U.S. NUC AR REGULATORY COMMISSION
OFFICE (INSPECTION AND ENFORCEMENT
REGION IV

Report No. 99900114/80-01 Program No. 51300

Company: Lamco Industries Inc.
1596 North Johnson
El Cajon, California 92020

Inspection Conducted: January 7-11, 1980

Inspectors: _____ _____
J. W. Sutton, Contractor Inspector Date
Components Section I
Vendor Inspection Branch

_____ 02-06-80
D. E. Whitesell, Chief Date
Components Section I
Vendor Inspection Branch

Approved by: _____ 02-06-80
D. E. Whitesell, Chief Date
Components Section I
Vendor Inspection Branch

Summary

Inspection on January 7-11, 1980 (99900114/80-01)

Areas Inspected: Implementation of 10 CFR 50, Appendix B and applicable codes and standards including action on previous inspection findings, review of reported 50:55(e) to assess cause, corrective action, and generic impact of the reported problem, procurement control, source evaluation audits and review of vendor's activities. The inspection involved fifty-six (56) inspection-hours on site.

Results: In the six (6) areas inspected, no apparent deviations or unresolved items were identified.

DETAILS SECTION I

(Prepared by J. W. Sutton)

A. Persons Contacted

L. Kerr, Quality Assurance Engineer, Supervisor
*L. L. Lindahl, Director Material Control and Fabrication
*L. Logan, Director Special Assignments
*R. Mathars, Director Quality Assurance
*B. Smith, Director, Engineering

Royal Globe

A. Ladd, Authorized Nuclear Inspector.

*Denotes those persons who attended the exit interview, (Paragraph G).

B. Action on Previous Inspection Findings

1. (Closed) Unresolved Item. (Inspection Report 79-01) Clarification required for documentation of the results of NDE Examination performed prior to the heat treat operation. The inspector verified that the QA manual, Section 5.0, Records and NDE procedure 01P-UT have been revised to document the NDE activities performed prior to the heat treat operation. The inspector further reviewed completed QA records to determine compliance to the Documentation requirement. NDE Personnel have complied with the revised procedures.

C. Procurement Source Control (Vendor Audits)

1. Objectives

The purpose of this inspection was to verify that:

a. Written procedures for this activity are available and in use.

b. Evaluations were performed prior to award of contracts and at the specified frequency.

c. Sufficient instructions or guidance is available to the auditors in the form of checklists or procedures to perform the audits effectively and in accordance with the audit plan.

2. Method of Accomplishment

The preceding objectives were accomplished by:

a. Review of QA Manual Section N8-paragraph 5, Control of Purchased Material, Equipment and Services

b. Review of QA Manual Section N5, Procurement Document Control.

c. Review of QA Manual Section N11, Paragraph 4.1. Source inspection.

d. Review of the Qualified Vendor Source List, dated 11-23-79.

e. Review of Nine (9) randomly selected vendor audits.

f. Discussions with cognizant personnel.

3. Findings

Within this area of the inspection, no deviations or unresolved items were identified.

D. Procurement Control

1. Objectives

The objectives of this area of the inspection were to ascertain that:

a. A system for procurement document control had been prepared and implemented, which was consistent with regulatory, Code and contract requirements.

b. Source selection was made in accordance with QA Program commitments.

c. Provisions were made in the QA Program for the evaluation of supplier performance.

2. Method of Accomplishment

The preceding objectives were accomplished by:

a. Review of the QA manual, Section N5 Procurement Document Control.

b. Review of the Qualified Vendor Source list dated 11-23-79.

c. Review of the ASME List of Nuclear Certificate of Authorization Holders file.

d. Review of the Suppliers Quality History Records.

e. Review of activity summaries on approved material Suppliers.

f. Review of the log of evaluations of Qualified Suppliers.

g. Review of the file containing letters sent to unsatisfactory suppliers.

h. Review of material Purchase documents for compliance to required QA review and approvals.

i. Examination of purchase orders and materials Reorder forms for the following P.O.s, Nos. 012278, 024938, 023892, E43312-42, E43308-42, 022706, 22701A, 022704 and 022708 relative to:

(1) Evidence of product assurance approval.

