

U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

REGION III

Report No. 50-358/78-17; 50-373/78-20; 50-374/78-13

Docket No. 50-358, 50-373, 50-374 License No. CPPR-88; CPPR-99; CPPR-100

Licensees: Cincinnati Gas and Electric Company
139 East 4th Street
Cincinnati, Ohio 45201

Commonwealth Edison Company
P. O. Box 767
Chicago, Illinois 60690

Facilities Names: Zimmer Nuclear Power Station, Unit 1
La Salle County Station, Units 1 and 2

Investigation At: San Jose California, Chester, Pennsylvania, Zimmer 1 site

Investigation Conducted: April 3-6, April 18-21, and May 4-5, 1978

Investigator: *J. E. Foster*
J. E. Foster

8/29/78

Inspector: *W. J. Key*
W. J. Key

8/29/78

Reviewed By: *Charles E. Norelius*
Charles E. Norelius
Assistant to the Director

8/29/78

D. H. Danielson
D. H. Danielson, Chief
Engineering Support Section 2

8/29/78

Investigation Summary

Investigation on April 3-6, April 18-21, and May 4-5, 1978 (Report No. 50-358/78-17; 50-373/78-20, 50-374/78-13)

Areas Inspected: Special, announced investigation into the quality of reactor core internals supplied by Sun Shipbuilding and Drydock Company, and the Quality Assurance program of General Electric Company; review of pertinent records, inspection of manufacturing activities, interviews with personnel. The investigation involved 60 inspector-hours onsite by two NRC inspectors.

Results: Of the areas investigated, no items of noncompliance with NRC regulations were identified. It was of concern that there had apparently been a breakdown in the vendor's quality control program.

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INTRODUCTION

Sun Shipbuilding and Drydock Company (Sun), manufactures nuclear reactor core internal components, under contract to General Electric (GE), for use in Boiling Water Reactors designed by GE. Core internals supplied by Sun include the core plate, shroud, core spray assembly, top guide, steam separator and shroud head. At a particular GE designed reactor facility, all of the preceding equipment may not have been supplied by Sun.

REASON FOR INVESTIGATION

On February 28, 1978, a NRC Region III (RIII) inspector advised the Chief, Reactor Operations and Nuclear Support Branch, by memo (Exhibit I), of concerns he had relative to reactor core internals supplied by Sun to the Zimmer 1 and La Salle 1 and 2 nuclear power plants. The memo detailed the items which triggered the inspector's concerns, and recommended that a NRC investigation into Sun's quality assurance program be initiated. On the basis of this memo, and discussions with the inspector, an investigation into the matter was initiated.

SUMMARY OF FACTS

The concerns identified by the RIII inspector related both to the GE overview of the Sun quality assurance program, and the Sun quality assurance programs applied to equipment supplied to the Zimmer 1 and La Salle 1 and 2 sites. Specific areas of concern included: bent pins on the core support plate, tack welds on core spray nozzles, the quality of welds on steam separators, and dye penetrant testing which had apparently been omitted by Sun. The concerns were directly related to equipment at the Zimmer 1 site, but applied in part to the La Salle site also as described in a later memo by the inspector (Exhibit II).

Nonconformances related to bent core support plate pins, tack welds on the core spray nozzles, omitted dye penetrant tests, and welds on the steam separator or shroud head assembly had been identified at the Zimmer 1 site previously. Several core support pins had been found to be bent at the La Salle site, apparently as the result of a shipping accident. Inspection of other parts of the core internals at the La Salle site had not been performed.

During April 3-6, 1978, RIII representatives visited the GE Nuclear Energy Division, San Jose, California. Records there indicated that the Sun-supplied core internals for the Zimmer site were manufactured during 1972-1973, and the internals for the La Salle site were manufactured during 1974-1975. Documents reviewed indicated that the GE Quality Assurance (QA) program implemented during this time period relied heavily on reviews of documents provided by Sun, but did include some observation of work in progress. The GE field representative assigned to Sun noted a number of deficiencies which were brought to the attention of Sun for correction. A review of reports of nonconformances identified during the manufacturing process (Deviation Disposition Requests) indicated that the nonconformances were properly evaluated and tracked for corrective action.

The GE QA program also included a review of all records related to quality, performed after manufacture of the equipment, when the complete record package was sent to GE from Sun. The GE document review disclosed a number of deficiencies which required either additional documentation or corrective action.

Correspondence between GE and Sun indicated that the GE document review for the Zimmer internals had disclosed that some dye penetrant tests performed by Sun had been performed prior to heat treatment of the equipment, rather than after heat treatment, as required. The corrective action taken for this was to authorize dye penetrant tests of the affected welds at the Zimmer site.

GE representatives indicated that cracks and other deficiencies in tack welds on the core spray nozzles had been identified as a generic problem as a result of inspections at the Limerick and Zimmer plants. Utilities having affected plants had been instructed to perform an inspection of the welds and report any defects found to GE in San Jose.

RIII representatives, accompanied by a GE representative, visited the Sun facility during April 18-21, 1978. At Sun, attention was focused on records pertaining to the Zimmer 1 site. Records pertaining to welding and inspection of equipment were acceptable according to standards in effect at the time the equipment was manufactured. The format and content of these records would not be considered acceptable under current standards. Specific dates when welding was performed or weld inspections were conducted cannot be determined, since inspection details were not recorded. Documentation for the La Salle plant was found to be in a different format, and contained more detail.

Sun documents indicate that an inspection of the core support plate was performed, but do not appear to indicate the method of inspection, or the criteria utilized for the inspection. Sun representatives stated that the core support plate and pins had been shipped in good conditions, and might have been damaged subsequently.

Since a full onsite inspection of core spray nozzle tack welds at the Zimmer 1 site identified many defects, an in-depth review of pertinent records was performed. It was found that the documentation for the tack welds on the core spray nozzles consisted of a single page entry in the permanent record folder which has several anomalies which make the document questionable. The document incorrectly references a drawing, and incorrectly indicates the number of nozzles inspected. No other records were available to substantiate the information in this inspection report. In addition, the equipment it refers to had been completed some six months prior to the noted date. The report is dated the day before a GE inspection visit. Discussion with Sun personnel indicated that the date may reflect the date on which the inspection was finished, or the date on which the documentation was produced.

The Sun inspector identified as having performed inspections of the tack welds was interviewed. He stated that he had performed the inspections as documented. However, as inspections of these tack welds at the Zimmer and La Salle plants disclosed numerous defects, including missing welds, it appears that the inspection was not performed.

