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

MAR 1 1 1985

The Honorable Dan Glickman
United States House of Representatives
Washington, D.C. 20515

Dear Congressman Glickman:

This is in response to your letter of February 1, 1985, to Chairman Palladino requesting additional information on structural steel welding at the Wolf Creek Generating Station. This information is provided as Enclosure I of this letter, including all references. Enclosure I describes a significant program of corrective action by the Kansas Gas and Electric Company (KG&E) which addressed not only the structural steel welding issue, but also included inspections and evaluations to determine that the aspects involved in the structural steel welding issue did not occur in other areas of construction. Enclosure I also describes the extensive NRC program of verification and independent inspection on all these issues to assure the adequacy of the structural steel welding and that the Quality Assurance (QA) program has been properly implemented. Based on the completed efforts of KG&E, which have been verified by NRC inspections, the NRC has concluded that these issues are resolved.

Your letter requested additional information regarding problems involving cable separation. This information is provided in Enclosure II of this letter. Based on KG&E corrective action and independent NRC inspections, we have concluded that adequate cable separation exists at Wolf Creek Generating Station and this issue is resolved.

You also asked about the status of items assigned to the Office of Investigations (OI). OI has recently initiated a number of investigations regarding alleged erroneous or falsified records. Some investigations are presently underway. At this time OI has no firm estimated completion date. One OI report regarding this subject has been recently completed. If you desire, we will be pleased to brief you on specific aspects of the investigations. In order to protect the integrity of the investigative process, we suggest such briefings be oral.

The NRC technical staff has evaluated the safety aspects of missing and potentially falsified welding records, and has resolved the safety aspects of these issues, as indicated in Enclosure I. The NRC staff has evaluated the safety-related aspects of the other issues being reviewed by OI. At this time, we are not aware of any information from the Office of Investigations that constitutes a basis for withholding the issuance of a low power license for Wolf Creek. Therefore, the staff is proceeding with its review in support of the license issuance. Matters pertaining to all continuing investigations will be reviewed by the Commission prior to issuance of a full power license.

Because of your interest in being informed about NRC activities at the Wolf Creek plant, we are also advising you that NRC review of preoperational test activities indicated that some deficiencies had occurred in these activities. These deficiencies included instances of incorrect test conditions, incomplete verification of systems operation, and incomplete recording of test data. These matters were identified to KG&E and corrective actions, including any repeating of preoperational tests, were performed by the applicant and were reviewed by NRC inspectors. Actions taken by KG&E to prevent recurrence are responsive to the NRC concerns. The technical issues have been resolved, and actions necessary to support issuance of a license permitting fuel load and low power testing have been completed. The NRC is also reviewing the need for possible enforcement action relative to the deficiencies identified in the preoperational testing program. A copy of inspection reports and any enforcement correspondence related to this subject will be provided to you when they are issued to KG&E.

Based upon the NRC staff review and inspection program, we conclude that the facility has been constructed in conformance with the requirements of the Commission and its operation will not represent any undue risk to the health and safety of the public.

Sincerely,

[redacted] William J. Dircks

William J. Dircks
Executive Director for Operations

Enclosures:
1. Structural Steel Issue
2. Electrical Separation Issue

REVISED BY EDO OFFICE (3/11/85)
*SEE PREVIOUS PAGE FOR CONCURRENCES

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Enclosure I

STRUCTURAL STEEL ISSUE

INTRODUCTION AND BACKGROUND

The purpose of this document is to provide a description of the issues involving field-welded structural steel at the Wolf Creek Generating Station (WCGS). There is substantial documentation associated with the matter. The documentation of primary importance is referenced throughout this document, and is listed in attachment A. The referenced documentation is also attached.

The vast majority of the structural steel at WCGS was erected during the period 1977 to 1981. Approximately 11,150 structural steel joints were fabricated during the erection period to support safety-related components or structures at the WCGS. The majority of these joints were bolted or shop-welded together. About a quarter of these structural steel joints were welded in the field in accordance with the design requirements and the American Welding Society code, AWS D 1.1. Between 1978 and 1982, a small sample (less than 1%) of these structural joints were selected by the NRC inspectors and inspected for compliance with the applicable code and NRC requirements. No significant deviations or violations were observed in these samples.

In July 1984, the NRC established a task force to complete the NRC inspection program at the WCGS. The inspection program calls for, among other activities, a review of the applicant's corrective action programs required by their QA program. During these inspection activities, the NRC inspectors raised concerns regarding the applicant's handling of certain corrective action requests associated with the field welding of structural steel joints. A review of one corrective action report indicated that a reinspection of a sample of field welded structural steel joints by the applicant showed that a relatively high percentage of the welds failed to meet one or more of the quality requirements of the applicable code; these results were at variance with the initial inspections which accepted the welds as meeting code requirements. In addition, another corrective action request indicated that the original inspection records for many of the field welded structural steel joints were not available.

The applicant's evaluation of these particular matters resulted in acceptance of field welded structural steel joints on the basis that the defects identified during the reinspected sample were cosmetic, and his conclusion that the unavailability of the original inspection records did not undermine confidence that the field welded joints were properly installed. The NRC task force did not agree that the applicant had properly handled the disposition of these corrective action requests.

The NRC task force requested that the applicant select, inspect, and evaluate additional field welded joints. These additional inspections revealed missing welds, missing structural material, an inspection record for welds which did not exist, and some welds not in conformance with the applicable code and design documents. The NRC task force consequently concluded that in view of

inappropriate disposition of the corrective action requests, the results of reinspections, and the unavailability of original weld inspection records, the quality of the field welded structural steel joints would have to be reevaluated. This became the central issue, but not the only issue, to be resolved.

As a result of the inspection findings, the NRC took enforcement action which required, among other things, the development and implementation of a corrective action plan which would provide adequate assurance that the field welded structural steel was appropriately installed and would perform the required safety function. The applicant developed and implemented a program which included a reinspection of all accessible structurally significant field welded joints. The program was reviewed and accepted by the NRC. Throughout the implementation of the program, the NRC monitored its conduct, witnessed inspections by the applicant, reviewed inspection results, and conducted independent inspections. These activities were completed in early March 1985.

The remainder of this document provides a general chronology of events, identifies the appropriate codes and their application, elaborates on the unavailable weld inspection records, describes the applicant's reinspection program scope and results, describes the NRC independent inspection activities and results, and sets forth the NRC conclusions.

CHRONOLOGY OF EVENTS

The following is a chronology of major events that were involved in the structural steel welding area.

1977 - 1981

Structural steel welding was initiated approximately during the last quarter of 1977, with approximate completion occurring during the last quarter of 1981. As discussed later, there are 2,670 safety-related structural steel connections consisting of approximately 11,000 welds identified in the six safety-related buildings; i.e., auxiliary, reactor, control, emergency service water system, fuel, and diesel generator buildings. These welds were made and inspected by Kansas Gas and Electric Company's (KG&E) construction contractor, Daniel International Company (DIC). The results of the weld inspections were to be documented in Miscellaneous/Structural Steel Welding Records (MSSWRs).

March 1983

As a result of previously identified deficient fillet weld conditions on component supports; e.g., pipe hangers, DIC Quality Control (QC) initiated a random reinspection of accessible structural steel fillet welds in the safety-related buildings. This activity identified 148 rejectable welds in a sample of 241, and resulted in the issuance of corrective action report No. CAR 1-W-0029 (Reference 1). This CAR directed that all of the

rejected welds be incorporated into a nonconformance report (NCR) so that an evaluation and disposition could be made by the DIC Project Welding Engineer on each discrepancy. NCR 1SN 10381PW was written and an evaluation of each rejected weld was performed. The NCR was dispositioned as follows:

Rework - 6 welds
Use As Is - 142 welds

Nearly all of the rejectable conditions were considered cosmetic in nature in that structural integrity was not jeopardized. Based on the above figures, DIC concluded that as a result of the very small percentage of welds requiring rework, "no sacrifice to structural integrity would have resulted . . . if they had not been reinspected and reworked." The NCR was closed with subsequent closure of the CAR on October 22, 1983.

August 1983

A DIC review of documentation prior to building turnover to KG&E revealed approximately 16% and 24% of the required MSSWRs were missing for Fuel Building and Reactor Building welds, respectively. This resulted in the issuance of CAR 1-C-0031 (Reference 2), dated August 10, 1983, through Revision 7 dated October 20, 1984. The suggested corrective action included a review of all existing MSSWRs prior to building turnovers and the generation of NCRs for each building identified as having missing MSSWRs. Each NCR was to be evaluated and dispositioned as rework or use-as-is, depending upon the circumstances revealed after the existing documentation for each building had been reviewed.

This CAR was intended to be closed out on the basis of the relatively small number of missing MSSWRs and the fact that the previous reinspection of a sample of structural steel welds showed an even smaller number of welds requiring rework. Thus, the fact that MSSWRs were missing was accepted because of the weld quality established during the sample reinspection.

This CAR was not formally closed until January 16, 1985, as a result of the continuing chronology of events.

The major cause of the missing MSSWRs was concluded to be the result of a lack of procedural compliance with respect to responsibility for origination, completion, and maintenance of these records. The MSSWRs were stored in various locations and by various personnel within the individual buildings from the time they were originally initiated; thus precluding any assurance of control.

June - August 1984

NRC first learned of the potential records problem in conversations with applicant personnel. In addition to personnel interviews, a review of

CARs was undertaken and the specifics of CARs 1-W-0029 and 1-W-0031 became known to the NRC.

August 1984

A document reconciliation effort was initiated by KG&E to determine which safety-related structural steel welds were lacking MSSWRs. In addition, an inspection verification effort was initiated to provide an accurate assessment of the as-built conditions of safety-related structural steel welded connections which were lacking available MSSWRs.

September 1984

KG&E, DIC, and Bechtel made a joint presentation to the NRC task force which identified the belief at that time, that the problem was one of document retrieval, and not a hardware problem. This was not an acceptable premise to the NRC task force and as a result, KG&E agreed to perform a sample structural steel joint inspection of six randomly selected structurally significant joints in each of the six safety-related buildings. This inspection resulted in the discovery of missing welds, missing structural members, and deficiencies with respect to weld size. This information was formally reported to the NRC under 10 CFR Part 50.55(e) on September 18, 1984. Subsequent meetings were held between KG&E and the NRC task force for further information updates.

October 1984

KG&E Quality Assurance issued CAR No. 19 (Reference 3) on October 17, 1984, to obtain the necessary actions required to resolve the issues associated with structural steel welding. The specific issues included: missing MSSWRs for safety-related structural steel welds; deficiencies being identified in previously accepted structural steel welds; missing structural welds and/or material; and documentation that a weld was inspected and accepted, but in fact, the inspected welds did not exist.

October 26, 1984

As a result of the above events, it was determined that a significant violation of NRC regulations had occurred and NRC's Region IV office issued Inspection Report No. 50-482/84-22 (Reference 4), which provided the details of the inspection findings and also stated that enforcement correspondence and Notice of Violation pertaining to this matter would be sent to KG&E under separate cover. It further addressed a scheduled enforcement meeting to be conducted on October 29, 1984.

