or of the plant.
46	1	Interdiscipline QC inspector sign-offs on C/S fabrication/installation travelers for embedded items	(C/S)	Interdiscipline QC inspectors sign-offs on C/S fabrication/installation travelers for embedded items.	C/S QA/DRG reviewers generated DEL items when QC inspectors who were not certified in C/S discipline signed off C/S fabrication/installation travelers for embedded items. GR 46 was initiated to resolve those DEL items and to more clearly define signature and authorization requirements of QC inspectors for the QA reviewer.

GR No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
46	1	(Continued)			Inspection of embedment material by QC inspectors not certified in the C/S discipline does not compromise the quality of the fabrication or installation because all QC inspectors are trained and certified to perform work governed by BAP 2.14 (fabrication/installation of items, systems, and components). The required general knowledge in this procedure is not limited to specific QC disciplines. When a QC inspector other than C/S signs for embedment material intended for electrical or piping/mechanical use, the final location and orientation of the embedment is inspected by C/S QC prior to placing the concrete. This inspection is documented on a pre-placement inspection checklist and is included in its respective concrete pour traveler. Per this clarification, the presence of any certified QC inspector's signature on embedment fabrication or installation is acceptable and assures that the items have been constructed, inspected, and accepted as meeting design requirements. Therefore, this matter has no impact on the quality of construction or safety of operation of CPS.
47	0	Items/materials rejected on RIRs (JV-152) for cleanliness	(PRO/SUB)	Items/materials rejected on RIRs (JV-152) for cleanliness.	Items or materials rejected for cleanliness during receipt inspection are acceptable per this GR. DRG reviewers accept items listed on the RIR, form JV-152, with a final disposition of "A" (conforming) even though the comments block of the RIR indicates the item was rejected for not meeting the cleanliness requirements.

GR No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
47	0	(Continued)			Items that conform except for cleanliness may be accepted by QC at receipt inspection by flagging the discrepant items with red tape to denote cleaning is required. Cleaning is performed by the responsible discipline and is verified by QC to be acceptable in accordance with site procedure. An NCR is not required for minor contaminations that can be cleaned onsite. Shipments of all pipe and piping components received without closure caps attached are either flagged with red tape or documented on an NCR. Therefore, the use of this GR does not affect the quality of the hardware of the plant.
48					GR 48 was issued to accept open change documents against BA installations, provided the changed document was identified on the IP system turnover punchlist. The GR was approved, issued, and retracted on 10/19/83. GR 48 was not used to resolve DEL items, and the original was marked as voided and vaulted.
49	0	GR for augmented class D (radioactive waste) travelers listing incorrect revisions of the non-safety work program (NSWP)	(C/S) (E) (P/M)	Augmented class D (radioactive waste) work was covered by the NSWP until BAP 2.26 was issued on 9/15/81. Specific quality requirements that should have been accomplished prior to this date were not delineated in the NSWP.	For work on augmented class D (radioactive waste) and fire protection systems performed under the NSWP, the proper revision of the NSWP was not always recorded in the documentation. This prompted the writing of DEL items during review.

GR No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
49	0	(Continued)			Analysis of the NSWP revisions 10 through 24 and separately imposed safety requirements revealed that, except for work types delineated in GR 49, all of the revisions met requirements for plant quality. Therefore, any revision is acceptable for all but the excepted work types. The acceptance of documentation for work in the excepted work types requires QC involvement to assure that safety requirements were met. For these areas, reviewers write DEL items that are appropriately handled on a case-by-case basis by QC and any other appropriate disciplines. The use of this GR does not affect the quality of the hardware or documentation at CPS.
50	0	Welders qualified for alternative welding procedure specifications (WPS) for non-ASME travelers	(C/S) (E) (P/M)	Welders qualified for alternative WPS for non-ASME travelers.	QA/DRG reviewers were unable to verify the qualification of a welder to an alternative welding procedure specified on a non-ASME type traveler. This GR allows QA/DRG reviewers to accept the qualifications of a welder to an alternative welding procedure when those procedures have similar acceptance criteria.

Generic Resolutions

GR No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
50	0	(Continued)			The similarities in alternative welding procedures and the welder qualifications to those procedures are verified in the field by BA's TS welding inspectors. Therefore, quality is not adversely affected.
51	0	Missing JV-155 for RIRs (JV-152) that contain the signed-off inspection requirements	(PRO/SUB)	Missing JV-155 for RIRs (JV-152) that contain the signed-off inspection requirement.	Prior to 9/28/76, the QC receiving inspection instructions were included on the QC RIR form JV-152. Prior to 9/28/76, RIR form JV-152 contained sufficient evidence to document the activities affecting quality as required by 10 CFR Part 50, Appendix B, Section XVII, and ANSI N45.2.9. Also on 9/28/76, revision 0 of Baldwin Associates procedure (B*.P) 2.3 was issued to remove the inspection instructions from form JV-152 and placed them on form JV-155. As shown, the requirements of receiving inspection are met throughout the proces , thus assuring the safety and design integrity of the plant and the documentation.

Generic Resolutions

GR No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
52	2	Q&TS acceptance marking of vendor records	(PRO/SUB)	Vendor records have been marked as acceptable by combinations of various Q&TS review stamps and sign-offs that are inconsistent and in disagreement with both current and previous project procedure requirements.	Though the method of signifying review and acceptance of records is inconsistent, the criteria for acceptance has not significantly changed. In other words, even though particular stamps or methods of sign-off differ, they all signified that the vendor records are acceptable to codes, standards, project procedures, and procurement document requirements. As long as the acceptability of each record is clear, the application of this GR will have no adverse effect on the safety of the plant, its design intent, or the quality of documentation.
53	1	Non-quality vendor documents deleted from scope of QA/DRG review.	(PRO/SUB)	Present QA/DRG document review has generated numerous DEL items on the following non-quality documents: - bills of material* - transmittals - bills of lading/shipping papers* - invoices - packing slips* * **Note:** When referenced on vendor certificate of compliance or certified material test reports (CMTRs) and required to assure traceability, these documents become quality records, and this GR does not apply.	GR 53 addresses the acceptance of DEL items written against specific non-quality documents such as invoices, transmittals, packing slips, shipping papers, bills of lading from transportation companies, etc. These documents (unless they are referenced by the vendor on his certificate of compliance or CMTRs to assure material traceability) are not considered records and have no bearing on the safety, hardware, or quality of documentation mandated by the codes, standards, and specifications used in the construction of CPS.

Generic Resolutions

GR No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
53	1	(Continued)			In those instances where the above referenced documents have been used by the vendor to provide or assure traceability, these documents become quality records and are subject to the same review and approval cycle as any other quality record, and this GR cannot be applied. Therefore, in instances where this GR is used, no design or safety significance exists.
54	0	Controlled documents referenced or contained within PO packages used for basis, justification, or making purchases deleted from the scope of QA/DRG review	(PRO/SUB)	DEL items have been written on controlled documents (for example, NCRs, DRs, FCRs, design specifications, ECNs, FECNs, field deviation disposition requests, drawings, etc.) in PO packages or have been referenced on the requisition, PO, or riders that were used only as a basis or justification for the purchase of items, materials, etc. These controlled documents were attached to or referenced on the requisition, PO, and riders, but were not imposed on the vendor by the PO or riders.	GR 54 addresses the acceptance of DEL items written against controlled documents ("Those documents which have been formally reviewed and approved for project construction activities which require strict control for distribution and/or traceability." Ref. BAP 2.0, paragraph 2.1) that were used only as a basis or justification for making purchases. This practice does not compromise the safety of the plant or quality of the documentation because the above defined documents were used only as attachments or references, and therefore no design or safety significance exists.