(2) Definition of technical requirements consistent with Code and customer requirements.

(3) Procurement from an approved vendor.

j. Review of basis for vendor approval relative to their QA Program commitments.

3. Findings

Within this area of the inspection, no deviations or unresolved items were identified.

E. Audits

1. Objective

The objective of this area of the inspection was to review the audit activities of the company to determine that the audit procedures and schedules are being properly and effectively implemented by the company.

2. Method of Accomplishment

The preceding objective was accomplished by:

a. Review of the 1978, 1979 internal and management audits.

b. Review of twelve (12) audit reports conducted during 1979.

c. Review of implementation of corrective action taken as a result of the audits.

d. Discussions with audit personnel.

3. Findings

Within this area of the inspection, no deviations or unresolved items were identified.

F. Review of Vendors Activities

1. Objectives

The objectives of this area of the inspection were:

a. To update the Vendors Activities to assess their impact on future IE inspections.

b. Review of the current workload.

2. Method of Accomplishment

The foregoing objectives were accomplished by discussions with the vendors management personnel and a review of future nuclear orders and nuclear orders in process.

Nuclear contracts for the manufacture of equipment and personnel air locks and component supports, constitutes approximately sixty percent (60%) of the work load.

The vendor was resurved for renewal of his nuclear certificates (N and NPT) N-1580 and N1581 during October and November 1979. A letter of extension has been sent to the vendor until the results of the nuclear survey has been evaluated by the ASME subcommittee on Nuclear Certification.

The vendor has contracted his shop inspection activities to the Royal Globe Insurance Co. effective July 30, 1979. The authorized inspector is available to conduct his required inspections.

G. Exit Interview

The inspector met with management representatives (denoted in paragraph A.) at the conclusion of the inspection. The inspector summarized the scope and findings of the inspection. The management representatives had no comment in response to the items discussed by the inspector.

DETAILS SECTION II

(Prepared by D. E. Whitesell)

A. Follow-up of Reported Deficiencies

1. Weld Defects

a. Background Information

On November 13, 1979, Duke Power telephoned RII, to report that code rejectable defects had been identified in weld joints in the lower lateral restraints for a steam generator at Catawba. The lateral restraint had been manufactured by Lamco Industries, Inc. of El Cajon, California.

The defects were identified at the site, after a part of the lateral restraint was cut off to provide proper fit of the support column during installation. A spot was observed in the weld which had been cut, and on further examination it proved to be a defect which did not meet the code acceptance limits. This prompted the owner to UT examine all of the other weld joints. During this re-examination and inspection, rejectable defects were identified in joints no 3, 4, and 5, of the lower lateral restraint which was identified by the vendor to be part number 6948-6.

b. Objectives

The objectives of this area of the inspection were to ascertain the following:

(1) The reason these defects were not identified during the inspections and examinations performed during the manufacturing process.

(2) The corrective action proposed or implemented concerning the weld defects.

(3) The actions proposed or taken to prevent recurrence;

(4) The generic impact; and

(5) Whether the safety significance has been evaluated to determine the reportability under 10 CFR 21.

c. Method of Accomplishment

The foregoing objectives were accomplished by:

(1) Review of the customer's purchase order (PO) No. 66716, CNS 7687; dated 11-11-76, for "NSSS Support Columns," to ascertain the quality requirements imposed on the vendor.

(2) Review of Lamco Industries, Inc. (Lamco) drawing No. 6948-6 Rev. C, dated 4/4/77, "Lower Lateral Support"; to verify that all pertinent quality requirements of the contract and code, had been translated onto the drawing.

(a) Review of the Weld Map Sketch which delineates the weld joint number, size and location of the weld defects.

(3) Review of Lukens Steel Certified Material Test Reports (CMTR), dated 2-1-78, for SA533, grd. A, Class 1); CMTR's for SA 516 grd 70, dated 8-26-77, and 5-11-77. It was observed that the CMTRs recorded the melt and slab numbers, the yield and tensile strength, the % of elongation, lateral expansion, and impact test results. The CMTRs for the SA 516, grd 70, also certified that the material had been normalized at 1625°F to 1675°F for 1/2 hour per inch of thickness, and air cooled; and stress relieved at 1100°F-1150°F for 2 hours. The heating rate was recorded as being 200°F maximum; and furnace cooled to 800°F at a maximum rate of 200°F.