October 29, 1984

Enforcement Conference at RIV offices in Arlington, Texas. KG&E issues plan for corrective actions, including CAR No. 19 (Reference 3).

November 15, 1984

NRC-RIV Issued Confirmation of Action Letter (CAL) confirming understandings reached at Enforcement Conference on October 29, 1984, and providing additional guidance on conduct of corrective action program (Reference 7).

November 21, 1984

The Notice of Violation and Proposed Imposition of Civil Penalty was issued to KG&E as Enforcement Action No. 84-107 (Reference 5).

November 1984 - February 1985

NRC personnel conducted independent visual and nondestructive examinations, and verified and evaluated KG&E's committed corrective actions. This information is documented in NRC Inspection Report Nos. 50-482/85-12 and 85-13 (Reference 6).

December 31, 1984

KG&E issues final report on CAR No. 19 corrective action in response to Notice of Violation (Reference 9).

January 21, 1985

KG&E issues supplement to final report on Notice of Violation (Reference 10).

February 27, 1985

A public meeting was held at the NRC in Bethesda, Maryland, between the NRC and the Kansas Gas and Electric Company to fully discuss the structural steel welding issue. A transcript of this meeting was made (Reference 8).

February - March 1985

KG&E provided supplemental information regarding results of additional inspection, and in response to NRC requests for additional information (References 11-14).

APPLICABLE CODES, STANDARDS, AND COMMITMENTS

The applicable codes and standards as committed to in the WCGS Final Safety Analysis Report (FSAR) with respect to building construction, are as follows:

- American Institute of Steel Construction (AISC) Specification for the Design, Fabrication and Erection of Structural Steel for Buildings

- American Welding Society's Structural Welding Code, AWS D 1.1-75.

The identified deficient welds were contrary to the acceptance criteria of AWS D 1.1-75.

At the time KG&E initiated CAR No. 19, construction was basically complete. This resulted in approximately 56% of the safety-related joints being in a painted condition. Due to KG&E's commitment to perform a 100% reinspection of all accessible structurally significant joints, criteria had to be established with respect to inspecting through paint. The inspection requirements, acceptance criteria, and method of documenting the results of the reinspection were proceduralized in procedure No. QCP-VII-200, Revision 20 dated November 2, 1984 (Reference 9). The procedure recognized that paint and fireproofing material would exist on most of the welds to be inspected; however, the inspectors were directed to inspect in accordance with the design drawings and AWS D 1.1-75 criteria. The procedure further stated that if the fireproofing material precluded the ability to reinspect, then the welds were to be recleaned. Additional information and results of the reinspection are addressed later.

MISCELLANEOUS/STRUCTURAL STEEL WELD RECORDS

The applicant's approved Quality Assurance/Quality Control (QA/QC) program required that a document referred to as a Miscellaneous/Structural Steel Weld Record (MSSWR) be prepared and retained for welds made on field-welded structural steel joints. The individual weld and joint records are not a requirement of AWS D 1.1. The MSSWR required the following principal items to be entered:

- Drawing reference and joint number
- Material type
- Weld procedure utilized weld
- Filler material identification
- Symbol identification of the welder
- Date of welding and inspection
- Identification of inspector
- Weld acceptance
- Remarks and/or sketches required for clarity

The QA/QC program provided that each Bechtel structural steel drawing be annotated to reflect the generation of acceptance MSSWRs on a connection-by-

connection basis. When all of the connections were annotated, that package of work was considered complete.

Following completion of the structural steel welding activities, the MSSWRs were retained at the construction site by the construction crews (field engineers and inspectors) at various locations referred to as "headache shacks" and "gang boxes." The great majority of the MSSWRs were single-part forms, so that copies were not provided at the time to records keeping organizations. The storage of MSSWRs in this manner in the field went on for a considerable period of time. The constructor, Daniels International Corporation, did not maintain adequate control or provide adherence to procedures, to ensure that the MSSWRs were fully retained (References 8 and 9).

It was not until the KG&E and DIC Combined Review Group (a document review group) began a review of the acceptance documentation in 1983 to accomplish building turnover, that they found that the acceptance of all welds in all connections could not be accomplished with the existing records. At that time, the effect of the above factors was identified and documented in CAR 1-C-0031.

The final report for KG&E CAR 19 (Reference 9) indicates that 1,509 of 6,816 MSSWRs for safety-related structural steel welds are missing. The detailed records of the reinspection of the structural steel welds are being retained as plant records (Reference 8).

REINSPECTION OF PAINTED WELDS

The KG&E corrective action plan to perform a 100% reinspection of all accessible safety-related structural steel welds necessitated the need for Bechtel to identify the applicable joints. This was accomplished by review of the erection drawings prepared by the structural and miscellaneous steel fabricators, field change request, nonconformance reports, construction variance requests, and structural steel fabrication requests. Bechtel identified 2,670 structurally significant safety-related field-welded joints which required reinspection.

As stated previously, approximately 56%, or 1,484 welded joints, were reinspected in a painted condition which consisted of either a primer coat, topcoat, or both. Approximately 58%, or 859 of the painted weld joints, had existing MSSWRs from the original inspection which showed the welds to be acceptable.

Bechtel provided a technical justification for inspection through paint as an attachment to a letter to KG&E identified as BLKES-1348 dated November 5, 1984 (Reference 9). Bechtel's position is that fillet welds which have been coated with up to 4 mils of primer and up to an additional 10 mils of topcoat can be visually examined to the AWS D 1.1-75 acceptance criteria. Paint thickness was measured using a standard dry film thickness gauge. Bechtel identified the following attributes as being those which could be fully evaluated:

- Weld presence and location
- Weld length
- Weld size, both leg length and throat thickness
- Weld profile, including convexity and concavity
- Fusion between weld and base metal
- Overlap
- Cross-section of weld craters
- Coarse undercut
- Large porosity

They further identified the following attributes as being more difficult to evaluate and measure in a painted condition, and in some cases may not be visible at all:

- Cracks
- Fine porosity
- Tight undercut

However, these three attributes were addressed as being largely dependent on the metallurgical characteristics of the base metal being joined, the welding material being used, and the ability of the welders performing the work.

The base material used for all structural steel at WCGS is ASTM A36, which is a low carbon, highly weldable steel. The welding materials used were Type E7018 electrodes, which are highly compatible with A36 material. This compatibility results in sound crack- and porosity-free welds provided basic precautions are taken. These precautions are all addressed in the welding procedure specifications used for the structural steel welding. The presence or absence of undercut is dependent on materials used, welding parameters, and welder ability. The first two factors were addressed earlier, leaving welder ability, which to a large degree is the major cause of undercut. The training and qualification tests are in accordance with AWS D 1.1, which is designed to provide the welders with the ability to control these attributes.

The NRC evaluated Bechtel's basis for joint selection and their justification for reinspection of painted welds.

The NRC concluded that:

- Bechtel's basis for the selection/identification of joints for reinspection was proper

- Bechtel's justification for inspection through paint was valid with respect to identifying those defects which would affect the structural integrity of the welds.

The NRC was not completely satisfied that visual examination of painted welds would reveal lack of fusion. Independent NRC visual inspection (VT) of painted welds was conducted to confirm that significant attributes could be detected. In addition, painted welds were magnetic particle tested (MT) to determine if the paint was masking surface discontinuities; no surface discontinuities were found in the sample examined. In addition, the NRC selected a statistically significant sample of painted joints which were reinspected by the NRC using VT and MT after the paint was removed. No defects were found in the sample selected. This provided additional confidence in the ability to inspect painted welds for significant defects, and confidence that the welds had been properly made (Reference 6).

It is important to note that the applicable code, AWS D 1.1, requires that welded joints not be painted until after the work has been completed and accepted. The AWS has suggested that paint will generally mask surface discontinuities. The DIC corresponded with the AWS regarding reinspection of structural steel welds. The AWS replied that reinspection is not covered (addressed) by AWS D 1.1, and that such reinspection should be in accordance with acceptance criteria agreed upon by the engineer and the contractor (Reference 8).

RESULTS OF REINSPECTION

The KG&E reinspection effort was performed by AWS-certified welding inspectors (CWIs) who were also certified as quality inspectors by DIC in accordance with the requirements of ANSI N45.2.6-78. As previously discussed, inspection criteria, acceptance standards, and method of documenting inspection results was procedurally defined. The reinspection data was recorded in Weld Data Sheets which documented the inspected as-built conditions of all accessible structural steel welds. All identified deficiencies were documented in NCRs which, together with the Weld Data Sheets, were presented to Bechtel in order that a case-by-case evaluation of each deficient welded joint could be performed.

The documented results of the KG&E reinspection effort can be tabulated as follows:

No. of Joints Identified for Reinspection -		2,670
No. of Joints Completely Reinspected -		2,403
No. of Painted Joints -	1,484	
No. of Unpainted Joints -	919	
No. of Acceptable Joints -	1,305	
No. of Rejected Joints -	1,098	
No. of Partially Inaccessible Joints -		165
No. of Totally Inaccessible Joints -		102

A question arose as to the causes of the obvious differences in inspection results with respect to the original inspections between 1977 and 1982, and the reinspection effort between October 1984 and February 1985. The existing MSSWRs documenting the results of the original inspections show that the welding was acceptable, while the reinspection identified 1,098 rejectable welded joints. This disparity was probably caused by a less intense inspection discipline during the original inspections. Considerable more latitude and judgement was the norm for structural steel welding inspection during the earlier time frame. As a result of the subsequent identification of defective welds during the sample inspection, a very disciplined and structured plan with absolute acceptance/rejection criteria was established for use during the reinspection activities. As a result, those attributes originally identified as being acceptable, were now being rejected. In addition, inspection to the established rigid and absolute criteria would allow Bechtel to perform complete and thorough evaluations of the as-built conditions.

Bechtel's evaluation of the 1,098 rejectable welded joints identified 82 joints requiring repairs due to defective conditions which caused the design allowable stresses to be exceeded in the as-built condition, and 81 additional joints were identified as requiring repairs due to KG&E's commitment to install missing material and missing and underlength welds (unless prohibited by field conditions) even though the design allowable stresses had not been exceeded. It was determined that field conditions did preclude the repair of 14 of the 81 joints. Thus, a total of 149 welded joints were repaired, and all others were dispositioned as "use-as-is."

With respect to the 102 joints identified as being totally inaccessible due to their being embedded in concrete or having physical interferences, 62 were acceptable as-is because evaluation showed that the concrete was capable of supporting the design load, thus eliminating any concerns with respect to defective welds. It was also noted that 165 joints were partially inaccessible; however, sufficient inspection data was available on 139 of the joints to allow an evaluation to be performed. This leaves a total of 66 joints out of 2,670 which could not be evaluated. The basis by which Bechtel accepted these joints was through statistical analysis, and is considered

proper logic. If the 2,604 fully evaluated joints are considered a sample of the 2,670 total population of joints, then the sample size represents such a large percentage of the total population that statistics associated with the sample may be applied to the total population with virtually 100% confidence. This implies that if a percentage of inspected joints were determined to exceed design allowable stresses, then statistically this percentage may be applied to the total population.