Generic Resolutions

GR No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
55	4	Q&TS certification type and level required for Q&TS sign-offs on JV-146, VJ-155, JV-418, JV-540, and JV-661	(PRO/SUB)	QA/DRG checklists, departmental/project procedures/instructions and forms require Q&TS sign-offs of forms JV-146 (documentation checklist), JV-155 (QC receiving inspection instructions), JV-661 (engineering documentation checklist), JV-540 (request to upgrade materials), and JV-418 (items or materials returned report), but do not clearly stipulate the specified levels and types of certifications that are acceptable.	This GR is used to address those instances where both departmental and project procedures, instructions, and forms require Q&TS sign-offs on documents, but do not clearly specify the level or type of certification required. This GR defines those parameters in conjunction with the aforementioned procedures, instructions, and forms and, in and of itself, has no impact on the design or safety of the plant or the hardware.
56		Not a GR			
57		Not a GR			
58		Not a GR			
59		Not a GR			
60		Not a GR			
61		Not a GR			
62		Not a GR			

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Generic Resolutions

GR No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
63	0	TSIVI listed on piping travelers in lieu of TSIVI-1	(P)	Many entries on piping hanger travelers for the TS instruction were written as TSIVI, instead of TSIVI-1. This problem existed for approximately 1-1/2 years.	This GR was initiated to cover cases in which TS had incorrectly identified an instruction (TSIVI-1) on piping hanger travelers. For approximately 1-1/2 years, this instruction was often listed on piping hanger travelers as TSIVI, omitting the suffix -1. TSIVI-1 is the instruction for TS Phase I inspection of location and orientation of hangers and is applicable to piping hanger travelers. At the time the Phase I inspection program began (4/16/81), only one TS inspection instruction (TSIVI-1) was in effect. On 9/10/81, TSIVI-2 became effective and caused confusion in distinguishing between the two instructions. TSIVI-2 is a general instruction written to direct TS inspectors on the generation of NCRs for deficiencies found during the inspection of a weld. The dissimilarity between the two instructions admits no confusion as to the traveler's function or intent. Further, neither site procedures nor directives required that these instructions be referenced on travelers, and TS no longer references them. The quality of the installation documentation is not adversely affected by omission of the suffix after TSIVI, and there is no impact significant to plant operational safety.

Generic Resolutions

GR No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
64	0	Missing cleanliness requirements on POs for piping items.	(PRO)	DEL items have been written on requirements for piping items, end protection, closure and end caps, or cleanliness that were stated on the purchase requisitions but were omitted from the POs.	It has been determined that items and materials received on site that conform except for cleanliness may be accepted by QC at receipt inspection by identifying the descrepant items to denote that cleaning is required. Cleaning is then performed by the responsible discipline and verified by QC as acceptable to the applicable cleanliness class, prior to issuance for construction. Shipment of all items received without end protection or cleanliness are either identified as such and cleaned or are documented on an NCR, depending on the severity of the contamination. In addition, approved site procedures require QC personnel to verify cleanliness of all piping items prior to issuance to construction for field installation or use. With the above stated requirements in effect, it is assured that the quality of the documentation and safety of the plant meet the requirements of the design intent.

Generic Resolutions

GR No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
65	0	Usage frequencies and effective dates for forms JV-146, JV-155, JV-436, and JV-661.	(PRO/SUB)	DRG procurement checklist, project/departmental procedures/instructions, and the forms themselves required issuance and completion of forms JV-146 (documentation checklist), JV-155 (QC receiving inspection instructions), JV-436 (standard quality requirements for BA procurement), and JV-661 (engineering documentation checklist). The problem is further complicated by revisions to the forms or governing procedures and instructions that affected the form's usage frequencies or their effective dates.	This GR was used to establish the frequencies and effective dates for the inclusion of forms required by site procedures and instructions into document packages. These parameters have since been incorporated into the current site procedures and instructions for those forms still in use. This GR does not affect either the design or safety of CPS or the quality of the documentation.
66	1	Welding interpass temperature that exceeds WPS maximum.	(P/M)	Welds fabricated under K-2882 jurisdiction were made using an interpass temperature which exceeds the maximum allowed per the WPS used.	Welds under S&L specification K-2882 jurisdiction were made using an interpass temperature (the temperature of the weld metal before the pass is started) that exceeds the maximum allowed per the WPS used. DEL items will not be written when the traveler specifies an interpass temperature of no more than 100° in excess of that specified by the WPS used for piping welds made on carbon steel materials which do not require impact testing.

GR No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
66	1	(Continued)			The interpass temperature is an essential variable only for piping welds that require impact testing. Piping welds made on carbon steel material, which do not require impact testing, are acceptable even though the interpass temperature violates a site welding procedure. The integrity of the physical plant is not affected.
67	1	Phase I inspection signed out of sequence with the fit-up sign-off on piping hanger travelers.	(P/M)	The Phase I inspection for piping hangers on form JV-597 has been signed off as acceptable by TS either prior to or after the primary attachment fit-up sign-off date. Phase I sign-offs that are prior to or after the date of the fit-up for the primary attachment weld violates BAP 3.2.5, paragraph 6.4.1, which states that the primary attachment location and orientation will be verified by a TS inspector during the fit-up inspection hold point.	The TS inspector's signature on the traveler form (JV-597) for Phase I location and orientation of the primary attachment to the building documents that he has verified that the location of the attachment meets design requirements. In addition, this verification is documented on a TS Phase I hanger inspection checklist (JV-728). The TS inspector's signature on the traveler form for the fit-up sequence documents that the weld has been done in accordance with codes, specifications, and site procedures. At one time, the governing procedure for the fabrication and installation of hanger support travelers (BAP-3.2.5) specified that these inspections be performed at the same time. In violation of BAP 3.2.5, Phase I sign-offs have been documented on the traveler form prior to or after the date of the fit-up inspection.

GR No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
67	1	(Continued)			Per the GR, this violation will not be written as a DEL item if the hanger was tack welded into its permanent location on or prior to the Phase I inspection date. Tack welds can be verified by documentation of weld rod issuance. This information can be found in the subject traveler. Futher, a DEL item is not required if there is a JV-728 included in the traveler package documenting that the location and orientation of the primary attachment was inspected and conformed to design requirements. If neither of the above conditions are met, the QA/DRG reviewer writes a DEL item and forwards it to the DEL Resolution Group. The procedural violation does not adversely affect the quality of the inspection because verification of location and orientation can be performed any time after the attachment has been tacked in its permanent location. If the limiting conditions stated in the GR are met, the required back-up documentation will assure that this has been done. This situation can have no impact on the quality of construction or operational safety of the plant.

Generic Resolutions

GR No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
68	1	Acceptance of any DEL items on the receiving inspection "performed by-date" section on JV-146 forms.	(P/M)	Old JV-146 forms (documentation checklist) contain a receiving inspection "performed by date" section. This section was left blank, partially completed, improperly lined out, marked N/A, etc.	Prior to 9/82, the JV-146 contained an informational signature type block which was used to identify the QC receiving inspector who receipt-inspected the items and materials as they were received on site. As this block was informational, quite often it was either left blank, partially completed, improperly lined out, marked N/A, etc. This section of the JV-146 is a duplicate of those sign-offs on the JV-152 (RIR). The JV-152 is the quality record used to document the actual receipt and inspection of the hardware. GR 68 is used to address errors and omissions of the receiving inspection "performed by" block of the old JV-146 (prior to 9/82) only. It has no impact, therefore, on the design of safety of the plant, the hardware, or the documentation.