During a brief tour of Sun's facilities, the RIII representatives observed the following problems: (1) weld rods were inadequately controlled, with welder training and production welding being performed in the same general area, (2) open containers of low hydrogen and stainless steel electrodes were observed in the production area, (3) tools containing lead were present and apparently in use, (4) welding defects disclosed by dye penetrant were being repaired without removal of the dye penetrant materials. These observed deficiencies were brought to the attention of GE and Sun representatives.

A visit was made to the Zimmer 1 site on May 4 and 5, 1978, to obtain additional information on the bent core support plate pins and perform a general inspection of the core internals. It was found that the core support plate pins were bent on the order of 15-20 thousandths of an inch, which would not be obvious during visual inspection. No information as to the cause of the pins being bent could be developed.

GE determined that an inspection of core components supplied by Sun should be conducted at each affected reactor site. To insure that the inspections were conducted using the same criteria, a GE team visited each site and performed the inspection. Field Deviation Disposition Reports (FDDRs) reflecting any observed deficiencies were generated for each site.

FDDRs generated at the Zimmer site as a result of this GE inspection identified welding deficiencies on the shroud, core support plate, shroud head, and top guide. FDDRs generated at the La Salle site identified similar deficiencies. These deficiencies, as well as those identified previously, will be evaluated and dispositioned by GE.

GE has indicated that, as a result of the identified problems with Sun supplied core components, a reviewed and augmented GE inspection program will be instituted during manufacture of future core components by Sun.

CONCLUSIONS

1. No items of noncompliance with NRC regulations were identified during the investigation.
2. It is of some concern to the NRC that there apparently was a breakdown in the quality control system of Sun which was not identified by the GE overview.
3. A Sun inspection of tack welds on core spray nozzles for the Zimmer and La Salle sites was apparently not performed.
4. No conclusive evidence could be developed to indicate the cause for bent pins on the core support plate for the Zimmer site.
5. GE's voluntary action, in the form of a complete inspection of all Sun-supplied components, was considered appropriate.

DETAILS

Personnel Contacted

General Electric Company (GE)

L. L. Aiello, Quality Control Representative (Zimmer)
T. E. Bloom, Resident Site Manager (Zimmer)
J. Barnard, Plant Quality Assurance Manager
A. Breed, Manager, Quality Assurance Section
C. R. Chavarria, Quality Control Representative
W. C. Cohn, Manager Quality Control Engineering
J. Murray, Manager, Reliability Engineering
J. K. Powledge, Manager, Quality Assurance Engineered Equipment
H. T. Thomas, Vendor Quality Control
D. York, Quality Control Engineer

Sun Shipbuilding and Drydock Company (Sun)

M. Lubragge, Quality Assurance Engineer
B. Taylor, Quality Assurance Engineer
R. Tompkins, Quality Assurance Auditor

Cincinnati Gas and Electric Company

B. K. Culver, Project Manager
J. R. Schott, Station Superintendent
W. W. Schwiars, Principal Quality Assurance and Safety Engineer
R. L. Wood, Quality Assurance Engineer

Reactor Controls

J. O'Connor, Assistant Site Manager
R. L. Kannen, Quality Control
E. Mayes,

Individuals

Individual "A"

Scope

This investigation focused on the specific concerns identified by a Region III inspector relative to core internals manufactured by Sun Shipbuilding and Drydock Company for use in the Zimmer 1 and La Salle 1 and 2 nuclear power plants. Emphasis was placed on nonconformances found in the core internals for the Zimmer plant. The quality assurance and quality control programs of the vendor and of GE were also reviewed during the investigation, but only as they relate to core internals manufactured by Sun Shipbuilding with emphasis on the program utilized during the manufacture of core internals for the Zimmer plant.

Discussion with RIII Inspection

Discussions with the RIII inspector who requested the investigation indicated that he had visited the Zimmer and La Salle sites, and had become aware that deficiencies had been identified on the core internals for both sites. These deficiencies pertained to bent pins on the core support plate, nonconforming tack welds on the core spray nozzles, dye penetrant testing which was being performed at the site (which he believed was omitted at the manufacturer's shop), and the quality of welds on the steam separator/shroud head assembly. The inspector acknowledged that these problems had been properly identified, and would be corrected before operation of the reactors, but he questioned why the problems had not been identified prior to delivery of the core internals. He also acknowledged that his concerns were primarily related to the core internals of the Zimmer site, as the internals of the La Salle site had not been available for inspection.

The inspector indicated that he was concerned that the GE Product QC Checklist appeared to indicate that the equipment had been inspected and found to be acceptable, and yet several defects had later been identified. He indicated that he felt that this brought the quality control programs of both the vendor and of GE into question.

A copy of the GE Product QC Checklist for the Zimmer internals (with the exception of the top guide which had a separate checklist) was discussed with the RIII inspector, focusing on the areas of his concern. He indicated that he felt the GE QC checklist indicated that it was mostly a "paper review", with very little observation of work in progress or independent verification of tests performed.

Visit to GE, San Jose

During April 3-6, 1978, RIII representatives visited the GE Nuclear Energy Division offices in San Jose, California. Concerns expressed by the RIII inspector were discussed with GE personnel, and documents related to core internals manufactured by Sun for the Zimmer and La Salle sites were reviewed, with emphasis on those records relating to the Zimmer site. Documents reviewed included: weld maps, certificates of inspection, inspection reports, construction drawings, deviation disposition requests, field disposition instructions, audit reports, material requests, purchase orders, trip reports (from GE field representative), and correspondence between GE and Sun. In addition, discussions were held with GE personnel regarding the procedures followed in their quality control program at the time the internals for Zimmer and La Salle were being manufactured. For the Zimmer plant, this was during 1972-1973, and for La Salle, this was during 1974-1975. GE representatives indicated that the GE program is basically one of overview of the Quality Control program of the vendor. A GE field representative might witness a test of a weld, for example, but would not participate in the test. An audit type of inspection was performed, with a percentage of specific tests observed, and an audit of a certain percentage of the QC documentation performed. GE representatives indicated that when full documentation for a piece of equipment was completed, the entire package was fully reviewed by a documentation specialist to insure that all tests and certificates were present.

A field audit of tests and documentation was performed by a field representative, GE personnel stated. The field representative was apparently not a resident inspector during the time of the manufacture of Zimmer and La Salle core internals, but a resident inspector is a part of the present GE program. A review of trip reports from the field representative who visited the Sun facility during the period in question indicated that he had performed an acceptable audit, and had been critical of the quality control program implemented by Sun. On several occasions, his observations were the basis for the issue of Deviation Disposition requests.