Of the 2,604 joints which were evaluated, 82 joints (3.14%) were identified in which the design allowable stresses were exceeded. Analysis has shown that those joints would not have failed under the design loading conditions. However, 60 of the 82 joints were polar crane radial stops in which the same welds were missing in each joint and the design allowable stresses were exceeded. In addition, 6 pressurizer support joints had the same welds missing in each joint, three of which exceeded the design allowable stresses. Thus, a total of 19 joints in the remaining population of 2,541 joints (0.75%), exceeded the design allowable stresses. It should be pointed out that the cause of the missing identical welds in the 60 polar crane radial stops and the 6 pressurizer supports is attributable to the failure of the detail drawings to provide a clear understanding of the weld details. This is considered an isolated condition and was substantiated by the NRC Region IV inspector's review of the applicable structural steel detail drawings delineating the welded joint configurations. That is, by reviewing typical drawings of the 66 joint details, the NRC staff concluded that they are more representative of the larger population; in other words, joint welding details are clear, not like the 60 polar crane stop joints. Therefore, the NRC staff concludes it appropriate to include these 66 joints in the larger population group.

The 0.75% statistically applied to the group of 66 joints which could not be evaluated, results in less than 1 joint in which the design allowable stresses could be expected to be exceeded. It would also be expected that none of these joints would fail under the design loading conditions as a result of defective welds.

NRC reviewed Bechtel's methodology with respect to evaluating and dispositioning the identified welding defects, and their approach with respect to inaccessible welded joints embedded in concrete. NRC concluded that:

- Bechtel's approach of individually calculating stress levels to determine the structural adequacy of the identified as-built conditions is acceptable.

- There is no deficiency in Bechtel's approach with respect to inaccessible welded joints embedded in concrete, in that the use of statistical analysis and acceptable alternative load path evaluation is proper.

In order to assess the adequacy and implementation of KG&E's committed corrective actions, NRC's Region IV staff accompanied CWIs on several occasions to observe and verify their inspection activities and to assure that the results of the inspections were being accurately recorded. In addition, NRC's

Region IV staff conducted independent inspections on selected joints with subsequent comparison to the CWIs inspection data sheets. There were no discernible differences in inspection results obtained by NRC's Region IV staff and the CWIs during either the accompanied or independent inspection activities. This created a very high level of confidence in the data being documented by the CWIs during the reinspection program.

The NRC Region IV staff reviewed weld data sheets and applicable NCRs for approximately 1,750 welded joints, including 149 data sheets and 34 NCRs associated with the joints that were repaired. In addition, and subsequent to the completion of the reinspection effort, the NRC Region IV staff performed an inspection on 42 of the 149 repaired joints, with acceptable results. It was noted that magnetic particle examination (MT) was also performed on 24 of the 149 repaired joints with acceptable results by KG&E.

Of potential concern was the reconciliation of the as-built conditions to the design drawings. This was resolved by Bechtel in that they are identifying all NCRs applicable to field-welded/structural steel joints on Drawing No. C-1045. Note 46 in Revision 1 to Drawing No. C-1003, "Civil-Structural Steel and Concrete General Notes," states, in part, " . . . See the shop detail drawings and appropriate nonconformance reports identified on Drawing C-1045 for connection details."

As stated earlier the NRC performed an independent NDE program at WCGS. The particular NDE disciplines used were VT and MT. The NRC specifically recognized that fine lack of fusion, tight cracks or porosity, might be masked by coatings and that the use of MT might be of significant assistance in helping to determine its existence. One of the goals of the MT was to help establish the validity of the VT of painted welds.

The results of the NRC inspection are documented in NRC Inspection Report 50-482/85-12; however, a summary of those results are presented here.

Four structural carbon steel weld samples were fabricated with known flaws such as tight cracks and porosity in the welds. The samples were 3/4" X 6" X 8" in dimension. These were examined by VT and MT, and then photographed before painting. The samples were then coated with Carboline CZ-11 primer and the coating thickness measured. The VT and MT examinations were repeated through the coating and the results photographed. The samples were then coated with Carboline 191 HB epoxy, representative of field conditions, and the examinations performed again and photographed. The types of indications noted within these test blocks represented the types of indications that could be encountered with structural welding. The NRC inspection team also indicated that the tight indications in the test blocks were difficult to visually detect and if all the welds were in the as-welded condition, a small percentage of the indications would have been detected visually. Indications wider than the samples would be detected by visual inspection.

The results of these tests proved that meaningful MT can be performed through paint coatings.

The NRC inspectors randomly selected safety-related structural welds in the essential service water system pumphouse (ESWS) and reactor building. The welds were subjected to VT and MT with either the primer or the epoxy coatings applied. The coatings were then removed and the welds were reexamined by VT and MT.

In the ESWS, welds on six clip angles were visually examined with Carboline CZ-11 primer coat applied. The dry film thickness for the primer ranged from 1.0 to 3.0 mils. After the primer was removed, the welds were reinspected by VT and MT using the NRC-approved procedure NDE-6, Revision 0, and Addendum WC-1-6-1.

The examinations disclosed that three of the clip angle welds were undersized; P-7, P-8, and P-10. Review of KG&E records showed that these welds had been identified as being undersize and were recorded on a nonconformance report. Otherwise, no other deficiencies were noted.

Similar examinations were conducted in the reactor building wherein five structural steel weld joints were VT'd and MT'd for AWS D 1.1 acceptability and overall workmanship. The welds had Carboline 191 HB epoxy coating on them. The welds were found to be acceptable.

A sample of 55 welded connections was selected in the reactor building for VT with primer and epoxy coatings applied. The samples were selected from different elevations in order to provide a sample that had been welded by different welders and at different times. The VT was performed to design requirements and AWS D 1.1 acceptance criteria. Five of the joints had their coatings removed and were reinspected by VT and MT. No indications were found on the welds with coatings or on those that had the coatings removed.

It was concluded that certain characteristics involved in VT can be evaluated effectively on coated welds. There were no characteristics identified during this inspection that could affect the integrity of the welded joints inspected.

A statistical sample of welded structural joints was selected from the reactor building for reinspection and evaluation to provide a level of confidence as to the quality of existing welded joints. The selected sample consisted of 53 welded joints that were inspected for size, surface condition and overall workmanship, then MT'd for discontinuities. On those welded joints selected, all primer and epoxy coatings were removed prior to inspection. The inspection was performed and evaluations made in accordance with the design requirements and AWS D 1.1 acceptance criteria. No rejectable welds were identified.

The NRC staff concluded that the above VT and MT examinations provided adequate assurance that welds can be MT'd through the coatings and that the previous reinspections give reasonable confidence that the inspection program was capable of identifying detrimental structural weld flaws.

There have been three other major activities involving AWS welding. These activities involved different inspection methods and record retention requirements than those used in structural steel welding. These activities

involved the installation of electrical raceway supports, pipe whip restraints, and supports for heating, ventilation, and air conditioning (HVAC) ductwork. KG&E had discovered problems in two of these areas as documented in a 10 CFR 50.55(e) report to the NRC relative to the HVAC supports, and was resolved by a 100% reinspection and rework program culminating in early 1983. An NRC inspection was performed on the HVAC system, including welded supports, which concluded that the rework program had been satisfactory. The other area of AWS welding problems involved electrical raceway supports. KG&E had identified problems with these welds in 1982, but Bechtel had resolved the issue through engineering analysis and revision to the engineering criteria which had the effect of allowing the welds to meet AWS Code criteria. This resolution was satisfactory, based on inspections performed by NRC. With respect to the pipe whip restraints, NDE (liquid penetrant or MT) was required on 100% of the welds. This was an original specification requirement for this category of hardware. MSSWRs were used as described earlier, however, each weld was also documented on a separate NDE report. A review of these documents provided no indication of problems.

The methods of documenting inspection results differed depending upon the quality discipline responsible for inspection of the different AWS welding activities. The inspections of electrical raceway supports and HVAC supports were documented on Raceway Support Checklists and Mechanical Travelers, respectively. These methods provided a closed loop system where individual accountability for a weld was required and controlled, and the documentation was verified accurate and complete by QC/QA personnel.

Welding of piping systems and supports for the piping systems was accomplished in accordance with Section III of the American Society of Mechanical Engineers (ASME) Code. The examination and documentation requirements with respect to ASME Code Section III welding, are considerably more detailed and controlled. Further, nearly all Class 1, 2, and 3 welds in pressure retaining materials receive some form of NDE; i.e., radiography, ultrasonic, liquid penetrant, or MT. With one exception, there have been no significant problems in this area identified during many inspections, the most recent of which were accomplished after initial development of the structural welding issue by NRC personnel. The exception noted was a KG&E 10 CFR 50.55(e) report which related a finding that there were undersized fillet welds in small diameter piping systems. These welds were reworked to achieve compliance and verified by the ASME Authorized Nuclear Inspector and by the NRC.

The inspections of nonwelding areas documented in NRC inspection Report 50-482/84-51 (Reference 15), were wide ranging in nature and involved nearly every principal aspect of construction. These inspections were conducted at a time and by personnel fully cognizant of the structural welding issue. As noted in the letter of transmittal for NRC Inspection Report 50-482/84-51, no pervasive breakdowns were identified.

CONCLUSIONS

Based on the comprehensive corre(;ive action by KG&E, and the NRC's extensive independent inspection and verification program, the structural steel welding issue is considered resolved.

REFERENCES

Reference No.	Description
1	CAR 1-W-0029 dated March 22, 1983
2	CAR 1-C-0031 dated August 10, 1983
3	G. L. Koester to R. D. Martin letter dated October 29, 1984 - KML NRC 84-191
4	R. P. Denise to G. L. Koester letter dated October 26, 1984. Transmits inspection report 50-482/84-22.
5	Robert D. Martin to G. L. Koester letter dated November 21, 1984, EA 84-107. Transmits Notice of Violation and Proposed Imposition of Civil Penalty.
6	Robert D. Martin to G. L. Koester letter dated March 7, 1985. Transmits inspection reports 50-482/85-12 and 50-482/85-13.
7	Robert D. Martin to G. L. Koester letter dated November 15, 1985. (Confirmation of Action Letter.)
8	Transcript of Meeting Between Kansas Gas and Electric Company and the Nuclear Regulatory Commission - Wednesday, February 27, 1985
9	G. L. Koester to R. C. DeYoung letter dated December 31, 1984. KML NRC-84-238. (Transmits CAR 19 final report.)