Generic Resolutions

GR. No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
69	0	Acceptance of document examiner and lead auditor certification in lieu of QA procurement engineer, Level II or III, prior to 3/29/77	(PRO/SUB)	Q&TS personnel, certified as document examiners or lead auditors, have signed off procurement-related documents in lieu of QA procurement engineers, Level II or III, prior to the 3/29/77 approval date of BQA-182, revision 1, "Qualification and Certification for QA Procurement Personnel."	This GR addresses those instances where Q&TS personnel, certified as document examiners or lead auditors, signed off procurement-related documents in lieu of QA procurement Level II and III engineers prior to 3/29/77. On 3/29/77, revision 1 of BQA-182 was issued. Since both lead auditors and procurement engineers are certified under ANSI N45.2 and the certification requirements for lead auditor are more stringent than those for procurement engineers, this GR has no impact on the design or safety of the plant or hardware.
70		Not a GR			
71	0	Acceptance of missing, incorrect, improperly corrected, etc., RIR number prefixes	(PRO/SUB)	Prefixes to the control numbers on RIR, JV-152, that should be listed as "S" for safety-related and "N" for non-safety related, are missing, incorrect, improperly corrected, etc.	This GR resolves instances of missing, incorrect, improperly corrected, etc., JV-152 numbered RIR prefixes. These prefixes consist of an "S" for safety-related and an "N" for non-safety-related RIRs, and are used as an in-house aid only to denote the status of the RIR. The prefixes are unique to CPS and are not required by codes, standards, or procedures. In and of itself, the RIR prefix has no impact on the design or safety of the plant, hardware, or documentation.

Generic Resolutions

GR. No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
72	1	BA GR for improperly filled out or missing containment hanger location data or missing QC witness sign-offs on JV-668 (QC electrical hanger installation checklists) and JV-719 (containment electrical hanger location forms)	(E)	BA GR for improperly filled out or missing containment hanger location data or missing QC witness sign-offs on JV-668 and JV-718.	GR 72 has a two-fold purpose. First, it accepts an engineering location verification instead of QC location verification for conduit supports (hangers) in the containment building. Second, this GR provides direction for accepting an N/A in the "location drawing and rev." block of the QC electrical hanger installation checklist (JV-668) for containment conduit supports. Prior to 3/27/81, it was QC's responsibility to verify that the location of all safety-related electrical hangers was in accordance with construction drawings. On 3/27/81, a procedural change shifted the responsibility to verify location of electrical hangers in the containment building from QC to the senior containment engineer. In May 1982, another procedural change required QC to witness the location verification by the senior containment engineer and to sign and date the containment electrical hanger location form (JV-718). In August 1982, QC was directed to sign the JV-718 form only if the senior containment engineer put the exact location of the hangers on the JV-718.

GR. No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
72	1	(Continued)			Using the aforementioned dates, DEL items were generated for missing QC signatures on the JV-718 (after they were required) and if the exact location was not noted on the JV-718. When the original procedural change occurred on 3/27/81, QC was no longer required to list the location drawing and revision number on their inspection checklist JV-668. They could put "N/A" in the block. There was a conflict between the procedure and the QC instruction which made it difficult for the DRG reviewer to determine if QC was or was not allowed to "N/A" the drawing location and revision block. Since this was not clear, DEL items were generated. GR 72 directs that any containment electrical hanger location form (JV-718) that is signed by a containment engineer is acceptable. It also defines 3/27/81 as the date QC could "N/A" the location drawing and revision block on the QC checklist JV-668. If QC marked "N/A" on this block prior to 3/27/81, a DEL item was written. Therefore, no safety significance to operation of CPS exists.

Generic Resolutions

GR. No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
73	0	Certification of QC inspector sign-offs on travelers for miscellaneous metals	(C/S)	Inspections of miscellaneous metal installation (including masonry columns), which are governed by K-2949, BAP 2.14 and applicable installation traveler, were signed off by Level II C/S inspectors not having structural steel certification.	QC inspections of miscellaneous discipline installation (including masonry columns), which are governed by K-2949, "Specification for Miscellaneous Metal Work and Embedded Work," BAP 2.14, "Installation/ Fabrication of Items, Systems, and Components," and the applicable installation traveler, have been signed and accepted by Level II C/S inspectors not having structural steel certification. Although miscellaneous metals, including masonry columns and tee's, are installed per K-2949, they are not considered structural steel and are installed per site procedure BAP 2.14, and the applicable traveler instructions. In this instance, a structural steel certification is not required to sign-off this type of inspection because all C/S inspectors are trained and qualified to BAP 2.14. They are, therefore, qualified to inspect miscellaneous metal fabrications and installations. Because the inspectors were trained and certified to the requirements of BAP 2.14, it is assured that the quality of the plant has not been altered by the use of this GR. Therefore, no design or safety significance exists.

Generic Resolutions

GR. No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
74		Not a GR			
75	0	Piping hanger inspections with no record of tool serial numbers or calibration due dates	(P/M)	QC inspections prior to QC instruction QCI-300, revision 4, did not require entering tool serial numbers and calibration due dates for measurements made during Phase II piping hanger inspections.	Per site procedures, various measuring devices are required to be periodically checked to ensure accuracy. The BA QA Manual requires entering tool serial numbers and their corresponding calibration due dates on the applicable quality documents. DEL items are written for this condition unless the hanger inspections were performed prior to 9/24/82. Quality records for hanger inspections (travelers and inspection records) did not document tool numbers or calibration due dates prior to issuance of QCI-300, revision 4, on 9/24/82. Phase II inspections are now and have been considered in-process type inspections, with ultimate hanger acceptability depending on the results of the final inspection. The final inspection will both determine the final acceptance and provide the documentation required by the QA Manual. All in-process items requiring the use of calibrated tools are re-checked during final inspection and documentation on a Phase III checklist.

GR. No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
76	0	Fitting/material type, traceable code, and RIR data entered in wrong blocks	(P/M)	Entries for fitting type, material type, traceable code, and RIR numbers were entered in blocks of instrumentation travelers that were not labeled to accept these types of data. RIR numbers for fittings were entered in the RIR/heat number column instead of in the filler heat number or lot number columns of block 12, as required by BAP 2.6. The codes have been entered in filler type column, the material requisition column, or RIR/heat number column instead of the filler heat number columns as required by BAP 2.6.	This GR was issued for fitting type, material type, traceable code, and RIR numbers entered in blocks of instrumentation travelers that were not specifically labeled to accept this type of data. This GR applies only to Parker-Hanifin type fittings. Site procedures do not state where this extra information is to be entered. Because this information goes beyond procedural requirements, it could confuse future documentation users after the plant is licensed. The DRG does not write DEL items for this extra information, except for fitting traceable code or RIR numbers that are entered in columns other than the filler heat and lot number columns. These DELs are to document the condition only and are closed by entering the following in the DEL resolution column: "Traceable Code (and/or RIR #) for fitting accepted per GR 76 R/O." This extra information benefits traveler users, both during construction and DRG review and throughout the life of the plant. It is particularly useful to the authorized nuclear inspector during his review. Also, since there is no block for this extra information, having the data on the same line as the base material (tube or pipe) makes the data more useful and less subject to confusion or transcription error. This