A review of the GE Product QC Checklist, comparison of the checklist with documents in the Zimmer file, and discussion with GE representatives did not indicate that the GE field representative had audited the areas where discrepancies were later found. That is, the field representative had not observed the inspection of core support plate pins, tack welds on the core spray nozzles, or the welds on the shroud head assembly which were part of the RIII inspector's concerns.

A review of documentation indicated that dye penetrant examination of core internals which was performed at the Zimmer site had been brought about by the final quality document review at GE, San Jose. GE personnel indicated that the document reviewer noticed that the dates on dye penetrant tests were prior to heat treatment for certain portions of the shroud. As the specification called for dye penetrant testing of these portions after heat treatment, GE initiated Deviation Disposition Report (DDR) No. 9136, which was used as the basis for issuance of Field Disposition Instruction 35/63000. Field Disposition Instruction 35/63000 directs personnel at the Zimmer site to perform the required dye penetrant tests. These tests then came to the attention of the RIII inspector during his visits to the Zimmer site.

A review of DDR No. 9136 indicated that the recommended disposition was to use "as is." GE did not agree with this disposition, and directed that the dye penetrant tests be performed. DDR No. 9136 indicates that the GE disposition of the DDR is "disapproved", which GE personnel stated meant that GE did not agree with the proposed disposition. On further discussion, GE representatives indicated that the use of the "disapproved" designation had been an error, as "disapproved" DDR's are not sent to the affected site. This error was corrected by the re-issuance of DDR No. 9136, with the disposition checked as "other". This had no effect on the work being done at the Zimmer site, but provided site personnel with a copy of the initiating DDR.

Discussions with GE representatives and a review of pertinent records indicated that deficiencies in tack welds on the core spray nozzles had been identified during inspections at the Limerick and at Zimmer plants, and was being treated as a generic problem. GE documents indicated that all potentially affected sites had been instructed to perform an inspection of the core spray tack welds and report the results to GE. A review of the inspection reports for the Limerick and Zimmer plants indicated that the inspections had identified numerous defects in the tack welds, including cracks, porosity, under size, melt through, and missing welds. Other inspection reports were not available.

GE personnel indicated that they were not aware of any particular problems with the welds on the shroud head/steam separator assembly. They indicated that they were aware that a number of the one-half inch pins on the core support plate plant had been found to be bent out of tolerance, but they could not offer any explanation for this condition.

Visit to Sun Shipbuilding and Drydock Company

GE personnel indicated that their records do not include all of the documentation produced during the manufacture of core internals, and that additional documentation would be available at the Sun manufacturing facility in Chester, PA. RIII representatives, accompanied by a GE representative, made an announced visit to the Sun facility during April 18-21, 1978.

Documents related to the manufacture of core internals for the Zimmer and La Salle plants were reviewed, discussions and interviews with Sun personnel were held, and a tour of the Sun reactor internal manufacturing facilities was made. During the document review, attention was focused on those documents pertaining to the core internals for the Zimmer plant.

Records pertaining to the welding and inspection of equipment (weld maps) were reviewed, and were considered acceptable according to the standards in effect at the time the equipment was manufactured. The format and content of these records would not be acceptable under current standards, as the specific date when a weld was made or the date on which it was examined cannot be determined (see Exhibit III for sample weld map page). Backup information, in the form of Job Package Tickets, indicated when a particular operation was complete, but does not detail the dates of inspection, or the criteria used during the inspections (See Exhibit IV for sample Job Package Ticket).

Discussions with Sun representatives and a review of pertinent documents did not provide any additional information regarding the bent core support plate pins. Documents at Sun indicated that the pins had been inspected, but no documentation was found to indicate that the pins had been inspected for angularity. Sun personnel stated that the pins had been inspected for angularity, using a machinist's square. Sun personnel further stated that their position was that the core support plate had been properly inspected, packaged, and had left the Sun facility in good condition. Sun personnel indicated that the pins could have been bent during shipping, storage, or site handling.

Sun records indicated that several problems related to welding of the steam separator/shroud head had been identified during the manufacturing process, and had been corrected under Deviation Disposition Reports.

An in-depth review of documentation for the core spray nozzle tack welds was performed. This documentation consisted of a single page entry in the permanent record file (see Exhibit V). This entry, rather than a weld map, is a statement that the inspection has been performed. Correspondence reviewed at the GE, facility in San Jose indicated that the GE document review had disclosed that this documentation was missing, and that GE requested Sun to supply inspection documentation. The document, incorporated as page 163 of the core internals documentation package by Sun, has several anomalies which make the document questionable. It incorrectly references drawing 158B566. This drawing was found to be a nozzle drawing, rather than a tack weld drawing or weld map. In addition, the document is dated approximately six months after the manufacture of the equipment, and one day prior to the day the GE field representative visited the plant to review the Sun documentation package. Sun personnel

indicated that they felt that the date may reflect the date on which the inspection was finished, or may just be the date on which the documentation of the inspections was drawn up, based on the inspector's memory of the inspections (performed some six months previously). The inspection report indicates that 102 nozzles were inspected, when only 100 nozzles were installed (two were provided as spares).

No other records were available to substantiate the information contained in the core spray tack weld inspection document. The individual noted as having performed the inspection was interviewed by RIII personnel. He stated that he had performed the inspection of the core spray nozzle tack welds for the Zimmer plant sometime in 1973, although he could not remember specifics of the inspection. Following a discussion of identified defects in these welds, he indicated that, in retrospect, he might not have done a very good inspection of the tack welds, or may have misinterpreted the inspection criteria. When questioned as to how he had identified the welder who had performed the tack welds, he indicated that the welds had to be made by one of two men on a particular shift, and that he must have checked with their foreman.

Notwithstanding the statement that the inspection was done, recent inspections at the Limerick and Zimmer sites disclosed numerous defects in the core spray nozzle tack welds, including missing welds and misplaced welds. Inspection at the La Salle site also disclosed missing tack welds. This inspection was conducted in the same manner as the original inspection was to have been conducted, by performing a visual inspection using 5X magnification and adequate illumination. It is not logical to assume that an inspection utilizing 5X magnification would not indicate that a weld was missing, and it appears that the original inspection was not performed.

RIII and GE representatives were taken a brief tour of the Sun reactor internals manufacturing facilities, conducted by Sun personnel. During the tour, a completed core support plate was observed by the RIII representatives, and a rough estimate of the angularity of pins on the core plate was made with the use of a machinist's square. Several pins appeared to be 0.015-0.020 inches from plumb. Sun representatives indicated that a final check of the pins was yet to be performed.