Reference No.	Description
10	G. L. Koester to R. C. DeYoung letter dated January 21, 1985 - KML NRC 85-037 (Transmits supplemental response to NOV.)
11	G. L. Koester to R. P. Denise letter dated February 14, 1985 - KML NRC 85-054.
12	G. L. Koester to R. P. Denise letter dated February 15, 1985 - KML NRC 85-057.
13	G. L. Koester to R. P. Denise letter dated February 22, 1985 - KML NRC 85-065.
14	G. L. Koester to R. P. Denise letter dated March 4, 1985 - KML NRC 85-073.
15	R. P. Denise to G. L. Koester letter dated January 3, 1985. (Transmitted inspection report 50-482/84-51.)

Enclosure II

ELECTRICAL SEPARATION ISSUE

A. Introduction

The purpose of this document is to provide information relative to the findings of electrical cable separation deficiencies and cable separation procedural inadequacies at the Wolf Creek Generating Station (WCGS) identified in NRC Inspection Reports 50-482/84-22 and 50-482/84-51, respectively.

B. Scope

1. The deficiencies in the area of electrical cable separation were discovered by the NRC during two different inspections at the WCGS. These resulted in the issuance of two violations. The inspection conducted during the period of June 11 through September 28, 1984 (documented in NRC Inspection Report 50-482/84-22), detailed several examples of the following:

   - Violations of the criteria where safety-related electrical conduits must be separated by 1-inch or more from redundant safety-related and nonsafety-related conduits.

   - Violations of the criteria where safety-related electrical cables must be separated by 6 inches or more from redundant safety-related and nonsafety-related cables within cabinets or panels.

2. NRC Inspection Report 50-482/84-51 documented the findings of an NRC inspection conducted during the period of October 23 through November 2, 1984. This inspection discovered that site procedures do not include the same separation criteria for nonsafety-related conduits to safety-related cable trays as is required for safety-related conduits to nonsafety-related cable trays. This is in violation of FSAR commitments to NRC Regulatory Guide 1.75 and IEEE-384, since no evaluation of safety significance was performed.

C. Scope of KG&E's Corrective Action

KG&E instituted a walkdown inspection of all safety-related buildings for violations of the 1-inch separation criteria, and all control room cabinets and panels for violations of the 6-inch internal separation criteria. KG&E stated that the deficiencies discovered during these walkdowns were documented on nonconformance reports and were corrected. In addition to the physical work performed, KG&E required retraining of the construction craft, engineering, and inspection personnel in the importance of assuring proper conduit separation. Also, a memo was issued to site organizations alerting them to the separation requirements, and the care that must be taken when routing cables within cabinets and panels.

A proposed change to the Wolf Creek FSAR was submitted to the NRC's Office of Nuclear Reactor Regulation (NRR) on January 14, 1985, to incorporate site procedural requirements into the FSAR. The change would accept the existing physical separation of nonsafety-related conduits to safety-related cable trays, based upon a KG&E evaluation. This change was accepted by NRR on February 15, 1985.

D. NRC Verification of KG&E's Corrective Actions

NRC Region IV performed an inspection of the areas where corrective action on the NRC-identified violation was to have been completed. All of the examples cited in NRC Inspection Report 50-482/84-22 were found to have been adequately resolved and no additional violations were discovered. The scope of KG&E's inspection of cabinets and panels in the control room was judged broad enough since several previous NRC inspections of cabinets and panels in other plant areas found no separation violations. It was determined that adequate corrective action has been performed to resolve existing deficiencies, alleviate future concerns, and satisfy NRC Regulatory Guide 1.75 and IEEE-384. The NRC closure of this violation is documented in NRC Inspection Report 50-482/85-03, which is attached.

In Reply Refer To:
Docket: STN 50-482/85-03

MAR 01 1985

Kansas Gas and Electric Company
ATTN: Glenn L. Koester
Vice President - Nuclear
P. O. Box 208
Wichita, Kansas 67201

Gentlemen:

This refers to the inspection conducted by Messrs. R. P. Mullikin, J. E. Bess and G. L. Madsen of this office during the period January 7-24, 1985, of activities authorized by NRC Construction Permit CPPR-147 for the Wolf Creek Generating Station, and to the discussion of our findings with Mr. W. J. Rudolph, and other members of your staff at the conclusion of the inspection.

Areas examined during the inspection included followup on previously identified inspection findings and allegations. Within these areas, the inspection consisted of selective examination of procedures and representative records, interviews with personnel, and observations by the inspectors. These findings are documented in the enclosed inspection report.

Within the scope of the inspection, no violations or deviations were identified.

Should you have any questions concerning this inspection, we will be pleased to discuss them with you.

Sincerely,

Original Signed By

R. P. Denise, Director
Wolf Creek Task Force

Enclosure:
Appendix - NRC Inspection Report
50-482/85-03

cc: (see page 2)

PSA	PSB	PSA	C:PSA	DRS&P	EO
RMullikin/jj	JBess	GMadsen	LMartin	RDenise	TWestermsn
3/1/85	3/1/85	3/1/85	3/1/85	3/1/85	/85

8503080370

cc w/enclosure:
Kansas Gas and Electric Company
ATTN: Gene P. Rathbun, Manager
of Licensing
P. O. Box 208
Wichita, Kansas 67201

Forrest Rhodes, Plant Superintendent
Wolf Creek Generating Station
P. O. Box 309
Burlington, Kansas 66839

bcc to DMB (IE01)

bcc distrib. by RIV:

*RPB1	P. O'Connor, NRR	K. Kneil, NRR
*RPB2	*Resident Inspector	R. D. Martin, RA
*EP&RPB	*Section Chief (RPB2/A)	C. Wisner, PAO
*RIV File	R. Denise, DRS&P	*MIS System
Myron Karman, ELD, MNBB (2)		J. Harrison, RIII
KANSAS STATE DEPT. HEALTH		*RSTS Operator
*D. Weiss, LFMB (AR-2015)		

*w/766

APPENDIX

U. S. NUCLEAR REGULATORY COMMISSION
REGION IV

NRC Inspection Report: STN 50-482/85-03 Construction Permit: CPPR-147

Docket: 50-482 Category: B1

Licensee: Kansas Gas and Electric Company (KG&E)
P. O. Box 208
Wichita, Kansas 67201

Facility Name: Wolf Creek Generating Station

Inspection At: Wolf Creek Site, Coffey County, Burlington, Kansas

Inspection Conducted: January 7-24, 1985

Inspectors: for R. P. Mullikin, Reactor Inspector, Project Section A, Reactor Project Branch 2 (pars. 1, 2, 3, 4, 5, and 6) — Date 3/1/85

J. E. Bess, Reactor Inspector, Project Section B, Reactor Project Branch 2 (pars. 1, 2, 3, 4, 5, and 6) — Date 31/85

G. L. Madsen, Reactor Inspector, Project Section A, Reactor Project Branch 2 (par. 3) — Date 31/85

Approved: L. E. Martin, Chief, Wolf Creek Task Force — Date 3/1/85

8503048325

Inspection Summary

Inspection Conducted January 7-24, 1985 (Report STN 50-482/85-03)

Areas Inspected: Routine, announced inspection for the followup on previous NRC inspection findings and allegations. The inspection involved 76 inspector-hours onsite and 8 inspector-hours in-office by three NRC inspectors.

Results: Within the areas inspected, no violations or deviations were identified.

DETAILS

1. Persons Contacted

Kansas Gas and Electric (KG&E)

*W. J. Rudolph II, Manager, Quality Assurance (QA)
*W. M. Lindsay, Supervisor, Quality Systems
*N. Hoadley, Nuclear Plant Engineering
*R. L. Stright, Licensing
*T. D. Fay, Licensing
*C. J. Hoch, QA Technician
H. K. Chernoff, Licensing
J. L. Blackwell, Fire Protection Specialist
K. Peterson, Licensing

SNUPPS

M. Fletcher, Licensing

The NRC inspectors also interviewed other site personnel during the course of the inspection.

*Denotes those attending the exit interview.

2. Licensee Action on Previous Inspection Findings

(Closed) Violation (482/8422-02): Failure to maintain electrical separation. The issue of 1-inch conduit-to-conduit separation deficiencies was satisfied by the completion of KG&E Corrective Action Request (CAR) 15. Under CAR 15, Daniel International Construction (DIC) was to identify all violations of the 1 inch separation criteria in all "Q" areas, and correct them using nonconformance reports (NCRs). After DIC completed its work on CAR 15, KG&E QA performed a surveillance of the inspected areas and found several unidentified separation violations. KG&E rejected the DIC corrective action as ineffective, and subsequently, a joint DIC and KG&E walkdown was initiated. This walkdown identified only four additional violations of the 1 inch criteria. All violations were corrected as denoted by the closure of the CAR. Corrective action was taken to avoid further violations of this type.

Startup Field Report (SFR) 1-RL-31 was initiated to identify all violations of the 6 inch internal cabinet separation criteria. These violations were corrected via the NCR process and closed out. Corrective action was taken to preclude recurrence of this noncompliance.

The NRC inspector visually inspected all NRC identified separation violations to confirm that corrective action had been performed. It appears that KG&E has adequately addressed the problems delineated in the violation. This violation is considered closed.

(Closed) Unresolved Item (482/8422-03): Potential flexible electrical conduit separations violations due to equipment vibration, transmitted hydrodynamic loads, or seismic events. During the walkdowns associated with CAR 15, as described above, inspectors physically attempted to violate the 1 inch criteria by moving the conduits together and overlapping if possible. When released by the inspectors, all conduits were observed to have maintained the required separation. This action appears to satisfy this concern. This unresolved item is considered closed.

(Closed) Open Item (482/8418-02): This item concerned the correct torquing of mounting bolts for safety-related instrumentation. SFR (SU-72) had been issued to track and document the completion of the bolt torquing concerns. Construction Work Permits (CWPs) were issued and work completed as required by SU-72. The NRC inspector verified that the work was completed and documented. This item is considered closed.

(Closed) Open Item (482/8419-01): Incorporation of revisions and issuance of fire protection procedures and fire preplans. The NRC inspector confirmed that all NRC identified changes to procedures had been made and that the procedures and fire preplans were issued. This open item is considered closed.

(Closed) Open Item (482/8419-02): Fire dampers operability during flow conditions, and maintenance procedure. KG&E Procedure STS-MT-026 was approved, which will require periodic visual inspection of fire dampers. The testing of the fire dampers during flow conditions has not been performed since the required actions to be taken during a fire would be to isolate the fire by shutting down all ventilation fans to the affected area. This appears adequate to resolve this concern. This open item is considered closed.

(Closed) Open Item (482/8419-03): Test of portable radios needed to support the safe shutdown function. The licensee supplied the NRC inspector with the results of a test that showed that communications between plant locations necessary to shut down the plant from outside the control room and the auxiliary shutdown panel were found satisfactory. Also checked were traffic routes between locations. This open item is considered closed.

(Closed) Open Item (482/8419-04): Inadequate emergency lighting. The NRC inspector verified that the previously identified lighting deficiencies were corrected. However, a new procedure for evacuating the control room

due to a fire was developed after the previous inspection. This procedure was walked down in its entirety to assess the emergency lighting in areas not previously inspected by the NRC. The NRC inspector identified three areas to the licensee where existing lights needed to be realigned. These lights were subsequently redirected, and a followup inspection by the NRC inspector showed them to be acceptable. This open item is considered closed.