(4) Review of Lukens NDE Reports of the UT examinations of the following heat and slab numbers:

(a) Ht No. A 6268, slab no 6 WA, dated 7-12-77;

(b) Ht No. A 6268, slab no 6 WC, dated 7-21-77;

(c) Ht No. D 4469, slab no. 11, dated 4-28-77; and

(d) Ht No. C 8053, slab no. 10A, date not obtained.

It was observed that the reports identified the equipment by name, model and S/N, and the transducer by name, size and frequency, the NDE specification number, the couplant, the size and thickness of the material which had been examined on a 9" grid pattern, and that the material was found to contain no rejectable indications.

(5) Review of the CMTRs for the weld metal used in the original welds, and/or used in the weld repairs:

(a) Hobart Bros. CMTR, dated 1-16-78 for Type L14 718 SR 3/32" S/N 9048Y001 - conforming to ASME SFA5.1, Section III NB2400.

(b) Hobart Bros. CMTR, dated 2-16-78, for E7018, 3/32", S/N 90483Y001;

(c) Durkee CMTR, dated 8-21-78 for E7018;

(d) Teledyne - McKay CMTR dated 8-17-78 for E 8018-C3, 1/8" and 3/32, coated Lot no. $\frac{22817}{3151002}$ to AWS 5.5-69.

The physical properties and Charpy Impact test results, were given for both the "as welded" and "PWHT" conditions. The PWHT temperature and the time at PWHT temperature was recorded as being 8 hours.

(6) Review of the Assembly Traveler no. 68358 (30 sheets), work order (WO) no. 695510, Part no. 6948-6 dated 6-5-78. It was observed that the traveler identified the part as being an ASME Section III, Subsection NF, Class 1 item. The type, grade, and heat number of the material was recorded and stamped and dated, and had been verified by a Lamco QC inspector, and the ANI. The work sequence established by the traveler, in the area of interest, were as follows:

(a) Operation 30.1A; Use Weld Map Sheet no. 23 locate fit-up and tack weld. The operation was verified, stamped, and dated 12-6-78.

(b) Operation 30.1C; Visually Inspect Weld per note A sheet 3. Verified by Inspector stamp (6) on 12-6-78

(c) Operation 30.1D; Apply root pass to one side, per Weld Map Sheet 23, Joints 1 through 9.

(d) Operation 30.1E; Back grind or gouge to sound metal for NDE of joints 1-9. - Verified 12-11-78

(e) Operation 30.1F; Visual Inspect Joints 1-9 per Note A sheet 3, verified 12-11-78.

(f) Operation 30.1G; Mag Particle joints 1-9 per Note B sheet 3 - verified 12-11-78.

(g) Operation 30.1 H; Final Weld Joints 1-9 per Weld Map Sheet 23. Verified 12-14-78.

(h) Operation 30.1J; Grind and A/R Joints 1-9 for NDE - verified 12/14/78.

(i) Operation 30.1K, Visual inspect joints 1-9 per Note B, sheet 3; verified 12-14-78.

(j) Operation 30.1L, MP joints 1-9 per Note B, Sheet 3; verified 12-14-78.

(k) Operation 30.1M, UT joints 1-9 per Note C, Sheet 3; verified 12-14-78.

(7) Review of the Traveler Weld Map, which is part of the traveler package, and provides more detailed information concerning the welding operation; i.e. the weld joint number, Part number, the type, grade, heat and slab numbers of the base materials, the size and type of weld and the Welding Procedure Number, and Revision, to be followed in making the weld. Space is also provided on the Weld Map Sheet for sketches of the part, or assembly, showing the location and orientation of the weld joint or joints as appropriate.