GR. No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
76	0	(Continued)			added information is not detrimental to the quality of the documentation or the safety of the plant.
77	0	Acceptance of QC check-list (JV-689) without referenced construction work requests (CWRs)	(CWRs) (E)	QC inspection personnel are required to reference all of the applicable CWRs in the comments section on form JV-689. This has been a requirement since BAP 3.3.7, revision 3, was issued on 9/17/82, but QC inspection personnel have not followed those procedural requirements. Also, traveler preparation review group reviewers have overlooked this requirement in their review; subsequently, these travelers have been sent to the vault without complying with the procedural requirements of BAP 3.3.7, revisions 3 through 5.	This GR addresses a disregard for a procedural requirement to list CWRs in the remarks section of QC checklist, form JV-689. The GR allows this oversight when the applicable CWR used to perform the work is referenced on an attached JV-707. The JV-707 form is used by engineering to reference all engineering directives needed to complete an installation. Included in this form is a block for each referenced directive that the QC inspectors initial and date when installation is complete and is acceptable per the referenced directive. This procedure requirement has been changed, allowing the QC inspector to omit reference to the CWR in the remarks section of the QC checklist. The lack of the referenced CWR on the QC checklist does not affect the quality of the hardware as long as it is referenced on the JV-707. The use of GR 77 does not adversely affect the quality of the hardware or documentation at CPS.

Generic Resolutions

GR. No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
78	1	Delete form JV-185, QC traveler review from the scope of QA/DRG review	(C/S) (E) (P/M)	Form JV-185 was an inventory of document reviews for individual traveler packages and was a required traveler attachment from 1/77 to 10/77. Form JV-185 has not been a regular part of applicable traveler packages nor has it been filed separately in the vault. This has resulted in traveler packages with no form JV-185, contrary to the procedural requirements that were then in force.	GR 78 deletes form JV-185 from the scope of the DRG review. The JV-185 form was required documentation from 1/77 to 10/77. Form JV-185 was an inventory of reviewed documents, such as other JV forms, drawings, and instructions, that applied to a particular traveler. These documents were reviewed prior to being listed on form JV-185. Data required by this form are documented and accepted using the review signatures on other applicable JV forms which are also contained in the traveler packages. Form JV-185 only provides redundant data. Its presence is superfluous and does not significantly affect the quality of the plant.
79	0	JV-668 not having same location drawing and revision as JV-667	(E)	QC inspection personnel are required to record the location, document number, and revision of S&L-approved documents used to verify hanger location on the QC checklist (JV-668). Per QCI-401 R/7, paragraph 7.2, "These numbers (the location document) shall agree with the traveler except that an earlier revision may be listed on the traveler." The document listed on the electrical hanger traveler is usually the area location drawing (EIH series drawings); however, the individual	This GR was written because the electrical conduit hanger location drawing referenced by QC inspectors on the QC checklist did not always agree with the hanger location drawing referenced by engineering on the cover of the traveler package. By project procedure, the location drawing listed on the traveler must also be referenced on the QC checklist. However, the drawing listed on the traveler is usually the area location drawing and is not always detailed enough to determine the exact location of a particular hanger. When this occurs, elevation drawings are used to determine the location of an individual hanger. It is this evaluation drawing that QC inspectors have been referencing on the QC checklist.

GR. No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
79	0	(Continued)		hanger locations are sometimes shown as section views located on elevation drawings (EI 1200 series) which are supplemental drawings to the area location drawings. The QC inspection personnel have been recording the actual drawing number and revision used, even though it does not agree with the traveler.	The elevation drawings used by QC inspectors are actually supplemental drawings to the main hanger location drawings. They appear on the location drawings as "cut" or "section" views and have traceability from the main location drawing to the supplemental drawing and vice versa. The supplemental drawing, when used in conjunction with the main location drawing, actually enhances the assurance of proper conduit hanger location; therefore, quality is not adversely affected.
80	0	Incorrect revisions on reference drawing	(C/S) (E) (P/M)	DEL items are being generated against BA drawings because referenced drawings are not up to the current revision. S&L design drawings that are referenced on the BA drawings are revised without BA updating the revision block on the BA drawing. The revision block for reference drawings on the BA drawing is updated only when a reference drawing affects the BA drawing.	This GR deals with BA-generated drawings that have S&L drawings listed as reference drawings, but list incorrect drawing revisions. The aforementioned S&L drawings are currently not being used for construction and are listed on the BA drawing or traveler as a reference only. Any changes to the S&L reference drawings that affect the BA drawing will result in a change to the BA drawing to incorporate the change. In addition, if field personnel or quality inspectors need to refer back to the S&L reference drawing, they must use the

GR. No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
80	0	(Continued)			current revision of the "approved for construction" controlled drawing. Plant safety is further assured because field verification performs a review of design documents during their overinspection. In consideration of these facts, it can be concluded that no design or safety significance exists with the use of this GR.
81		Not a GR			
82	0	Missing or incomplete data for block 9 of form JV-488	(C/S)	Senior discipline engineers (C/S) often omitted or did not fully complete entering applicable data in block 9 of form JV-488 (fabrication/installation traveler).	This GR was issued because the senior discipline engineers (C/S) often omitted or did not fully complete entering applicable data in block 9 (sub-assembly information) of form JV-488. DEL items are not written for this condition since the information for block 9 is the same information as entered in block 8 of the form. Due to the lengthy description required in listing sub-assemblies for block 8, they were often not repeated in block 9 because of inadequate space. The omission of

GR. No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
82	0	(Continued)			this information does not affect either the hardware or the documentation and, therefore, does not compromise the safety of the plant or quality of the documentation.
83	0	Incorrect or missing heat/RIR numbers on form JV-668	(E)	BAP 3.3.6 and QCI-401 did not address spaces or filler plate material traceability requirements directly; however, the procedures defined how traceability was to be maintained for all materials listed on the bills of material. Inspection personnel verified heat and/or RIR numbers on filler plates and shim plates used in bolted connections on Category I electrical conduit supports.	This GR was issued to resolve deficiencies where heat or RIR numbers were missing from the QC fabrication and inspection checklist for filler or shim plates used in bolted connections on Category I electrical conduit supports. S&L design drawings E05-1980, sheet 1, revision AH, note 40, and E05-1980, sheet 2 revision B, note 55 (hanger installation notes) were revised to allow the use of any commercial grade of steel in bolted connections for electrical supports. Traceability of the material to a specific type or grade or manufacturer's heat or lot number was no longer required. This change deletes the requirement to document heat or RIR numbers on QC checklists for electrical conduit hangers. This GR is used to apply current construction and inspection requirements to hanger installations completed prior to the effective date of the drawings and eliminates the need to document missing or incorrect heat or RIR numbers (for filler or shim plate) on QC inspection or fabrication checklists for electrical conduit hangers. There is, therefore, no design or safety significance.