(Closed) Open Item (482/8419-05): Completion of all preoperational fire protection tests and the completion of an acceptable set of fire pump operation curves. The licensee confirmed that all fire protection preoperational tests had been performed. In addition, the licensee performed fire pump performance tests on their electric and diesel fire pumps. Curves were shown to the NRC inspector and these will become their base curves. This open item is considered closed.

(Closed) Open Item (482/8419-06): Installation of all fire barrier penetration seals. The NRC inspector was informed by KG&E that the installation of all penetration seals required for safe shutdown was completed on January 12, 1985. However, due to modifications requiring the breaching of some of these seals, not all safe shutdown penetrations may be sealed on a certain day. This concern is alleviated by the site Technical Specifications which will require a fire watch for each breached seal. This open item is considered closed.

(Closed) Open Item (482/8419-07): Adequacy of fire protection detectors in the control room ventilation ducting. The NRC inspector reviewed an analysis of the fire detection arrangement in the control room, which included the installation of two additional detectors in the control room. This appears to satisfy the concern. This open item is considered closed.

(Closed) Open Item (482/8419-08): Completion of identified fire barrier wrapping. KG&E confirmed to the NRC inspector that all fire wrapping has been completed. A visual inspection was made of a sample of the completed wraps in the auxiliary building by the NRC inspector. These wraps appeared to satisfy separation requirements. This open item is considered closed.

(Closed) Open Item (482/8419-09): Isolation of diesel generators from the control room and the analysis of the spurious signal concern. The NRC inspector reviewed and walked down Procedure OFN 00-017 for the evacuation of the control room due to a fire. This procedure, along with physical modifications, allows for the isolation of the diesel generators and the elimination of spurious signals to selected equipment. This open item is considered closed.

(Closed) Open Item (482/8419-10): Issuance of an acceptable hot shutdown procedure, training of operators and demonstration of the procedure to the

NRC. The NRC inspector reviewed and walked down Procedure OFN 00-017 for the evacuation of the control room due to a fire. The licensee also provided records of the training of personnel in this procedure. This appears adequate to resolve this concern. This open item is considered closed.

(Closed) Open Item (482/8419-11): Alternate source of power, independent of the control room, for the pressurizer relief isolation valves (PRIV). The NRC inspector reviewed Procedure OFN-00-017 which demonstrates how the PRIVs can be isolated from the control room and still have power. This open item is considered closed.

3. Followup on Allegations

a. (Closed) Allegation (4-84-A-71): This allegation concerned a number of items in the startup program. Included are several KG&E SFRs dealing with the fire protection program that the allegers felt were incorrectly dispositioned. The following are the investigations of each allegation item:

Allegation: Part 1: SFR 1-KC-39, stated that site specifications require that halon piping be rigidly supported to prevent swaying. The SFR listed several fire protection systems as violating this requirement. Bechtel's response was that the term "rigidly supported" does not mean "supported with no movement." They stated that additional restraints would be added if found necessary due to preoperational tests.

Findings: Part 1: The National Fire Protection Association (NFPA) Standard 12A states, in part, "The piping system (halon) shall be securely supported with due allowances for agent thrust forces, thermal expansion and contraction and shall not be subjected to mechanical, chemical, vibration or other damage."

The KG&E startup engineer who originated SFR 1-KC-39 was interviewed by the NRC inspector. The startup engineer stated that this SFR was written before the piping wall penetration seals were installed. At that time, unacceptable movement was observed. However, he stated that the preoperational halon tests performed on the systems at the time of the interview showed no adverse problems with pipe sway.

Conclusion: Part 1: After an investigation of this allegation, it is concluded that although the word "rigidly" may be inappropriate as used in the vendor drawing, the present halon piping system does not violate the NFPA standard for pipe movement or FSAR commitments. Part 1 of this allegation could not be substantiated.

Allegation: Part 2: SFR 1-KC-41 stated that the infra-red detectors' view in the diesel generator rooms are severely obscured by permanent HVAC ductwork, catwalks, and the diesel generator silencer. These detectors are line-of-sight devices and must see a fire to operate. This, according to the SFR, is a violation of NFPA-72E. Bechtel responded that the rooms have the required detector coverage and that the obstructions noted in the SFR were temporary due to construction activities.

Findings: Part 2: The NRC inspector toured both diesel generator rooms and could find no permanent structure that appeared to obscure the detectors' view. A review of the preoperational tests for these rooms (SU4-KC03) showed that the detectors performed as required by site requirements for a simulated fire.

Conclusion: Part 2: Based upon the above findings it is concluded that the installed infra-red fire detectors in the diesel generator rooms are adequate in number and location. Part 2 of this allegation could not be substantiated.

Allegation: Part 3: SFR 1-KC-45 stated that the FSAR requires that all fire detection and alarms in safety-related areas be Class A circuits. However, according to the SFR, Bechtel Drawings 10466-M-651-0074 through 0076 show 84 out of 103 zones in safety-related areas as Class B circuits. The SFR recommended revision of design documents and the FSAR. Bechtel rejected the proposed resolution and accepted the design "as-is" stating that FSAR commitments were met.

Findings: Part 3: The FSAR, Section 9.5.1, requires, in part, "In safety related areas, the fire detection and alarm system meets NFPA-72D, Class A." NFPA-72D states, in part, "A smoke detecting combination of a Class A Proprietary System shall be capable of operating for a smoke alarm signal during a single break or a single ground fault condition of the circuit wiring conductors (a) between the central supervising station and the smoke alarm signal transmitter and the smoke detector control unit. . ."

An NRC fire protection engineer informed the NRC inspector that the NRC interpretation of NFPA-72D is that the actual fire detection circuit (from the detector to the control unit) does not have to be Class A as is the contention in the SFR.

Conclusion: Part 3: It is concluded that the present design of Class A detection circuits satisfies FSAR and NFPA requirements. Part 3 of this allegation could not be substantiated.

Allegation: Part 4: SFR 1-KC-46 stated that, for fire protection system KC-05, KC-06, KC-07, and KC-09 each main and reserve bank of halon cylinders has parallel solenoid actuators where the Bechtel drawings show only one. Also, the SFR stated that this arrangement does not allow for the required solenoid coil supervision. Bechtel's response to the SFR was to initiate a design change to show the parallel coil arrangement on the site drawings. They further stated that the parallel solenoids are supervised and, thus, no additional changes were made to design.

Findings: Part 4: Bechtel Drawings M-658-0035-03 and M-658-0038-03 were reviewed by the NRC inspector. The inspector verified that a change was made to these drawings to show the parallel solenoid actuators. The redundant solenoids are installed in areas required for the safe shutdown requirements of 10 CFR 50, Appendix R. This arrangement provides an extra measure of reliability, but is not required by the NRC. The NRC inspector determined that electrical supervision of the redundant solenoids is available under the present arrangement.

Conclusion: Part 4: It is concluded that the present arrangement of redundant parallel solenoids actuators satisfies both FSAR and NFPA requirements. Part 4 of this allegation could not be substantiated.

Allegation: Part 5: SFR 1-KC-47 dealt with the power supply to the fire protection control cabinets. The SFR had the following three concerns:

1) The dc power supply is rated for 130 to 170 volts dc but the required input range is 105 to 140 volts dc per Bechtel Specification No. 10466-M-658.

2) The power supply is mounted flush against the wall but the manufacturer recommends a 1/2-inch stand off for ventilation.

3) There is no indication that the power supply is listed or approved for fire protection service.

Bechtel's response was that the power supply is acceptable for its intended service.

Findings: Part 5: The halon control panels require a regulated power supply. The plant dc power, can vary from 105 to 140 volts. However, the regulated power supply in the control panel is listed for a 130 to 170 volt dc input range. The vendor has supplied information from the manufacturer of the control panels that the regulated power supply will operate satisfactory at the different input range. Also, the manufacturer stated that flush mounting of

the supply would have no adverse effect on its operation. Although the power supply is not UL listed the control panel, with the power supply, is approved and listed by Factory Mutual for fire protection service which satisfies FSAR and NFPA requirements.

Conclusion: Part 5: Based upon the above findings it is concluded that the halon control panel will operate satisfactory with the installed power supply. Part 5 of this allegation could not be substantiated.

Allegation: Part 6: SFR 1-KC-52 stated that an improper crimp on a conductor to pressure switch KC-PSH163 required the replacement of a ring type lug with a split type lug. The SFR questioned this replacement. Bechtel's response was that the installation was acceptable due to the fact that the connection was facilitated in a craftsmanlike manner and the pressure switch is a component of a supervised circuit. A failure mode such as an open or short circuit would alarm in the control room.

Findings: Part 6: Bechtel Specification M-650-04 does not address the type of lug required. An inspection by the NRC inspector of local panel 259, where switch termination is located, showed that no unusual stress would be put on the connection. It appears highly unlikely that the split type lug could lose electrical contact.

Conclusion: Part 6: It is concluded, based upon the above findings, that this termination satisfies FSAR and NFPA requirements. Part 6 of this allegation could not be substantiated.

Allegation: Part 7: SFR 1-KC-57 stated that a flaw was discovered during troubleshooting and checkout of the KC-008 fire alarm panel in the control room. An incoming alarm signal caused (1) a printout, (2) a blinking LED annunciation, and (3) audible annunciation. The blinking LED went solid and the audible stopped when the alarm was acknowledged. The problem occurred, according to the SFR, when an input signal went through several changes of state rapidly, like the bouncing of a contact. The annunciator window would clear after being acknowledged but the audible signal continued to sound until it had been acknowledged twice as many times as the contact bounced. The result was having a seemingly clear board with an audible alarm that would not stop. Bechtel responded to the SFR by stating that the operation of the control panel was normal as described. The nuisance alarms were to be expected during inspection and testing.

Subsequently, startup initiated a second SFR disagreeing with Bechtel's response. In addition, they stated that operators were observed acknowledging KC008 "phantom" alarms by keying in "A 3 A (return), A 3 A (return), A 3 A (return)," etc., until the audible

went away. They did not have to type in the specified sequence of A (acknowledge), (zone number), A or T (for alarm or trouble). The audible alarm was noticed by startup to cease, based on the right number of acknowledgements, regardless of which zone entry was inputted.

Findings: Part 7: The Quality First organization at Wolf Creek also investigated this matter. Subsequently, SFR 1-KC-129 was issued to resolve the problem. Coordination among the manufacturer, KG&E Nuclear Plant Engineering (NPE), and Bechtel resulted in the resolution that the operation of the panel is as intended and as NFPA requires. Quality first did not substantiate this allegation.

Conclusion: Part 7: The above findings appear to adequately resolve the concern. Part 7 of this allegation could not be substantiated.