(a) The Traveler Weld and NDE Record Sheet, which is also a part of the Traveler package, and supplements the traveler and Weld Map by identifying the weld joint, the identification of the welder making the weld, the date the joint was welded, the welding qualification number, identifies the welding materials used (ie flux and filler metal) by heat and/or lot numbers, the NDE to be performed, the NDE Procedure no. and revision to be used, and Columns are provided for each NDE technician to stamp and date each type of NDE examination made. A column is also provided for the ANI stamp and date.

(b) One weakness identified in the foregoing documents, occures when more than one weld joint are included in a single operation (i.e. UT examine joints 1-9) which could result in one or more joints not being UT examined. This is especially true during shift changes or work breaks for an extended period of time. The vendor has identified this inadequacy in the documentation of its manufacturing processes, and has initiated appriate action to eliminate this potential problem area.

(8) Review of the Heat Treating Report and the furnace strip charts for stress relieving part no. 6948-6 dated 12-19-78. The report identified the PWHT Procedure no. and Revision, the furnace number, the thermocouples used, the status

of the thermocouple calibration, the rate of heating, the time at temperature and the cooling rate. The furnace time and temperature charts confirmed the times and temperatures recorded in the PWHT report.

(9) Discussions with the vendor's cognizant personnel.

d. Findings

(1) The inspector was informed by the Director of QA, that upon receipt of the notification concerning the weld defects, it had dispatched a field crew to re-examine by UT, all of the weld joints in the NSSS support columns. The field crew UT examined all welds, and they too identified the defects reported by the owner. This provided confirmation that welds joints containing the defects in part no. 6948-6, had not been UT examined in the shop during the manufacturing process.

(2) To correct the identified defects the welds were excavated and repaired, inspected, and nondestructive examined in the field. The repair work was controlled by approved procedures and was well documented. The documents were available for review and verification.

(3) As part of the Vendor's investigation, as to why these weld joints were missed during the in-process examinations, all QA/QC documents pertinent to the manufacture of part no. 6948-6 was retrieved for review. A review of the records indicated that the defects were in joints included in the nine (9) joints which had been welded and examined as a single operation i.e. UT examine joints 1 through 9. The inspector verified that documenting the NDE examinations of several welds collectively, rather than individually, creates a potential QA problem as follows:

(a) Should a work break occur, i.e. coffee break, shift change, or other work stoppage, after a specific in-process examination was commenced, and prior to completing the examination of all of the welds included, provides a possibility for one of more of the several welds being inadvertantly omitted from the examination, and its acceptability undetermined. The documentation does not provide assurance that each weld was examined and found to be acceptable.

(b) The vendor has revised the Traveler Welding and NDE record sheet, to provide documentation for the in-process examination and acceptability of each weld individually. The inspector verified that the revised document has been implement and used in production.

(4) The vendor has determined that these specific weld defects are not generic to any facility other than Catawba. The rational for this determination is based on the fact that the Support Columns for Catasba, are the only ones that had been shipped. All others are still in-house, and the revised weld and NDE Record Sheets are being used to document, and ensure, that the specified inspection and/or non-destructive examination specified has been performed on each individual weld and the results are within the specified acceptance limits.

(5) The QA Director stated that Lamco did not have the expertise to evaluate the safety significance of these weld defects in compliance with 10 CFR 21. He also stated that he did not know whether such an evaluation was being performed by the owner (Duke Power).

2. Noncompliance with Code

a. Background Information

In preparation for completing the Data Reports required by the ASME Code, the ANI noted, during his review of the QA/QC records, that the 1/2 inch SA 516, grade steel plate, was furnished by Kaiser Steel Company in the "as rolled condition" rather than "normalized" as required by Subsection NE 2121 (b); and exempt form Charpy Impact Test by NE 2311(a). He reported this non-compliance to Lamco and the customer (Woolley) on 11/7/79. Lamco, determined that the 1/2 inch plates from two of the heats furnished, was used for the barrels of the four (4) personnel air-locks subcontracted from the WJ Wolley Company for installation in the Perry 1 and 2 facilities. Three of the units had been shipped, and one was still in-house. Sufficient excess plate from the two heats of the suspected material was available from which the necessary coupons were cut, and a series of Charpy Impact tests performed. The results of there tests demonstrated that the material would resist energy levels in excess of code requirements, when tested at a temperature of -0°F. However when tested at the contract specified temperature of -30°F, the energy levels were not within the code impact acceptance limits.