During the manufacturing facility tour, several quality control problems were observed in relation to equipment currently under manufacture. An area with welding booths and a supply of various types of weld rod was found to be located in the general area where production welding was being performed. Measures had not been taken to insure that production welders did not use welding materials from the booth area. Weld rod stored in the booth area consisted of various types, including low hydrogen rod which was in open packages, in poor condition. Weld wire was found lying in several locations, a further indication of a lack of weld rod and wire control.

A welder was observed under the direction of a quality control inspector, apparently repairing weld defects found through dye penetrant examination. The welder was not removing the dye penetrant material before welding over the areas of indication. This is not in accordance with Sun examination procedures.

A welder was observed working on a shroud head, and he had with him a mallet with a lead-bearing head. Sun apparently has no procedure to limit the use of lead-bearing tools during the manufacture of core internals. This deficiency was discussed with the GE representative, who indicated his belief that there was nothing in the purchase specification which required the control of lead containing tools.

All of the above problems were brought to the attention of the accompanying Sun and GE representatives. A full inspection was not performed, as it was considered beyond the scope of this investigation

Visit to the Zimmer Site

A visit was made to the Zimmer 1 site during May 4-5, 1978, in an effort to obtain additional information on bent pins on the core support plate, and to observe the core internals. During the visit, records related to site receipt and inspection of the core internals were reviewed, discussions were held with personnel from Reactor Controls, Incorporated, and the individual who had attempted to straighten some of the core support pins was interviewed.

A review of records indicated that an individual had been observed attempting to straighten some of the half-inch pins on the reactor core support plate using a lead mallet. This was documented on Field Deviation Disposition Request (FDDR) No. KN-1-104, which indicated that lead contamination should be removed, and all core support pins be checked for angularity. The inspection results attached to the FDDR indicated that 84 out of 137 pins were found to be out of tolerance (this inspection was performed using a Sun go-no go gauge). Reactor Controls, Incorporated documents indicated that the pins originally observed as having been bent were bent on the order of 0.015-0.020 inches from plumb (which would not be observed during a visual inspection).

The individual who had attempted to straighten the pins indicated that the discovery that the pins were bent was accidental. He stated that a workman toying with a machinist's square had backed it up against a core support pin and noted that the pin was not straight.

A review of site documents indicated that the core internals had been visually inspected for evidence of shipping damage when received onsite (November 6, 1973), and had been stored until recently. It appeared that the inspection had been performed as required in the licensee's commitments, and no items of noncompliance with NRC regulations were identified. No information as to the cause of the pins being bent could be developed.

A brief visual inspection of the available core internals (the core support plate was submerged) indicated minor welding problems on the steam separator assembly, and two areas on the shroud skirt where there seemed to be indications of carbon steel contamination of the stainless steel. The noted problem areas were brought to the licensee's attention. The licensee indicated that a complete inspection of the core internals had not been performed.

GE Inspection of Affected Facilities

Partially due to the concerns expressed by the NRC, GE initiated an inspection of core components supplied by Sun at each affected reactor site. Plans for this inspection effort were transmitted to the NRC by letter to Mr. James G. Keppler, RIII Director (see Exhibit VI). These inspections were performed by a GE inspection team which visited each site, to insure that each inspection as performed utilizing the same inspection criteria. The attachment to the letter to Mr. Keppler indicates that GE intends to implement an augmented inspection of Sun supplied core components currently being manufactured, with special emphasis on welded areas.

Mr. David York, of the GE San Jose office, was contacted on July 20, 1978. He indicated that GE had completed the inspections of all affected reactor site with the exception of one Mexican reactor site, whose inspection had been deferred. He stated that Field Deviation Disposition Requests, at each site, would reflect all deficiencies identified by the GE inspection team.

FDDR's generated at the Zimmer site as a result of the GE inspection team visit reflect welding problems on the shroud, core support plate, shroud head, and top guide. FDDR's at the La Salle site identified similar problems. All of the identified problems will be treated as routine FDDRs, GE personnel indicated, and will be evaluated and dispositioned in accordance with GE procedures.

Attachments:
Exhibits I through VI

February 28, 1978

Docket No. 50-358
Docket No. 50-373

MEMORANDUM FOR: G. Fiorelli, Chief, Reactor Operations and Nuclear Support Branch

THRU: W. S. Little, Chief, Nuclear Support Section

FROM: Reactor Inspector

SUBJECT: CONCERN REGARDING QA PROGRAM DURING MANUFACTURE OF CORE INTERNALS AT SUN SHIPBUILDING (ZIMMER & LASALLE)

This is to inform you of a concern I have regarding the Quality Assurance (QA) Program at Sun Shipbuilding and of the audits performed by General Electric and the licensee of the work at Sun Shipbuilding of reactor internals. This also reflects on our vendor program.

I became concerned following a series of inspections at the LaSalle County Nuclear Station and the William H. Zimmer Nuclear Power Station during the months of January and February 1978. The core internals for both sites were manufactured at Sun Shipbuilding. Maybe the problem is that I do not understand QA, but at present, I feel someone is not doing his job. To me QA and QC mean more than a paper review to ensure all documentation is in order; it means that the final product is built as it was supposed to be.

Now to the reasons for my concern. During my visits to Zimmer, I became aware of licensee problems with the core support plate pins. These pins are used to align the fuel support pieces. A review of the problem showed that 84 out of 137 pins are bent in excess of allowable. The licensee is studying ways of correcting the problem. There are different opinions as to where the pins were bent with a GE representative stating the core support plate left Sun Shipbuilding in good condition and the licensee disagreeing. I feel the problem occurred during manufacturing because of the large number of pins damaged and because at LaSalle the same problem was found. At least 4 pins at LaSalle are badly bent, but the licensee has not yet used the vendor's gauge to determine how many more are out of tolerance.

RHH

RHH

Little

2/27/78

2/27/78

Exhibit I
page 1 Of 2

February 28, 1978

It should be noted that the General Electric Product QC Checklist does not identify the problem as part of Item 4.7, "Core Plate Final Inspection Verification," prior to shipment.

A second problem involves the tack welds on the core spray nozzles. It has been discovered that some of the welds are missing—some have cracks, crater pits, etc., or are undersized. Both LaSalle and Zimmer have this problem and I understand GE is sending a generic letter to all NVR 5 owners to inspect these welds. Again, I like to point out that according to GE's QC Checklist the nozzles, elbows and deflectors were correctly assembled, and that dye penetrant and visual examination of welds were witnessed for 25I and record reviewed for 100I. No problems were noted.