Allegation: Part 8: SFR 1-KC-59 stated, in part, that the halon discharge system could be put into an inhibit mode which would not allow automatic or manual electric pushbutton actuation of the system. The alleger claimed that the only way to discharge halon in an emergency, while the system is in the inhibit mode, would be to operate the manual lever at the tanks. This operation would discharge halon into the protected area but would not close ventilation dampers or shut off the HVAC system. This, according to the alleger, would make the halon system ineffective due to the halon concentration being dissipated through the HVAC system. The remaining halon could decompose, due to the heating of the halon, into toxic gases and spread into other areas of the plant. The SFR recommended a design change to permit the manual electric discharge pushbutton to override the inhibit switch. Bechtel rejected the proposed resolution to the SFR and accepted the present design "as-is". KG&E NPE agreed with Bechtel's evaluation. Subsequently, startup issued another SFR (1-KC-76) which depicted the design change needed to resolve the problem stated in SFR 1-KC-59. Bechtel and NPE rejected this resolution also.

Findings: Part 8: The use of the inhibit switch is to allow for occupancy of the protected area during periods of maintenance. The NRC inspector discovered that the SFR was correct in stating that manual actuation of the halon would not shut down the HVAC system or close dampers. However, there are several design and administrative controls in effect that would eliminate a major problem. In the event of the halon system being put into the inhibit mode, site Technical Specifications will require a continuous fire watch in the area. If a fire occurred while the system is in the inhibit mode, a detection signal would be received in the control room even though halon would not discharge. The approved site fire preplans require the control room operators to isolate the fire by shutting down the HVAC fans and dampers to the affected area.

Conclusion: Part 8: Based upon the above findings, it is concluded that the present design could allow halon discharge without dampers closing and the HVAC system shutting down, but administrative controls in effect will eliminate any concern. Part 8 of this allegation is partially substantiated but appears to have no safe shutdown significance.

Allegation: Part 9: SFR 1-KC-60 stated that five fuel building fire alarm horns and fifteen turbine building horns failed to operate during tests due to corrosion on electrical contacts. Also, some turbine building horns were indistinguishable from background noise. Bechtel's response was that once the plant is operational a surveillance procedure will periodically verify that the horns function. Also, they stated that the background noise in the turbine building will diminish during normal plant operation.

Findings: Part 9: NFPA-72A requires that audible alarms be protected from the environment and that they be heard clearly regardless of the maximum noise level obtained from machinery or other equipment under normal conditions of occupancy. KG&E has a surveillance procedure which will require periodic testing of the audible alarms. The Quality First organization also investigated this allegation and determined that the background noise level should be tested during power ascension to adequately determine whether horns could be heard. Quality First stated that this will be added to the open items work list and will be tracked through the closure process for Quality First File QCI-84-24W.

Conclusion: Part 9: It is concluded that surveillance tests will be adequate to detect faulty horns, and that further tests will be needed for background noise levels in the turbine building. Part 9 of this allegation is partially substantiated but appears to have no safe shutdown significance.

Allegation: Part 10: SFR 1-KC-64 stated that the smoke detection system in the south electrical penetration room does not meet NFPA 72E-1978 criteria. This requires more detectors in an area when structural beams are more than eighteen inches deep. In addition, the SFR described two cross zoned detectors (107-006 and 114-006) in the north electrical penetration room which are separated by a full height wall. Bechtel responded by adding additional smoke detectors where needed. However, Bechtel stated that the structural beams only exceed eighteen inches in depth when fireproofing material is added, which they considered to be the correct interpretation of the NFPA standard. KG&E startup initiated another SFR which stated opposition to accepting Bechtel's interpretation of the NFPA standard.

Findings: Part 10: The NRC inspector conferred with an NRC fire protection engineer who agreed that Bechtel's interpretation of the NFPA standard concerning beam depth with fireproofing added is acceptable. Bechtel Drawing E-1F1401 was reviewed which showed the location of additional smoke detectors in the subject areas. The NRC inspector verified that these detectors were actually installed.

The north electrical penetration room was inspected by the NRC and found that two cross zoned detectors were separated by a full height wall. However, both detectors are located within the protected area of two other cross zoned detectors (114-007 and 107-003).

Conclusion: Part 10: Based upon the above findings it is concluded that the present system of detectors satisfies both FSAR and NFPA requirements. Part 10 of this allegation could not be substantiated.

Allegation: Part 11: SFR 1-KC-68 stated that, contrary to NFPA requirements, return bends were not installed for wet pipe sprinkler pendent heads when used in drop tile ceiling areas. Bechtel's responses was that the NFPA standard does not require return bends in the subject area.

Findings: Part 11: NFPA-13 states, in part, "when piping on wet systems are concealed, with sprinklers installed in pendent position below a ceiling, return bends shall be used when the sprinkler system is from a raw water source. . ." The use of return bends is required to minimize sediment build-up in the sprinkler heads. The Quality First organization also investigated this allegation and found it to be substantiated. The corrective action is being handled through Quality First File QCI-84-24W. The area in question is not an area required for safe shutdown.

Conclusion: Part 11: It is concluded that the use of return bends in drop type sprinkler heads are required to satisfy FSAR and NFPA requirements. Part 11 of this allegation is substantiated but appears to have no safe shutdown significance.

Allegation: Part 11: SFR 1-KC-69 stated that the FSAR and site specifications require that visual and audible local alarms and trouble indicators be installed on field deluge valve panels. The panels do not have these alarms and indicators. Bechtel's response was to accept the system "as-is."

Findings: Part 11: Section 9.5B of the FSAR requires the fire detection system to alarm locally and in the control room. The NRC inspector discussed with an NRC fire protection engineer the definition of "local." The engineer stated that the NRC interprets

local indication and alarming to be at the multiplexer and not at the field deluge valve panels as alleged.

Conclusion: Part 11: Based on the above findings it is concluded that the present design for local indication and alarming satisfies FSAR and NFPA requirements. Part 11 of this allegation could not be substantiated.

Allegation: Part 12: SFR 1-KC-70 stated that NFPA-12A requires the following for the halon discharge system:

1) Design nozzle pressures shall be not less than 200 psig.

2) The agent discharge shall be substantially complete in a nominal 10 seconds.

The SFR said that Bechtel Drawing M-658-0046-01 allowed variations to these requirements in violation of FSAR commitments. Bechtel accepted the system "as-is" since they stated that NFPA allows longer discharge times, and the discharge nozzle pressure requirements has been removed from the NFPA standard.

Findings: Part 12: Section 9.5.1 of the FSAR requires that halon fire protection systems be designed in accordance with NFPA-12A-1973.

NFPA-12A-1973 required that design nozzle pressure be not less than 200 PSIG. Subsequent issues have this requirement removed. Also required in the NFPA standard is that the halon discharge shall be substantially completed in a nominal 10 seconds or a shorter time if practical, unless a longer discharge time is specifically permitted by the authority having jurisdiction. Preoperational tests have shown several discharge times greater than 10 seconds. The American Nuclear Insurer, which is the authority having jurisdiction for insurance purposes, has accepted longer discharge times based on the larger capacity halon tanks used over what the design specifies. An NRC fire protection engineer has informed the NRC inspector that the variations from nozzle pressure and discharge time requirements are acceptable.

Conclusion: Part 12: Based on the above findings it is concluded that the Bechtel response to this SFR is acceptable. Part 12 of this allegation could not be substantiated.

Allegation: Part 13: SFR 1-KC-73 stated that halon discharge pressure switches were not wired to shut down the HVAC system once halon discharged as required by the FSAR. Bechtel's response was that the HVAC system needed to be shut down prior to halon discharge

to eliminate loss of halon due to the fans coasting down. Bechtel subsequently revised the FSAR to reflect their design intent.

Findings: Part 13: Section 9.5.1.2.3 of the FSAR was revised to delete any reference to the initiation of the shutdown of associated equipment by the halon discharge pressure switch. This design was found to be acceptable to the NRC.

Conclusion: Part 13: It is concluded that the present design for HVAC system shutdown satisfies FSAR and NFPA requirements. Part 13 of this allegation could not be substantiated.

Allegation: Part 14: SFR 1-KC-74 stated that the water flow pressure switches for fire protection control panel 322 and 323 in the north and south electrical penetration areas fail to provide Class A function as described by NFPA-72D, and required by the FSAR for flow monitor device circuits. Bechtel's response was to accept the system "as-is."

Findings: Part 14: The FSAR, Section 9.5.1 states, in part, "In safety-related areas, the fire detection and alarm system meets NFPA-72D, Class A." NFPA-72D states, in part, "Class A system provides emergency operation for fire alarm, waterflow alarm and guard's tour signals during a single break or a single ground fault of the signaling line circuit."

The alleger interpreted the signaling line circuit to mean from the detector to the transmitter and beyond. Bechtel's interpretation was that a signaling line circuit runs from the transmitter and beyond. This circuit is already Class A. A discussion between the NRC inspector and an NRC fire protection engineer revealed that Bechtel's interpretation of a signaling line circuit is correct.

Conclusion: Part 14: It is concluded, based on the above information, that circuit design for the water flow pressure switches satisfies FSAR and NFPA requirements. Part 14 of this allegation could not be substantiated.

Allegation: Part 15: SFR 1-KC-94 stated that in the cable chases adjoining electrical equipment rooms, a water sprinkler system has replaced the originally designed halon system. The concern in the SFR was that consideration had not been given to possible water damage to the electrical equipment and electrical penetration seals. Bechtel's response was that floor penetration seals in the cable chases could withstand the pressure of water buildup and drains could handle the overflow from the chases.

Findings: Part 15: The NRC inspector reviewed the data supplied by Bechtel and inspected the electrical equipment rooms. There is no indication that the drains would not be able to eliminate water buildup in these rooms and the penetration seals would be breached.

Conclusion: Part 15: Based on the above findings, it is concluded that the present fire suppression system in the cable chases satisfies FSAR and NFPA requirements.

Allegation: Part 16: SFR 1-SU-80 stated that the penetration sealant being used between the north and south electrical penetration room walls and the outer containment wall is a combustible type material. Also of concern was that flammable caulking was being used around numerous fire doors throughout the powerblock. A handwritten comment on the SFR said that Bechtel pigeonholed this SFR until a new one (SFR 1-SU-94) was written on the same subject with the "yes" box checked for 10 CFR 50.55(e) reportability.

Findings: Part 16: The Quality First organization also investigated this allegation (QCI-84-24W) and determined it to be substantiated. This allegation subsequently became a 10 CFR 50.55(e) reportable item (53564-K140).

Conclusion: Part 16: Part 16 of this allegation was substantiated. The safety significance and generic implications of this deficiency are discussed in NRC Inspection Report STN 50-482/85-04 for the closure of this reportable item.

Allegation: Part 17: The alleger stated that construction had landed many electrical cables using nylon screws and washers to allow for construction completion, but at the same time not allow the circuit to operate. The alleger believed that there was no control over where this was done and that testing was being relied on exclusively to find and change the screws/washers.

Findings: Part 17: The subject of the use of nylon fasteners was previously found to be a violation of 10 CFR 50, Appendix B, requirements, and documented in NRC Inspection Report STN 50-482/84-05, dated February 29, 1984. This violation was subsequently closed out in NRC Inspection Report STN 50-482/84-15, dated September 6, 1984.