Further search of the material records demonstrated that this problem was also generic to the air locks manufactured for installation at Catawba 1 and 2. A representative of the customer (W. J. Woolley) was present in the shop when the ANI identified this noncompliance, and notified the owners, Cleveland Electric Illumination Company and Duke Power Company, respectively.

b. Objectives

The objectives of this area of the inspection were to ascertain the following:

(1) Why the LII QA program failed to identify this noncompliance;

(2) Corrective action taken or to be taken;

(3) Action implemented, or to be implemented, to prevent recurrence.

(4) Generic impact; and

(5) Whether a safety-evaluation has been, or is being, performed.

c. Method of Accomplishment

The foregoing objectives were accomplished by:

(1) Review of W. J. Woolley's P.O. no. 1047 dated 5-18-76 for Catawba personnel locks; and P.O. no 1066 for Perry personnel locks, to ascertain the scope of work, and the requirements imposed on the vendor by the customer.

(2) Review of Duke Power Specification No. CNS 1132.00-1, dated 4-30-74, and changes thereto, to ascertain the edition and addenda of the governing codes and standards, and the material inspection and test requirements specified for the design and construction of the personnel locks for Catawba 1 and 2.

(3) Review of Cleveland Electric Illuminating Company's Specification No. SP 660-5449-00, dated October 11, 1974 and Revisions thereto, to ascertain the codes, standards, materials, inspections and tests, specified for the design and construction of personnel lacks for Perry 1 and 2.

(4) Review of Lamco's purchase orders issued for the procurement of steel plate material for Catawba 1 and 2 (Job Order No. 6817) as follows:

(a) P. O. no. 015383-6817, dated 6/1/76 to Armco Steel Corporation for plates with nomical thickness of ½"; 3/4"; 1"; 2" and 2½". The PO specified that the material was to conform to ASME 1971 edition through the 1973 Winter Addenda, Section II; SA 516, -Grade 70, Class MC. All materials with a nominal thickness of 3/4" and greater were to be Charpy Impact Tested at -30°F per NE-2320, Acceptance Standard to be an average of 20 foot-pounds.

(1) Review of Armco's CMTR for the following heat numbers.

(a) Heat numbers 77175; 75462; 81782; and 91808 - for ½" plates.

(b) Heat number 77175 for 1¼" plates;

(c) Heat number 67297 for 1" and 1¼" plates;

(d) Heat number 67291 for 3/4" plates; and

(e) Heat number 67295 for 2" plates.

It was verified that the foregoing CMTR certified that the materials conformed to SA 516, grd 70, Class MC, pressure vessel quality (PVQ). The melt and slab numbers, chemistry, physical properties, were recorded and had been verified by Lamco as conforming with the purchase order. For materials 3/4 inch thick and greater, the results of the Charpy Impact tests level of 20 ft.-lbs. Also it was certified that material with a nominal thickness of 3/4" and greater had been normalized at 1650°F for 25 to 31 minutes and stress relieved at 1100° minimum for 2½ hours, the heating and cooling rates above 600°F did not exceed 160°F/Hr.

(b) Review of PO number's 020690-6817, and 011394-6817, both dated 8/24/76, and both issued to Kaiser Steel for ½" and ¼" plate respectively. The PO specified that the material was to conform to the 1971 edition through the 1973 Winter Addenda of the ASME code for type SA 516 - grade 70, class MC, plate material.

(1) Review of the Kaiser Steel CMTR's for heat no. 44014, dated 9-20-76; and heat number 13437, dated 9-30-76, to ascertain whether the ½ inch

and ¼ inch plate material conformed to the chemistry and physical properties, specified for SA 516-grd to steel plate, and whether the heat and slab numbers were recorded. Also to verify that the CMTR had been verified and found acceptable by Lamco and the ANI.