A third problem concerns the steam separator or shroud head assembly. The quality of the welds appears to be poor. Soon that I looked at in January had pits or craters and many had crevices where future corrosion fatigue cracking could originate. In addition, I noted the licensee was dye penetrant checking a large number of horizontal welds during my January visit. The reason was that Sun Shipbuilding had forgotten to do so. But, again, according to the GE Product QC Checklist, all accessible welds were dye penetrant checked. One thing I noted in the QC Checklist is that most of it consists of record review and very little actual witnessing of the work. So I wonder, who's minding the store? I do not know if the shroud head for LaSalle has similar problems because it was not accessible for inspection last month.

While I realize that the identified problems can be corrected in the field, I wonder if all defects have been identified. After these events, I tend to loose faith in the vendor's QA program which in some instances even borders on supplying false information.

I feel the NRC should conduct a thorough investigation of the vendor's QA Program as it applies to both the LaSalle and Zimmer contracts.

Reactor Inspector

cc: R. F. Haisman
R. F. Warnick
T. L. Harpster

Exhibit I
page 2 of 2



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
799 ROOSEVELT ROAD
GLEN ELLYN, ILLINOIS 60137

March 15, 1978

Docket No. 50-356
Docket No. 50-373

MEMORANDUM FOR: G. Fiorelli, Chief, Reactor Operations and Nuclear
Support Branch

THRU: W. S. Little, Chief, Nuclear Support Section

FROM: , Reactor Inspector

SUBJECT: CONCERN REGARDING QA PROGRAM DURING MANUFACTURE OF
CORE INTERNALS AT SUN SHIPBUILDING (ZIMMER & LASALLE)

This is an update my last memo to you of February 28, 1978. Since then, additional conversations with LaSalle personnel have revealed that the core support plate and top guide were not manufactured by Sun Shipbuilding; however, the core spray headers, shroud and steam separators were. Therefore, while my comments regarding the core support plate apply only to Zimmer, all other comments apply to both facilities.

Reactor Inspector

cc: R. F. Helshman
R. F. Warnick
T. L. Harpster

Exhibit II

WELD	PT FINAL	MAG	VISUAL	WELDER	NO
23	12-7-72 RV	12-7-72	12-7-72	DELANEY	153
24				DELANEY	153
25				DELANEY	153
26				DELANEY	153
27				DELANEY	153
28				DELANEY	153
29				DELANEY	153
30	12-7-72 RV	12-7-72	12-7-72	DELANEY	153
31				DELANEY	153
32				DELANEY	153
33				DELANEY	153
34				DELANEY	153
35				DELANEY	153
36				DELANEY	153
37				DELANEY	153
38				DELANEY	153
39				DELANEY	153
40	12-7-72 RV	12-7-72	12-7-72	DELANEY	153
41				DELANEY	153
42				DELANEY	153
43				DELANEY	153
44				DELANEY	153
45				DELANEY	153
46				DELANEY	153
47				DELANEY	153
48				DELANEY	153
49				DELANEY	153
50	12-7-72 RV	12-7-72	12-7-72	DELANEY	153
51				DELANEY	153
52				DELANEY	153
53				DELANEY	153
54				DELANEY	153
55				DELANEY	153
56				RALPH	273
57				RALPH	273
58				RALPH	273
59				RALPH	273
60	12-7-72 RV	12-7-72	12-7-72	RALPH	273


 SOLD TO
 R. M. ...
 ...

Exhibit III

CORE SUPPORT

206 A-B JOB PACKAGE TICKET
 Customer Li E Charge CH. 571-3-516 Drwg 711-557-0 Rev. 1
 Description Weld Lap Joint Qty 1 Route 8 Mat'l. Loc. 8
 Instructions (See reverse side for C.I. requirements) Mat'l. Cert. Appr. R. Thompson
File lines, reactions, crystals Required Completion Date 12-7-72
These are required Job Assigned To R. Thompson
check for alignment pins Date Assigned 11-23-72
 Date Completed 12-7-72
 Inspected By C. Tompkins
 Stored At B
 Shipped To NA
 Production Sign Off R. Thompson
 Hours Total Dept Dept Dept
 Est Actual

(Over)

The circled Quality Requirements are to be signed off by responsible Supv. & QC Rep. as Completed

	Prod. Sign Off	QC Rep. Sign Off		Prod. Sign Off	QC Rep. Sign Off
1 Heat No. (s) verified prior to and after job	LS	RT	L Magnetic Particle Inspect 2/4 Level		
2 Welder(s) qualification verified & No. recorded	SM	RT	M Magnetic Particle Inspect Final Weld		
3 Penetrant Inspect after back gouge	N/A	N/A	N Magnetic Particle Inspect Final Weld After B Cell		
4 Penetrant Inspect final weld	RT	RT	P Radiograph Partial Weld		
5 Visual Inspect final weld	SM	RT	Q Radiograph Final Weld		
6 Magnetic test final weld	RT	RT	R Ultrasonic Inspect Final Weld		
7 Magnetic Particle Inspect Back gouge			4 Check Dimensions & Fit Up and Record	LS	SL
8 Magnetic Particle Inspect Root Pass			5 Buyers O.C. Rep. must be notified		
9 Magnetic Particle Inspect 1/3 Level			6 Verify Cleanliness		
10 Magnetic Particle Inspect 2/3 Level			7 Infold Points Buyers O.C. Rep. must witness		
11 Magnetic Particle Inspect 1/4 Level			8 Record Serial No. or Heat No. and Location		
12 Magnetic Particle Inspect 1/2 Level					

Production Feedback Comments

CUST. <i>General Electric</i>	NAME <i>Coin Structure</i>		NO. POS. <i>102</i>	SER. <i>-</i>
CUST. P.O. <i>205 AE 172</i>	DWG. <i>15888566</i>	REV.	DWG. PC. <i>146</i>	CHG. <i>42594</i>
CUST. REP. <i>R. Stevens</i>	DATE <i>9/24/73</i>	INSP. <i>RT</i>	SHIPPED	B/M PC.