Generic Resolutions

GR. No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
84	0	Deletion of traveler transmittal forms JV-340 and JV-386 from the scope of QA/DRG review	(C/S)	Forms JV-340 and JV-386 were traveler transmittal forms used for initial and final reviews and were required traveler attachments from 9/19/77 to 3/20/78. Forms JV-340 and JV-386 have not regularly been part of applicable traveler packages nor have they been filed separately in the vault. This has resulted in traveler packages that are missing the subject forms, in violation of the procedural requirements in effect at the time.	This GR was issued to delete the traveler transmittal forms (JV-340 and JV-386 used for initial and final review, respectively) from the scope of the DRG review. These two forms were used to provide instruction for the administrative processing and engineering, QC, and TS review of embed and platework travelers. They were required to be an attachment to the traveler between 9/19/77 and 3/20/78. Consequently, when they were missing from the affected traveler package, a DEL item was written. The use of this GR does not affect the quality of the hardware since the instructions listed on the applicable forms were transcribed from applicable approved procedures and documents in the traveler itself. The DRG review is based on the instructions contained in the applicable procedures. These forms are not required to verify assurance of quality.
85	1	Equipment installation travelers lacking JV-488 forms.	(E) (P/M)	From 6/23/80 until 6/11/82, BAP 2.10 stated "...where welding operations are required for installation, the Senior Discipline Engineer shall prepare a Fabrication/Installation Traveler, Form JV-488, JV-488-1, and as required, JV-488-2..."; from 6/11/82 until present, "....where welding operations require in-process	From 6/23/80 until 6/11/82, piping/mechanical equipment travelers where welding was involved required the use of the welding fabrication and installation form (JV-488). From 6/11/82 to the present, the JV-488 form is now required in all equipment installation travelers (piping, mechanical, and electrical) where welding operations require in-process inspections. This GR was written because the majority of equipment travelers requiring welding operations issued by engineering

GR. No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
85	1	(Continued)		inspections for installation, the Senior Discipline Engineer.....".	during the aforementioned time frame did not contain the JV-488 form. However, the GR allows QA/DRG reviewers to accept those travelers provided they satisfy the following criteria: - A qualified welding procedure is listed in the equipment traveler - A TS welding inspector has accepted and signed-off the weld - The in-process inspections are documented in the traveler - The in-process inspections meet the requirements of the applicable welding specification. When these criteria are met, project quality is not compromised and no design or safety significance exists.
86	0	BA drawings that do not indicate S&L status	(C/S)	BA structural drawings are not statused or stamped, and QA/DRG reviewers have not been trained that this is not a requirement.	This condition is acceptable and is not written as a DEL item per this GR.

GR. No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety	
86	1	(Continued)			BA has created these drawings to show locations of embedded plates. The drawings are reproductions of S&L structural drawings to be used as a construction aid in placing embeds, material take-offs, and procurement. Therefore, they do not need review by S&L and are acceptable without the S&L status stamp. The safety of the plant or the quality of the documentation is not affected by this GR.	R
87	1	Capitol Manufacturing Company CMTRs	(PRO/SUB) (P/M)	CMTRs from Capitol Manufacturing Company have a ∅ prefix to some heat codes; BA QC does not consistently reference the ∅ prefix on the associated BA documents (for example, RIR, material withdrawal slips, travelers, etc.).	Certified material test results from Capitol Manufacturing Company have a ∅ prefix to some heat codes that BA QC does not consistently reference on associated BA documents, such as RIRs, material withdrawal slips, and travelers. DEL items are not written on this condition; however, the DRG will ensure that the heat code is entered in the heat log, both with and without the prefix, to indicate to all subsequent users of the RIR, CMTRs, associated travelers, or other related documentation that the heat numbers without the ∅ are acceptable.	R

GR. No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
87	1	(Continued)			Acceptance of the existing paperwork is based on the suppliers' statement and confirmation in writing that Ø is a registered trademark and is used to identify items manufactured from bar stock at their Columbus, Ohio, plant from bar stock. The integrity of the hardware and the documentation is not affected; therefore, there is no significance to the safe operation of CPS. R
88		Not a GR			
89		Not a GR			
90	0	Incomplete checklists for embedded electrical raceways	(C/S) (E)	The embedded raceway checklist form, JV-506, has sections that have not been used during the post-pour inspection (attribute 15 indicating that the installed raceway has been swabbed; attribute 16 indicating that the installed raceway has been mandrilled; and attribute 17 indicating that the installed raceway is capped or plugged). These attributes have been either marked N/A or left blank. In addition, the post-pour inspection section has no QC inspector or a QC Level II review sign-off.	The embedded raceway checklist used by QC inspectors during post-pour (concrete) inspections have attributes 15, 16, and 17 either marked N/A or left blank. In addition, the post-pour inspection section has no QC inspector or QC Level II review sign-offs. This GR was written to allow QA/DRG reviewers to close all open DEL items written against JV-506s where attributes 15, 16, and 17 were left blank or marked N/A and where there was no QC inspector or QC Level II review signature sign-offs. This is justified because attributes 15 and 16 are covered by JV-353 (cable installation checklist), are governed under BA procedure 3.3.2, and require that

GR. No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
90	0	(Continued)			conduits be swabbed or cleaned. Attribute 17 does not apply because embedded conduit cannot be capped or plugged after the cable has been pulled through the embedded conduit. Therefore, quality is not adversely affected.
91	1	Improper processing of concrete test cylinders	(C/S)	During concrete test cylinder processing, attributes that create optimum curing conditions were out of installation specification requirements. Despite this, the concrete test cylinders reached the required strength. The various optimum attributes that have been found out of specification requirements are: initial cure temperature, cure room temperature, early stripping of test cylinders, and late stripping of test cylinders.	During the processing of concrete test cylinders, various attributes (which create optimum curing conditions) were out of specification requirements. These optimum attributes are curing temperatures and stripping times (the time of removing the cylinders from their molds). R Codes, specifications, and site procedures stipulate that concrete test cylinders are to be processed in a uniform manner. This aids in developing a uniform statistical base for evaluating concrete performance in reaching its required strength. The curing temperature is one of the many variables affecting the strength of the concrete specimens. Minor variances from the optimal curing conditions would not cause a significant change in the strength of the concrete cylinders. The affect on the statistical base would be even less significant.

GR. No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
91	1	(Continued)			A minimum stripping time for concrete cylinders is stipulated so that the cylinders are not damaged by premature stripping. Late stripping of the cylinders could result in difficulty in stripping the molds from the cylinders. Both early and late stripping are procedural violations and could reduce the compressive strength if the test cylinders were physically damaged. This would not enhance the cylinder strength. R Acceptance of cylinder strengths is based on minimum design required strengths. Therefore, this GR instructs QA/DRG reviewers not to write DEL items for violations in processing the concrete test cylinders, provided that the minimum design strength is met. As long as minimum strength requirements are met, violations of this type have no significant impact on the quality of construction, inspection, or safety of operation of the plant.
92	0	Missing revision numbers for supplemental travelers	(C/S) (E)	The supplemental travelers have been improperly identified by the omission of the revision level from the traveler identification in the traveler number block. **Note:** This does not apply to cable pull cards completed prior to 5/3/84 (BAP 3.3.2) and cable termination cards prior to 7/6/84 (BAP 3.3.3).	Supplemental travelers are issued when the original traveler has been previously vaulted. To properly identify a supplemental traveler, the word "SUPP" is written on the traveler, followed by the next sequential traveler number, i.e., SUPP. 01, or SUPP. 02, etc.