(5) Review of Lamco's P.O. no. 015003-5848 dated 6/22/76, to US Steel for plate material for the personnel locks manufactured for Perry 1 and 2 (Job Order no. 5848), and to be delivered to Newport News Industries. The P.O. specified that the material was to conform to the 1974 Edition and 1974 Summer Edition of the ASME code for SA 516, grd 70-PVQ.

(a) Review of the US Steel CMTR for heat numbers 1G4990; 2G0384; to verify that the chemical and physical properties of the plates supplied conformed to those specified for SA 516 grd-70. It was also verified that the steel had been normalized at 1660°F for 25-31 minutes and stress relieved at 100°F for 2½ hours. The charpy impact test results were recorded and found to be in excess of the minimum average of 20 ft.- lbs. at -30°F. The grain size #8-8 was recorded for both heats.

(6) Review of the pertinent sub articles of Subsection NE, Class MC, of the ASME Codes - 1971 Edition through 1973 Winter Addenda and the 1974 Edition and the 1974 Summer Addenda, to ascertain the code requirements concerning the fracture toughness tests of pressure retaining materials.

(7) Review of the list compiled by the Vendor to determine the heat number(s) of the materials used in the pressure retaining parts of the personnel locks manufactured for both Catawba 1 and 2, and Perry 1 and 2, which had not been Impact tested or normalized incompliance with Code.

(8) Discussions with cognizant personnel including the ANI who had identified the noncompliance.

d. Findings

(1) The vendor explained that the nonconformance occured, not becuase of a breakdown in its QA program, but because of

but because of misinterpretation of the code requirements by the Lamco Engineering and QA staff, and also by its customer, the then ANI, and the owners. All of whom overlooked the requirement established in the 1973 Winter Addenda at NE 2121, (b).

(a) It was verified that Lamco's QA program provides for purchase order to be checked to verify that all contract and code requirements are included, prior to their issuance.

(2) The proposed corrective action proposed by the vendor is to cut test coupons from the heat(s) of material available in the shop, and cut coupons from the personnel lock for those heats of material not in the shop and perform Charpy Impact Tests at 0°, and upon acceptable results, change the Design Specification to establish the lowest service metal temperature as being $+30^{\circ}F$.

(a) It was verified that the initial Design Specification established the lowest service temperature to be $+30^{\circ}F$ and NE 2322.4 1974 Edition permits the impact test temperature, to be $30^{\circ}F$ below the lowest service metal temperature, or $-0^{\circ}F$.

(b) The corrective action request has been made of W. J. Woolley, and properly documented on Corrective Action Request no. 1066-14, dated 1-4-80. It will be necessary for W. J. Woolley to obtain concurrence from Duke Power re: the Catawba 1 and 2 personnel locks.

(c) Plate material for those heats used in the Perry 1 and 2 personnel locks were available in the vendor's shop and Charpy Impact tests were made and the minimum acceptance level of 20 ft.-lbs. was achieved at $0^{\circ}F$. The W. J. Woolley Company will have to obtain a change in the Cleveland Electric Illumination Company. Design Specification to establish the lowest service metal temperature as being $30^{\circ}F$.

(d) The performance of acceptable Charpy Impact Tests will bring pressure retaining materials in compliance with code.

(e) The corrective action request also includes a request for Duke Power to establish the criteria required to facilities Code compliance in the rework, repair, over pressure tests of the area(s) in the pressure boundry from which the test samples are removed.

(3) To prevent recurrence of a similiar noncompliance, purchasing has been instructed to require all steel for Class MC code work that is less than 5/8 in thick to be normalized, fully killed, and fine grained. Materials 5/8 inch and greater require Charpy Impact tests.

(4) The vendor explained that this noncompliance was not generic to any facilities other than Catawba and Perry, because the personnel locks for Catawba were the first completed and all 4 were shipped. Of the 4 for Perry, three had been shipped and one was still in the shop. The materials for other contracts in-house for personnel locks, has not yet been purchased.

(5) The vendor stated that it does not have the expertise to evaluate the safety-significance of this noncompliance, and does not know whether W. J. Woolley, or the owners of the personnel locks, have made such an evaluation in compliance with 10 CFR 21.