*102 Th'd nozzles welded into oil
visual inspection: Satisfactory*

*Weld. Procedure: WP 37
Welder: W. Brysiek 59-88*

REC'D
A
9/25/73
SUN
45476

Exhibit V

2
55

GENERAL ELECTRIC

NUCLEAR ENERGY
ENGINEERING
DIVISION

GENERAL ELECTRIC COMPANY, 175 CURTNER AVE., SAN JOSE, CALIFORNIA 95125

May 15, 1978

Mr. James Keppler, Director
Region III
US NRC
799 Roosevelt Road
Glen Ellyn, ILL 60137

70-1308
70-1309
50-358
50-373/374

Mr. Keppler:

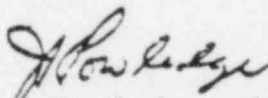
Recently, Mr James Foster and Mr. William Key conducted inspections of our General Electric facilities in San Jose and of Sun Shipbuilding & Drydock Co. regarding the Shroud Assemblies for the Zimmer and LaSalle sites. The General Electric intended inspection program for corrective action was discussed with them. Through Mr. David York, in our organization, we have continued to keep them apprised of the program.

On May 10, they conveyed to Mr. York your desire to obtain a copy of our complete inspection plans. Attached for your information is a copy of our internal letter of May 5, 1978 to GG Sherwood, Manager, Safety & Licensing regarding those plans. I hope that it will convey the information you desire.

We have completed the activities at the Hatch 2 site, and are scheduled to conduct the remaining inspections at the Zimmer site this week.

If you desire further information, I will be pleased to assist you.

Sincerely,



JK Powledge, Manager
QA-Engineered Equipment
& Installation
MC 727, Extension 6731/32

Exhibit VI
page 1 of 1

MAY 17 1978

cc: BA Podberesky
GG Sherwood
DS York

/jac

ENGINEERED EQUIPMENT PROCUREMENT OPERATION
SAN JOSE, CALIFORNIA

CC: WA Anders
N Biglieri
AP Bray
A Breed
TR Dankmeyer
NL Felmus
DL Fischer
FD Judge
EW O'Rorke
JK Powledge
GA Roupe
HE Stone
WB Webster
B Wolfe

May 5, 1978

J Barnard, Manager
P&QAO

GG Sherwood, Manager
Safety & Licensing

SUBJECT: CORE SPRAY SPARGER MANUFACTURING DEVIATION, PRC 78-02

REFERENCE: Letter WHD/69/78, WH D'Ardenne to NL Felmus, et al,
dated April 11, 1978.

The referenced letter concludes that the several BWR4-5 core spray sparger nozzle tack weld deficiencies do not constitute a reportable deficiency. However, it requests EEPO to identify the corrective action to be taken to preclude recurrence in the future.

All BWR-5 Shroud Assemblies, containing the installed core spray spargers, have been shipped to the sites except Nine Mile Point 2. That Shroud Assembly is currently in fabrication at Sun Shipbuilding. QA-EE&I has already taken steps for an assured and documented 100% inspection of the sparger nozzle tack welds by Sun Shipbuilding with a documented 100% overcheck inspection by the GE QC Representative. These actions must confirm that the nozzle installation meets requirements prior to release to ship the Shroud Assembly.

For the BWR4-5 Shroud Assemblies that have been delivered to requisition plant sites that are not operational, QA-EE&I and Design Engineering have taken several actions:

1. Regarding the Core Spray Sparger Nozzle installation, FDI's have been generated to conduct detailed examinations of the Nozzle Tack Welds at the following plants:

Limerick 1/2	Zimmer 1	Exhibit VI
Shoreham	LaSalle 1/2	page 2 of 16
Fermi 2	Bailly	
Susquehanna 1/2	Hope Creek 1/2	
Hatch 2	Laguna Verde 1/2	
	Hanford 2	

The status of accomplishment of these inspections is reflected in Attachment A. Note that we are conducting the inspections at Hope Creek & Fermi (Shroud Assemblies by Rotterdam Nuclear) and Hanford, Bailly, Susquehanna and Laguna Verde 1 (Shroud Assemblies by CBIN) to determine if the problem is design/fabrication-generic or is unique to Sun Shipbuilding workmanship.

2. Because of numerous scattered problems reported on Sun Shipbuilding manufactured components, QA-EE&I and Design Engineering are undertaking a task-force inspection of all available BWR4-5 core structure components made by Sun Shipbuilding. This activity is being performed to establish through integrated action, the as-built quality and to establish best-balanced field corrective actions for any deficiencies noted. The scope of this program is contained in Attachments B & C.

Completion of both of these programs is highly dependent upon project schedules, component availability and customer attitude. Some inspections have already been accomplished, others are imminent, and some, like Laguna Verde, will be delayed in accomplishment because of site conditions. However, regardless of the timing, we intend to re-establish customer confidence in the quality of these core structures and GE's willingness to properly confront and correct problems.

To further improve our performance on the forthcoming BWR-6 Core Structure Components, we will increase our physical inspection/surveillance of the hardware, particularly in the welded areas, by a factor of at least two/three times that in the past. We will document this through the QC Representative completion of Engineering Surveillance Parameter Check Lists. These checklists will be prepared by the QC Engineers, with inputs from Design Engineers, to focus the inspection on areas or attributes of the Core Structure components deemed to be critical or important to satisfactory performance or service.

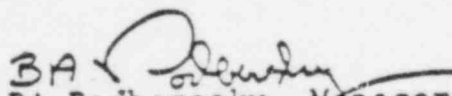

BA Podberesky, Manager
Engineered Equipment Procurement Operation

Exhibit VI
page 3 of 16

/jac
ATTACHMENTS

ATTACHMENT A
CORE SPRAYER TACK WELD INSPECTION STATUS

<u>SITE</u>	<u>FDI/FDDR</u>	<u>INSPECTION STATUS</u>	<u>MFG</u>	<u>INSPECTION RESULTS</u>	<u>REMARKS</u>
MERICK I	FDDR-HHO-089	COMP.	SUN	CRACKS & MISSING WLDS.	
MERICK II	FDDR HHO-089	COMP.	SUN	CRACKS & MISSING WLDS.	
MERIMAC I	FDDR KN-1-137	COMP.	SUN	UNACCEPTABLE & MISSING WLDS.	
MOREHAM	FDI65/ks-01-170	COMP.	SUN	CRACKS ETC. & MISSING WLDS.	
MASALLE I	FDI53/HA1-086	COMP.	SUN	21 CRACKS.	
MASALLE II	FDI32/HA2-056	COMP.	SUN	3 CRACKS, 46 MISSING TACKS.	
MERMI II	FDI79/(LATER)	PARTIAL 1/2	RDM	1/2 DONE-NO MISSING TACKS 1 POSSIBLE CRACK.	SHROUD DROPPED INSP. DELAYED.
MERRILL	FDI44/(LATER)		CBIN		
MUSQUEHANNA I	FDI25/IN PROCESS	COMP.	CBIN	2 MISSING TACKS-NO CRACKS, 20% A LITTLE UNDER SIZE.	FDDR'S TO FOLLOW
MUSQUEHANNA II	FDI25/IN PROCESS	COMP.	CBIN	NO MISSING TACKS OR CRACKS, 20% A LITTLE UNDER SIZE.	
MOPE CREEK I	FDI33/(LATER)	PARTIAL 1/2	RDM	CRACKS	INSPECTION WILL BE COMPLETED LATER FOR BOTH UNITS
MOPE CREEK II	FDI27/(LATER)	PARTIAL 1/2	RDM	CRACKS	
MORRIS I	FDDR-HF2-331	COMP.	SUN	VERY MINOR PROBLEMS	
MORRIS II	FDI1A/UNKNOWN		CBIN		DELAYED
MORRIS III	FDI12/UNKNOWN		SUN		DELAYED
MORRIS IV	FDI43/UNKNOWN		CBIN		UTILITY AND CONSTRUCTOR RE- SCHEDULED INSP. WEEK 05/08/78.