GR. No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
92	0	(Continued)			The GR allows QA/DRG reviewers to close all open DEL items where the traveler SUPP revision level has been omitted from the traveler identification. The omission of supplemental traveler revision level is a proper problem and does not affect the quality of the hardware.
93	1	U.S. Testing personnel not certified to perform test per ASTM D421	(C/S)	U.S. Testing personnel that performed tests in accordance with ASTM D422, D423, and D424 were certified to perform such tests. However, for the document of qualification, several U.S. Testing employees do not indicate certification for ASTM D421. ASTM D421 specifies the proper method of obtaining samples for tests ASTM D422, D423, and D424.	This GR is used to address document exceptions in which U.S. Testing personnel were not certified to prepare soil samples per ASTM D421, "Dry Preparation of Soil Samples for Particle-Size Analysis and Determination of Soils Constants." This soil sample preparation operation was necessary when performing the following soils tests: ASTM D422, "Particle Size Analysis of Soils," ASTM D423, "Liquid Limit of Soils," and ASTM D424, "Plastic Limit and Plasticity Index of Soils." For an individual to be certified for a specific ASTM test, he must be able to perform the test as described by the ASTM method.

Generic Resolutions

GR. No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
93	1	(Continued)			Each of the tests (ASTM D422, D423, and D424) specifically references ASTM D421 when describing the sample preparation method, making ASTM D421 part of the method and separate certification unnecessary. U.S. Testing management concurs with the justification of GR 93, letter UST-JAG-10/ 84-10 from J. A. Grimm (U.S. Testing) to R. McCullough (BA/QE). Therefore, this condition has no impact on the quality of construction nor the safety of operation of CPS.
94	0	Incorrect data on the "check if received" column on the JV-146	(PRO/SUB)	Numerous DEL items have been written on missing or incorrect QA documentation checklists (Form JV-146). These forms are used to identify required vendor documentation and to document its receipt. Frequently, the receipt status is missing or was added after the material had been received, as in the case of a JV-146 being reconstructed to replace a missing one. Many times, vendor documents have been noted as received on the JV-146 ("check if received" column); however, when the package reaches QA/DRG for review, some of the	JV-146s are the project records used to identify the required vendor documentation and to indicate its receipt. This GR is used to address those instances where the data in the "check if received" column is incorrect, i.e., a document shown as received in 1977 is no longer in the package or is incorrect. Since the JV-146 is not the project record used to review vendor documentation, the application of this GR has no impact on either the design or safety of the plant or the hardware.

GR. No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
94	0	(Continued)		documentation has often become separated from the package. This results in two separate DEL items: - a DEL item stating that JV-146 is incorrect; it shows receipt of a document no longer in the package, and - another DEL item for missing documentation as referenced on the requirements side of the JV-146.	
95	1	K-specification amendment not current at final review	(C/S) (E) (P/M)	K-specifications referenced on BA documents have incorrect amendments listed at the final review. This does not show that documents have been reviewed to all changes of the K-specification.	This GR allows the acceptance of improper K-specification (contract specification) amendments (revision levels) being referenced on travelers at the time of traveler final review. K-specifications provide the basic rules, regulations, and specifications for the design, construction, and installation activities at CPS. In accordance with site procedures, the current K-specification amendment was required to be referenced on the traveler when the traveler underwent final review. The lack of this did not mean that changes were made to the specifications without any evaluations being performed to determine impact on hardware or documentation. R

GR. No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
95	1	(Continued)			BA's RE Group performs a design review of all K-specification changes independent of the travelers. During this review, RE identifies changes that are more restrictive and evaluates if they will impact any travelers or procedures. R There are also two checks on RE's performance. First, IP's Nuclear Station Engineering Department reviews all specification changes to determine site impact. Second, S&L incorporates changes in the K-specifications into the design drawings. Changes in the design drawing will be incorporated into the traveler or procedures or will cause the issuance of supplemental travelers (supplemental travelers are issued to continue work on an item that had previously been completed and accepted). R The lack of proper K-specifications amendment and the implementation of this GR does not adversely affect the quality of the hardware or the documentation of the plant.
96		Not a GR			

Generic Resolutions

GR. No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
97	0	Traveler document packages where attached documents (except change documents) are not listed as attachments	(All)	GR for traveler document packages where attached documents (except change documents) are not listed as attachments.	This GR addresses a problem where documents (such as inspection reports, equipment requisitions, engineering changes, etc.) are present in the traveler packages without being listed as attachments. This violates project procedures. When a traveler package is reviewed by DRG, all documents in the package are listed on the DRG table of contents (JV-942), which then becomes the official listing of all documents within the traveler package. There is no reason to re-enter documents as attachments to the original traveler cover page once the table of contents has been filled out. No DEL item is required as all documents will be listed by the DRG reviewers. This GR does not adversely affect the quality of the documentation.
98		Not a GR			

Generic Resolutions

GR. No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
99	0	Hold Points signed without correct traveler revision level	(E)	TS welding inspection hold points have been signed-off and dated, but the inspector failed to enter the traveler revision that was current at the time of the weld inspection.	This GR resolves cases where a TS weld inspector fails to enter the current traveler revision in effect at the time of the TS hold point sign-off. TS hold points are designated steps in the installation process where an inspection is required to take place. Inspectors are trained to complete their work to the latest revisions of the traveler. Since current traveler revisions are the only revisions available to the inspectors when they do their inspections, the weld sign-off has to be accomplished during the current revision. The correct traveler revision that should be listed by an inspector can be ascertained by comparing the TS weld sign-off date to the closest traveler initial review date, that is, prior to the sign-off date. When this situation occurs, a GR stamp is applied next to the deficiency to indicate it was noted by the DRG reviewer. This GR does not adversely affect the quality of the hardware or the documentation for CPS.

Generic Resolutions

GR. No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
100	0	Pre-inspection checklists (JV-531, JV-541, JV-542, and JV-543) that conflict with quantities on design drawings	(C/S)	Pre-inspection checklists have been completed with an item quantity that does not agree with design drawings. BAP 3.1.1 prescribes completing these checklists, but there are no procedural requirements that govern their use or define their ultimate purpose. Acceptance criteria were obtained from drawings and change notices. However, errors have occurred in transferring quantity information from the design criteria onto the pre-placement checklists.	The GR was issued to resolve DEL items written that identify pre-inspection checklists (JV-531, JV-541, JV-542, and JV-543) having quantities that conflict with quantities given on design drawings. Site procedure BAP 3.1.1 prescribes completing these forms, but only as an aid to inspection and not as an instrument to delineate the inspection criteria requirements. This procedure requires using the applicable drawings and change notices to determine the pour scope and inspection requirements. Acceptance of item quantities are then documented on form JV-526 to reflect the requirements stated in the design drawings and applicable change documents. Installation and quality attributes, such as quantity, are documented on form JV-191 (pre-placement checklist). Information concerning quantities of penetration and cadwelds are documented in the applicable travelers and then listed on the traveler checklist (JV-525) and pre-inspection checklists (JV-531, JV-541, JV-542, and JV-543). In addition, surveyors, concurrence on quantities, and location is documented by the C/S engineer's signature on the concrete pour travelers (JV-259).