Conclusion: Part 17: Part 17 of this allegation is substantiated based on the NRC's issuance of a violation.

Allegation: Part 18: The alleger stated that many systems were turned over from construction so incomplete that test procedure sequences had to be altered by test change notices (TCNs) in a gross manner and that startup testing was not well sequenced or integrated.

Finding: Part 18: During the initial phases of startup testing, the NRC inspectors observed a lack of communication between test engineers. Additionally, the lack of good sequencing procedures resulted in the need for TCNs. Most of the required TCNs resulted from the impact of integration of different tests which were being performed on similar systems plus word and grammatical corrections. Issued TCNs were not associated with the incompleteness of systems.

Conclusion: Part 18:

Most TCNs were administrative in nature rather than a technical system change. The large number of TCNs did not invalidate the acceptability of the systems or the acceptability of the preoperational test program.

b. (Closed) Allegation (4-84-A-114): This allegation concerned several safety issues on the fire penetration seals, and of reprisals mode against the alleger for identifying them. The following technical issues were identified:

1) Due to pressure exerted by the production department of B&B construction to install penetration seals at a fast pace, some in-process and post installation QC inspections were not performed.

2) QC was told to write only a limited number of NCRs.

3) NCRs were not processed in a timely manner.

4) Quality of penetration seals was suspect.

Findings: The Quality First organization investigated this allegation also under file number QCI-84-93W. They performed an in-depth investigation into each concern. Quality First was able to substantiate the allegation that in-process and final inspections for fire penetration seals were not performed. It was found that during a period from March to June 1984 some inspection hold points had been bypassed. Quality First issued Quality Program Violation 8/84-24 to determine how many hold points were bypassed, inspect them, and develop measures to prevent recurrence of the problem. This has subsequently been accomplished.

The NRC inspector discovered that a random reinspection of foam penetration seals was conducted during March 1984 at the request of KG&E. This reinspection was initiated due to concerns raised at

Callaway on the quality of seals there, and covered approximately 55 percent of the total population. No significant problems were identified. The NRC inspector also randomly inspected penetration seals in the control and auxiliary buildings and found those to be acceptable, based on B&B inspection and manufacturer criteria.

The allegation into the reprisals against the alleger for identifying safety issues was investigated by the NRC Office of Investigations and documented in report Q4-84-048.

Conclusion:

Based on the above findings, it is concluded that some required QC inspections of fire penetration seals were bypassed. This allegation was partially substantiated, and appears to have had safe shutdown significance. However, corrective action is considered satisfactory to resolve this concern.

c. (Closed) Allegation (4-85-A-04): The alleger stated that the resolution to KG&E CAR 15 was inadequate due to the use of unqualified DIC QC inspectors. CAR 15 dealt with the corrective action required for NRC Violation 50-482/8422-02 concerning violations of the 1 inch separation criteria for electrical conduits. In addition, the alleger stated that NCRs 19715E and 20443E identified minimum bend radius problems in small terminal enclosures but many more exist.

Findings: The NRC inspectors identified the four DIC QC inspectors that participated in the walkdown associated with CAR 15. The qualifications and training for these inspectors were reviewed. Although the NRC inspectors were unable to determine how much actual inspection experience each person had relative to electrical separation, each QC inspector was trained and certified for that discipline. Also, it was determined that each inspector was given a refresher course in separation requirements prior to the walkdown. After DIC completed its walkdown and performed corrective action, KG&E QA did their own walkdown and found other separation deficiencies. KG&E rejected the corrective action as being inadequate and instituted a joint DIC-KG&E walkdown of all areas (Details are given in paragraph 2 of this report for the closure of NRC Violation 482/8422-02.)

The two NCRs noted above were reviewed by the NRC inspector. These NCRs dealt with the separation problems associated with CAR 15 and not with minimum bend radius problems as alleged. The area of conformance to minimum bend radius requirements has been the subject of several NRC inspections as documented in the following NRC Inspection Reports: 50-482/82-08, 82-17, 83-03, 83-31, 83-35, 84-02,

and 84-05. These inspections discovered no adverse minimum bend radius problems.

Conclusions: Based on the above findings it is concluded that there is no evidence to suggest a significant problem in adherence to minimum bend radius requirements within enclosure. Even though the qualifications and training of the DIC QC inspectors appear adequate, the separation walkdown was inadequate as supported by the KG&E rejection of CAR 15's corrective action. However, KG&E's prompt action in this matter appears to have eliminated any concern. This allegation is partially substantiated.

d. (Closed) Allegation (4-84-A-76): The concerns of this allegation involve a wide range of technical and procedural questions in the areas of instrumentation and control (I&C) calibration methods. These concerns are the results of decisions made on technical and procedural issues that the alleger did not agree with. The NRC inspector reviewed and investigated the concerns of the alleger which could have an impact on plant safety. The following is a summary of each item:

Allegation: Part 1: The alleger stated that component retesting was performed using a startup procedure (SU6-CS04) rather than Operational Procedure ADM 08-806.

Investigation: Part 1: The NRC inspector reviewed the referenced procedure (ADM 08-806) to ascertain whether procedural instructions were being followed during component testing. ADM 08-806 applies to the operational recalibration program. This procedure is implemented after Operations has jurisdiction over components turned over from the startup groups. Until the operation groups receive turnovers from the startup groups, startup procedure (SU6 CS04) is used for initial tests. Any retests requested are by CWPs. The NRC inspector reviewed a memo (RJG-084) from the start-up manager referencing initial component calibration and recalibration. This memo was written to system engineers to clear up apparent confusions, concerning component calibration and recalibration program for instrumentation. The memo stated that all initial component testing would be performed under the startup (SU6-CS04) test program.

Conclusion: Part 1: Because there was a possible misinterpretation of the applicable procedures, KG&E issued Administrative Procedure Change Notice, ADM 14-003 Rev. 9. This amendment was written to delete the requirement for entering component into the site calibration program after testing, thus eliminating the possibility of confusing when startup procedures (SU6 CS04) or Operation Procedures ADM 08-806 are to be implemented. The investigation

findings concluded that correct procedures were being followed. On this basis, Part 1 of this allegation could not be substantiated.

Allegation: Part 1a: The alleger stated that data on switch test records was inconsistent with the Wolf Creek Generating Station Total Plant Setpoint Document (TPSD) and the TPSD is inconsistent with Vendor Prints.

Investigation: Part 1a: The NRC inspector reviewed calibration test records of several switches to ascertain if inconsistencies existed between the TPSD or if the TPSD was inconsistent with Vendor Prints. The NRC inspector reviewed the test records for KJ-DSL-106A. This instrument had been identified as having incorrect or inconsistent documentation. Also reviewed was the TPSD to verify if there was a difference in setpoints. After reviewing both the test records and TPSD the NRC inspector noted that there was a difference in setpoints. The test record listed the tolerance of the instrument as being ± 12 psig. The TPSD listed the tolerance as +10,-0 psig. According to drawing MO 18274-5, the TPSD is correct. However, the test records showed the actual error to be +3 psig. Since this was within the +10,-0 psig tolerance, the component test was acceptable.

The NRC inspector also reviewed the test records for instrument KJ-TSL-163. The test record had an accuracy of ±1% per vendor print MO 18-271-4. According to the TPSD, this accuracy was stated as ±.1%. The licensee stated the accuracy of (±.1%) was a typographical error. A recent revision to the vendor print (MO 18-271-5) has revised the setpoints to read ±5°F at 40°F, ±1.25°F at 225°F. With the new revised setpoints, the allowable error should have been ±2°F per the setpoint tolerance in the TPSD. The test record shows the actual errors to be ±1.2°F. Since the actual error is within the ±2°F tolerance, the component test was acceptable. The TPSD typographical error has been corrected. The licensee stated that Procedure ADM 14-103 clarifies what steps are taken to correct inconsistencies between the TPSD and other documents.

Paragraph 4.3.2 states, in part, "If a conflict occurs between the TPSD and another design document, testing may proceed using the TPSD as the lead document. In this case, results engineering shall be notified and a startup field report (SFR) written to correct the conflict." The NRC inspector was advised that a SFR is not required to be written if the TPSD is to be revised to agree with a design document. A SFR would only be written if design document revisions are required or, if there are discrepancies between design documents. Since the TPSD only needed to be revised to reflect the latest vendor prints, no SFR had been written to correct the discrepancies. The NRC inspector verified that all documents had been corrected.

Conclusion: Part: 1a: After an investigation of other documentation to verify if inconsistencies existed, the NRC inspector noticed that another instrument (KJ-TSL-163) had a discrepancy in documentation. The discrepancy was caused by a drawing change which also resulted in the TPSD requiring changes. For all cases identified, where the wrong allowable error was used, the actual error was within the setpoint tolerance. In view of the inconsistencies found, there is no impact on any preoperational test results. This portion of the allegation is substantiated; however, it was found to be without technical merit.

Allegation: Part 1b: It was alleged that data sheets generated by I&C using Procedure SU6-CS04 did not provide sufficient detailed actions necessary for unique testing of individual components. Also, calibration data sheets for level indicators LI 0031 and LI-00131 were found not to have been corrected for using water in the calibration media instead of lube oil, as required by startup field report (SFR) KJ 13.

Investigation: Part 1b: Data sheets for several instruments were reviewed to ascertain if sufficient information was available to insure that individual components are correctly calibrated. The investigation revealed that indicators LI-0031 and LI-0131 were originally calibrated with no specific gravity compensation. The test equipment indicator used to perform the test was "inches of water." Since there is a specific gravity difference between oil and water, retesting of all instruments was done per SFR (KJ-13). This SFR corrected all level type devices to show "inches of oil" for actual level. Due to a technician error, LI-0031 was tested without this correction. CWP KJ-4051 retested and corrected this device. The technician was notified of his error. The level III personnel had been reinstructed to review tests for proper conditions.

Conclusion: Part 1b: Based on the investigation above, it appears that I&C procedures did provide sufficient detail to assure objective evidence of acceptable testing. This was clearly stated in Section 2.0 of Procedure SU6-CS04. There appeared to be confusion by the I&C technician concerning compensation of the difference in specific gravity of water and oil. The investigation also concluded that the allowable instrument error would have been in its uncorrected state, within the acceptance criteria. Since I&C identified, corrected, and documented the errors committed by I&C technicians, this portion of the allegation cannot be substantiated.

Allegation: Part 2: This allegation states the KJ system component retest data sheets did not contain the "as found" condition or corrective action performed.

Investigation: Part 2: Administration Procedure ADM 14-102 was reviewed to determine if instrument data sheets were required to list as found conditions during startup. For a typical startup test procedure, the "prerequisites" section provides the "as found" condition, and the "restoration" section provides the "as left" condition. While the "as found" and "as left" are not specifically listed, the signoffs for the prerequisites and restoration are made. In place of recording this data, visual checks were made of the instrument condition denoting the "as found" condition. The calibrated device test data is recorded. The Operational Calibration Program (ANSI N18.7) does record "as found" and "as left" data. For startup purpose, the initial calibration as "left data" is all that is appropriate. The NRC inspector was informed that ADM-102 will be revised to clarify this issue.