A T T A C H M E N T B

SUN SHIP CORE STRUCTURE QUALITY PROBLEMS
BEING FOUND AT PROJECT SITES

Due to the fact that various weld quality deviations have been found at several different project sites on Shrouds supplied by Sun Ship, it has been decided that an overall review for re-inspection of the total core structure fabricated by Sun Ship should be considered.

Considerations in determining the need for re-inspection of the complete core structure supplied by Sun Ship on a one team approach included:

1. Weld quality problems found on the Zimmer and Limerick Shrouds, specially on the LPCI System, the Core Spray Sparger System and the Seismic Blocks have lead to concerns about other attachment type welds in the core structure.
2. Issuing of one generic inspection FDI for all suspect Sun Ship Core structures will be less costly and less time consuming than issuing Inspection FDI's on piece meal bases for each type deviation found.
3. One inspection by one team will result in better inspection uniformity, minimize re-inspection time and assure more factual information.
4. Quality concerns on all attachment welds and other related items can be factually answered to re-established product acceptability for General Electric, Sun Ship, Customer and NRC.

The review resulted in the following conclusions:

1. A team should be established for the re-inspection of the core structures for projects listed in Item 2 below.
 - A. The team should consist of the following:
 1. Responsible BWR 5 Core Structure Q.C. Engineer
 2. Responsible BWR 5 Core Structure Design Engineer
 3. Materials Engineer - 1st few plants & as needed thereafter.
 4. Q.C. Representative at each site or site person as assigned when deviations are found and FDDR's are to be issued.
 5. Sun Ship Representative if possible to be arranged by Purchasing.

2. The Projects that should be looked at include:

<u>PROJECT</u>	<u>LOCATION</u>	<u>*DOES NOT INCLUDE</u>
Lilco	Site	1) Top Guide & Core Supports fabricated by Bingham-Williamette.
Zimmer	Site	
Hatch II (Limited, only Shroud Head available for inspection)	Site	2) The Core Spray Sparger Hardware fabricated by Murdock.
Limerick I & II	Site	3) LaSalle II and Laguna Verde II Shrouds were inspected in shop after LPCI re-inspection FDI was issued.
LaSalle I & II*	Site	
Laguna Verde II*	Site	
Nine Mile Point 2*	Shop	

Total 9 Units including Hatch II.

3. One generic FDI should be issued to cover the re-inspection of all core structure components fabricated by Sun Ship for the projects identified in Item 2 above. Initially, the welds should be re-inspected visually for contract compliance for each of the major component features as outlined on the attached lists.

Shroud Welds - See Attachments of FDI

Shroud Head Welds - See Attachments of FDI

Core Support Plate Welds - See Attachments of FDI

Top Guide Welds - See Attachments of FDI

GENERAL ELECTRIC

NUCLEAR ENERGY DIVISION

INITIATING DATE _____
 FDI NO. _____ REV NO. _____
 SHEET _____ OF _____
 PROJECT _____ UNIT NO. _____
 DATE OF ISSUE _____

FDI DIRECTED TO Project Manager
(GE FIELD REPRESENTATIVE AND LOCATION)
 EQUIPMENT Core Structure MPL NO. _____
 AFFECTS A SAFETY RELATED FUNCTION YES NO MAKE BUY

DESCRIPTION OF TASK: (EXTENT OF DESCRIPTION DEFINED IN EP&P 5.3.1)

PURPOSE:

Visual inspection of the core structure fabrication welds on Shroud Head & Separators, Core Plate, Top Guide & Shroud to verify welding requirements are in compliance with GE Purchase Order on SunShip.

<u>REQUIRED DOCUMENTS:</u>	<u>GE Dwg. #</u>	<u>SunShip Dwg. #</u>	<u>VPF #</u>
Shroud _____	_____	_____	_____
Core Plate _____	_____	_____	_____
Top Guide _____	_____	_____	_____
Shroud Head & Separators _____	_____	_____	_____
Purchase Specification		<u>21A3319 Rev.</u>	
Purchase Order Number _____		_____ Rev.	

MATERIAL REQUIRED:

- 1) Scaffolding Ladders and other equipment, preparations/ and/or unpacking necessary for access to the core structure componets for visual inspection of all welds made by SunShip during shop fabrication.
- 2) Steel Scales, Fillet Gages, Lighting, Mirrors and/or other visual aids necessary to visually inspect, measure and verify the welds and weld assembly details required by the above referenced requirement drawings have been complied with.

SIGNATURES	DATE
1. ORIGINATOR _____	_____
2. DESIGN ENGINEERING* _____	_____
3. PROJECT MANAGER _____	_____
4. OTHER _____	_____

Exhibit VI
page 7 of 16

DATE COMPLETED _____

VERIFIED BY: _____
(SITE MANAGER)

*ALSO INITIALS LINE 1 IF ORIGINATOR

FIELD DISPOSITION INSTRUCTION

GENERAL  ELECTRIC

NUCLEAR ENERGY DIVISION

FDI NO. _____

SHEET 2 OF 3PROCEDURE:

- 1) Visually inspect all welds as necessary to verify welding and weld assembly details that were completed by SunShip in their shop on the Shroud, Shroud Head & Separators, Core Plate and Top Guide with particular emphasis on the welds of attachments.
- 2) The following lists of attachment welds applicable for core structure component shall as a minimum be visually inspected.
- 3) The team shall work to check lists and/or drawings and document their findings in writing for evidence of Quality acceptability.
- 4) All deviations from attachment weld Quality and original Purchase Order requirements shall be submitted on FDDR to the above Project Manager per EOP 55.3.00.