Generic Resolutions

GR. No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
100	0	(Continued)			In summary, although the information on forms JV-531, JV-541, JV-542, and JV-543 is misleading, the true quality configuration is properly documented on forms JV-525, JV-526, JV-191, and applicable travelers, thus assuring that the quality of documentation and intent of design are maintained.
101	0	Heat number not documented for bolting material 1" and under	(PRO/SUB)	Because of past interpretations of procedures, heat numbers are not documented on the RIR for bolting materials 1" and under that do not have heat numbers physically marked on the material. This violates current and past BAP 2.3 revisions. (This GR only applies to document packages completed before 1/3/84.)	Because of past interpretations of procedures, heat numbers are not documented on the RIRs for bolting materials 1" and under that do not have heat numbers physically marked on the material. This violates current and past site procedures. When the JV-146 (documentation checklist) and the PO required the vendor to submit CMTRs, the DRG reviewer verifies that the applicable CMTRs are reviewed, found acceptable, stamped with the correct RIR number, and included in the PO package. DRG reviewers will accept cases that meet this criteria. RIRs with JV-146 forms prescribing CMTRs require that the material purchased be traceable to individual test analysis. When the CMTRs are stamped with the applicable RIR number and are reviewed, found acceptable, and included in the PO package, this provides traceability to the CMTRs and PO through the RIR, thus ensuring the quality of the documentation and safety of the plant significance would exist.

Generic Resolutions

GR. No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
102	0	Traveler items in which content is not required are marked N/A per JV-488	(C/S) (P/M)	Note 1 on back of JV-488 states, "All items shall be completed on the face of the form. If contents is not required, the items shall be marked 'N/A' by the responsible department." This requirement was not met.	The traveler has been reviewed and signed by the RE, QC, and TS departments signifying that the scope of work defined on the traveler had been completed; therefore, the absence of N/A in drawing items outside the scope of the traveler does not affect the quality of hardware or installation. Further, the DRG reviewer must verify that the traveler documents the scope of work defined in the traveler. By signing, the DEL is signifying that the use of this GR does not have any impact on quality of the plant or hardware.
103	0	Absence of JV-938 from traveler packages	(C/S)	Form JV-938, "Document Review Checklist for Concrete Travelers," was a required concrete traveler attachment from 11/1/82 to 3/28/84. Form JV-938 has not been part of applicable concrete traveler packages nor has it been filed separately in the vault. The absence of form JV-938 from concrete travelers is contrary to procedural requirements that were then in force.	This GR resolves deficiencies noted where JV-938 forms are missing from concrete travelers. The JV-938 was required as an attachment to concrete travelers from 11/1/82 to 3/28/84 and was used to assist in the traveler review by BA engineering and TS final review personnel. The BA DRG final review is performed in accordance with procedures and specifications in effect at the time the work was completed from requirements independent of the JV-938 forms. Therefore, the use of this GR does not affect the quality of the hardware or the plant when the form is missing because it is redundant to the review of the traveler and is not used to verify QA.

Generic Resolutions

GR. No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
104	0	Improperly checked attribute for proper cable tension on the JV-353 inspection form	(E)	The maximum tension attribute on the QC inspection checklist (JV-353) has been erroneously marked as acceptable, even though cable has been hand-pulled or hand-layed and no tension monitoring or tension limiting devices have been used. BAP 3.3.2 requires the attribute to be marked N/A.	The maximum tension attribute is only observed when a tension monitoring or limiting device is prescribed by project engineering and is used for installation. The requirements stated in K-2999 and project procedures governing cable installations are that a tension monitoring or limiting device will be used if the tension expected by the pull will exceed 75% of the cable's maximum allowable tension. Project engineering will indicate on the cable installation traveler when tension monitoring or limiting equipment will be required. Therefore, the GR allows QA/DRG reviewers to accept these erroneously marked attributes without compromising project quality.
105	0	Sequenced TS in-process welding inspection hold points were deleted after "weld complete" sign-off on structural attachments (AWS code work)	(C/S) (E)	Sequenced TS in-process welding inspection hold points were deleted after work was completed, without revising the traveler as required per BAP 2.14; in most cases to date, the traveler has the statement "only weld complete required" as a hold point.	AWS D1.1, "Structural Welding Code," only requires as a minimum that the final weld be inspected and documented 100% of the time. AWS D1.1 does not require that in-process inspection such as fit-up, cleanliness, and weld pre-heat be documented; and BA welding inspection procedure BTS-405 requires that the various in-process inspection be conducted on a random surveillance basis to assure compliance to codes or standards. By signing for final weld inspection, the weld inspector is signifying that the completed weld meets the requirements stated by both AWS D1.1 and BTS-405 and that either he or the BA TS final reviewer may delete the pre-established

GR. No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
105	0	(Continued)			hold points for AWS D1.1 welding without a traveler revision. Therefore, since the final weld is acceptable, the use of this GR will not compromise the safety or design of the plant.
106	0	Fabrication/installation traveler initiation review by engineering, TS, and QC was signed-off out of sequence	(ALL)	Fabrication/installation traveler was reviewed by QC after the engineering review but prior to TS review. This is contrary to procedural requirements which state that the resident engineer will forward the traveler to TS for review, and then TS will forward the traveler to QC for review.	Fabrication and installation traveler initial review by BA engineering, QC, and TS was signed out of sequence. BA procedures require that traveler initial review be performed in a specific sequence (1: engineering, 2: TS, 3: QC). Regardless of the sign-off sequence, all required reviews are completed and signed off prior to the traveler being issued to the field for work. Each traveler review group has independent criteria to follow which do not interface with other departments; therefore, this GR does not affect the safety of the plant or quality of the hardware.
107	0	IP-purchased material not listed/statused I on the equipment document list	(P/M)	BA/DRG is reviewing docmentation for IP-purchased materials that are in augmented class D (radioactive waste) systems. This documentation has been identified as being outside of the scope of BA/QC review, but it has still not been officially excluded from the scope of BA's Records Verification Program.	GR 107, revision 0, was issued because BA/DRG was responsible for reviewing documentation for IP-purchased materials that are in the augmented class D (radioactive waste) systems. The documentation has been identified as being outside of the scope of BA/QC review, but was still not excluded from the scope of BA's Records Verification Program. BA's responsibility is to install IP-purchased augmented class D (radioactive waste) materials. Also, in letter M60-84-(03-30)-L, IP authorized BA to perform a documentation inventory as a service to IP, in order that they might scope IP-purchased equipment.

Generic Resolutions

GR. No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
107	0	(Continued)			In letter LW-24484, Mr. L. W. Osborne received the inventory of IP-purchased equipment from BA personnel. Since the documentation for IP-purchased equipment is not a BA responsibility and since BA personnel have been relieved of the requirement to inventory IP documentation, the removal of this attribute from BA's review checklist and usage of this GR has no detrimental affect on the quality of CPS.
108	0	QC checklists (JV-550) missing from traveler revisions and supplemental travelers.	(E)	QC checklists (JV-550) are missing from traveler revisions and supplemental travelers. This occurs when the supplemental traveler does not affect the anchor location or torque, when there was no technical need for the form, and when QC was notified to perform an in-process inspection. This form was required by BAP 3.3.6, revision 6. When anchor bolts were included within the scope of the supplemental travelers, a JV-550 form was not used. Before 2/13/84, QCI-401 required the use of JV-668 to re-verify torque.	This GR was written because anchor bolt installation checklists (JV-550) were missing from revised and supplemental electrical conduit hanger travelers. The checklist documents that the torquing requirements of the anchor bolts have been met during the installation of the hanger support. From 2/13/84 to 6/10/84, project procedure BAP 3.3.6, revision 6, (which governs the installation of electrical conduit hanger supports) required the inclusion of JV-550 for all revised and supplemental conduit hanger travelers. JV-550 was required whether or not the anchor bolt location or torque had been affected by the revised or supplemental work.