Conclusion: Part 2: Based on the review of ADM-102, it is apparent that misinterpretation of this procedure is possible. However, this portion of the allegation could neither be substantiated nor found to have any technical merit.

Allegation: Part 3: It was alleged that I&C was not documenting rejection of out of calibration instruments.

Investigation: Part 3: An investigation into the allegation revealed that KJ-P1-0193, KJ-LI-0131, and PT-0126 did not appear to note exception documented by RCIC-2067-KJ, RCIC-2066-KJ and RCIC-2068-KJ. Procedure SU6-CS04 was reviewed and found to contain steps 7.2.1.4 and 7.2.2.6 instructing that for unsatisfactory tests utilize the guidance in ADM 14-103, Section 4.5, on procedure exception. ADM 14-103, Rev. 19, Section 4.5.1.1 Part b, states, in part, "or if as a result of the exception (e.g., component will be rejected out of startup jurisdiction) the test record will not be completed and no credit taken for the test portion performed, the test data sheet may be discarded." Since the three items listed above were not reworkable, they were discarded, as well as their data sheets. The new instruments were calibrated using new data sheets.

Conclusion: Part 3: Based on the objective evidence examined and procedures reviewed, I&C were following administrative procedures and appropriate actions were followed. This portion of the allegation could not be substantiated and did not appear to have any technical merit.

Allegation: Part 4: This allegation stated that I&C Level III personnel signed preoperational steps stating that necessary retesting recalibration is current and data sheets are available. The level III technicians indicated that only retesting/recalibrations contained in Appendix B were current and available and not other instruments used in the preoperational testing.

Investigation: Part 4: SU3-KJ-01 was reviewed to determine if the procedure required Level III personnel to sign data sheet stating that all necessary retesting/recalibration was current and data sheets were available. The NRC inspector contacted the Level III personnel involved to try and get their interpretation of this procedure. It was stated that steps 6.1.23 and 6.2.23 of the data sheets are signed by Level III personnel to assure that all components covered by the preoperational test have been tested, and that data sheets are available. This was consistent with RJG-084. After conversation with the Level III personnel, it appears that mis-communication, or answers to specific questions, were given without understanding the entire concept. The alleger had a listing of plant instruments used as test equipment for preoperational test SU3-KJ-01 Rev. 1. The list contained forty instruments which was alleged to not have been reviewed by I&C Level III personnel prior to signing steps 6.1.23 and 6.2.23. This list of instruments was reviewed and verified as calibrated except: PT-107 and TSH-53, which did not exist; LG 170 and LG 70, which are sight glasses and were marked N/A, since they are non-calibratable, and LS-119, which the vendor instructed the startup engineer and I&C not to calibrate for contamination reasons.

Conclusion: Part 4: Based upon the above investigation finding, it appears that a communication problem existed as to what was required of the Level III personnel. All retesting/recalibration signed by the Level III personnel appeared to be complete and data sheets were available. This portion of the allegation could not be substantiated.

Allegation: Part 5: It was alleged that Bechtel had lost control of design change process in relation to the Diesel Generators.

Investigation: Part 5: Several Colt drawings were reviewed to determine if discrepancies existed between current design drawings and the current TPSD. This allegation concerned the setpoints for instruments TS-50, TS-150, PSL-106A, 106B, 6A, and 6B as being different from the current TPSD. A review of the latest TPSD listed the setpoint for TS-50 and TS-150 to be 150°F. The setpoint for PSL 106A, PLS-106B, PSL-6A, and PSL-6B was listed as 435 psig. A review of the Colt latest Drawing 11873493 (10466-M-018-0140-08) and an earlier submittal (10466-M-018-0140-07), indicated the setpoints approved by Bechtel were 145°F (for TS-50 and TS-150). The setpoints for TS-50 and TS-150 were unchanged from the original Colt Drawing 11873493 (10466-M-018-0140-01). The setpoints of 435 psig for PSL-106A, PSL-106B, PSL-6A and PSL-6B were changed from 485 psig by Bechtel on Drawing 10466-M-018-0140-07. This revision was

accomplished after Colt submitted Drawing 10466-M-018-100-03 showing the corrected setpoints to be 435 psig.

Conclusion: Part 5: Based on the investigation above, it was acknowledged that there was a discrepancy in the setpoints for TS-50 and TS-150, between Colt Drawing 10466-M-018-0272-06 and Colt Drawing 10466-M-018-0140-07. This oversight was corrected with the issuance of Drawing 10466-M-018-0272-W07. Also, it is the responsibility of KG&E to update and maintain setpoints changes to the TPSD when changes are made to a design drawing. This was not a Bechtel responsibility. A review of current drawings and the current TPSD appears to resolve the discrepancies for TS-150 and TS-150. It has been established that portions of this allegation are substantiated but the concerns were identified and corrected. Therefore, the technical merits of this allegation could not be proven.

Allegation: Part 6: The alleger stated that the acceptance criteria, which states the performance characteristics of the diesel generators and associated auxiliaries are within design specification, were not incorporated into preoperational test SU3-KJ01, Revision 1, Section 2.1, entitled "Acceptance Criteria."

Investigation: Part 6: TCN 24 was issued to delete this entry from Section 5.8 of the preoperational test and re-enter in Section 2.8. The following actions have been completed by TCN-24. Section 5.8 has been deleted.

Section 2.8 states, "The acceptance criteria to ensure performance characteristics of the diesel generator and associated auxiliaries are within design specification is performed as recorded in SU3-NE01 and SU3-NF02. All data is recorded under loaded conditions. The reason for this change was to clarify traceability of acceptance criteria.

Conclusion: Part 6: Based on the investigation of the changes above, the TCN was issued for clarification and not because of a technical or procedural concern. Also, prior to this investigation, the alleger was quoted by Quality First Investigators as saying that the preoperational test was in good shape and he was no longer concerned with the contents. This portion of the allegation could not be substantiated.

Allegation: Part 7: It was alleged that instruments were being calibrated individually instead of in a loop. Problems were encountered when "loop" was operated.

Investigation: Part 7: Administrative Procedure ADM 14-140 was reviewed to verify if procedures had been developed to ensure that instruments were being correctly calibrated and "loop tested." Piping and Instrumentation Diagrams (P&ID's) were reviewed to identify which instruments should be loop tested. The NRC inspector reviewed the list of instruments generated by the alleger as not being loop calibrated. The allegers list contained such instruments as Pressure Indicators (PIs), Pressure Transmitters (PTs) and Hand Indicating Switches (HISs), etc. The NRC inspector randomly selected several CS 12 data sheets from the vault to ascertain if loop testing was required for these types of instruments. Data sheet revealed that component test had been performed. These instruments are not of the analog type and, therefore, no loop testing were required. Further investigation revealed that the allegers list contained instruments such as Temperature Elements (TEs) and Temperature Indicators (TIs) which were embedded in component structures and could not be removed for loop testing. However, the NRC inspector verified by reviewing data sheets that scheme and element tests were completed. Also, it was alleged that instruments LSH-27, LSH-127, LSH-36, LSH-136, LSH-32, and LSH-132 had not been loop checked. An investigation of this concern revealed that vendor instructions suggested these instruments not be tested to avoid possible contamination. These instruments were checked during preoperational testing.

Conclusion: Part 7: Based on the investigation above, all instruments that had been identified as requiring loop checks, had these checks completed, and documentation verified their acceptability. This portion of the allegation could not be substantiated.

Allegation: Part 8: The alleger stated that Resistance Temperature Detectors (RTDs) are not calibrated in a loop. I&C calibrates the elements but does not account for loop resistance.

Investigation: Part 8: The NRC inspector investigated these concerns using the same approach as listed above in Part 7. The list of instruments identified by the alleger was reviewed. As stated in the investigation above, the instruments (RTDs) were embedded in component structure and were not removed because they were not considered as part of loops. Data sheets reviewed indicated that all RTDs had a scheme or point check.

Conclusion: Part 8: All pertinent documents (data sheet, drawing etc) were reviewed; there were no indications of a programmatic breakdown in the areas of instrument calibration. This portion of the allegation could not be substantiated.

Allegation: Part 9: Following completion of acceptable component testing, the Status Indicator was not completed in accordance with Procedure ADM 08-806.

Investigation: Part 9: The supervisor of the I&C Startup program was interviewed by the NRC inspector to verify if there was, in fact, a problem with the calibration program as defined by Procedure ADM 08-806. The I&C supervisor stated that steps 4.8.1 of Procedure ADM 14-103 applies to the "Operational" program for the compilation of a Master Schedule in accordance with ADM 08-806. This schedule is being refined and updated using data sheets, the Status Index, P&IDs, and the instrument index. The I&C supervisor also indicated that the Master Schedule is a document which is updated on a daily basis. It is not a controlled or design document. It was further stated that the Master Schedule is in the preoperational stage for "Operational use." This master schedule was not to be used to determine operability of any system in startup, the status index performs this function. A review of Procedures ADM 08-806 and ADM 14-103 did not reveal any discrepancies in the purpose and functions of the Status Indicator.

Conclusion: Part 9: Following the review of the above referenced procedures and the interview with the I&C supervisor, the NRC inspector did not find discrepancies as alleged. It appears that there was confusion as to how and when Procedure ADM 08-806 was to be used by the site I&C personnel. This portion of the allegation could not be substantiated.

Allegation: Part 10: It was alleged that the "yellow dot" system used by the I&C startup group is confusing.

Investigation: Part 10: The "yellow dot" system was researched to get an understanding of what this system meant in relation to instrumentation. The I&C supervisor referenced I&C-IP-001 which clarified the usage of the "yellow dot" system. IP-001 states, in part, "After an instrument is checked by the I&C group, a yellow paper dot will be placed on the instrument to indicate that it has been calibrated. This dot is to be used only as an I&C in-shop tool to identify any instrument that may not be calibrated." I&C personnel further stated the "yellow dot" was not apart of an official procedure and did not necessarily imply that an instrument was in present calibration. It was also stated by I&C startup personnel that the "yellow dot" system was a method used to "flag" or let the electrician know that the I&C group should be contacted prior to working on that particular instrument.

Conclusion: Part 10: Based on the investigation above, it appears that the "yellow dot" system was only used for "in-shop" purposes.

It appears that I&C had complete control of the system, and the confusion by the alleger was the results of not understanding how the system works. This portion of the allegation could not be substantiated.

4. Unresolved Items

Unresolved items are matters which require more information to ascertain whether they are acceptable items, violations, or deviations.

5. Open Items

Open items are matters which have been discussed with the licensee, which will be reviewed further by the NRC, and which will involve some action on the part of the NRC or licensee or both.

6. Exit Interview

The Region IV inspectors met with Mr. W. J. Rudolph and other licensee personnel on January 24, 1985, to discuss the scope and findings of this inspection.