The FDDR shall be issued while the Inspection Team is available at the respective sites to assure that consistent and factual deviation descriptions get in the FDDR.

To insure that sound Engineering and economically feasible Dispositions are made by the Team Members, all rework or reinspection Dispositions shall require Purchasing, Engineering, Quality Assurance and Projects review for acceptance before FDDR Disposition is implemented.

- 5) Reportable Findings that are not covered or required by Purchase Order requirements originally placed upon SunShip are to be so identified, documented, and dispositioned accordingly.

DRAFT Rev. 1

CONTINUATION SHEET

FIELD DISPOSITION INSTRUCTION

GENERAL  ELECTRIC

NUCLEAR ENERGY DIVISION

FDI NO. _____

SHEET 3 OF 3

STANDARDS, REFERENCES
AND RECOMMENDATIONS:

1) Liquid Penetrant reinspections must be authorized via FDDR Deviation Documentation and Disposition.

2) The Re-Inspection Team shall consist of two primary members and three support members.

Primary members: 1. David York - QC Engineer
2. Clyde Morton - Design Engineer

Support members: 1. David Sandusky - Materials Engineer
2. Site QC Rep. as assigned by L. Duff
3. George Barry - Team Leader
Prin. QC Engineer

Note: The supplier SunShip may also include a primary participating member on the Inspection Team which will be arranged by Purchasing when possible.

Exhibit VI
page 9 of 16

Shroud Welds

- *1. Top Guide Blocks
- *2. Seismic Blocks
- *3. Top Guide Hold Downs Blocks
- 4. Guide Pin Lugs
- 5. Bench Mark Blocks
- 6. Shroud Head Bolt Hold Down Lugs
- 7. Lifting Lugs
- *8. Align Blocks for Horizontal Design Core Plate & Top Guide
- 9. Water Dam Plate to Top Flange
- 10. Sparger System Weld Requirements
 - Sparger Brackets
 - Sparger Pipe/Inlet
 - Sparger "T" Box Cover Plate
 - Sparger Nozzle Tack
- *11. LPCI (Water Box Weld Requirements)
 - Fillet Welds
 - Full and Partial Penetration Welds
 - Bracket Welds

*Design Feature not Applicable for all Plants.

Shroud Head Welds

1. Bolt Lugs
2. Guide Pin Lugs
3. Lift Rod Lugs
4. Stand Pipe to Dome Welds
5. Stand Pipe Stiffeners Straps 3"
6. Stand Pipe Stiffeners Plates 48"
7. Bolt Ring Gussets
8. Steam Separator Tie Bars
9. Stand Pipe to Separator Weld Collar or Full Penetration
10. Lift Eye to Lift Rod

Core Plate Welds

1. Beams to Rim
2. 1/2 Pins to Top Plate
3. Rim to Top Plate Weld
4. Peripheral Fuel Support Casting to Top Plate
5. Incore Pipe to Rod
6. Align Block to Rim

Top Guide Welds

1. Aligner Blocks to Rim
2. Lift Eye Blocks to Rim
- *3. Boss to Cover Plate Ring - Seismic Block
- *4. Beam to End Block Weld - Certain Designs only
5. Beam Blocks to Pin Welds
- *6. Cordall Plate to Rim Weld
- *7. Top Guide Latch Hold Down Block Welds

*Design Feature Not Applicable for all Plants.

A T T A C H M E N T C

BWR 4 & 5 CORE STRUCTURE REINSPECTION-SUN SHIP SUPPLIED

GROUND RULE PURPOSES:

1. Re-establish overall product acceptance and document the same.
2. One time Inspection that will address all doubts and questions once and for all.
3. Guidelines for uniform, objective and practical Inspection approach that will yield positive findings.
4. Guidelines for documenting deviations and/or findings and for making expeditious dispositions based upon sound Engineering and Economics. This would include providing for administrative concurrence/controls by Purchasing, Projects, Quality Control and Engineering to assure the best balanced disposition and implementation for over-all General Electric Interests.

ATTACHMENT C

BWR 4 & 5 CORE STRUCTURE REINSPECTION - SUNSHIP SUPPLIED

GROUND RULES: (Based upon stated purpose)

1. Initially perform only Visual Inspection (unaided eye) to the original Purchase Order requirements on all welds and related workmanship made by Sun Ship, including structural and attachment welds and specification defined workmanship.
2. Inspection of tack and intermittent welds originally requiring 5 power magnification for Visual Inspection need only be sample reinspected using 5 power magnification unless weld Quality deviations are found that would justify need for more extensive inspection.
3. Visual Inspection of welds that required P.T. on final surface. If the final surface conditions or visual defects are present that would make a valid P.T. Inspection on the weld or section of weld improbable, then an FDDR is to be issued and appropriate reinspection or other disposition is to be made. (P.T. or other methods such as 5 X Visual could be appropriate reinspection)
4. Guidelines for Inspection of open crevice welds. Open crevices are to be accepted based upon the following:
 - a. No visual weld defects or evidence of wrong weld process application.
 - b. Weld characteristics and location comply with Purchase Order requirements.
 - c. No other factual evidence to substantiate non-compliance.

If it can not be determined that open crevice welds are in compliance with Purchase Order requirements and there is some factual evidence that there is likely flux process weld material open to reactor water, then the factual evidence is to be written up on a FDDR and dispositioned as to action necessary to establish acceptable or unacceptable open crevice welds in question. This could include either seal welding the crevice or cutting out pieces of weld and testing to determine what type of root process was used.

5. All Reportable Findings must be agreed upon by all GE Team Members or findings will not be considered valid until resolved by San Jose Management of respective Team Members.

6. Reportable Findings that are not covered or required by Purchase Order requirements originally placed on Sun Ship are to be so identified, documented and dispositioned accordingly.

7. Deviation Findings which do not meet the minimum requirements of the Purchase Order are to be documented on FDDR's and dispositioned, if possible while Team is at the site. FDDR dispositions prior to implementation are to have review and concurrence of Purchasing, Quality Control and Engineering Managers, and respective Project Managers via telephone and TWX authorization through the responsible GE Buyer to assure the following:

- Purchasing Consideration - Vendor participation and warranty cost reimbursements.

- Engineering Consideration - Design and Safety requirements as well as rework effects on hardware & costs.

- Quality Control Consideration - Deviation causes and correction actions.

- Projects Consideration - Disposition effects on schedule and costs as well as customer and NRC relations and legal aspects.