GR. No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
108	0	(Continued)			Prior and subsequent revisions to BAP 3.3.6 do not require that JV-550 be included in revised or supplemental hanger travelers, unless the anchor bolt location or torque will be disturbed. The GR allows QA/DRG to accept those supplemental travelers where the scope of work does not affect the anchor bolt location or torque. Therefore, project quality is not adversely affected.
109	0	Errors and omissions or missing forms from JV-667 and JV-668 for conduit electrical hanger travelers vaulted before 7/26/82	(E)	Prior to 7/26/82, inspection data and other information was incorrect, omitted from, or incomplete on BA QC support fabrication/ installation checklists (JV-668) and TS "electrical welding inspection" sections on conduit hanger travelers (JV-667). In some areas, no JV-668 is in the package.	This GR was written because conduit hanger fabrication and installation checklists (JV-668) and the welding inspection sections on conduit hanger travelers (JV-667) completed prior to 7/26/82 had incorrect data, errors and omissions, and incomplete information recorded on the traveler. The GR allows QA/DRG to accept these travelers if the following criteria have been met: - The conduit hanger traveler was vaulted prior to 7/26/82 - The conduit hanger was reinspected under the conduit support Field Verification Program. - All affected attributes or data have been verified to be complete and acceptable on the new inspection reports. When these criteria are met, project quality is not adversely affected.

Generic Resolutions

GR. No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
110	0	Lack of JV-1340 forms for flex-conduit and missing calculations for cable pulls	(E)	DRG reviewers are writing DEL items for missing JV-1340 forms and for lack of calculations on JV-1340 forms for cable pull-through flex-conduit. Sidewall tension is not measurable in flex-conduit as the conduit is fixed only at one end during the cable pull.	This GR was written because cable pull installation travelers involving cable pulls through flex-conduit were missing either the pull-tension calculation form (JV-1340) or the actual pull-tension calculations. K-2999 and project procedure BAP 3.3.2, governing electrical cable installations, required that maximum pull-tension calculations be included in all cable pull travelers. However, sidewall tension is not measurable in flex-conduit if the conduit is fixed at only one end during the actual cable pull. The flex-conduit is slipped over the cable during the pull. The final coupling of the flex-conduit is accomplished after completion of the cable pull. Therefore, QA/DRG's use of GR 110 does not adversely affect project quality.
111	0	Missing or incorrect heat and RIR numbers on QC inspection checklists or travelers installed prior to 1/1/84	(E)	Electrical material identification required per BAP 1.5 was not noted or was noted incorrectly on QC inspection checklists or travelers for items installed prior to 1/1/84. This lack of information made it impossible to determine if the purchased material was safety-related. Also, NCRs were written documenting this fact, with the disposition from S&L to "accept as is, providing BA QA verifies material is A-36." There was no documentation provided	Site procedures required that the material traceability (heat and RIR numbers) be noted on QC inspection checklists for specific types of material used in electrical installations. This was not done in many instances, which made it impossible to determine if the purchased material was safety-related. This missing information was documented on NCRs. Finally, a program was developed that required intensive testing and sampling to verify that all materials installed prior to 1/1/84 met the contract specifications to be considered safety-related.

GR. No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
111	0	(Continued)		affirming that such verifications had been made.	The results of this program were written on an NCR which was accepted and dispositioned "use-as-is" by IP and S&L. The result of this NCR provided direction (through GR 111) to accept all material installed in electrical installations prior to 1/1/84. Material installed on or after 1/1/84 is required to have the material traceability information noted on the QC inspection checklist. If it is missing or incorrect, a DEL item will be generated and resolved on a case-by-case basis in accordance with site procedures. The use of this GR does not or will not adversely affect the quality of the hardware or documentation of CPS.
112	0	Not approved in process			
113	0	Not approved in process			
114	0	Information written on quality documents in pencil.	All	Concrete truck numbers have been written on batch tickets (JV-293) in pencil contrary to project directives.	The truck number is entered on the batch ticket by batch plant personnel at the time of batching. The batch ticket is brought to the placement by the concrete truck driver with the represented batch of concrete and presented to the U.S. Testing personnel for testing. R

GR. No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
114	0	(Continued)			At that time, the U.S. Testing representative visually checked the truck number on the batch ticket and confirmed that it matched the number on the truck. This number was then transferred to the in-process concrete test report, which was then completed during the course of the placement. As stated above, the information noted on the documents is correct and can be confirmed. The fact that it was annotated with the use of a pencil has no adverse affect on the hardware or its documentation.
				Quality information has been written on documents (other than batch tickets) in pencil.	For pencilled item (other than batch tickets) a certified true copy of the information provides a permanent record, as does duplication of information in other documents within the traveler, to provide assurance that the use of this general resolution can have no adverse affect on the quality of the hardware or its documentation. R
115	0	Not approved in process			
116	0	Not approved in process			
117	0	Concrete traveler packages contain an in-process concrete test report and a report of concrete cylinders which show identity numbers that differ from each other.	Civil/Structural	Concrete test cylinders are documented on two different U.S. Testing forms; the in-process concrete test report and the report of concrete cylinders. Each set of test cylinders is assigned a unique identification number by U.S. Testing personnel.	Both of the U.S. Testing forms list the batch ticket number which represents the concrete batch tested. By using this number, the sample can be traced from the in-process test report to the report of concrete test cylinders. The field test results and conditions are directly traceable to the compression test results, laboratory test, and curing conditions, thereby

GR. No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
117	0	(Continued)		This identification number differs between the in-process concrete test report and the report of concrete cylinders, though this number represents the same set of cylinders. The difference is either 1) the CL prefix (*CL - Cylinder) to the sample number is deleted on one or both forms or 2) the numerical suffix to the sample number, which designates the set number within the sample, has been deleted on one or both forms.	assuring that the use of this general resolution will have no adverse affect on quality of the documentation or the safety of the physical plant.
118	0	Not approved in process			
119	0	Not approved in process			
120	0	Incorrect drawing revisions listed on travelers and/or associated documentation.	P/M, C/S, E	Reference drawing revision designations are listed on the traveler, and the drawings used for inspection are placed in the package during the traveler's initial review. QC and Technical Services inspectors used the drawings in the package to perform their inspections even though the drawings did not necessarily agree with the revision in effect on the date of inspection or final review.	Engineering is responsible for initiating the guidelines of a traveler and maintaining configuration control through the traveler's initial and final review process, which includes evaluation of design changes. If, at final review, it was determined that the installed configuration did not meet the latest design criteria, an addendum to the traveler or another traveler was issued to bring the hardware into conformance with the latest design drawings. The fact that final reviewers sometimes did not update drawing revisions listed on travelers when the revisions did not affect the traveler work had no adverse hardware quality consequences.

R

GR. No.	Rev.	Subject	Discipline	Reason/Problem	Justification and Significance to Safety
120	0	(Continued)			In the case of concrete travelers, drawing revision control was maintained by the QC concrete inspection during the course of the placement inspection, with another verification at the time of final review sign-off. If drawing changes affected the placement, the concrete inspector verified that they were reflected in the hardware. All revision changes were noted on the appropriate drawing checklist. By signing the traveler, engineering and quality final review signifies in an officially and programmatically acceptable manner that the inspected configuration conforms to the latest design requirements. R In addition, of the more than 54,000 packages reviewed to date, 15 packages have resulted in 11 NCRs, and none of those mandated hardware modifications, further assuring that the use of this generic resolution will not adversely affect the quality and safety of the hardware or its documentation.